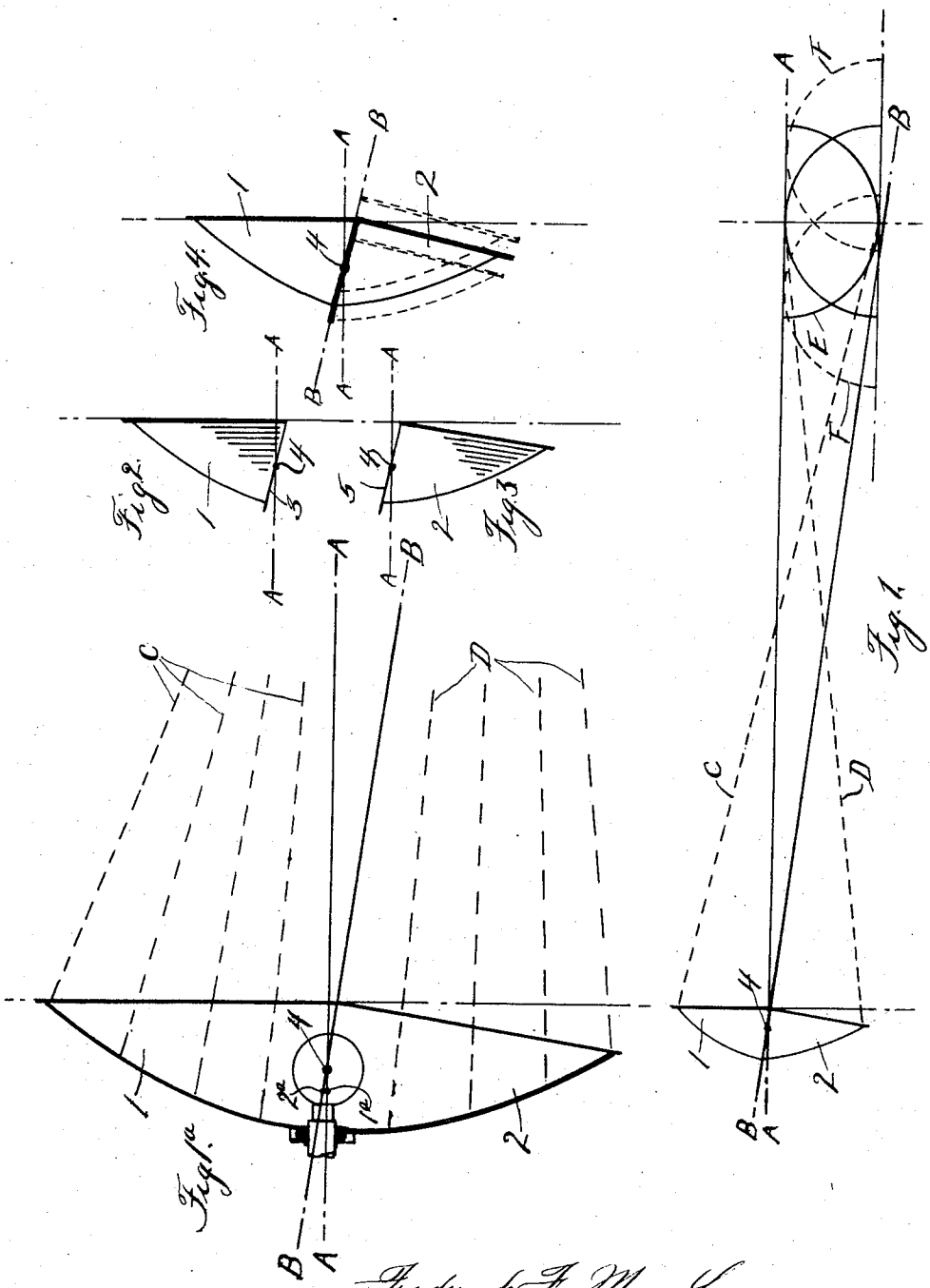
April 13, 1926. 1,580,314

F. F. MacLEAN

REFLECTOR FOR HEADLIGHTS

Filed June 12, 1923 3 Sheets-Sheet 1



Frederick F. MacLean INVENTOR.

