

March 29, 1927.

1,622,272

R. B. BENJAMIN
HIGHWAY LIGHTING UNIT

Filed May 15, 1924

3 Sheets-Sheet 1

Fig. 1.

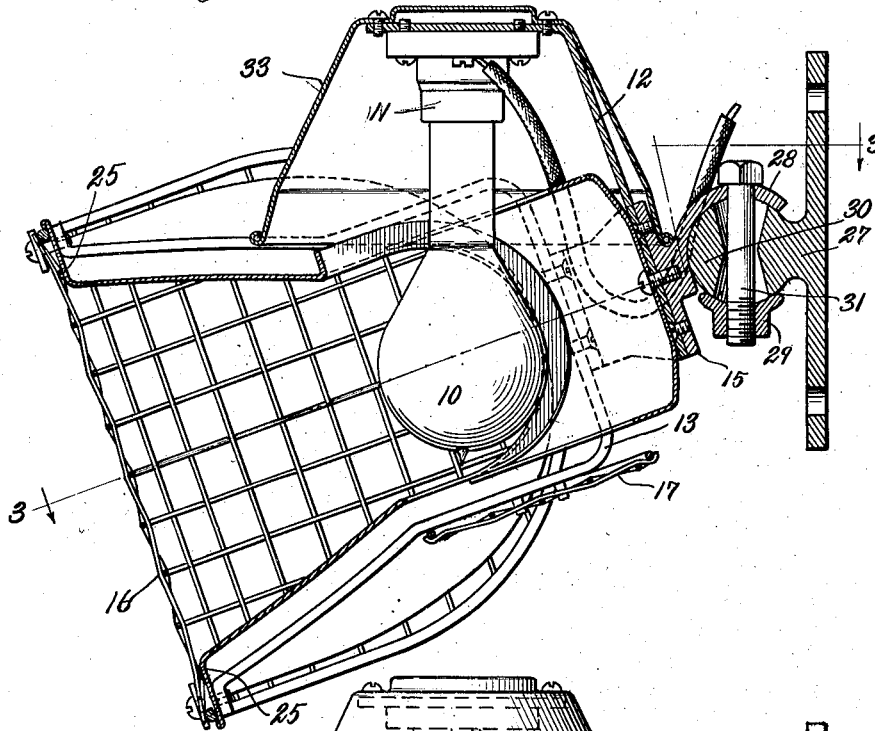
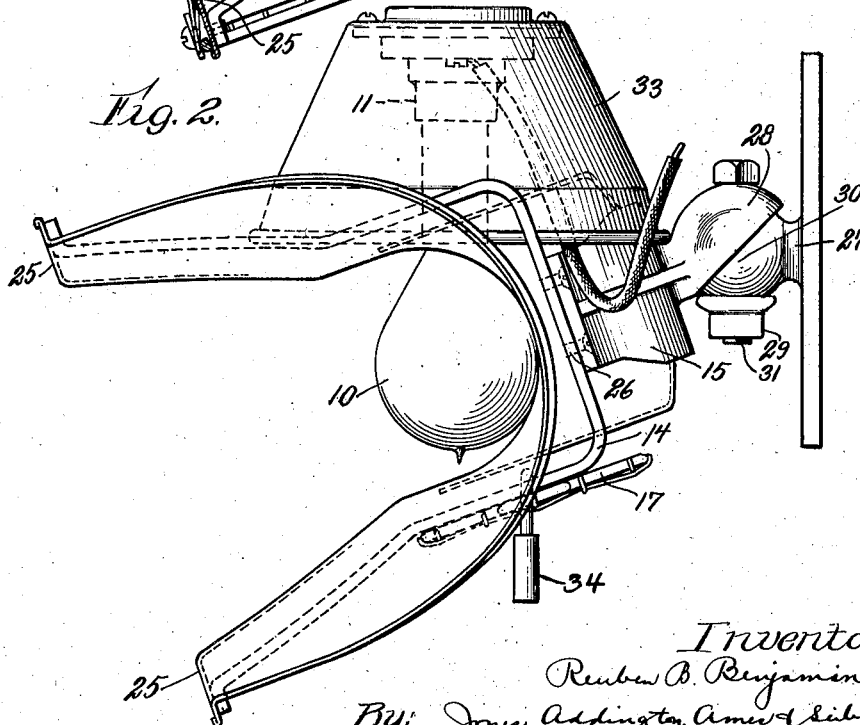


Fig. 2.



