

Sept. 8, 1964

R. W. JOHNSON
VEHICLE HEADLIGHT

3,148,301

Filed June 3, 1960

2 Sheets-Sheet 1

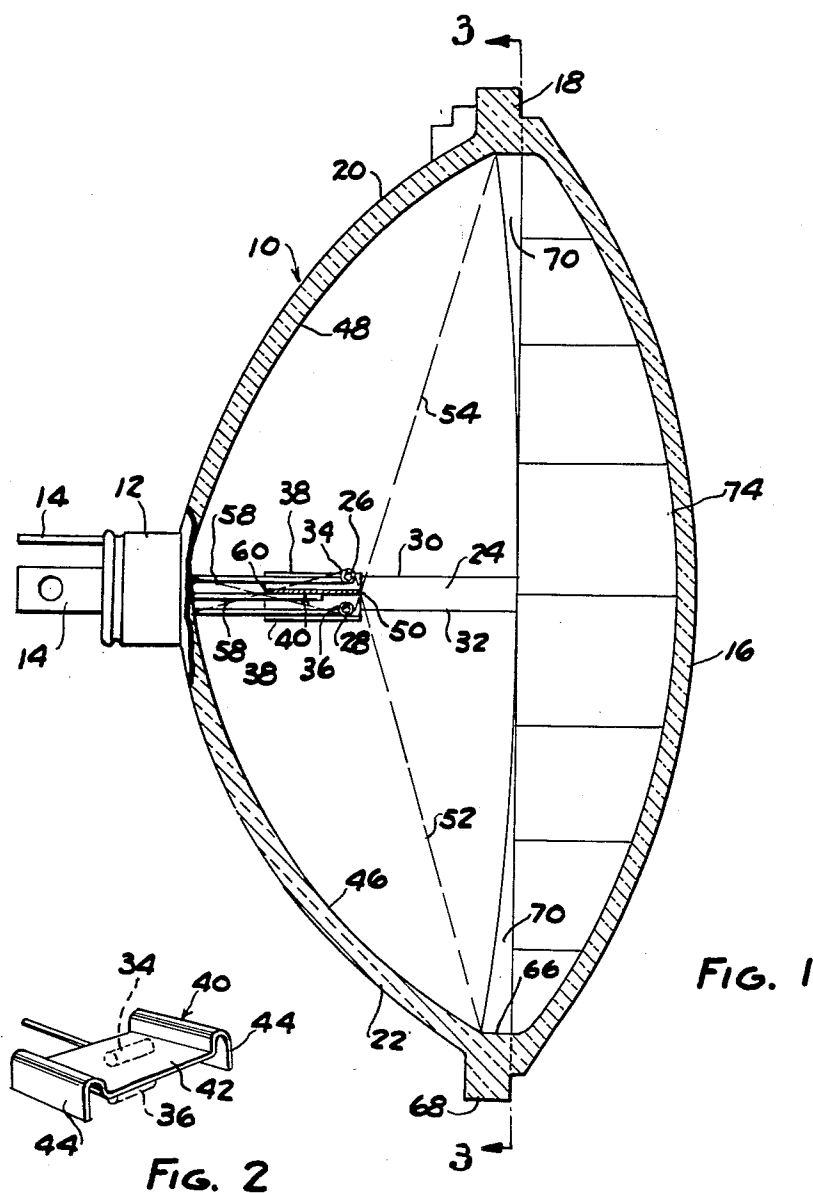


FIG. 1

FIG. 2

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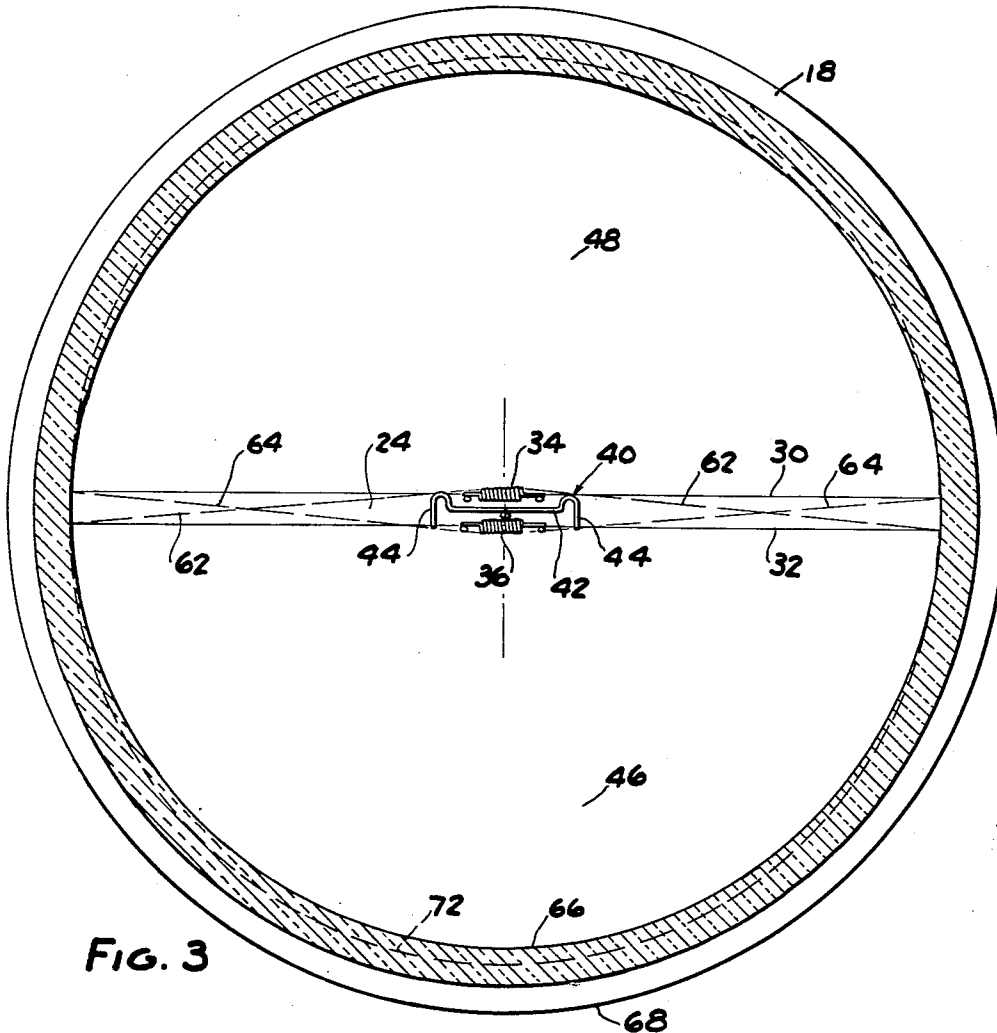


FIG. 3

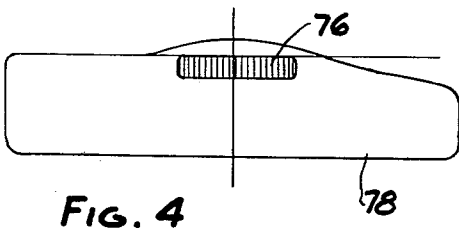


FIG. 4

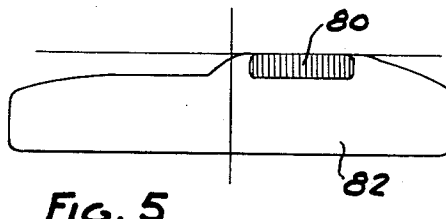


FIG. 5

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1

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VEHICLE HEADLIGHT

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Filed June 3, 1960, Ser. No. 33,739

1 Claim. (Cl. 313-114)

This invention relates to a vehicle headlight and more particularly to a headlight of the type which is adapted to project either a high or driving beam, as it is sometimes called, or a low or passing beam.

It is well known and understood that the most efficient design of a headlight reflector is parabolic. With a parabolic reflector and a filament located at the focal point of the reflector, the light rays reflected are directed generally parallel to the central axis of the reflector. A minimum of scattering and diffusion results from reflectors of this design when the light producing filament is concentrated at the focal point of the reflector. In the case of headlights requiring both high beam and low beam filaments, it is obvious that both filaments cannot be located at the focal point of the reflector. Thus, a problem is presented with respect to the design of a headlight reflector having both high and low beam filaments.

