Oct. 7, 1958 J. A. HOLMAN 2,855,500

GLARE FILTER FOR HEAD LAMP

Filed July 9, 1954 2 Sheets-Sheet 1

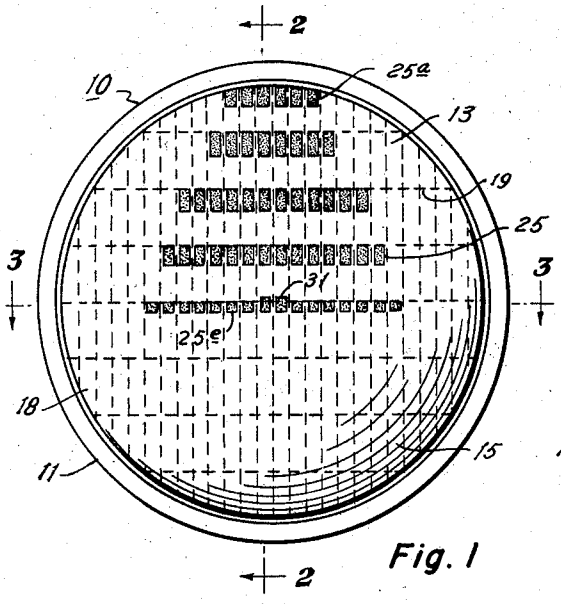


Fig. 1

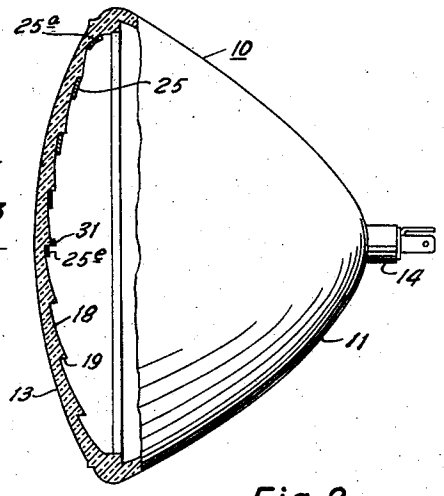


Fig. 2

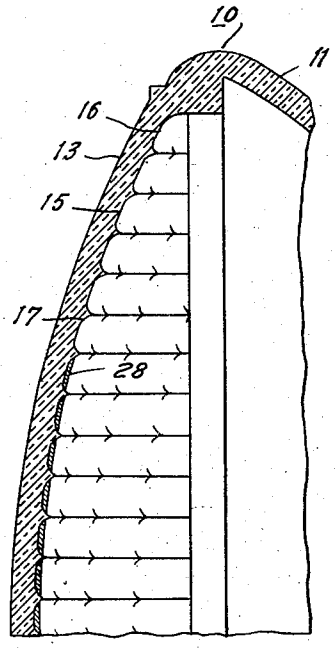


Fig. 3

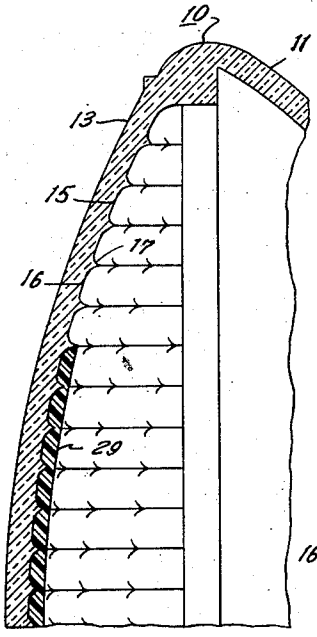


Fig. 4

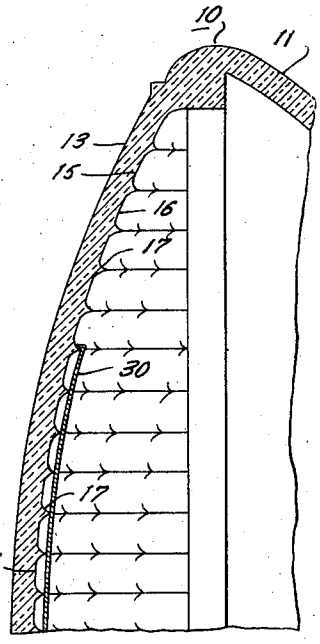


Fig. 5

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GLARE FILTER FOR HEAD LAMP

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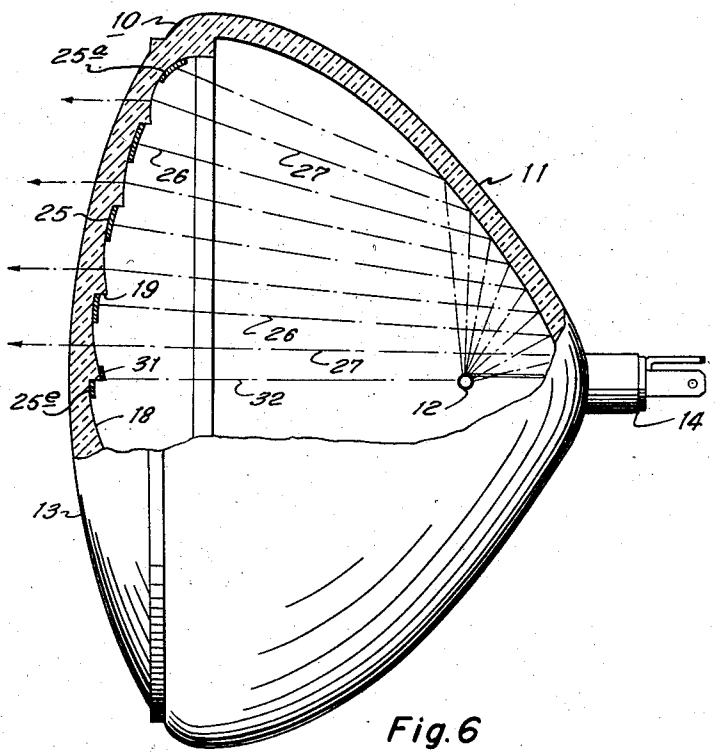


Fig. 6

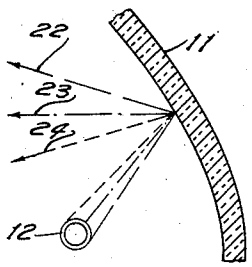


Fig. 8

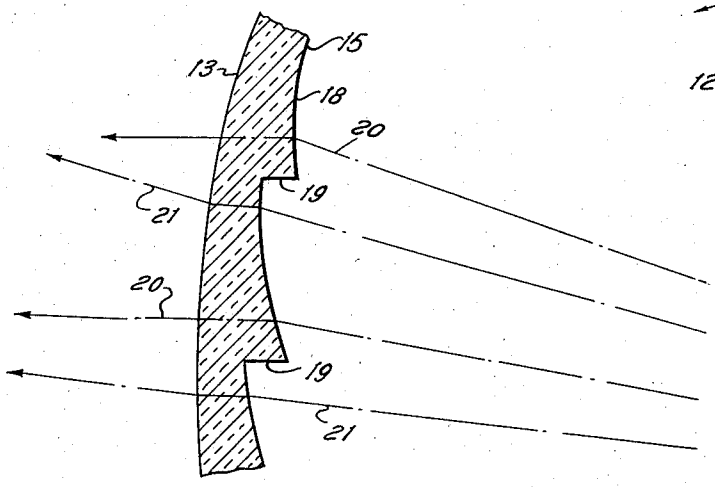


Fig. 7

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United States Patent Office 2,855,500 Patented Oct. 7, 1958

2,855,500

GLARE FILTER FOR HEAD LAMP

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Application July 9, 1954, Serial No. 442,361

3 Claims. (Cl. 240—46.45)

This invention relates to new and useful improvements in anti-glare means for automobile head lamps.

A conventional head lamp includes a light source or filament, a concave reflector and a coacting lens, with the filament being contained by a removable lamp bulb or being prefocused and fixed directly within the reflector and with the lens being removably attached or permanently sealed to said reflector to provide a so-called "sealed beam" lamp. Usually, the reflector is of the parabolic type for directively reflecting the light rays emitted by the filament in a concentrated beam, while the lens is of the diffusing type having a plurality of upright substantially parallel major prisms or flutes for refracting the rays of the beam horizontally so as to spread said beam laterally or transversely. Each upright prism or flute is divided into small sections or minor prisms for bending or refracting the rays of the beam downwardly and the minor prisms are arranged in substantially parallel, transverse rows and may be asymmetrical. As a result, the beam is of a width much greater than its height and is primarily confined within a plane parallel to the horizontal axis of the lamp.