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3 Sheets-Sheet 2

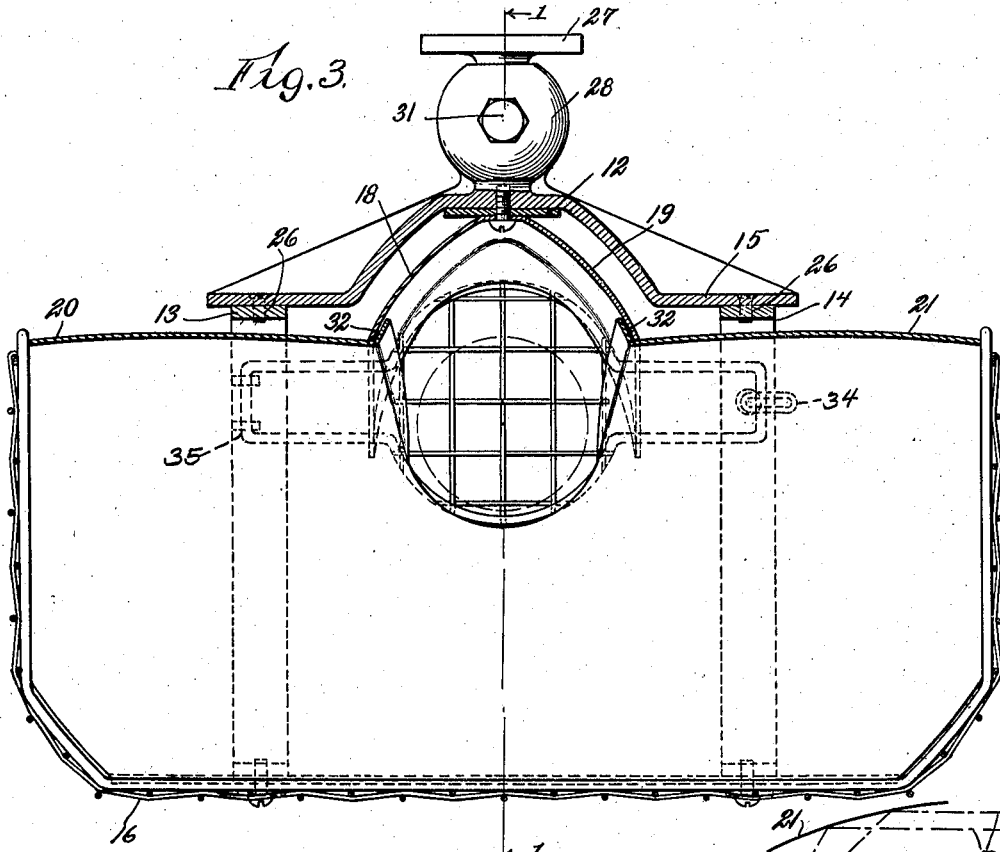


Fig. 6.

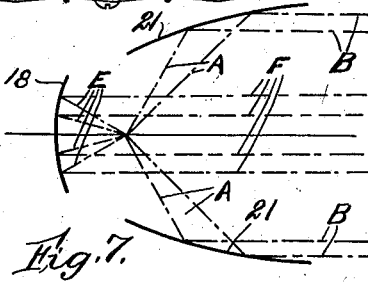
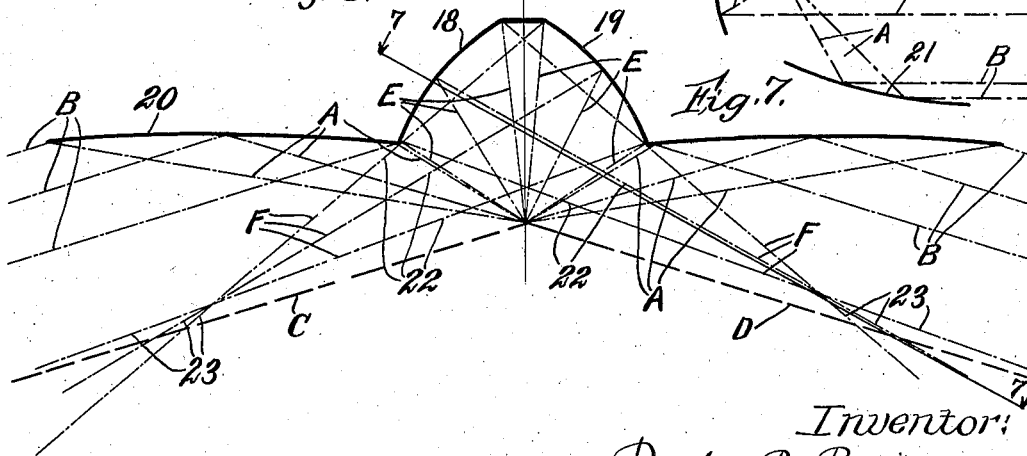


Fig. 7.