Various approaches towards a solution of this problem have been attempted in the past. In some cases, the two filaments are spaced apart but located as close as practically possible to the focal point of the reflector. With such location of each filament, neither is capable of producing the most efficient reflection. In other cases, one of the filaments is located at the focal point and the other filament closely adjacent. With the latter arrangement, inefficient lighting results with at least one of the filaments. Still another approach has been in the use of a reflector comprising two paraboloidal-shaped portions staggered axially relative to one another with a filament placed at the focal point of each portion of the reflector and with a third filament located between the two. This latter type of reflector does not solve the problem because the light emanating from each filament is reflected by both portions of the reflector and there is therefore divergence in the reflected light beam.

It is an object of the present invention to provide a reflector for a headlight which is designed to produce most efficient illumination with respect to both the driving beam and the passing beam.

A further object of the invention resides in the provision of a headlight having two paraboloidal-shaped reflecting portions with two filaments, one located at the focal point of each reflector portion and with a mask or shield disposed between the filaments so that the light emanating from one of the filaments strikes only one of the reflector portions and the light emanating from the other filament strikes only the other reflector portion.

A further object of the invention resides in the provision of a headlight which can be manufactured economically and the reflector of which comprises a pair of paraboloidal-shaped portions.

In the drawings:

FIG. 1 is a vertical sectional view of a headlight constructed in accordance with the present invention.

FIG. 2 is a perspective view of a mask employed between the two filaments of the headlight.

FIG. 3 is a sectional view taken along the lines 3-3 in FIG. 1.

FIG. 4 is a diagrammatic showing of the field of illumination produced by the headlight of this invention with the driving beam.

FIG. 5 is a view similar to FIG. 4 showing the field of illumination with the passing beam.

Referring to FIG. 1, the headlight of the present in-

2

vention is illustrated as having a reflector 10 molded from glass or the like and having a central integrally molded base 12 from which project the conventional electrical contact prongs 14. Prongs 14 are adapted to connect the headlight filaments with the vehicle electrical system. The headlight illustrated is of the sealed beam type having a lens 16 sealed to the peripheral bead 18 around the open end of the reflector 10. A glass reflector is shown by way of illustration, not limitation.

Reflector 10 comprises an upper portion 20 and a lower portion 22 which are separated by an intermediate spacer portion 24. Portions 20, 22 and 24 are integrally molded as one piece. The upper portion 20 and the lower portion 22 are each formed as a semi-paraboloid. The focal point of the upper portion 20 is located on its central axis at 26 and the focal point of the lower portion 22 is located on its central axis at 28. In the illustrated arrangement the focal points 26, 28 are shown vertically aligned one above the other. Each of these focal points lies in the horizontal plane forming the junctures between the upper and lower edges 30 and 32, respectively, of the intermediate portion 24 with the upper portion 20 and the lower portion 22, respectively.

Two light producing filaments designated 34 and 36 are located at the focal points 26 and 28, respectively. In the arrangement illustrated, the filament 34 is adapted for producing a driving beam and the filament 36 is adapted for producing a low beam. Each of these filaments are mounted in position by means of supporting wires 38 and the filaments are connected with the appropriate prongs 14.

As mentioned previously, the filaments 34, 36 are spaced apart vertically a distance corresponding to the thickness of the intermediate portion 24. Between the filaments 34, 36, there is arranged a mask 40. Mask 40 comprises a generally horizontally disposed central portion 42 and upright flange portions 44 at the opposite lateral ends of the central portion 42. It will be observed that the upright flange portions 44 extend above and below the plane of the central portion 42. Mask 40 is designed such that the light emanating from filament 34 is shielded from the reflecting surface 46 of the lower portion 22 of the reflector and the light emanating from the lower filament 36 is shielded from the reflecting surface 48 of the upper portion 20. Thus, as shown in FIG. 1, the forward edge 50 of mask 40 terminates at a line such that the forwardly directed light rays 52 and 54 emanating from the filaments 34 and 36, respectively, which just clear the forward edge 50 of the mask strike the peripheral edge of the reflector. The rearwardly directed rays 56 and 58 which just clear the rear edge 60 of mask 40 strike the intermediate portion 24 of the reflector. Likewise, as seen in FIG. 3, the laterally directed rays 62 of filament 34 and the laterally directed rays 64 of the filament 36 which just clear the lower and upper edges, respectively, of the upright flanges 44 of mask 40 strike the intermediate portion 24 of the reflector. Thus, none of the effective light rays of filament 34 strike the reflecting surface 46 of the lower portion 22 of the reflector and none of the effective light rays from filament 36 strike the reflecting surface 48 of the upper portion 20 of the reflector. In other words, the light rays from filament 34 are in no way scattered or diffused by the reflecting surface 46 and the light rays from filament 36 are in no way scattered or diffused by the reflecting surface 48. Thus, each of the filaments 34, 36 is arranged to produce the most efficient lighting by limiting the field of their reflection to their respective reflector portions 48, 46.