Although the lens prisms are designed to coact with the reflector and filament in providing a beam of parallel light rays, the coaction is not perfect because of the multiplicity of light rays emitted by the filament in spaced relation to the true focal point. A large portion of the light rays are directed or reflected upwardly above the horizontal plane of the beam and cannot be refracted downwardly to a sufficient extent by the minor down-bending prisms. It is these uncontrolled rays which cause upward blinding glare and which strike the eyes of drivers of approaching automobiles as well as rear view mirrors of automobiles immediately in front of the head lamps.

It has been found that the objectionable or upwardly-directed rays pass through the upper portions of the minor prisms at and above the horizontal axis of the lamp and, being relatively thin and having little refraction properties, said upper portions cannot bend said rays downwardly to the horizontal plane of the beam. Also, it has been found that the minor prisms at the upper, central portion of the lens cause substantially all of the glare and that the light rays passing through the lower prisms are confined within or directed below the horizontal plane of the beam, while the laterally-disposed prisms direct the rays laterally and there are fewer rays passing through said laterally-disposed prism. Therefore, the objectionable glare of an automobile head lamp may be substantially eliminated by filtering or otherwise obscuring the light rays passing through the upper and/or relatively thin portions of the minor prisms in the upper, central portion of the lens.

One object of the invention is to provide improved anti-glare means for automobile head lamps and other lamps having diffusing lenses whereby substantially all of the light rays are confined to the light beams of the lamps.

Another object of the invention is to provide improved means for substantially eliminating the glare of automobile head lamps without impairing the efficiency of the lamps or creating excessive heat which might cause failure of the light source or changing the construction of said lamps, their adjustment or operation.

A particular object of the invention is to provide improved means for materially reducing the glare of head lamps whereby it is unnecessary to "dim" or depress the light beam for passing approaching automobiles and whereby the head lamps are more efficient in fog, rain, sleet, snow and dust conditions.

An important object of the invention is to provide improved means for substantially eliminating the glare of automobile head lamps having diffusing lenses by obscuring the upper or relatively thin portions of the minor down-bending prisms in the upper, central portions of the diffusing lenses whereby the light beams of the lamps contain a maximum of useful rays due to the small percentage of rays obscured.

A further object of the invention is to provide improved anti-glare means, of the character described, wherein the objectionable rays may be eliminated by merely obscuring the valleys of the upright flutes or prisms of the diffusing lenses and wherein said objectionable rays may be obscured by filtering or light-retarding means, such as colored glass, plastic, paint, vitrous or metallic material, or by refracting prisms.

Another object of the invention is to provide improved anti-glare means, of the character described, which is capable of being used in any lamp having a diffusing lens of the type formed with substantially parallel prisms or flutes for spreading the light rays transversely of the flutes and divided into minor light-bending prisms for refracting said rays longitudinally of said flutes.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawings, wherein examples of the invention are shown, and wherein:

Fig. 1 is an elevational view of a head lamp having a lens provided with anti-glare means in accordance with the invention,

Fig. 2 is a side elevational view of the lamp with the lens in transverse, vertical section and taken on the line 2—2 of Fig. 1,

Fig. 3 is an enlarged, horizontal, cross-sectional view, taken on the line 3—3 of Fig. 1, and showing one-half of the lens,

Fig. 4 is a view, similar to Fig. 3, showing a modified form of the invention,

Fig. 5 is a view, similar to Fig. 4, of another modification,

Fig. 6 is an enlarged, side elevational view, partly in section, of the lamp and showing the function of the anti-glare means,

Fig. 7 is an enlarged, transverse, vertical sectional view of a portion of a conventional lens without the anti-glare means, and

Fig. 8 is an enlarged, transverse, vertical sectional view of a typical filament and a portion of a parabolic reflector.

