July 17, 1928. 1,677,678

A. MAURER

HEADLIGHT

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Fig. 1.

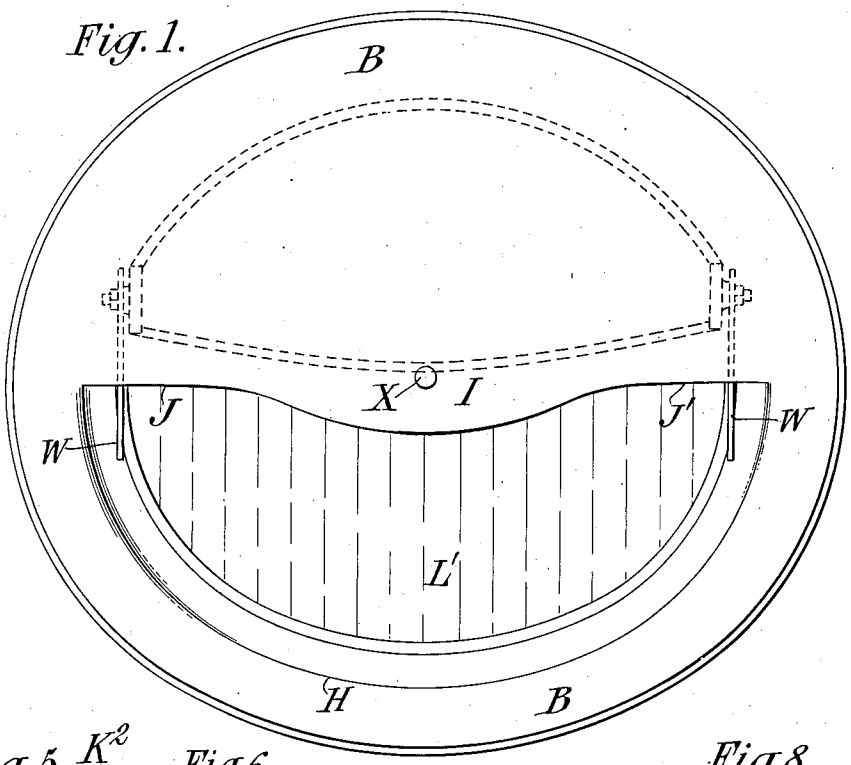



Fig. 5.

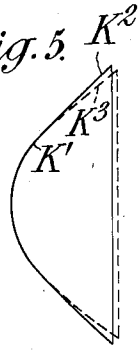



Fig. 6

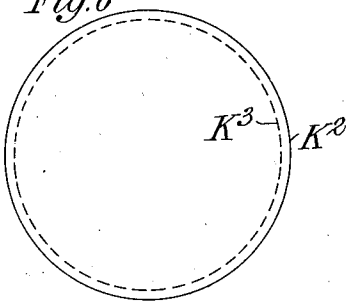



Fig. 8.

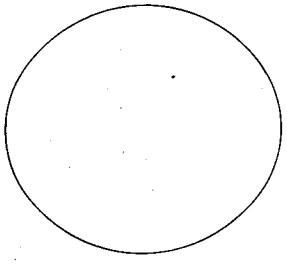


Fig. 7.

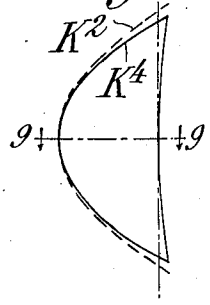



Fig. 10.

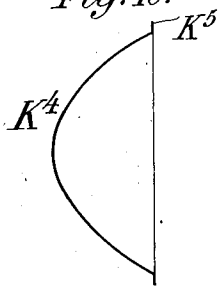



Fig. 9.




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Fig. 2.

