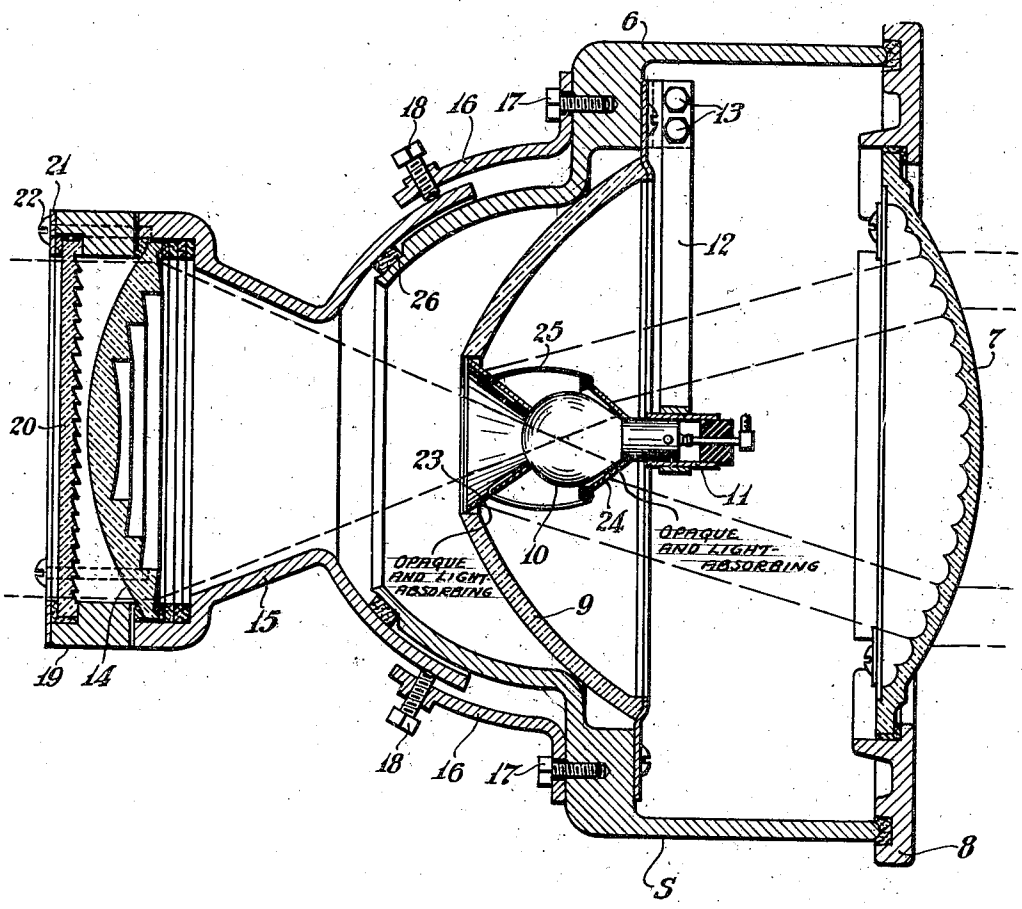
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LIGHT SIGNAL

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LIGHT SIGNAL

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Our invention relates to light signals, and has particular reference to the provision in such signals of means for preventing false or phantom indications.

An object of our invention is the provision, in light signals of the class having at least two optical systems each of which is caused to display an indication in response to light rays originating at a common source, of novel and improved means effective to prevent light rays entering a signal from a foreign external source through one optical system from causing the other optical system to display a false or phantom indication.

Other objects and advantages of our invention will appear as the description progresses.

We shall describe one form of apparatus embodying our invention, and shall then point out the novel features thereof in claims.

The accompanying drawing is a view partially diagrammatic and partially sectional, showing a light signal provided with a preferred form of apparatus embodying our invention.

Referring to the drawing, the reference character S designates as a whole a light signal provided with two optical systems each of which projects a beam of light from a common source, herein shown as an electric lamp 10. The lamp 10 is provided with an opaque base which is mounted in a socket 11, which in turn is mounted within an opaque housing 6 by means of a supporting member 12 secured to the housing 6 by cap screws 13. Also supported within housing 6 is a reflector 9 preferably of the paraboloid type, so proportioned that its focal point is located at the filament of lamp 10.

The reflector 9 is adapted to project light rays originating at lamp 10, through a first lens or cover glass 7 mounted in an opening provided in a hinged door 8 which provides convenient access to the interior of the housing. The reflector 9 also is provided with an opening in its center portion, the function of which will be explained shortly.