In the drawings, the numeral **10** designates an automobile head lamp which includes a reflector **11**, a light source or filament **12** and a lens **13**. Preferably, the lamp is of the so-called "sealed beam" type wherein the rims of the reflector and lens are integrally sealed together with the filament contained by or mounted between said reflector and lens and a terminal **14** projects rearwardly from the axial portion of said reflector. Although not shown, it is pointed out the invention is applicable to a

lamp having a separable lens and reflector with the filament mounted in a removable bulb. The reflector **11** is of the parabolic type for reflecting the light rays emitted by the filament **12** in a concentrated beam of substantially parallel rays, while the lens **13** is of the diffusing type having a plurality of upright major prisms or flutes **15** formed in its inner surface for spreading the rays laterally or transversely of the horizontal axis of the lamp.

Usually, the major prisms are substantially parallel, vertical and equally-spaced and the resulting beam is of generally oval shape of greater width than height. Each prism **15** is substantially concave in transverse, cross-section and includes a longitudinal groove or valley **16** with marginal ridges **17** between adjacent prisms (Figs. 3–5). For bending the rays downwardly, each major prism is divided into a plurality of small sections or minor down-bending prisms **18** which are arranged in substantially parallel, transverse rows (Figs. 1, 2, 6 and 7). Ordinarily and necessarily, the minor prisms decrease in thickness upwardly so as to provide downwardly-facing, transverse risers or horizontal shoulders **19** between adjacent minor prisms. The foregoing construction is more or less conventional and in itself forms no part of the present invention.

As shown by the broken lines **20** in Fig. 7, the light rays passing through the lower or relatively thick portions of the prisms **18** are refracted or bent downwardly. Since the upper or relatively thin portions of the prisms have little refracting properties, the light rays passing therethrough are not refracted but are merely deflected and are transmitted in substantially parallel relation to their paths of incidence as indicated by the broken lines **21**. As a result, if the incident rays are directed upwardly, as shown in Fig. 7, the transmitted rays are directed upwardly and are not bent downwardly into parallel relation to the horizontal axis of the lamp so as to be confined to the horizontal plane of the beam. Although the reflector **11** is adapted to reflect the rays in a concentrated beam, the very size of the filament **12** prevents the obtaining of perfect results. As shown by the broken lines **22**, **23** and **24** in Fig. 8, every point on the reflector receives light rays from a multiplicity of points on the filament and said rays have an angular, non-parallel relationship. Manifestly, all of these rays do not emanate from the true focal point and cannot be accurately controlled by the reflector. In addition, there are a large number of rays emitted forwardly by the filament directly through the lens and some of these rays are directed upwardly and pass through the upper or relatively-thin portions of the prisms **18**.

Since it is impossible to refract or otherwise control these upwardly-directed light rays by a lens of conventional construction, anti-glare means has been provided for the upper or relatively-thin portions of the minor prisms so as to obscure said rays. As shown by the numeral **25** in Figs. 1, 2 and 6, the anti-glare means is required only at the upper, central portion of the lens **13** because the rays passing through the lower and laterally-disposed minor prisms are less intense or fewer in quantity and/or are confined within or directed below or laterally of the horizontal plane of the beam. Also, the anti-glare means is of upwardly-decreasing length transversely of the lens, whereby the uppermost means **25*a*** is of least length and the lowermost means **25*e*** is of greatest length (Fig. 1). Since the lowermost anti-glare means is disposed at substantially the horizontal axis of the lamp, said means may be relatively narrow or of less height than the other anti-glare means. The anti-glare means is adapted to obscure or obstruct the light rays passing through the upper or relatively-thin portions of the minor prisms **18** as shown by the broken lines **26** in Fig. 6 without interfering with the passage of rays **27** through the lower or relatively thick portions of said prisms.