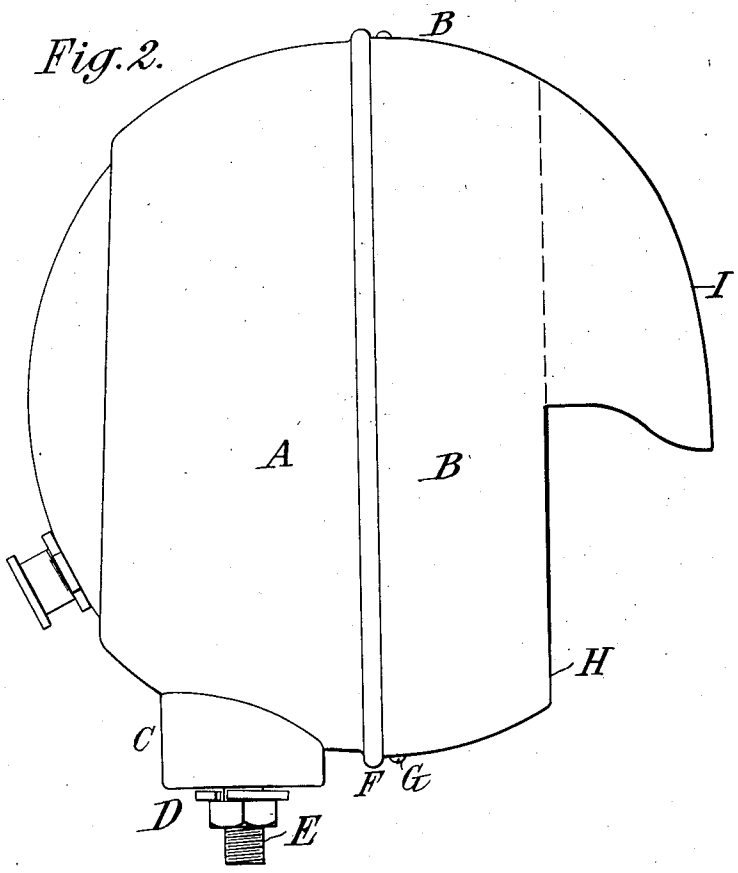
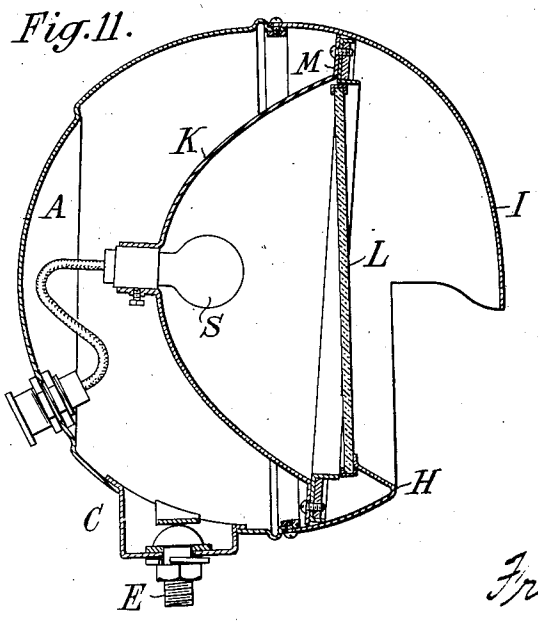



Fig. 11.




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HEADLIGHT

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Fig. 3.

