Aug. 5, 1924.

1,504,017

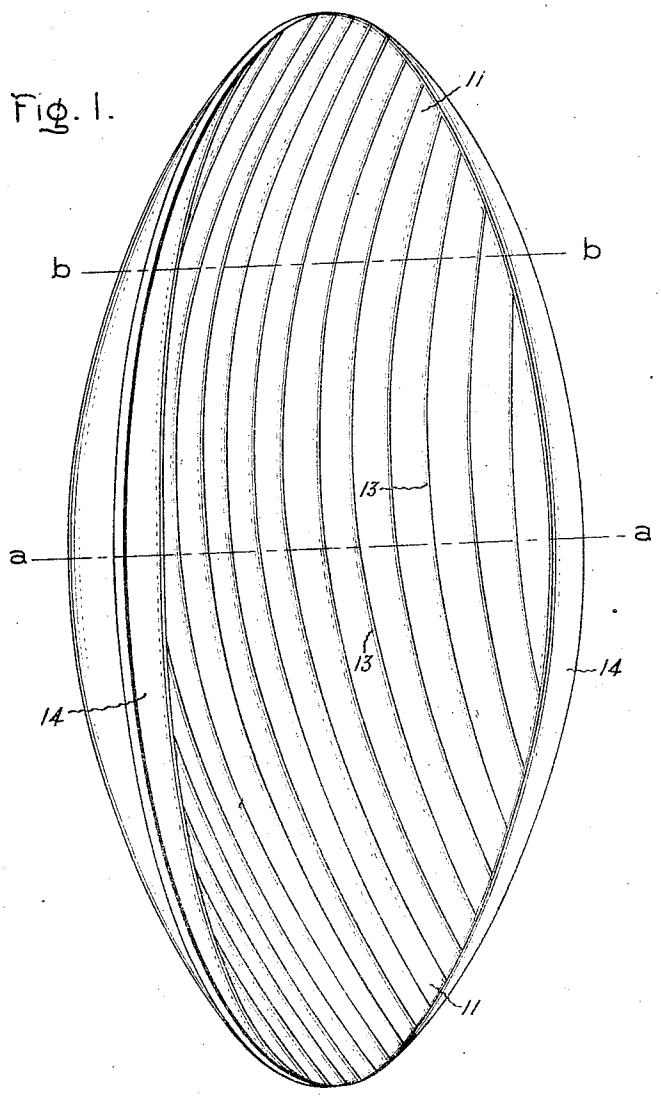
P. S. BAILEY

REFLECTOR

Filed Feb. 2, 1921

3 Sheets-Sheet 1

Fig. 1.



Inventor:
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by Adams & Adams
His Attorney

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Fig. 2.

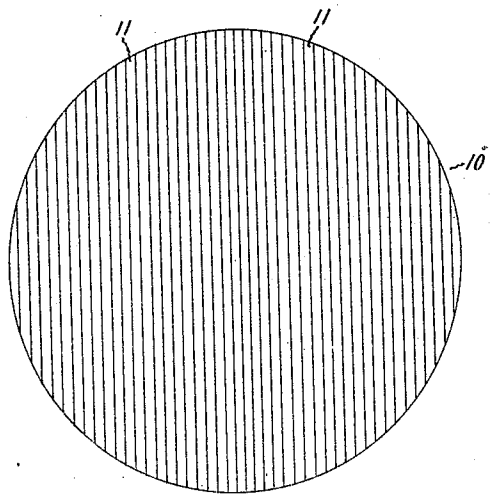


Fig. 3.