Although the anti-glare means may be formed of opaque or light obstructing material, such as paint, vitrous or metallic material, said means may be translucent so as to merely filter or retard the objectionable rays. The filtering or light-retarding means may be in the nature of pigmentation, colored glass or plastic or refracting prisms. Preferably, the anti-glare means is applied to the inner surface of the lens so as to retain the continuity of its external contour, but may be formed in or made integral with said lens. Although satisfactory results may be obtained by supplementary prisms, it is more economical to filter or otherwise obscure the rays. As shown by the numeral **28** in Fig. 3, the anti-glare means need be applied only to the valleys **16** of the upright flutes **15** since the ridges **17** refract the rays laterally. The numeral **28** also indicates that the anti-glare means is in the nature of paint or other suitable material applied directly to or forming a part of said lens. For ease of application, the anti-glare means for each transverse row of minor prism portions may be continuous and cover the ridges as well as the valleys as shown by the numeral **29** in Fig. 4, such as strips of colored glass or plastic or other filtering or translucent material. In Fig. 5, the anti-glare means is shown in the form of a strip **30** of metal or other opaque or light obstructing means suitably attached to the lens in overlying relation to the valleys and ridges of the upper or relatively-thin portions of the minor prisms. Irrespective of its form, the anti-glare means is disposed in spaced, transverse rows conforming to the transverse rows of minor prisms and the spacing between the upper or relatively-thin portions of said prism rows.

If desired, the filament **12** may be shielded from direct view by the driver of an approaching automobile by means **31** overlying the lower or relatively thick portions of the lowermost anti-glare means (Figs. 1, 2 and 6). The means **31** may be formed of the same material as the anti-glare means and may have little height so long as it filters or otherwise obscures the direct, axial rays of the filament indicated by the numeral **32** in Fig. 6.

From the foregoing, it is readily apparent that novel means has been provided for substantially eliminating the objectionable glare of automobile head lamps without impairing the efficiency of the lamps or creating excessive heat which might result in premature failure of the filament. The vast majority of the light rays are utilized due to the relatively-small area of the anti-glare means which only obscures the objectionable rays. Although filtering or translucent means is preferred due to less interference with heat transfer, it is possible to employ metal or other opaque or light-obstructing material. It has been found that it is unnecessary to "dim" or depress the beam for passing approaching automobiles and that the lamps are more efficient in fog, rain, sleet, snow and dust conditions since there are no appreciable quantities of rays directed upwardly above the horirzontal plane of said beam. Another advantage resides in the fact that the application and use of the invention does not alter the construction, operation or adjustment of the lamps. It is noted that the invention is applicable to lamps other than but similar to head lamps.

The foregoing description of the invention is explanatory thereof and various changes in the size, shape and materials, as well as in the details of the illustrated construction may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A head lamp having a lens provided with a plurality of transversely extending rows of prisms on its inner surface, said prisms being also arranged in vertical parallel rows, each of said prisms having a relatively thick base and a relatively thin upper portion, and anti-glare means obscuring glare from the upper section of the lens, said last named means comprising a plurality of light obstructing elements, said elements being disposed in verti-

cally spaced transversely extending rows conforming to the vertically spaced transversely extending rows of prisms and to the spacing between the thin upper portions of said prism rows, said elements overlying in transverse rows said upper portions of the prisms at the top half of the lens and such transverse rows increasing in height from the middle of the lens to the top of the lens.

2. A head lamp having a lens provided with a plurality of transversely extending rows of prisms on its inner surface, said prisms being also arranged in vertical parallel rows, each of said prisms having a relatively thick base and a relatively thin upper portion, and anti-glare means obscuring glare from the inner and top part of the upper section of the lens and passing unobscured light from the peripheral sides of the upper section of the lens, said last named means comprising a plurality of light obstructing elements, said elements being disposed in vertically spaced transversely extending rows conforming to the vertically spaced transversely extending rows of prisms and to the spacing between the thin upper portions of said prism rows, said elements overlying in transverse rows said upper portions of the prisms at the top half of the lens and such transverse rows increasing in length from the top of the lens down to the middle of the lens and increasing in height from the middle of the lens to the top of the lens.

3. A head lamp having a lens provided with a plurality of transversely extending rows of prisms on its inner surface, said prisms being also arranged in vertical parallel rows, each of said prisms having a relatively thick base and a relatively thin upper portion, and anti-glare means obscuring glare from the inner and top part of the upper section of the lens and passing unobscured light from the peripheral sides of the upper section of the lens, said last named means comprising a plurality of light obstructing elements, said elements being disposed in vertically spaced transversely extending rows conforming to the vertically spaced transversely extending rows of prisms and to the spacing between the thin upper portions of said prism rows, said elements overlying in transverse rows said upper portions of the prisms at the top half of the lens and such transverse rows increasing in length from the top of the lens down to the middle of the lens and increasing in height from the middle of the lens to the top of the lens while terminating in spaced relation with the margins of said lens.

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