Jan. 6, 1925. 1,522,252

O. G. LUYTIES

HEADLIGHT

Original Filed May 22, 1915

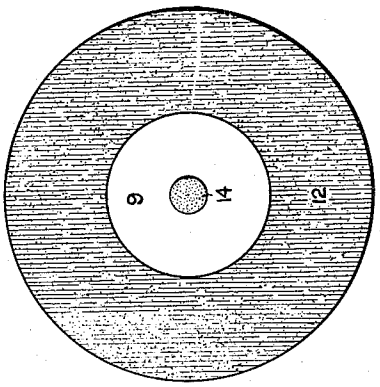

FIG. 2

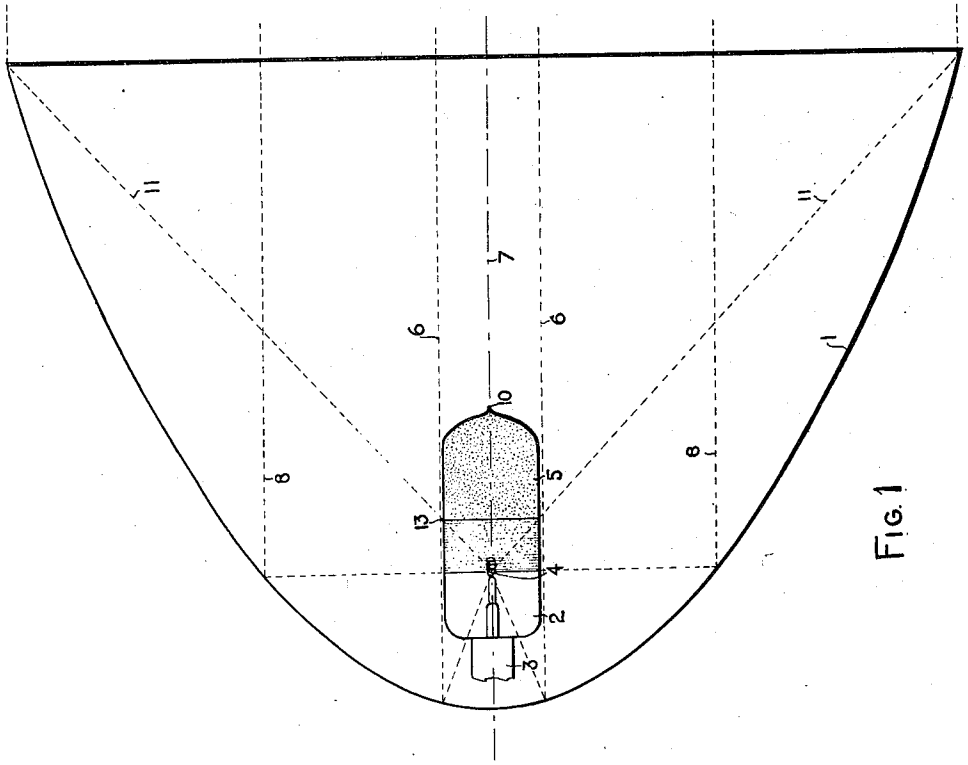

FIG. 1

WITNESSES:

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UNITED STATES PATENT OFFICE.

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HEADLIGHT.

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To all whom it may concern:

Be it known that I, OTTO G. LUYTIES, a citizen of the United States, and residing at Mount Vernon, in the county of Westchester and State of New York, have invented a new and Improved Headlight, of which the following specification is a full disclosure.

This invention relates to vehicle headlights. One of the objects thereof is to provide a simple and inexpensive light projecting device of highly efficient action. Another object is to provide a practical and effective light adapted to throw an illumination having certain desirable characteristics especially suiting it for use as a vehicle headlight. A more specific object is to provide a vehicle headlight of simple construction and efficient action in which a powerful illumination is achieved without a dazzling or blinding effect upon the eye.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the structure hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is shown one of various possible embodiments of this invention, Fig. 1 is a diagrammatic sectional view of the same. Fig. 2 is a front elevation on a smaller scale.

Similar reference characters refer to similar parts throughout both views of the drawing.

Referring now to Fig. 1 of the drawing, there is indicated at 1 a parallel-ray reflector, in this case a reflector of the parabolic form, although the above term is used to comprehend equivalent devices such as Mangin mirrors.