As shown, housing 6 is provided on its side opposite door 8, with an integral extension upon which an auxiliary housing 15 is mounted by means of brackets 16. These brackets are each secured at one end by a cap screw 17 to housing 6, and are each provided at their other end with a tap bolt 18 threaded through an opening provided in the bracket into engagement with housing 15, thereby forcing that housing into engagement with housing 6 to thereby secure the two housings together. As shown, a gasket 26 preferably is interposed between the housings 15 and 6 to effect a weatherproof seal.

A second lens 14, preferably of the echelon type having its focal point coincident with the focal point of reflector 9, is mounted in an opening provided in the outer portion of auxiliary housing 15. A deflecting lens or cover glass 20 having prismatic projections also is mounted in the opening of housing 15 outside lens 14, the lenses 14 and 20 being held in such opening by means of lens rings 19 and 21 secured to housing 15 by screws 22.

With signal S constructed in the manner just described, it is readily apparent that when lamp 10 is illuminated, reflector 9 projects a beam of light from the lamp through lens 7 to thereby cause the first lens of signal S to display an indication in response to light rays originating at lamp 10. It is further apparent that a suitable portion of the light rays originating at lamp 10 are permitted to pass through the opening provided in reflector 9, to thereby cause lens 14 to project a beam of light, whereby the second lens of signal S is caused to display an indication in response to light rays originating at lamp 10. It follows, therefore, that each lens 7 and 14 is caused to display an indication in response to light rays originating at the common source. In this connection, it should be pointed out that the construction so far described for signal S is substantially that of well-known highway crossing signals of the class capable of displaying two indications from a common light source, one indication of which is a main or front indication and the other indication of which is a backlight indication. Such signals commonly are employed at railway-highway intersections for warning highway users of the approach of trains to the intersection.

In accordance with an object of our invention, we provide signal S with novel and improved means embodying our invention for preventing light rays from shining through signal S to thereby cause phantom indications to be displayed by that signal. As can readily be seen from an inspection of the drawing, one such phantom indication might be caused by light rays (indicated in the drawing as long dash lines) entering signal S through lens 7 from a foreign external source and transmitted by that lens in such manner as to illuminate the other lens 14. Similarly, another phantom indication might be caused by light rays (indicated in the drawing as short dash lines) which enter signal S from a foreign external source through lens 14, and

which are transmitted through the signal in such manner as to illuminate lens 7.

In order to prevent the above mentioned phantom indications, we provide signal S with opaque screens so proportioned and arranged as to cooperate with the opaque base of lamp 10 to intercept all light rays entering signal S through either of its lenses and transmitted by that lens in such manner as to illuminate the other lens. Preferably, the screens are further so proportioned that no interference is effected with light rays originating at lamp 10 and emitted therefrom in the directions to illuminate lens 14 and reflector 9, so that such screens do not affect the optical efficiency of the signal.

We have found that the above mentioned features can best be obtained by providing signal S with two opaque truncated conical screens 23 and 24, one of which is interposed between lamp 10 and one lens 7, and the other of which is interposed between lamp 10 and the other lens 14. These screens 23 and 24 may be formed of any suitable material, but we prefer to form such screens from thin copper sheets first drawn into the required conical shapes, then oxidized and lacquered black.

To effect the aforementioned features, the screens 23 and 24 may be supported and positioned in signal S by any suitable means. However, as shown, we prefer to position and support the screens in signal S by mounting them on the lamp. In mounting the screens on lamp 10, the lamp is first inserted into one screen 24 so that the smaller end of the screen is engaged by the base of the lamp, and its larger end extends outwardly from the base toward the filament. The other screen 23 may then be positioned with its smaller end engaging the envelope of the lamp 10, and its larger end extending outwardly and away from the filament. The screens then may be detachably secured to lamp 10 by means of spring clips 25 which engage openings provided in each of the screens, thereby permitting the screens to be readily assembled upon or detached from the lamp.