BY

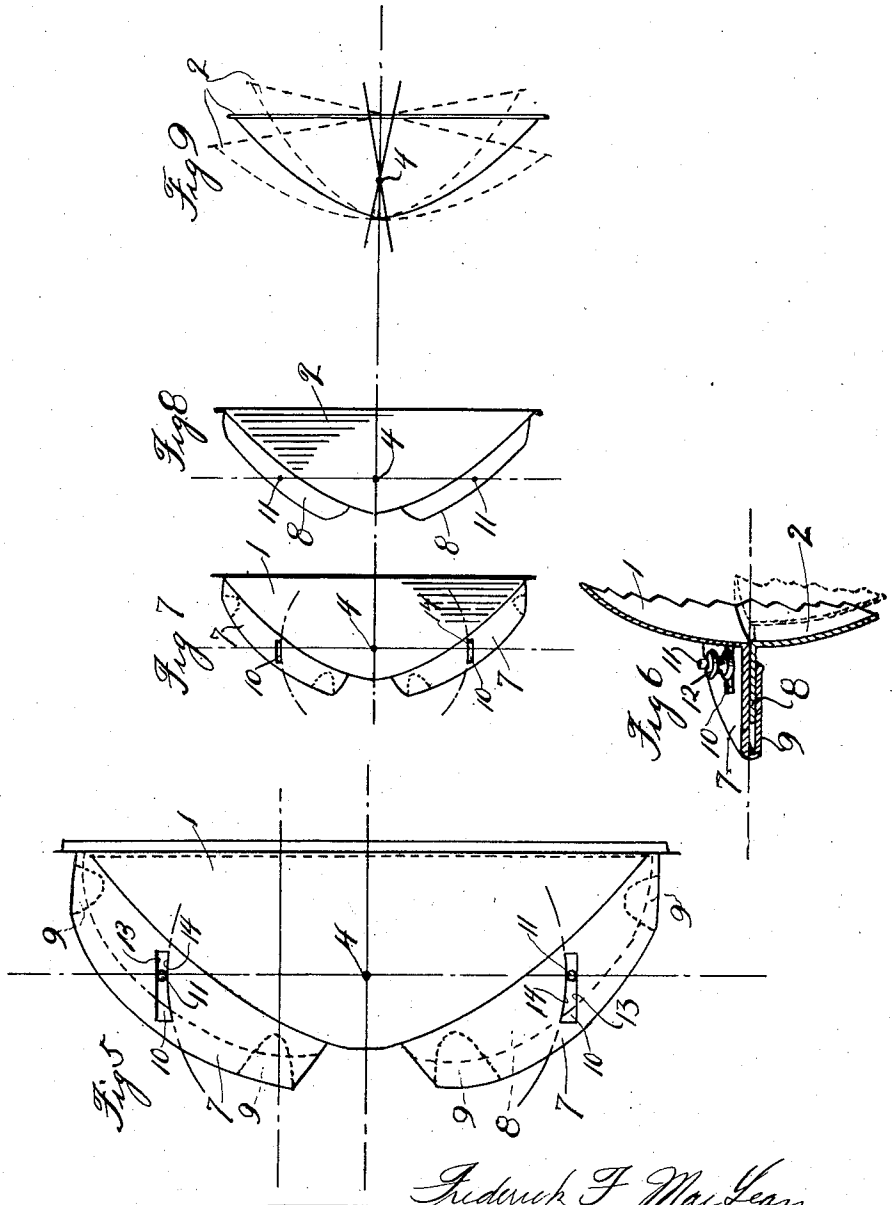
Parmele & Bodell ATTORNEY.

April 13, 1926. 1,580,314

F. F. MacLEAN

REFLECTOR FOR HEADLIGHTS

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Frederick F. MacLean INVENTOR.