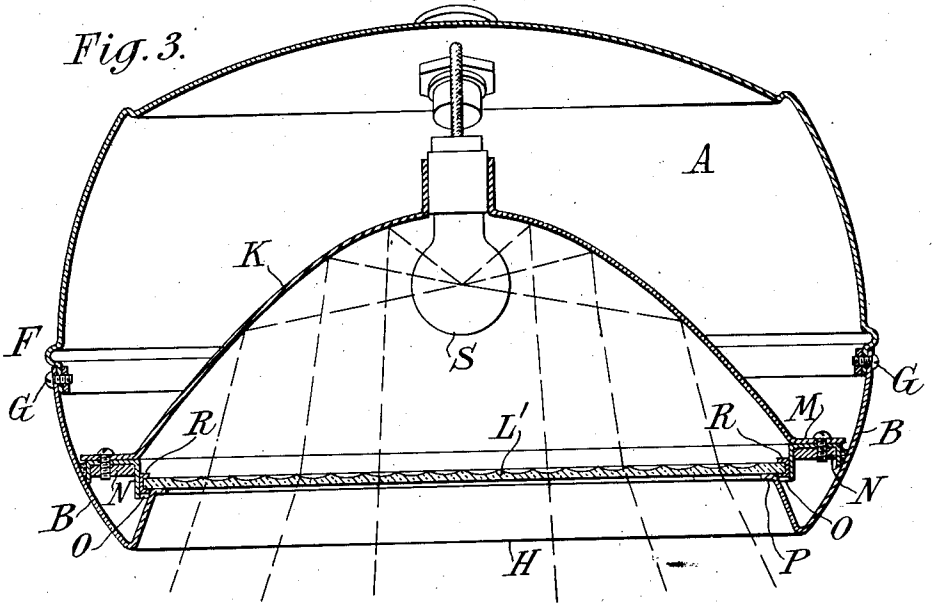
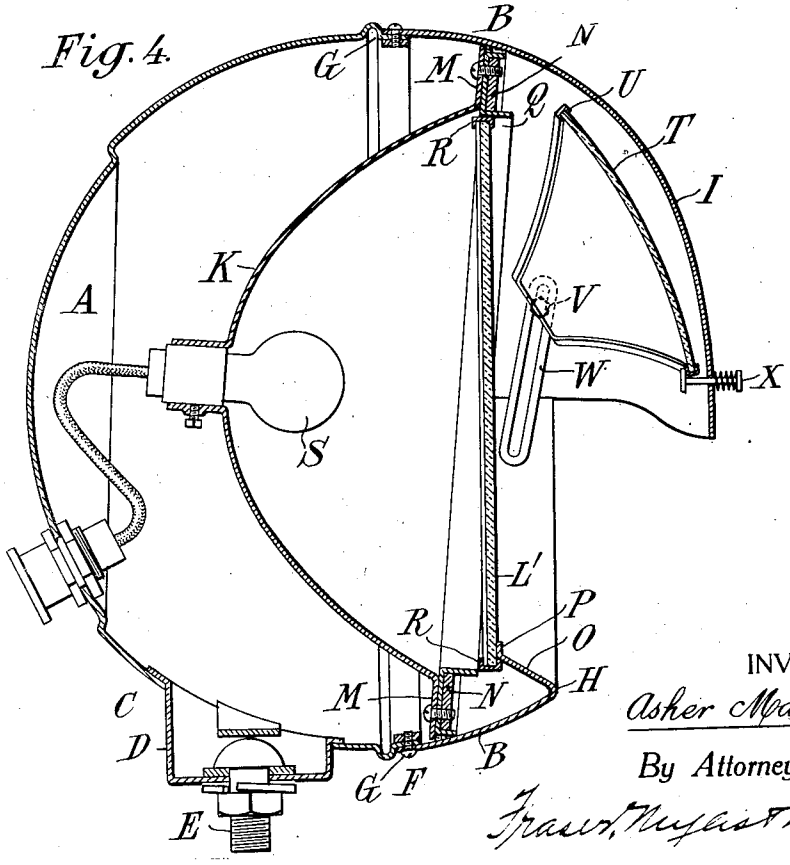



Fig. 4.




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Patented July 17, 1928. 1,677,678

# UNITED STATES PATENT OFFICE.

ASHER MAURER, OF NEWARK, NEW JERSEY.

## HEADLIGHT.

Application filed May 29, 1928. Serial No. 281,521.

This invention relates to headlights for motor car or other uses, and aims to provide certain improvements therein.

The principal purpose of the invention is to provide a headlight for motor car use in which there will be the desired distance illumination and adequate intervening illumination, combined with illumination on either side of the car, and in which the headlight operates with a total absence of glare at any distance and in any direction in which the car may be approached or passed.

These and other objects of the invention are more fully described with reference to the accompanying drawings, wherein:

Figure 1 is a front elevation of the invention in its preferred form.

Fig. 2 is a side elevation of Fig. 1.

Fig. 3 is a section taken on a horizontal plane.

Fig. 4 is a section taken on a vertical plane.

Fig. 5 is a vertical section of the reflector after the first step of its generation.

Fig. 6 is a front view of Fig. 5.

Fig. 7 is a vertical section of the reflector after the second step of its generation has been taken, the figure also showing in dotted lines the outline of the curve shown in Fig. 5.

Fig. 8 is a front view of Fig. 7.