Mounted in this reflector in any suitable manner so as to receive electric current, is a lamp bulb 2 having the plug portion 3 by which it is supported. The filament of this bulb is indicated at 4 and is concentrated or brought within a small compass in order to give, in so far as is practicable, point illumination. This filament is positioned substantially at the focus of the reflector 1 and hence the rays emitted therefrom are reflected in substantially parallel relation.

The glass portion 5 of the bulb 2 is elongated in a direction axial to the reflector, as shown, and is preferably substantially cylindrical in shaps. In this manner a sufficient heat radiating surface for a given filament is gained and a sufficient volume within the bulb attained to admit of a proper vacuum and yet the greatest cross-section transverse to the axis of the reflector is held to a minimum. To render this matter and the advantages of this construction more clear, it may be noted that with a given illuminating power with a given type of light, there is a minimum to which the heat radiating surface can be reduced. Also, in the practicable methods to producing a vacuum in electric light apparatus, it is desirable that the bulb have a considerable volume in order that the residual fluid therein be small relative to its cubic contents. These requirements are fulfilled in the above construction, and yet, by elongating the bulb in a direction parallel to the reflected light rays, the area of the reflector obscured by the bulb is reduced to a minimum and a proportion of its light rays of greatest intensity are given unobstructed reflection, as for example the ray indicated at 6, instead of being forced through two thicknesses of glass with attendant losses, as would be the case if the bulb were spherical and of the same cubic contents. The bulb, moreover, is preferably reduced in cross-section with respect to the maximum cross-section of a bulb of the ordinary form in general use of the same candle-power and type. It may also be noted that the filament is preferably wound in a spiral with its axis substantially coincident with the axis of the reflector, as in this way the optical efficiency of the device is increased.

Considering, now, the construction of this bulb more in detail, it may be noted that it is given clear transparent form substantially up to the plane passing through the filament transversely to the axis 7 of the reflector. In this manner, the entire illumination in the annular space between rays such as 6 and 8, which comprises nearly half of the light emitted by the filament 4, is strongly reflected in a clear beam as indicated by the area 9 in Fig. 2 of the drawing. The bulb surface from the transverse plane through the filament up to the tip 10 is preferably frosted and hence the light reflected between the rays 8 and 11 is softened and diffused and irregularly reflected, and hence forms an annular beam as indicated at 12 in Fig.

2 of the drawing, of far less intensity than the beam 9. As I have found it desirable to secure a light diffusing area as large as is practicable without interfering with other features of this invention, it is desirable that the concentrated filament be located not at the center but about two-thirds of the length of the bulb, or more, from the tip. In this manner the light diffusing surface is increased and its intensity of illumination, and hence blinding effect on dark roads, is reduced. Furthermore, the rays from the source of light fall upon the diffusing surface at the sides of the bulb at a slight angle rather than normally to its surface, and hence the diffusing effect is increased.

The frosted portion of the bulb 2, as far as the line 13, is preferably not only frosted but given a slight color, preferably yellow, which aids in softening its effect upon the eye and renders it better suited to act as an illuminated background for the bright area 9.

In order to render more clear the action of the latter feature, it may be noted that the blue and violet rays of the spectrum are most irritating to the eye. Furthermore, the outer portions of the retina of the eye, although less sensitive than its center, are relatively more sensitive to blue and violet rays, and hence the cutting off of rays of this character from the latter portion of the retina, as for example those radiated outside the point on which the vision is centered, is correspondingly important. I have found that the use of colored light as above set forth is of peculiar value and, furthermore, that a yellow light is best suited to accomplish the objects in view as it not only cuts down the blue and violet rays but has a higher illuminating power than, for example, the light thrown through an amber glass.

The limit 13 of the colored band is determined by the ray 11 passing to the outermost point of the reflector, and it may here be noted that the terms "outer" and "inner" with respect to the reflector, are used in a relative sense to denote distance from the axis 7. The remaining end portion or tip of the bulb is preferably frosted and serves to give a diffused light which aids in illumination of adjacent objects. Its cross-sectional area with respect to the axis 7 is relatively small, as indicated at 14 in Fig. 2 of the drawing, and does not materially cut down the area of the bright reflected beam 9.