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April 13, 1926. 1,580,314

F. F. MacLEAN

REFLECTOR FOR HEADLIGHTS

Filed June 12, 1923 3 Sheets-Sheet 3

Fig 10

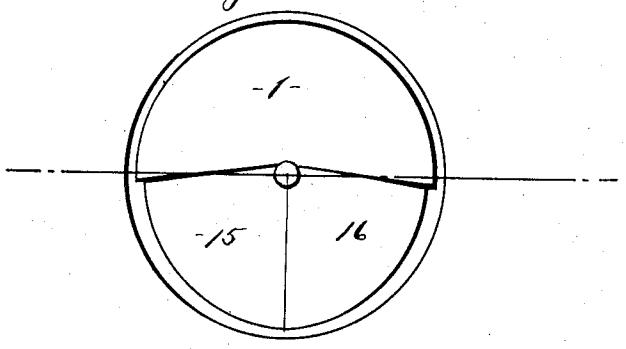


Fig 12

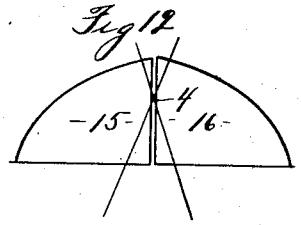


Fig 11

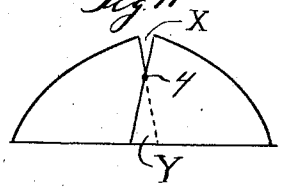


Fig 13



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Patented Apr. 13, 1926. 1,580,314

UNITED STATES PATENT OFFICE.

FREDERICK F. MacLEAN, OF SYRACUSE, NEW YORK, ASSIGNOR TO BELVA S. MacLEAN, OF SYRACUSE, NEW YORK.

REFLECTOR FOR HEADLIGHTS.

Application filed June 12, 1923. Serial No. 644,889.

To all whom it may concern:

Be it known that I, FREDERICK F. MacLEAN, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Reflector for Headlights, of which the following is a specification.

This invention has for its object a reflector particularly applicable for headlights for automobiles and other motor vehicles, by which the light rays projected from the upper and lower halves of the parabolic reflector are projected below the horizontal plane of the center of the reflector, (or any other predetermined horizontal plane) and merge, focus, or spot below such plane at a predetermined distance in advance of the headlight, and in which the upper and lower halves have different axes which intersect in front of the true focal points of such halves and in which the axis of the upper half is horizontal and that of the lower half is inclined downwardly, so that, when the source of light is arranged at such intersection of the axes in advance of the true focal points, the rays from the upper half are projected downwardly below the horizontal plane of the horizontal axis of the upper half, and the rays from the lower half are likewise projected below such horizontal plane.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings, in which like characters designate corresponding parts in all the views.

Figure 1 is diagrammatic view of the reflector showing the projection of the light rays from the upper and lower halves of the reflector.

Figure 1ª is an enlarged fragmentary diagrammatic view similar to Figure 1.

Figure 2 is an elevation of the upper half of the reflector.

Figure 3 is an elevation of the lower half.

Figure 4 is an elevation of the upper and lower halves assembled, showing the forward and rearward adjustment of the lower half.

Figure 5 is a plan view of the reflector.

Figure 6 is a fragmentary sectional view of parts seen in Figure 5.

Figures 7 and 8 are respectively a plan view of the upper and lower halves of the reflector.

Figure 9 is a diagrammatic view, illustrating the various lateral adjustments of the lower half of the reflector.

Figure 10 is a face view of a reflector in which the right and left quarters of the lower half are arranged with the focal axes diverging laterally, as well as including downwardly and intersecting in advance of the true focal point.

Figures 11 and 12 are diagrammatic views of duplicate quarters constituting the lower half of the reflector, the quarters being shown in Figure 11 as tilted inwardly about the vertical line of the intersection of the axes to arrange their focal axes to diverge outwardly.

Figure 13 is a similar view of the projection or spot from the reflector shown in Figures 11 and 12, in which the lower half is subdivided into quarters.

This reflector comprises upper and lower different nonduplicate halves 1, 2, having substantially the same parabolic curve, but different focal axes, which intersect in front of the true focal points or centers of the halves or sections, the upper half being a half of the reflector divided along a line arranged in a plane inclining downwardly relatively to the plane of the focal axis of such half and intersecting the plane of such focal axis of the upper half in front of the focal point, and the lower half is substantially the half of a reflector divided along the horizontal plane of the focal axis so that when the upper and lower halves are brought together, the lower edge of the upper half inclines downwardly from rear to front when the plane of the front edge of the upper half is vertical and the focal axis horizontal; and the focal axis of the lower half inclines downwardly relatively to the focal axis of the upper half, when the upper edge of the lower half meets the lower edge of the upper half. Thus the upper and lower halves have different focal axes, which intersect in front of the true center or centers of the parabolic curves. The source of light is placed at such intersection.

For regular equipment, the reflectors are formed or stamped from one piece with respect to their upper and lower halves and

the lower front edge of the lower half is brought out or extended to the vertical plane of the front edge of the upper half. Hence, the lines or meeting edges of the sections are theoretical. But for applying this reflector to headlights now in use on motor vehicles, that is, headlights that are not now standard equipment, the reflectors may be formed in separable sections in order to adjust the sections to the conditions of the particular headlight and car to which the reflector is being adapted and such meeting edges are real.