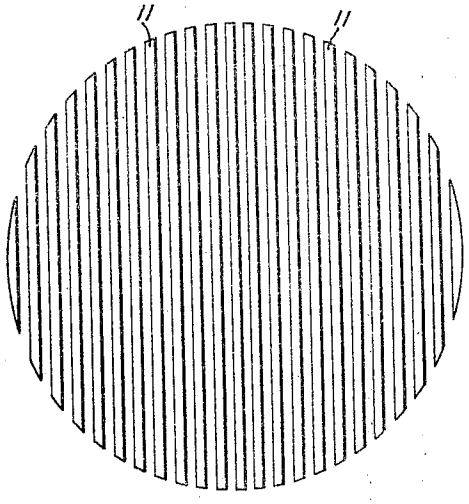
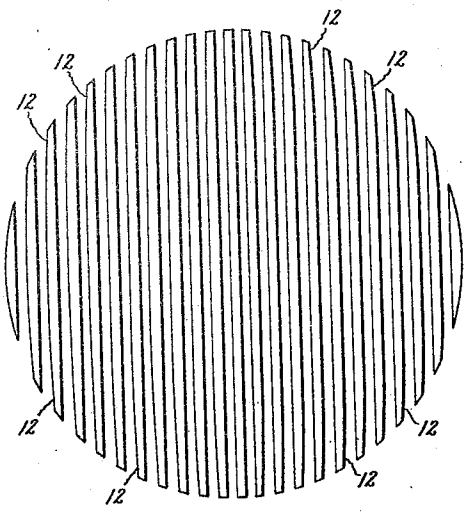


Fig. 4.



Inventor:
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1,504,017

P. S. BAILEY

REFLECTOR

Filed Feb. 2, 1921

3 Sheets-Sheet 3

Fig. 5.

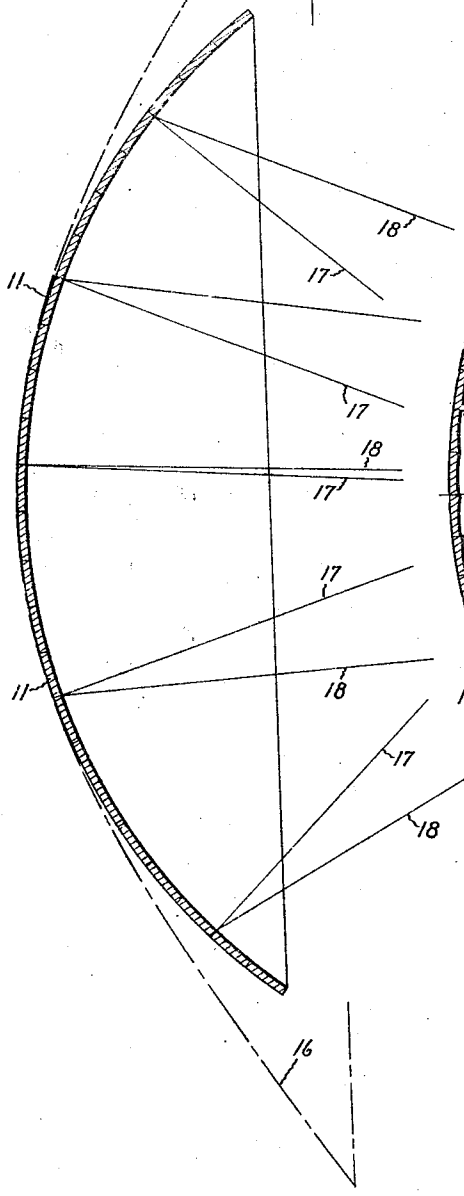
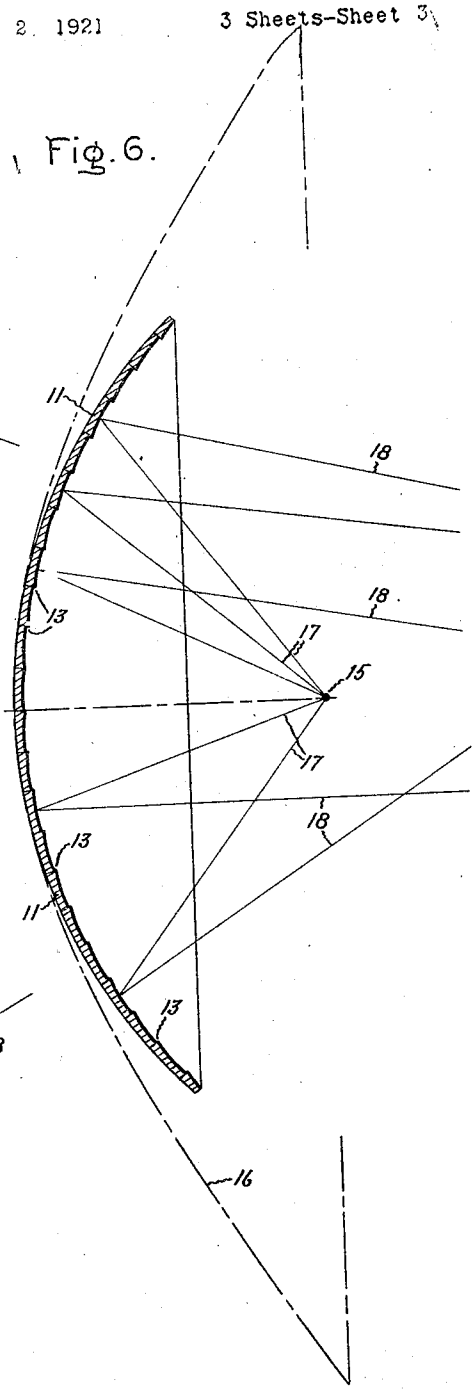


