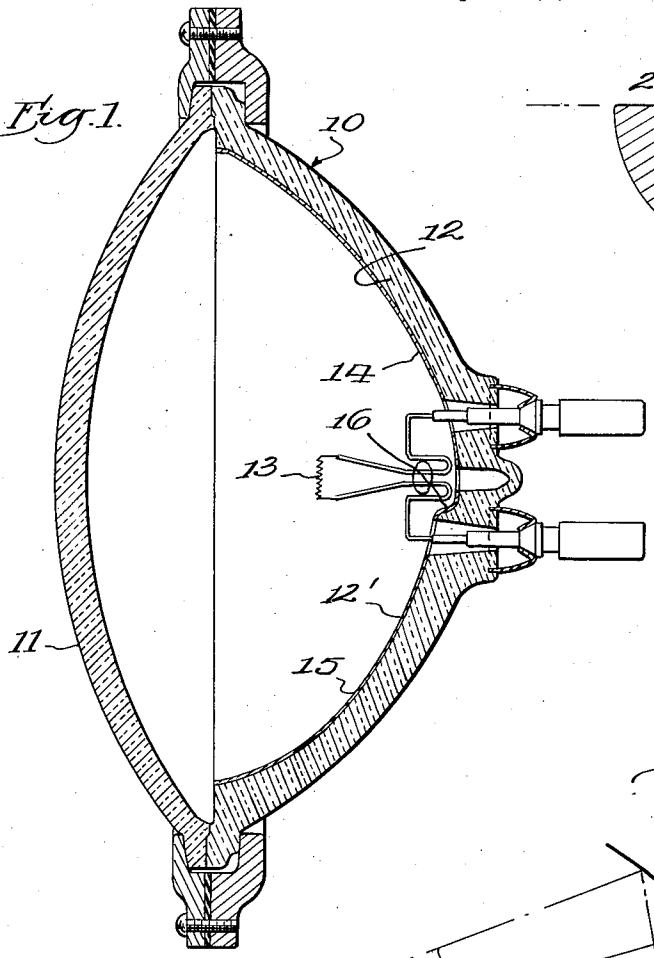
Feb. 27, 1940. M. SCHREIBER 2,191,546

VEHICLE HEAD LAMP

Filed April 1, 1939

Fig. 1.



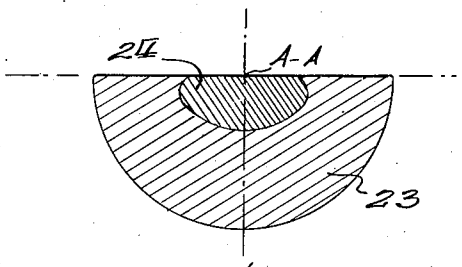
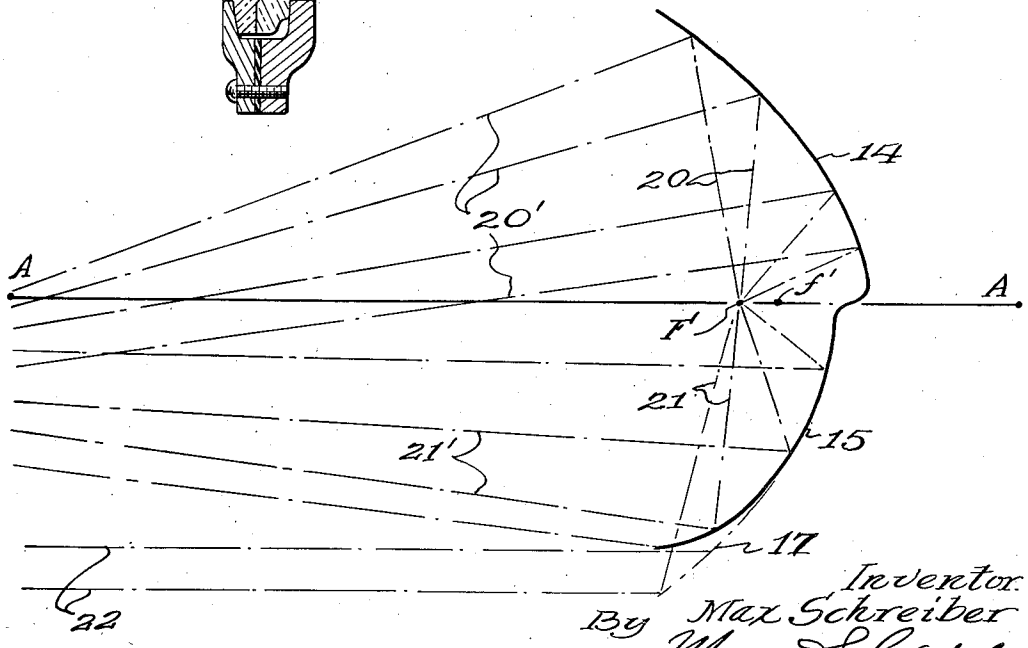