1 and 2 are respectively the upper and lower halves of the parabolic reflector, the upper half having its lower edge 3 located in a plane inclined downwardly and forwardly relatively to the focal axis A, A, of the upper half and intersecting such axis at 4, and the lower half 2 has its upper edge 5 arranged in a plane containing the focal axis B, B, of the lower half, so that, when the lower half 2 is assembled with the upper half with its real or theoretical upper edge against the lower inclined real or theoretical edge 3 of the upper half 1, such upper edge of the lower half is inclined and the focal axis of the lower half inclines downwardly relatively to the axis of the upper half and intersects at 4. This intersection 4 is in advance of the true focal points or centers 1^a and 2^a of the halves 1 and 2. Thus, the rays of light are projected from the upper half in downwardly inclined directions, as indicated by the lines C, Fig. 1, and the light rays are projected from the lower half 2 along lines D, but lines C, and lines D, converge as the source of light is placed at the intersection 4 of the axes A—A, B—B, of the upper and lower halves and such intersection is slightly in front of the true focal points of the upper and lower halves. However, both upper and lower halves have the same light center at 4 and the projections from the upper and lower halves merge or fall, one on top of the other or "spot" as shown in Figure 1, in which the projection from the upper half 1 is indicated by the semi-circle E and from the lower half by the semi-circle F.

As before stated, reflectors furnished as regular equipment are formed in one piece, but for attachments for headlights, now built, the reflectors might be furnished with the upper and lower halves separable and the lower half adjustable forwardly and rearwardly and also to swing laterally, but maintaining the axes of the halves in such relation that they intersect at a point where the source of light can be placed.

As seen in Figures 2, 3, 4, 5, 6, 7, and 8, especially Figs. 5 and 6, upper and lower halves are formed with flanges 7 and 8 at their meeting edges, the flange 7 of the upper half having a portion 9 bent into a position opposite the main portions of the flange 7 forming a channel for receiving the flange 8 and one of these flanges, as the flange 7, is formed with slots 10 and the other flange 8 with pins 11, passing through the slots and on which clamping nuts 12 turn. Each slot 10 has an outer wall 13 substantially parallel to the focal axis of the upper half and an inner wall 14 struck in an arc from the intersection point 4. By loosening the nuts 12, the lower half 2 can be moved backwardly or forwardly along the inclined lower edge 3 of the upper half and the intersection point 4 adjusted along the horizontal axis of the upper half, and also the lower half can be swung to the right or left slightly about a vertical line passing through the intersection 4 to cause its projection F, Figure 1, to locate to the right or the left, as indicated in dotted lines, Figure 1. The purpose of this adjustment is to adjust the headlight so as to throw light on the side or heel of the road and at the side of the road.

In Figure 9, the lateral adjustment of the lower half is indicated in dotted lines.

In Figure 10, the lower half of the reflector is shown as subdivided into right and left quarters 15, 16. These quarters are different or non-duplicate quarters, although each is substantially a quarter of two reflectors of the same size and form, and the axes of both quarters intersect at the point 4. Thus, the horizontal axis of the upper half and the downwardly and laterally inclined axes of the lower quarters intersect at 4.

When the lower half is formed in like quarters, the rear portions thereof, back of a vertical line passing through the point of intersection 4 would separate from each other, as at X, Figure 11, if the quarters were exact duplicates and the front portions in front of such vertical line would lap, as at Y. Therefore, in laying out these quarters, they are filled up at X, back of said vertical line so that their edges meet, and the lapped portion at Y, cut away so that the edges meet here also. However, in manufacturing for regular equipment, the headlight is stamped from one piece, and as the curves are true parabolic curves the dies are easily laid out.

The projection from the upper half and lower quarters of the reflector are illustrated in Figure 13, in which E represents the projection from the upper half of the reflector and F^1 and F^2 show the projections from the lower quarters.

By my reflector the rays of light are all projected below a certain so-called glare line and also the projections from all parts of the reflector are focused on one substantial "spot" with the rays of light from the lower half spread laterally to light up the heel and sides of the road and ditches and foot paths, etc., along the road.