Fig. 9 is a horizontal section of the reflector taken on the line 9—9 of Fig. 7.

Fig. 10 is a vertical section of the reflector in its final stage.

Fig. 11 is a vertical section of a modified lamp wherein the fog device has been omitted and a plain glass cover has been substituted for the lens.

Referring to the drawings, I will first describe the preferred form of the casing of the lamp. This casing is shown as comprising a rear section A and a front section B. The rear section A may be of any approved form, it being shown as generally circular in outline and as provided with a mounting C of any approved form for holding the lamp upon a motor car or the like. That shown comprises a socket-piece D formed of sheet-metal and attached to the body of the rear portion of the casing, the socket-piece carrying a bolt E which is adapted to fit in a lamp bracket carried by the car.

The front of the casing, to which I would direct particular attention, in its preferred form comprises a sheet-metal section which fits the front edge of the rear part of the casing, being shown as overlapping the latter at F and being connected therewith by screws G.

The front B is preferably made of a single piece of sheet-metal, and is preferably stamped or spun to shape, its greatest diameter being preferably at its rear edge where it overlaps the rear section, and from this point it is curved forwardly and inwardly to its front edge H, so that its front opening is of smaller diameter than its rear edge.

In the preferred form the general shape of front B as well as of the rear section A is oval with its major diameter arranged in a horizontal plane, in which case the reflector hereinafter to be described is also made in oval form.

According to the present invention in its preferred form I form the front B with a visor portion I, the preferred shape of which is shown in Figs. 1, 2 and 4 of the drawings, the visor being best formed integrally with the front and extended downwardly in one continuous piece with the front to a point where it substantially covers the front of the bulb. Preferably the general curve of the top of the front B is continued into the visor so that the latter at its lower edge is spaced forwardly a considerable distance in advance of the body portion of the front. By preference, as is shown in Fig. 1, the visor portion does not extend straight across the lamp, but is cut upwardly on each side, as shown at J and J'.

According to the preferred form of the invention I utilize the front B to support the reflector K and the glass L', so that these parts may be removed (with the source of light) by disconnecting the front from the rear. In the construction shown, the reflector is provided with a flange M which is screwed to a series of brackets N soldered or otherwise united to the interior of the front B, and the glass L' fits against a flange P, a part of which may be constituted by an inturned portion O of the forward edge of the front, and a part of which may be a separate flange, as shown at Q, soldered or otherwise connected to one of the brackets N which is soldered to the front beneath the visor I. Suitable catches adapted to be bent up in the rear of the glass are shown at R.

The above construction is available for

lamps generally, whether of round or other shape, and may be conveniently utilized to provide a lamp of symmetrical and attractive appearance which can be disassembled in the manner set forth.

An important feature of the present invention lies in the shape of the reflector, and preferably also the shape of the headlight. According to the present invention I make use of a reflector which is oval in front elevation; that is to say, its shape is such that it is elongated in its horizontal axis and is preferably curved throughout its entire outline. The lamp casing, accordingly, in the preferred form, is given a similar contour.

Referring now to the reflector, which is indicated by the reference letter K, this has a peculiar shape which I will now proceed to describe.

In developing my reflector I begin its generation with a round reflector which is basically parabolic and which is indicated by the reference letter K'. I then modify the forward annular portion for a depth of about one and one-half or two inches by flattening somewhat the curvature of said portion or rendering it substantially conical. This conical portion then lies outside of the parabolic curve at the open side of the reflector, as is clearly shown in Figs. 5 and 6, wherein the letter K' indicates the reflector, $K^2$ its conical or flattened portion and the dotted lines $K^3$ indicate its original parabolic shape on its front side. With the construction shown in full lines in Fig. 5 if a source of illumination be placed at the focus a concentrated beam of light would issue from the central parabolic portion and a spread fan-shaped beam from the forward annular portion $K^2$. The shapes of the two concentric beams would still be circular and ineffective for vehicle lighting; also the upper flattened or conical part $K^2$ would produce glare.

I next bend or squeeze the top and bottom of the reflector toward the axis, as shown in Fig. 7, which makes the reflector oval in front view, as shown in Fig. 8, with the longer dimension horizontal. In Fig. 7 the reference letter $K^2$ applied to the dotted line figure is the same as the full line curve of Fig. 5. The full line construction of Fig. 7 indicated at $K^4$ shows the curvature produced by the bending operation.