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3 Sheets-Sheet 3

Fig. 4.

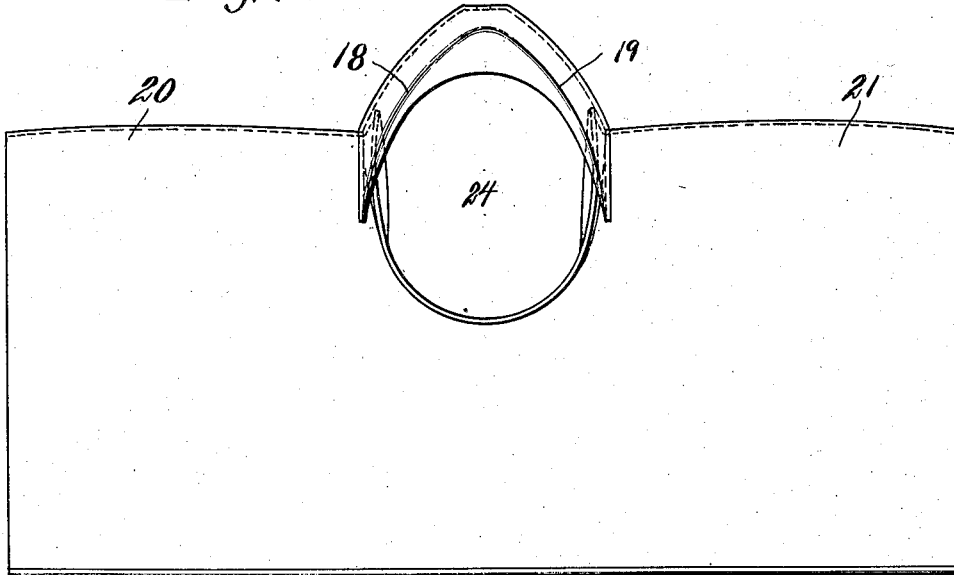
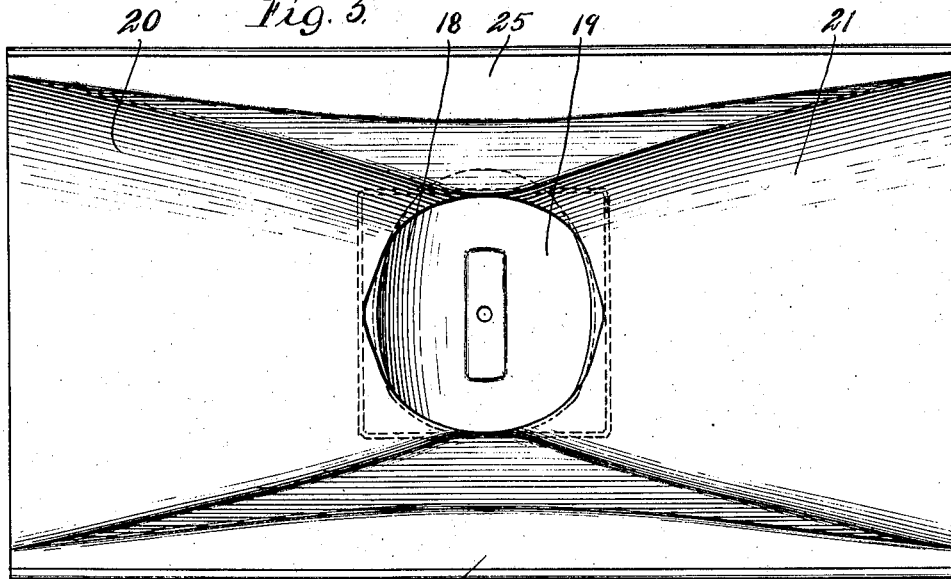


Fig. 5.



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UNITED STATES PATENT OFFICE.

REUBEN B. BENJAMIN, OF CHICAGO, ILLINOIS, ASSIGNOR TO BENJAMIN ELECTRIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

HIGHWAY-LIGHTING UNIT.

Application filed May 15, 1924. Serial No. 713,417.

My invention relates to highway lighting units.