By my reflector all the light from the

upper or lower halves is thrown on the road and is not dimmed or widely diffused, and owing to the fact that the projections from both upper and lower halves lap or are projected, one on the other, the maximum driving light is obtained, and furthermore, owing to such projection of the light from both halves one on the other and below a predetermined glare line, there are no glaring rays which strike the eyes of the driver of approaching cars or of pedestrians, except perhaps for an instant when two cars are approaching the crown of a hill from opposite directions. Furthermore, owing to the lateral adjustment of the lower half, or the lateral arrangement of the lower quarters, the space along the sides of the road is well lighted.

What I claim is:

1. A concave reflector for headlights, comprising upper and lower unlike halves, the upper half being arranged with its axis horizontal and having its lower edge extending downwardly in a plane at an incline to the horizontal plane of the focal axis of the upper half, the lower half being arranged with its axis inclined downwardly and intersecting the horizontal axis of the upper half within the reflector, and having its upper edge arranged in a plane coincident with and containing the axis of such lower half, such upper edge of the lower half joining the inclined lower edge of the upper half, in combination with a source of light arranged substantially at such intersection of the axes whereby the projections of the halves are thrown one upon the other.

2. A parabolic reflector for headlights comprising upper and lower unlike halves, having the same parabolic curve, the upper half having its lower edge extending downwardly in a plane at an incline to the horizontal plane of the focal axis of the upper half, and the lower half having its upper edge arranged in a plane coincident with and containing the focal axis of such lower half, such upper edge of the lower half meeting the inclined lower edge of the upper half and such halves being so arranged that their axes intersect, in front of the true focal points of the halves, in combination with a source of light arranged substantially at such intersection.

3. A parabolic reflector for headlights comprising upper and lower different, unlike halves, having the same parabolic curve, the halves being separable, the upper half having its lower edge extending in a plane at an inclined angle to the plane of the focal axis of the upper half and the lower half having its upper edge arranged in a plane coincident with the focal axis of the lower half and meeting the inclined lower edge of the upper half and arranged so that the upper and lower halves have different focal axes and the focal axis of the lower half inclines downwardly relatively to the focal axis of the upper half and intersects the axis of the upper half in advance of the true focal points of the halves, the lower half being slidable along the lower edge of the upper half to shift the point of intersection and means for holding the lower half in its adjusted position, substantially as and for the purpose specified.

4. A parabolic reflector for headlights comprising upper and lower different, unlike halves, having the same parabolic curve, the halves being separable, the upper half having its lower edge extending in a plane at an inclined angle to the plane of the focal axis of the upper half and the lower half having its upper edge arranged in a plane coincident with the focal axis of the lower half and meeting the inclined lower edge of the upper half and arranged so that the upper and lower halves have different focal axes and the focal axis of the lower half inclines downwardly relatively to the focal axis of the upper half and intersects the axis of the upper half in advance of the true focal points of the halves, the lower half being slidable along the lower edge of the upper half to shift the point of intersection, means for holding the lower half in its adjusted position, and means to adjust the lower half about an upright axis, passing through the intersection of the axes to incline its focal axis laterally out of the vertical plane of the focal axis of the upper half, substantially as and for the purpose set forth.

5. A parabolic reflector for headlights comprising upper and lower different unlike halves having the same parabolic curve, the upper half having its lower edge extending in a plane at an inclined angle to the plane of the focal axis of the upper half and the lower half having its upper edge arranged in a plane coincident with the focal axis of such lower half and slidably engaging the inclined lower edge of the upper half, and such halves being so arranged that their axes intersect in advance of the true focal points of the halves, the upper and lower halves being formed with rearwardly extending flanges near their meeting edges, which flanges lap each other and the flanges on one of said halves being each formed with a slot and the flanges on the other having pins extending through the slots, one side of each slot being parallel to the focal axis of the upper half and the other side of each slot being in an arc struck from the intersection point of the axes and means for clamping the flanges together, substantially as and for the purpose described.

6. A reflector having upper and lower portions of the same parabolic curve and arranged so that the axis of the upper half

is horizontal and the axis of the lower half is inclined downwardly out of the horizontal, and intersects the axis of the upper half in advance of the true focal points of the halves, whereby the rays from the upper and lower halves are projected below the axis of the upper half of the reflector when the source of light is at the intersection of the axes, substantially as and for the purpose described.

In testimony whereof, I have hereunto signed my name, at Syracuse, in the county of Onondaga, and State of New York, this 31st day of May, 1923.

FREDERICK F. MacLEAN.