While lens 16 could be oval, square or of other shape, it is most economical, of course, to provide a lens 16 which is perfectly circular in contour. Thus, it is desirable that the inner and outer peripheries of the bead

18 designated 66 and 68, respectively, be likewise circular in contour. The outer periphery 63 is made circular by simply forming the cavity in the reflector mold of circular shape at the portion thereof corresponding to the peripheral edge 18. The punch used with the mold in forming reflector 10 would be initially formed as two paraboloidal-shaped portions with an insert corresponding in size to intermediate portion 24 between the two paraboloidal-shaped portions of the punch. In order to provide an inner periphery of the reflector as at 66 of circular shape, the end of the punch corresponding to the peripheral edge 18 of the reflector is turned down to cylindrical form which accounts for the cylindrical surface portions 70 on the upper and lower portions of the reflector. These cylindrical surface portions have a zero axial dimension at the upper and lower edges 30, 32 of intermediate portion 24 and have their maximum axial dimensions at the top and bottom of the reflector. In FIG. 3, the broken line 72 represents the contour that the punch would have prior to being turned down to circular shape as indicated at 66.

Lens 16 is shaped on its inner surface with a suitable configuration as shown at 74 for producing the desired pattern and direction of the beam. Desirable patterns for the high beam and low beam are illustrated in FIGS. 4 and 5. FIG. 4 shows the light pattern for the high beam or driving beam, as it is sometimes called, wherein a small but brightly illuminated area 76 is located in a central portion relative to the vehicle and a less brightly illuminated area 78 extends laterally beyond and below the brightly illuminated area 76. The pattern illustrated in FIG. 4 would be produced by the combination of the filament 34 with the reflecting surface 48 and the proper configuration of the inner surface of lens 16. The passing beam illustrated in FIG. 5 has the small but brightly illuminated area 80 shifted to the right and surrounded by the larger less brightly illuminated area 82. The pattern illustrated in FIG. 5 would be produced by the lower filament 36 in combination with the reflecting portion 46 and the necessary configuration of the inner surface of lens 16.

It will be appreciated that the two halves of the reflector need not be vertically superposed. They could be located side by side instead of one above the other. Likewise while it is preferred to have the two focal points lying in the same vertical plane, they may be otherwise spaced apart. It is essential however according to the present invention that the focal points of the two portions of the reflector be spaced apart and shielded from one another.

I claim:

A headlight for a vehicle comprising a unitary, one-piece reflector having an upper portion, a lower portion and an intermediate portion, said upper and lower portions each having on the inner side thereof identical reflective surfaces of generally semi-parabolic shape, said intermediate portion forming an integral connection between the upper and lower portions and spacing said upper and lower portions uniformly apart, the inner surface of said intermediate portion being of parabolic shape in horizontal section, said reflective surfaces of the upper and lower portions being vertically spaced such that the focal points of said reflective surfaces are vertically spaced in the same vertical plane, a filament located generally at the focal point of the reflective surface of the lower portion, a filament located generally at the focal point of the reflective surface of the upper portion, said filaments being spaced vertically apart a distance corresponding generally to the thickness of the intermediate portion, a mask extending between said filaments and shielding the rays of the upper filament from the reflective surface of the lower portion and the rays of the lower filament from the reflective surface of the upper portion, said reflector adjacent the open end thereof having a radially enlarged, circumferentially extending bead thereon, the outer periphery of said bead defining a circle the axis of which corresponds to the central longitudinal axis of the reflector, the inner peripheral edges of said upper, lower and intermediate portions at the open end of the reflector also defining a circle concentric with the first-mentioned circle and a lens closing the open end of the reflector, the inner and outer peripheral edges of the lens also being of circular shape, the reflective surfaces of the upper and lower portions of the reflector each being fashioned with a cylindrical portion at the open end thereof, said cylindrical surface portions, in view of the semi-parabolic shape of the upper and lower reflector portions, having a maximum axial dimension at the vertical central portions of the open end of the reflector and tapering to a substantially zero dimension at the junction of the reflective surfaces of the upper and lower portions with the inner surfaces of the lower and intermediate portions.

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