Fig. 3.

Fig. 2.



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VEHICLE HEAD LAMP

Max Schreiber, Chicago, Ill.

Application April 1, 1939, Serial No. 265,426

9 Claims. (Cl. 176—34)

This invention relates to head lamps for vehicles, and has for its main object the provision of a lamp which will consist of an optical system arranged to project a beam or beams of light which will have portions thereof of concentrated brilliance and portions of diffused or widespread illumination, the whole of the beam or beams being free from stray rays and glare.

It is further an object of the present invention to provide a vehicle head lamp, including a filament within an hermetically sealed container or enevelope, the rear portion of said container constituting an optical system internally thereof and the face of said container or envelope comprising a lens, said optical system being related to said filament in such a manner as to project two beams of light out therefrom as rays of said filament, one being a widespread beam and one being a beam concentrated within said first-mentioned beam.

It is a further object of the present invention to provide a device of the character described, which will consist of an hermetically sealed container provided on the face thereof with a lens, the rear wall of said container being provided internally thereof with two independent optical systems and a filament or other luminant in definite optical relation to each of said optical systems respectively.

It is a still further object of the present invention to provide in a device of the character described, a reflector which will consist of two separate and independent optical systems adapted to project two beams of light by reason of a luminant arranged within said reflector in definite relation to said systems, respectively, said reflector being integrally formed of such shape as to provide said optical systems thereon.

The present device has been primarily intended as an improvement over patents 2,148,314 and 2,148,315 issued February 21, 1939 to Daniel K. Wright, assignor to the General Electric Company; therefore, as the description proceeds, portions thereof which relate specifically to these patents will be omitted, except as necessary to describe my invention.

The foregoing and other objects will become more apparent from the description which follows, in which my invention will be set forth in its complete disclosure with regard to construction, arrangement, and combination of parts, the same being illustrated in the accompanying drawing and pointed out more specifically in the claims. It should be apparent that the invention may be changed in form, size, proportion and general configuration without departure from the spirit thereof, thus utilizing all the expressed and implied advantages and features thereof which are obviously inherent thereto.

For the purposes of illustration, I have presented in the drawing a preferred embodiment of my invention, the description and inspection of which will serve to more completely and clearly apprise one of my invention and the modes of construction, assembly and operation thereof, making the same more easily understood and appreciated.

Referring now to the drawing in which characters of reference used in connection with corresponding or similar portions throughout the several figures of the drawing refer to parts in common of the invention

Fig. 1 is a sectional view of the embodiment of my present invention;

Fig. 2 is a diagrammatic view of the optical system of my present invention and the beams of light resulting therefrom;

Fig. 3 is a diagrammatic view of the projection of the combined beams from my new vehicle head lamp upon a screen or wall.

Referring to the constructional details, the reference character 10 designates generally a lamp provided with a lens 11, a reflector 12, and a luminant or filament 13 set into said reflector 12 at the optical center thereof in definite relation to the portions of the reflector as will hereinafter be more fully disclosed. Since it should be apparent that the inner surface of the reflector 12 is coated with silver, aluminum, or similar means designated by 12', the same will be referred to throughout the description as the reflector 12 without mention of the coating 12', the same being obviously necessary to cause said reflector 12 to operate optically.

Said reflector 12 comprises two portions, an upper half 14 and a lower half 15. Said portions are generally of parabolic configuration, i. e. as the surfaces of semi-paraboloids, and are molded, pressed, or in some other manner formed together as a single unit, being joined at the stepped portion 16.