Fig. 6.



Inventor:
Percy S. Bailey,
by Albert G. Davis
His Attorney

Patented Aug. 5, 1924. 1,504,017

UNITED STATES PATENT OFFICE.

PERCY S. BAILEY, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

REFLECTOR.

Application filed February 2, 1921. Serial No. 441,941.

To all whom it may concern:

Be it known that I, PERCY S. BAILEY, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Reflectors, of which the following is a specification.

My invention has reference to improvements in reflectors designed to give a widely spreading narrow beam, or a so-called sheet light, that is, a beam which is narrow in one plane and wide in the plane at right angles to the same.

Such reflectors may be employed for illuminating signs, and the like, where it is desired to keep the adjacent zone in darkness. Or they may be used to illuminate the ground without projecting glaring rays upwardly, such as in landing fields for aviators, or in automobile headlights.

I accomplish this result by providing a novel reflector having a number of adjacent parabolic surfaces extending in one general direction to project a narrow bunch of parallel rays in one direction, and these surfaces are laterally so arranged as to produce a widely spreading beam in the general direction at right angles to the parallel rays.

My invention will be better understood from the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings, Fig. 1 is a perspective view of my reflector; Figs. 2, 3 and 4 illustrate several steps in the manufacture of my reflector; Fig. 5 is a section taken on the line *a*—*a* of Fig. 1 with reflected rays of light illustrated; and Fig. 6 is a view similar to Fig. 5 taken on the line *b*—*b* of Fig. 1.

Referring to the drawings, a surface of revolution such as a paraboloid 10 is cut into a number of zones or sections 11 on lines parallel to the axis as indicated in Fig. 2. These sections are shown as of equal width, although their widths may vary. Preferably an odd number of sections are cut and the even numbered or interstitial sections removed, as shown in Fig. 3; however, the odd numbered sections could be removed if desired. The remaining sections 11 are arranged parallel on a curved form whose curvature is selected with the view of obtaining from the reflector the desired lateral spread of light; the curvature may be circular, elliptical or parabolic. The curved form may be a simple circular hoop of suitable diameter. I do not limit myself to any particular number of sections since this number is determined by the width of the sections and by the particular cross sectional curvature adopted.

The parabolic sections are assembled side by side on the hoop or other form like the staves of a barrel, with their middle portions in contact. By reason of the fact that only the alternate sections are used, these sections, while in contact at their middle or equatorial points will overlap at all other points of their meridional length, the amount of overlapping increasing from the middle points to the ends. In addition thereto, each section following the central section on each side will appear as stepped down from the preceding section. In order to rectify the overlaps, which could not be tolerated, the sides of the sections, and preferably the sides not facing the central section, are trimmed off, as indicated at 12 in Fig. 4, so that each section will fit the next adjacent section without overlap. In this condition the sections will, of course, still be stepped from each other, and the gaps are filled out by well fitting ledges 13, indicated in section in Fig. 6, and by dotted lines in Fig. 1.

In practice molds or patterns of the parabolic sections are primarily made of stiff unyielding material, preferably of wood, and when trimmed for correction of overlap the sections are glued together and the well fitting ledges are also glued in their places. In this manner a mold is obtained from which any number of reflectors may be obtained by casting or electro-deposition. In the completed reflector the ledges 13 are of the same reflecting material as the parabolic sections and the effect

of these ledges is generally the same as that of the surfaces of the sections. After the sections 11 have been united in the manner described the reflector is provided with a flange 14, for convenience in mounting.