If an ordinary parabolic reflector were squeezed or bent, as shown in Figs. 7 and 8, the upper and lower front ends would curve too much inwardly, thereby producing glare and also no satisfactory transversely elongated concentrated beam of light would be produced. By first flattening the parabolic reflector into more or less conical form, as indicated at $K^2$ in Fig. 5, this result is avoided.

Proceeding now with the construction as shown in vertical section in Fig. 7, in front view in Fig. 8 and in horizontal section in Fig. 9, it will be observed that the bending operation has caused the reflector to advance at its top and bottom and to retreat at its sides. If the projecting edges be permitted to remain, glaring will take place. I next cut off the projecting parts at the top and bottom of the reflector preferably back to the dot-dash line shown in Figs. 7 and 9, so that the front edge of the reflector when it reaches its final shape lies in substantially one plane. The resultant shape is shown in vertical section in Fig. 10 with the addition of a flange $K^5$.

The proportions of the finished reflector are important and I will give those of a typical case with the understanding, however, that they may be somewhat varied without departing from the invention.

Let us assume that the round reflector shown in Fig. 5 after the flattening of its edges has an internal diameter of 8 1/4 inches. If this reflector be squeezed or bent as described, the vertical dimension finally arrived at will be approximately 7 11/16ths inches. The horizontal dimension in a typical case will be approximately 8 11/16ths inches. If the modified parabolic reflector forming the starting body of the bending operation has a depth of 3 5/16ths inches its final depth will approximate 3 2/16th inches. The extreme width of metal cut off at top and bottom during the process will approximate 5/16ths of an inch. The flattening process described with reference to Fig. 5 extends rearwardly about 1 1/2 or 2 inches from the front edge of the reflector. During the squeezing or bending process the side edges retreat about 3/16ths of an inch and the upper and lower edges advance about 1/8th to 3/16ths of an inch from the original vertical edge, creating a difference in depth of reflector of about 5/16ths to 3/8ths.

While the proportions of the reflector may be arrived at by the process just described, it will, of course, be understood that in actual manufacture the reflector will be stamped or drawn to its proper dimensions by the use of suitably formed dies.

The incandescent lamp or other source of illumination S is preferably mounted in the base of the reflector in such position so that the filament will be located substantially at the focal point of the reflector.

Such a reflector if mounted so that its forward edge lies in a vertical plane, will cast a beam of light which vertically is non-divergent. I prefer, in fact, that it shall be slightly convergent, to which end, in the proportions previously indicated, the vertical section of the reflector lies within the parabolic curve. In a horizontal plane, however, the beam cast by the lamp is diver-

gent to a considerable extent, the reflector in this dimension lying outside of the parabolic curve.

The range of proportions as set forth above is of great importance and should not vary materially from the proportion of eight inches vertical dimension to nine inches horizontal dimension. I have found in certain instances that if the reflector is squeezed together an eighth of an inch more, the beam of light will be distorted and much less available for vehicle lighting. In using this proportion of 8 to 9 in the specification and claims, I wish to be understood, however, as permitting such variations as do not in a given case materially alter the character and value of the beam.

With a reflector of the construction just described it is important that the front section of the casing of the lamp (or its equivalent) shall be smaller, so far as its front opening is concerned, than the front of the reflector, so that there is an overlapping of the casing when viewed from the front. The body of the front section of the casing B is designed to produce this overlapping and thereby cut off stray rays which may emanate from the edges of the reflector, and particularly those which may be described as upwardly-inclined lateral rays.

If the lamp casts a slightly converging beam in a vertical direction, as by preference it does, this is counteracted by the mounting of the reflector in a slightly tilted position. The light reflected from the lower half of the reflector is hence brought to the horizontal, so that it does not produce any glare above the horizontal plane of the lamp.

This is provided for in the present invention by tilting the reflector downwardly, which may be accomplished by mounting the reflector in a tilted position inside the lamp casing, as shown.