The upper half 14 is of semi-paraboloidal shape, having the focus thereof at the point f', which is to the rear of the point F, said point F representing the position of the luminant 13. Thus, any rays 20 emanating from the luminant 13 will strike the reflecting surface 14 and be directed slightly downward, as exaggeratedly shown by 20'. This causes the resulting beam to spread slightly and serves to illuminate the road in front of a

vehicle in a widespread manner. Since this portion of the reflector 12 is only half thereof, there are no rays directed upwards to cause glare and the like.

The lower half 15 of the reflector 12 is semi-paraboloidal in shape also, but the contours of the reflector 12 at this point do not follow the surface of a true paraboloid as designated by the broken line 17 of Fig. 2. Instead, at the outer edges of the reflecting surface 15, the shape is somewhat distorted inwards. This is done in a gradual manner starting at substantially the center of the portion 15.

The focal point of the paraboloid 17, which is the constructional basis for the shape of the lower half 15 of the reflector 12 is the point F, at the luminant 13. Thus, rays 21 from the filament 13 to the reflecting surface of the lower half 15 of the reflector 12 are reflected as rays 21' and tend to concentrate toward the optical axis A—A of the lamp 10. The effect of the distortion is to cause convergence of the rays 21' at a point short of infinity, infinity being the converging point for rays which would be reflected from a true paraboloid 17 as designated by the reference characters 22.

Thus, it is seen that all of the reflected rays from the reflector 12 will be below the optical axis of the lamp, eliminating glare and providing a brilliant illumination of the road at the same time. The beam, which is produced by the present device, consists of a sharply concentrated bright beam just below the optical axis A—A of the reflector 12, converging at a point short of infinity. Said point may be adjusted by the amount of distortion given to the lower half 15 of the reflector 12. The other portion of the emanation from the reflector 12 is a downwardly reflected wide beam which illuminates the road directly ahead of and to the front sides of the vehicle mounting the present device. The amount of spread of the beam is a factor of the distance which the focus f_1 of the upper half 14 of the reflector is behind the focus F of the lower paraboloid 17.

The characteristics of the beam can best be identified from a projection thereof on a screen a distance of about one hundred feet or so from the lamp. The resulting image will be a semi-circle of comparatively large diameter 23, within which is a second semi-circle 24 of small diameter and very intense illumination. The semi-circle 23 represents the beam of light from the upper half 14 of the reflector 12, and the semi-circle 24 represents the beam from the lower half 15.

It will be noted that reference has been made to stepped portion 16 between the upper and lower halves of the reflector 12. The sharpness of this step and the abruptness of change it makes between the two halves serves to make a definite differentiation between the two beams which the device is capable of projecting. It is obvious that this step may not be as sharp as shown and may consist of a gradual blending of one surface with another. This type of a step has a tendency to produce stray beams which may cause glare and the like. The preferred embodiment which I have shown, therefore, has a sharp step, as aforesaid. However, the word "step" or "stepped portion" as herein used refers to any type of blending or merging of one surface with another, be it gradual, sharp, or otherwise.

Thus, it is seen that I have presented a vehicle head lamp, which eliminates all need for extraneous reflectors, lenses, mountings, and the like, and which is simple in construction and effective in operation. The beam which is presented to the surface of the road consists of two portions, one a concentrated portion lighting the way ahead a great distance, and the other a diffused or spread beam, lighting the way immediately to the front and sides of the automobile. The construction of my invention and the arrangement of the optical systems thereof are such that the beams are free from glare or other undesirable rays of light therefrom which might tend to interfere with the vision of an oncoming driver, or which might tend to be reflected back into the eyes of the driver of the vehicle equipped with my new lamp, as from fog and snow particles.

Since it is believed that the above disclosure of the construction of the preferred embodiment of my invention will obviously set forth the entire and complete operation thereof, further explanation will be dispensed with.

While reference and disclosure have been made with regard to a more or less specific embodiment of my invention, it is to be noted that the details and less important features are capable of assuming diversified forms and wide variations without departing from the purview of my invention. I do not wish to be limited in my Letters Patent to specificities as disclosed, but rather would be protected for the broad generalities to which my invention entitles me and which are herewith stated in the appended claims.

1. In a light-projecting device comprising an hermetically sealed envelope provided with a luminant therein, a concave reflector portion and a lens, said reflector portion consisting of upper and lower portions substantially optically independent of one another thereby producing two independent beams of light.