A source of light indicated by the numeral 15 is placed in the focus of the paraboloid 10; the contour of the paraboloid is indicated by the broken line 16, in Figs. 5 and 6. As I have hereinbefore pointed out, the alternate parabolic sections 11 are arranged parallel, in which positions they occupy planes parallel to the planes of their original positions, and form parabolic surfaces in one general direction, which is shown in Fig. 1 as vertical. In accordance with well known laws governing reflection from parabolic surfaces, rays of light proceeding from the focus 15 are reflected from these surfaces parallel to the axis of the paraboloid in this general direction. It has not been deemed necessary to indicate these parallel rays. In the general direction which is at right angles to the general direction just described, the reflecting surface is formed of the parabolic surfaces of the sections 11 arranged as a polygon inscribed in or circumscribed over a predetermined curve other than a parabola. Cross-sectional views of this surface are shown in Figs. 5 and 6.

In accordance with well known laws, all rays incident upon the polygonal surfaces are more or less equatorially reflected convergently toward the axis and diverge after crossing the axis. This is illustrated by the incident rays 17 and reflected rays 18. It will therefore be seen that in one general direction a narrow beam of parallel rays is obtained and in the general direction at right angles thereto a wide, laterally, spreading beam is obtained.

While I have described my invention as embodied in concrete form in accordance with the provisions of the Patent Statutes, it should be understood that I do not limit my invention thereto, since various modifications thereof will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A reflector having a reflecting surface comprising a series of alternate sections cut from one paraboloid on lines parallel to the major axis of the paraboloid and arranged side by side polygonally about a predetermined curvature.

2. A reflector having a reflecting surface comprising a series of alternate sections cut from one paraboloid on lines parallel to the major axis of the paraboloid, said sections assembled side by side polygonally about a predetermined curve and reflecting surfaces closing the gaps between the sections.

3. A reflector formed by a series of noncontiguous sections cut from one particular surface of revolution, said sections having their focal points displaced and non-coincident.

4. A reflector formed of a series of superimposed noncontiguous sections cut from one particular surface of revolution, the major axes of said sections located in a common plane, said sections in contact along a curve formed by the intersection of said plane and said sections the cut edges all lying in parallel planes.

5. A reflector constructed with zones from a particular surface of revolution which is cut, by a series of planes all parallel to a plane through the major axis of said surface, into said zones and alternate interstitial areas and which zones remain after the interstitial areas are removed, said remaining zones drawn together to reduce the interstitial gaps.

6. A reflector constructed with zones from a particular surface of revolution which is cut, by a series of planes all parallel to a plane through the major axis of said surface, into said zones and alternate interstitial areas and which zones remain after the interstitial areas are removed, said remaining zones drawn together to reduce the interstitial gaps while maintaining the parallel relation of the planes through the cut edges of said remaining zones.

7. A reflector constructed with zones from a particular surface of revolution which is cut, by a series of planes all parallel to a plane through the major axis of said surface, into said zones and alternate interstitial areas and which zones remain after the interstitial areas are removed, said remaining zones drawn together to reduce the interstitial gaps while maintaining the parallel relation of the planes through the cut edges of said remaining zones and surfaces connecting the adjacent cut edges of adjacent zones.

8. A reflector constructed with zones from a particular surface of revolution which is cut, by a series of planes all parallel to a plane through the major axis of said surface, into said zones and alternate interstitial areas and which zones remain after the interstitial areas are removed, said zones in contact along the curve formed by the intersection with the said zones of a plane through the said major axis which plane lies perpendicular to said last mentioned plane.

9. A reflector constructed with zones from a particular surface of revolution which is cut, by a series of planes all parallel to a

plane through the major axis of said surface, into said zones and alternate interstitial areas and which zones remain after the interstitial areas are removed, said remaining zones drawn together to reduce the interstitial gaps, said zones in contact along a curve formed by the intersection with the said zones of a plane through the said major axis which plane lies perpendicular to said last mentioned plane.

In witness whereof, I have hereunto set my hand this 29th day of January, 1921.

PERCY S. BAILEY.