In connection with my invention I prefer to use the visor I heretofore described, which extends downwardly preferably integrally from the body of the front B to a point approximately in line with the bulb S, cutting back the side portions at J J′ as previously explained. This visor cuts off any direct light which may shine upwardly through the glass, so that the drivers of passing cars are completely shielded from the direct rays of the bulb. It is particularly to be understood that this visor, when utilized, is not formed with a specular reflecting surface on its inner side, but is preferably made either non-reflecting or light-diffusing, as by coating with a dead-white paint or by leaving the inner surface of the metal untreated. If its is permitted to reflect any considerable part of the light rearwardly, glare effects will be produced by the re-reflection of these rays on the main reflector and this my invention is particularly designed to avoid. A light-diffusing surface on the inner side of the visor, however, spreads the light in the vicinity of the car to illuminate ditches, side-walks, cross-roads, &c.

The glass L may be plain glass, as shown in Fig. 11, or it may be ribbed to secure a further divergence of the horizontal beam, as shown in Fig. 3, at L′.

Preferably, I provide a shield of amber or other colored glass, which constitutes a fog device, this being lettered T in the drawing, the glass or other translucent substance being mounted in a frame U which has guides V sliding on guideways W, so that the fog device may be brought down to cover the lower portion of the lamp. A catch X serves to hold the fog device housed in the visor when not in use.

The front B may be varied in width but preferably is of substantially as great width and inward projection throughout as is represented by the lower section, as indicated in the drawings. In Fig. 2 the dotted line indicates the preferred width of the upper portion, which it will be seen corresponds to that of the lower portion.

While I have shown and described the preferred form of the invention, it will be understood that various changes may be made therein without departing from the spirit of the invention. It is characteristic of my invention that it casts a beam which at a distance from the lamp is much elongated but sharply defined. This field of brilliant illumination extends well beyond the sides of the motor car when a pair of lamps is used, so that the illumination includes the entire roadway. The intervening ground illumination is quite adequate as is also the nearby side illumination. These various characteristics are accompanied by a complete absence of glare at all points above the horizontal line of the lamp, no matter from what point the lamp is viewed.

The lamp is also characterized by the fact that it does not shine in the mirrors of vehicles ahead of the car provided with the lamp of the present invention, and therefore does not cause glare to drivers of such vehicles.

In Fig. 11 I have shown the invention with the fog device omitted, in which case the inner light-diffusing surface of the visor will be more effective. I have also shown a plain glass cover in place of a light-spreading lens, which will give excellent results.

This application is a continuation in part of my application filed March 7, 1927, Serial No. 173,524.

What I claim is:

1. A vehicle lamp, comprising a reflector oval in front elevation and developed in shape by pressing inwardly the upper and

lower parts of a modified parabolic circular reflector from points near its base to its rim, thereby shortening its vertical diameter and elongating its horizontal diameter and removing the parts of the upper and lower sections of the edge which project beyond the vertical plane of the axial horizontal section.

2. A vehicle lamp, comprising a reflector oval in front elevation and developed in shape by pressing inwardly the upper and lower parts of a modified parabolic circular reflector from points near its base to its rim, thereby shortening its vertical diameter and elongating its horizontal diameter and removing the parts of the upper and lower sections of the edge which project beyond the vertical plane of the axial horizontal section, and said lamp having a casing provided with a front which extends forwardly beyond the plane of the front edge of the reflector an inwardly so as to overlap somewhat the outer edge of the reflector.

3. A vehicle lamp, comprising a reflector oval in front elevation and developed in shape by pressing inwardly the upper and lower parts of a modified parabolic circular reflector from points near its base to its rim, thereby shortening its vertical diameter and elongating its horizontal diameter and removing the parts of the upper and lower sections of the edge which project beyond the vertical plane of the axial horizontal section, the lengths of the vertical diameter and horizontal diameter bearing substantially the proportion of 8 to 9.

4. A lamp having a reflector according to claim 1, in which the upper and lower portions of the reflector in vertical section lie inwardly of a parabolic curve so that the beam is concentrated in vertical section and in which the horizontal portions lie considerably outside of a parabolic curve so as to considerably spread the beam in a horizontal plane.

5. A lamp according to claim 1 having a casing, and means for mounting the reflector in the casing so that its axis is tilted downwardly.