The action of the above apparatus will be substantially clear from the description given but it may be noted that the light emitted by the filament is economically used, partially by reason of the shape of the bulb and partially by reason of the fact that a large proportion is projected in substantially parallel form, although the rays are optically so disposed as to cut the objectionable glaring or blinding effect to a minimum. It is also to be noted that by the shape of the diffusing portion surrounding the filament in substantially cylindrical form, a large part of the rays passing radially outward from the filament strike this member at an angle and thus enhance the irregular refracting effect. The translucent portion, by which is meant a portion which transmits light with some impedance of diffusion, is arranged about the bright central beam and thus gives an illuminated background which much reduces the blinding effect of the central beam. In the use of the apparatus, there is thus thrown a far-reaching beam of white light containing the usual percentage of blue and violet rays surrounded by a somewhat diffused beam of yellowish light in which the latter rays are greatly reduced. Due to this, the appearance of the headlight to one looking directly into it is that of a small bright shining surface at and around the center of the rear of the reflector surrounded by a softly lit yellowish annular portion which, as above set forth, reduces the glaring effect. This form of illumination, moreover, is not only easily borne by the eye looking directly into the headlight and effective for the user of the light, but is peculiarly suited for practical use in which passing vehicles or pedestrians are usually at one side of the bright ray when close to the light and hence are exposed only to the yellowish diffused light. It is to be understood, however, that the broader features of this invention are not limited to this coloring effect or to other details of the above illustrative embodiment.

It will thus be seen that there is provided simple and inexpensive apparatus in which the various objects of this invention are achieved and which is well suited to meet the requirements of hard, practical use. It will also be seen that this is achieved without a wasteful dimming effect as by partially opaque bodies, but by an economical handling of the light rays.

As many changes might be made in the above construction, and as many apparently different embodiments might be made of this invention without departing from the scope thereof, it is intended that all features herein described or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having thus revealed this invention, I claim as now and desire to secure the following combinations of elements, or equivalents thereof, by Letters Patent or the United States:—

1. In a vehicle headlight, in combination, a parallel-ray reflector, a source of light, the

inner portion of said reflector being directly exposed to said source of light and adapted to project light therefrom and translucent diffusing means normally interposed between said source of light and an outer zone of said reflector whereby said reflector is adapted to throw a beam of undiffused reflected light surrounded by diffused light.

2. In a vehicle headlight, in combination, a parallel-ray reflecting surface, a source of light substantially at the focus of said surface and adapted to throw a strong beam reflected from said surface, and means adapted to reflect light from said source and emit said light in diffused form and of reduced intensity from an annular area surrounding said beam, said source of light being in the form of a filament of an electric bulb and said means comprising irregularities on the surface of the forward portion of said bulb and extending between said source of light and the outer portions of said reflecting surface.

3. In a vehicle headlight, in combination, a parabolic reflecting surface, a source of light substantially at the focus of said surface and adapted to throw a strong beam of reflected light from the inner portion of said surface, and an annular colored translucent member interposed between the outer annular portion of said reflecting surface and said source of light, whereby there is thrown a strong beam of reflected light surrounded by less penetrating colored light.

4. In a vehicle headlight, in combination, a parallel-ray reflector, and an electric light bulb having a concentrated filament substantially at the focus of said reflector and having its glass materially elongated in cylindrical shape in the direction of axis of said reflector and of relatively reduced maximum diameter in a transverse plane, said bulb being mounted with its rear wall forwardly of said reflector and the reflecting surface in the rear of said wall being exposed to light passing through said wall.

5. In a vehicle headlight, in combination, a curved reflector, a source of light, and yellowish translucent diffusing means interposed between said source of light and an outer portion of said reflector, the inner area of said reflector being exposed to substantially full illumination from said source of light whereby said reflector throws a beam of strong light surrounded by yellowish light of less intensity.

6. In a vehicle headlight, in combination, a parallel-ray reflecting surface, an electric light bulb having a concentrated filament substantially at the focus of said surface and having its glass materially elongated in cylindrical form in the direction of the axis of said reflector and adapted to throw a strong beam of light reflected from said reflecting surface, and means adapted to reflect light from said source and emit said light in diffused form and of reduced intensity from an annular area surrounding said beam.

7. In a vehicle headlight, in combination, a parallel-ray reflector, and an electric light bulb having a concentrated filament substantially at the axis of said reflector and formed as an elongated cylinder lying with its length extending in a direction substantially parallel to that in which the reflector throws its light, the glass of said bulb at its rear portion being substantially clear and having a frosted forward portion extending between said filament and the outer portions of said reflector whereby there is thrown a beam of strong light surrounded by diffused light of less intensity.

In witness whereof, I hereunto subscribe my name, as attested by the two subscribing witnesses.

OTTO G. LUYTIES.

Witnesses:
LEON MINTZ,
R. S. BLAIR.