One of the objects of my invention is to provide a highway lighting unit which will illuminate the roadway in both directions from the source of light for a substantial distance and which will effect a substantially uniform lighting of the roadway and which will distribute the light efficiently and effectively.

Further objects will appear from the description and claims.

In the drawings, in which an embodiment of my invention is shown—

Figure 1 is a central transverse vertical section through the lighting unit on the line 1—1 of Fig. 3;

Fig. 2 is an end view of the lighting unit;

Fig. 3 is a medial section on the line 3—3 of Fig. 1;

Fig. 4 is a top view of the reflectors;

Fig. 5 is a front view of the reflectors;

Fig. 6 is a diagrammatic view showing the distribution of light rays in a medial plane; and

Fig. 7 is a diagrammatic view showing the light distribution in the plane 7—7 of Fig. 6.

Referring to the drawings in detail, the construction shown therein comprises the electric lamp 10, a socket 11 in which the lamp is inserted, a socket support 12 on which the socket is mounted, a set of reflectors for controlling the distribution of light, a pair of reflector supports 13 and 14, a bracket 15 on which the reflector supports and socket support are mounted, a wire guard 16 extending around the reflector for preventing injury to the lamp bulb, and a wire door or guard 17 underneath the lamp bulb 10 to permit insertion and removal of the bulb.

The reflector set comprises in effect two pairs of concave reflector members, one pair 18 and 19 being located intermediate the members 20 and 21 of the other pair. The members of the outer pair are in the form of trough-like wings extending in substantially opposite directions from the light center, each of these trough-like wings having an open side and open ends and being of parabolic formation so as to cause the light rays incident thereon to be reflected substantially as a beam of light through the outer open end thereof whereby the two

wings throw two beams of light in substantially opposite directions. This construction and reflection of the incident light rays is shown in Fig. 6, which shows the incident rays A reflected as indicated by the rays B substantially parallel to the axes C and D of the parabolas which generate the surfaces of the trough-like reflector members 20 and 21. The major portion of these trough-like reflector members is formed as surfaces of revolution generated by rotation of the parabolas referred to about their respective axes.

Each of the inner reflector members 18 and 19 is of such a formation and is so positioned that rays of light E incident thereon will be reflected as indicated by rays F through the inner open end at 22 of that wing portion 20 or 21 which is farthest from it, and thence through the open side at 23 of said farthest wing portion, illuminating that portion of the roadway which lies between the portions illuminated by the beams of light reflected from the wing reflector portions.

As shown in Fig. 7, the intermediate reflector members 18 and 19 are substantially parabolic in vertical section, so that the rays E incident thereon are reflected in planes parallel to the medial plane through all four of the reflector members as indicated by the reflected rays F. Also, as shown in Fig. 7, the rays B reflected from the wing reflector members 20 and 21 are in planes substantially parallel to the medial plane through the four reflector members.

By this construction, a substantially uniform illumination of the roadway for a considerable distance is effected. The light is divided substantially into five parts, as follows: The two beams reflected in substantially opposite directions from the wing-like reflector members 20 and 21, the two fields of light reflected from the two intermediate reflector members 18 and 19, which illuminates the roadway between the portions illuminated by the two beams of light, and the direct unreflected rays of light from the lamp which illuminate that part of the roadway between the parts which are illuminated by the rays reflected from the intermediate reflector members 18 and 19.

As shown in Fig. 1, the lighting unit may be mounted so that the wing reflector members extend substantially horizontally and

so that the medial plane through the four reflector members is inclined (indicated substantially by the line 3—3 in Fig. 1.)

Referring now to details of construction, the two wing portions of the reflector may be formed as parts of an integral pressed metal member which may be enameled to give a good reflecting surface. The socket 11 for the lamp bulb is mounted above the reflector members, and clearance space is provided as indicated at 24 between the intermediate reflector members 18 and 19 and the wing reflector members 20 and 21 for the neck of the lamp bulb. The intermediate reflector members 18 and 19 may be formed as parts of an integral pressed metal member which may be enameled if desired to give a reflecting surface or, if desired, may be a silver-plated copper sheet.

The bracket 12 on which the lamp socket is mounted may be a sheet metal strap screwed onto the adjustable bracket 15 which also carries the reflector supports 13 and 14. The supports 13 and 14 for the wing reflector members are in the form of U-shaped straps to which the flanges 25 of the reflector members are secured, the straps being secured to the adjustable bracket by means of screws 26.