6. A vehicle lamp, comprising a casing, a reflector, and a source of light, the casing being formed in two sections, both of which are oval in outline, the front section being adapted for engagement with the rear section and extending forwardly and inwardly over the edges of the reflector, and a visor formed as an integral part of the front section and extending forwardly and inwardly over a considerable portion of the upper half of the reflector.

7. A vehicle lamp, comprising a casing, a reflector, and a source of light, the casing being formed in two sections, both of which are oval in outline, the front section being adapted for engagement with the rear section and extending forwardly and inwardly over the edges of the reflector, and a visor formed as an integral part of the front section and extending forwardly and inwardly over a considerable portion of the upper half of the reflector, and a translucent fog device movable upwardly to a housed position beneath the visor and downwardly to substantially cover the open portion of the front of the lamp.

8. A vehicle lamp, comprising a reflector, a casing, and a source of illumination mounted in the base of said reflector, and substantially at the focus of the reflector, the reflector in vertical section having a curve which lies inwardly of a parabolic curve and having in horizontal section a curve which lies outwardly of a parabolic curve, whereby the beam cast by the light is converging in vertical section and diverging in horizontal section, and a rim device extending in front of the upper half of the reflector and serving to cut off upwardly inclined divergent rays whereby lateral glaring effects are eliminated, the reflector being mounted in downwardly inclined position to bring the light reflected by its lower half substantially to horizontal.

9. A lamp having a source of light and a reflector, a fixed shield extending over the upper part of said lamp, and a movable colored translucent fog device normally housed behind said shield and adapted to be moved over the lower half of said lamp, and means for mounting said fog device comprising fixed guideways, said fog device having means for moving along said guideways in its travel between its upper and lower positions.

10. A vehicle lamp, comprising a reflector oval in front elevation and developed in shape by spreading or flattening the front edge of a substantially parabolic reflector into somewhat cone shape so that such front edge lies outside a parabola, and bending or squeezing the top and bottom of the reflector to oval shape.

11. A front for a lamp comprising a single piece of metal adapted at its rear for connection to a rear section, and having a rim portion extending inwardly and forwardly, and having a integrally formed shield or visor extending forwardly and inwardly of the rim portion, to a point to cover substantially half the vertical diameter of the front, and a part of said rim having an inturned portion, serving as an abutment for a glass closure, and said front having a front opening below said visor.

12. A front for a lamp comprising a single piece of metal adapted at its rear for connection to a rear section, and curved inwardly and forwardly, and having an oval rim portion and an integrally formed shield or visor extending forwardly and inwardly of

the body of the front, to a point to cover substantially half the vertical diameter of the front, the front having an oval outline in front elevation, and having a semi-oval front opening, and said front having an inturned portion serving as an abutment for a glass closure.

13. A vehicle lamp, comprising a reflector, the lower section of which is developed by spreading or flattening the front edge of the lower section of a substantially parabolic reflector into somewhat cone shape so that said front edge lies outside a parabola and displacing the lower edge toward the focal axis, to oval form.

14. A reflector oval in front elevation and developed in shape by flattening the front annular portion of a concave focalizing circular reflecting surface so that the front edge lies outside the focalizing surface, and bending or squeezing the top and bottom of the reflector to oval shape.

15. A reflector oval in front elevation and developed in shape by pressing inwardly the upper and lower parts of a concave focalizing circular reflecting surface from points near its base to its rim, thereby shortening its vertical diameter and elongating its horizontal diameter and removing the parts of the upper and lower sections of the rim which project beyond the plane of the edges of the axial horizontal section and which plane is perpendicular to said axial section.

16. A reflector as defined in claim 14 and removing the parts of the upper and lower sections of the edge which project beyond the plane containing the edges of the axial horizontal section and perpendicular to said axial section.

17. A reflector as defined in claim 15 in combination with a light source placed substantially at the focus of the reflector, whereby the beam of light projected by the reflector is converging in a vertical plane and diverging in a horizontal plane; said reflector being inclined downwardly to bring the light rays reflected by the lower half of the reflector substantially to horizontal.

In witness whereof, I have hereunto signed my name.

ASHER MAURER.