When lamp 10 has been provided with screens 23 and 24 in the manner described, the screens and lamp may be positioned in signal S by inserting the lamp into its socket 11. When this is done, screens 23 and 24 then present substantially parallel surfaces which extend outwardly from the lamp toward the reflector 9. Screen 23, which is interposed between lamp 10 and lens 14, extends from the envelope of the lamp into the opening of reflector 9 to engage the sidewalls of such opening, and is proportioned to lie within the surface defined by lines drawn from the filament of lamp 10 tangent to the opening of the reflector. It follows, therefore, that no interference is effected by screen 23 with light emitted from lamp 10 in the directions to illuminate lens 14 and reflector 9. The other screen 24 is interposed between lamp 10 and lens 7, and is proportioned to be out of the path of light rays projected by reflector 9 to lens 7. The screens 23 and 24 are further proportioned so that any line drawn tangent to the smaller end of screen 23 and the larger end of screen 24 will, when extended, fall upon housings 6 and 15. It follows, therefore, that no optical paths can be established through the opening of reflector 9 from either lens to the other.

From the foregoing, it is readily apparent that with signal S constructed in the manner described and provided with means embodying our invention, the reflector 9, screens 23 and 24, and the lamp base are interposed between the two lenses 7 and 14 in such manner that no light rays can be transmitted from one lens to the other since all straight line or optical paths between the two lenses are interrupted by one or more of the above mentioned elements. It is further apparent that, since screens 23 and 24 as pointed out heretofore are disposed out of the path of light rays emitted from lamp 10 in the directions to illuminate lens 14 and reflector 9, the optical efficiency of signal S remains substantially unaffected. It follows, therefore, that light rays from a foreign external source cannot enter signal S through either of its lenses and be transmitted by that lens through the signal to cause the other lens to display a phantom indication.

Although we have herein shown and described only one form of apparatus embodying our invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of our invention.

Having thus described our invention, what we claim is:

1. In a light signal, in combination, a housing having two opposed aligned openings, a first lens mounted in one opening of said housing, an electric lamp having its filament positioned on the axis of said openings at the focal point of said lens for projecting a beam of light for said signal through said first lens, a second lens mounted in the other opening of said housing, a reflector for projecting light from said lamp to said second lens and having a focal point coincident with said first mentioned focal point and an opening through which light from said lamp passes to said first lens, and two opaque screens mounted adjacent said source to intercept light rays entering the signal through either lens in any direction to pass through the opening in the reflector to illuminate the other lens, said screens being so proportioned and disposed as to be out of the path of light rays originating at said lamp and emitted therefrom in the direction to impinge upon said first lens or said reflector.

2. In a light signal, in combination, a housing having two opposed aligned openings, two lenses one disposed in each opening of said housing, an electric lamp having its filament positioned on the axis of said openings at the focal point of a first of said lenses, a reflector for projecting light from said filament to the second of said lenses having a focal point coincident with said first mentioned focal point and an opening through which light from said filament passes to said first lens, and two opaque screens supported by said lamp effective to intercept light rays entering the signal through either lens at any angle with the axis of the openings in said housing such as to pass through the opening in said reflector to illuminate the other lens.

3. In a light signal comprising a housing having two opposed aligned openings, a single source of light positioned in said housing in alignment with said openings, and a reflector positioned intermediate said source and one of said housing openings for projecting light from said source through the other housing opening and having in axial alignment with said housing openings an opening through which light passes from said source to said one housing opening, the combination with such signal of a first opaque screen extending between said source and said reflector and disposed out of the path of light from said

source to said reflector or said one housing opening, and a second opaque screen interposed between said source and said other housing opening and disposed out of the path of light projected from said reflector to said other housing opening; said reflector and screens being arranged to intercept light entering either of said housing openings in a direction such as to pass through the other housing opening, whereby to prevent false indications due to light shining through the signal and maintain substantially unimpaired the transmission of light from said source through each housing opening.

4. In a light signal comprising a housing having two opposed aligned openings each provided with a lens, a single source of light having an opaque base and disposed at the focal point of one of said lenses, and a reflector for projecting light from said source to the other of said lenses and having a focal point coincident with said first-mentional focal point and an opening through which light from said lamp passes to said one lens, the combination of a first opaque truncated conical screen extending from said lamp to the opening in said reflector and disposed out of the path of light rays originating at said lamp and emitted therefrom in such direction as to impinge upon said one lens or said reflector, and a second opaque truncated conical screen interposed between said source of light and said other lens and disposed out of the path of light rays projected from said reflector to said other lens; said reflector, screens and opaque light source base being so ararnged as to prevent transmission of light from either lens to the other, whereby to prevent false signals due to light from an external foreign source shining through said housing while maintaining substantially unimpaired the optical efficiency of said signal.

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