The bracket 15 which carries the socket and reflector members has a ball and socket connection with the fixed bracket 27, this ball and socket joint comprising the concave portion 28 of the bracket 15, and the concave nut 29 which clampingly engage the apertured ball portion 30 of the bracket 27, through which the clamping screw 31 extends.

The edges of the wing reflector members adjacent the intermediate reflector members are provided with flanges which extend inside the edges of the intermediate reflector members as indicated at 32 in Figs. 3 and 4 to provide a weather proof construction. To further exclude rain and snow from the interior construction, a metal hood 33 is provided, which extends above the lamp socket and down over the junction of the intermediate reflector members with the wing reflector members as shown in Figs. 1 and 2.

To remove or insert a lamp, the padlock 34 is unlocked and the wire guard 17 is swung downwardly about its hinge 35, after which the lamp can be removed or inserted through the opening controlled by the wire guard.

While I have shown but one form of my invention, it is obvious it may be embodied in other forms covered and defined by the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the U. S. is:—

1. A high-way lighting unit comprising

means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means for reflecting the light rays incident thereon as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means for reflecting rays of light incident thereon through the inner open end of that wing portion which is farthest from it.

2. A high-way lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected through that wing portion which is farthest from it.

3. A high-way lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected through the inner open end of that wing portion which is farthest from it and thence through the open side of said farthest wing portion to illuminate that portion of the highway which is not illuminated by said beams of light, the axes of said wing portions intersecting at an angle to the center of the source of light.

4. A high-way lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected in planes parallel to or coinciding with the medial plane of the four reflector members through the inner open end of that wing portion which is farthest from it and thence through the open side of said farthest wing portion to illuminate that portion of the highway which is not illuminated by said beams of light, the rays reflected from said intermediate reflector member lying substantially in planes parallel to or coinciding with the medial plane of the four reflector members.

5. A high-way lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected through the inner open end of that wing portion which is farthest from it and thence through the open side of said farthest wing portion to illuminate that portion of the highway which is not illuminated by said beams of light, said reflector means being mounted so that the wing reflector members extend substantially horizontally and so that the medial plane of the four reflector members is inclined.

6. A high-way lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form

of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected through the inner open end of that wing portion which is farthest from it and thence through the open side of said farthest wing portion to illuminate that portion of the highway which is not illuminated by said beams of light, said reflector means being mounted so that the wing reflector members extend substantially horizontally and so that the medial plane of the four reflector members is inclined, said means for supporting the source of light comprising a lamp socket mounted above and adjacent said intermediate reflector member.

7. A highway lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected through the inner open end of that wing portion which is farthest from it and thence through the open side of said farthest wing portion to illuminate that portion of the highway which is not illuminated by said beams of light, said reflector means being mounted so that the wing reflector members extend substantially horizontally and so that the medial plane of the four reflector members is inclined, said means for supporting the source of light comprising a lamp socket mounted above and adjacent said intermediate reflector member, and an inverted dish housing enclosing said socket and overlying the junction between said intermediate reflector portions and said wing reflector portions.

8. A highway lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair,

the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected through the inner open end of that wing portion which is farthest from it and thence through the open side of said farthest wing portion to illuminate that portion of the highway which is not illuminated by said beams of light, said reflector means being mounted so that the wing reflector members extend substantially horizontally and so that the medial plane of the four reflector members is inclined, and means for adjusting said device to vary the inclination of said medial plane.

9. A highway lighting unit comprising means for supporting a source of light and reflector means for controlling the light distribution, comprising two pairs of concave reflector members, one pair being located intermediate the members of the other pair, the outer pair of members being in the form of trough-like wings extending in substantially opposite directions from the light center, each of said trough-like wings having an open side and open ends, and having means to cause the light rays incident thereon to be reflected substantially as a beam through the outer open end thereof whereby the two wings throw two beams of light in substantially opposite directions, each of the intermediate reflector members having means to cause rays of light incident thereon to be reflected through the inner open end of that wing portion which is farthest from it and thence through the open side of said farthest wing portion to illuminate that portion of the highway which is not illuminated by said beams of light, said reflector means being mounted so that the wing reflector members extend substantially horizontally and so that the medial plane of the four reflector members is inclined, said means for supporting the source of light comprising a lamp socket mounted above and adjacent said intermediate reflector member, said reflector means having an opening underneath the lamp to permit the insertion or removal of the lamp and the closure for said opening.

In witness whereof, I have hereunto subscribed my name.

REUBEN B. BENJAMIN.