2. In a light-projecting device comprising an hermetically sealed envelope provided with a luminant therein, a concave reflector portion and a lens, said reflector portion consisting of upper and lower portions substantially optically independent of one another, and having respectively definite optical relation with said luminant thereby producing two independent beams of light.

3. In a light-projecting device comprising an hermetically sealed envelope provided with a luminant therein, a concave reflector portion and a lens, said reflector portion consisting of upper and lower portions substantially optically independent of one another and having respectively definite optical relation with said luminant, said upper portion comprising a semi-paraboloid with the focus thereof to the rear of said luminant, and said lower portion being substantially a semi-paraboloid and having the focus thereof at the luminant.

4. In a light-projecting device comprising an hermetically sealed envelope provided with a luminant therein, a concave reflector portion and a lens, said reflector portion consisting of upper and lower portions substantially optically independent of one another and having respectively definite optical relation with said luminant, said upper portion comprising a semi-paraboloid with the focus thereof to the rear of said luminant, and said lower portion being substantially a semi-paraboloid and having the focus thereof at the luminant, said lower portion being formed with the outer edges of said semi-paraboloid dis-

torted inwardly and away from the true semi-paraboloidal surface.

5. In a light-projecting device comprising an hermetically sealed envelope provided with a luminant therein, a concave reflector portion and a lens, said reflector portion consisting of upper and lower portions substantially optically independent of one another and having respectively definite optical relation with said luminant, said upper portion comprising a semi-paraboloid with the focus thereof to the rear of said luminant, and said lower portion being substantially a semi-paraboloid and having the focus thereof at the luminant, said lower portion being formed with the outer edges of said semi-paraboloid distorted inwardly and away from the true semi-paraboloidal surface, said distortion being gradually increased from the center of said semi-paraboloid outwards towards the edges thereof.

6. In a light-projection device comprising an hermetically sealed envelope provided with a light source therein, a concave reflector portion and a lens, said reflector portion consisting of upper and lower portions substantially optically independent of one another, said upper portion comprising a semi-paraboloid, said lower portion being substantially a semi-paraboloid, said lower portion being formed with the outer edges of said semi-paraboloid distorted inwardly and away from the true semi-paraboloidal surface, said distortion being largest at the outer edges of said lower portion and decreasing inward toward the center thereof.

7. A vehicle head lamp, comprising an hermetically sealed envelope consisting of a concave reflector portion, a lens, and a source of illumination therein, said reflector portion comprising two portions, one being a semi-paraboloidal and arranged with respect to said luminant to throw a compartively diffused beam of light below the optical axis of said reflector, the second of said portions being of distorted semi-paraboloidal shape and being arranged with respect to said source of illumination to throw a concentrated beam just below the optical axis and within the said diffused beam, said first portion having its focal point substantially to the rear of said source of illumination, and said second portion having its focal point at said point of illumination.

8. A vehicle head lamp, comprising an hermetically sealed envelope consisting of a concave reflector portion, a lens, and a source of illumination therein, said reflector portion comprising two portions, one being semi-paraboloidal and arranged with respect to said luminant to throw a comparatively diffused beam of light below the optical axis of said reflector, the second of said portions being of distorted semi-paraboloidal shape and being arranged with respect to said source of illumination to throw a concentrated beam just below the optical axis and within the said diffused beam, said concentrated beam consisting of slightly converging rays, said first portion having its focal point substantially to the rear of said source of illumination, and said second portion having its focal point at said source of illumination, the distortion of said second portion being an inward departure around the edge thereof from a true paraboloidal surface, thereby causing said slight covergence.

9. A vehicle head lamp, comprising an hermetically sealed envelope consisting of a concave reflector portion, a lens, and a source of illumination therein, said reflector portion comprising two portions, one being semi-paraboloidal and arranged with respect to said luminant to throw a comparatively diffused beam of light below the optical axis of said reflector, the second of said portions being of distorted semi-paraboloidal shape and being arranged with respect to said source of illumination to throw a concentrated beam just below the optical axis and within the said diffused beam, said concentrated beam consisting of slightly converging rays, said last-mentioned beam being projected from said substantially semi-paraboloidal portion by reason of said portion being formed with the outer edges thereof distorted inwardly and away from the true surface of a semi-paraboloid, said distortion decreasing inward of the edges until at the center of said portion, the surface substantially conforms to a true semi-paraboloid.

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