Dec. 3, 1929. L. C. LAURENT 1,738,304

REFLECTOR FOR AUTOMOBILE HEADLIGHTS

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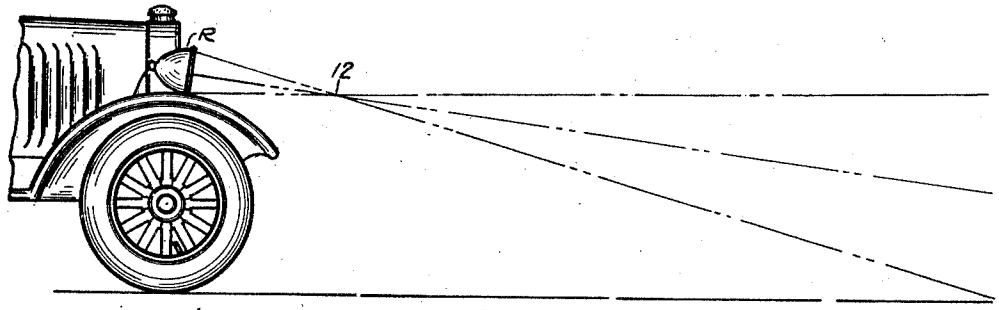


Fig. 4.

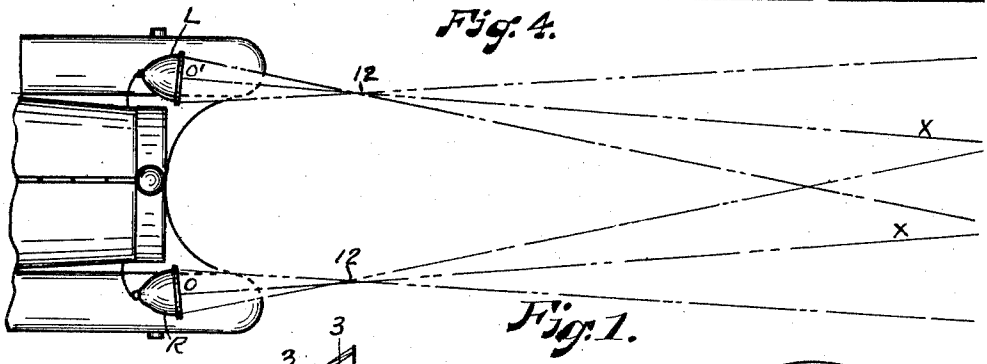


Fig. 1.

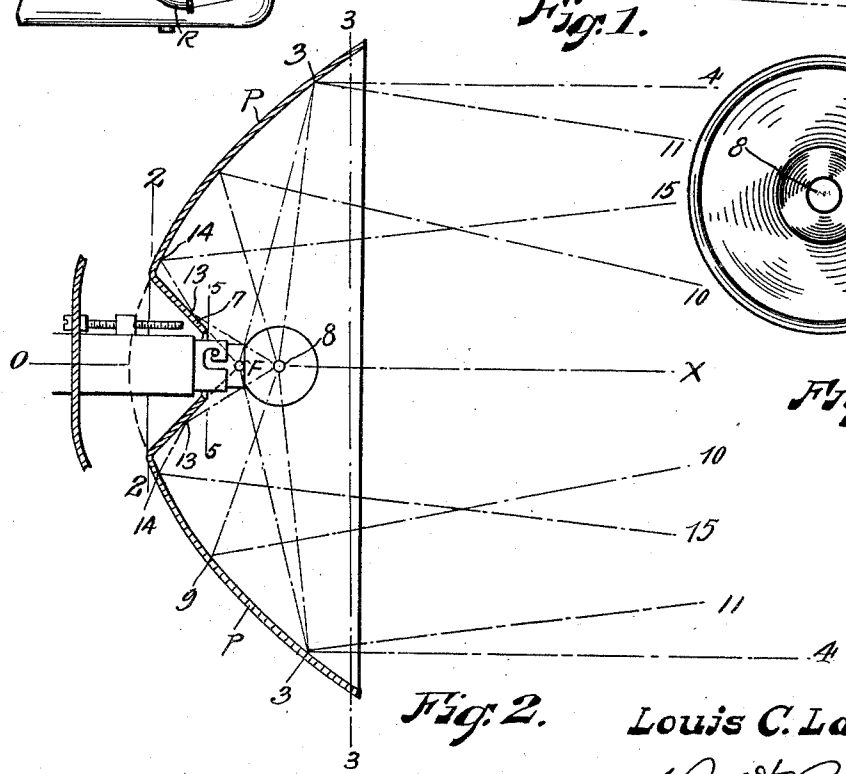


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE

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REFLECTOR FOR AUTOMOBILE HEADLIGHTS

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This invention relates to improvements in reflectors for automobile headlights.

It is well known to all who have occasion to drive automobiles after dark that the glare from the headlights of approaching automobiles is most annoying and it is easy to understand how serious accidents often occur from this cause.

I have found from a series of experiments that, with the usual form of paraboloidal reflectors, now almost universally used, the greater part of the objectionable glare comes from the central portion of the reflector which therefore, instead of being of service in producing useful illumination is actually highly objectionable.

It is the object of this invention to produce a reflector which shall be so constructed that the central glare emitting portion will not reflect harmful rays but will rather assist in producing useful road illumination.

The ordinary reflector is so constructed that a section taken on any plane passing through the axis is a parabola. One of the properties of a parabolic reflector is that all rays of light which enter it parallel with its axis will be reflected so as to intersect each other at a point located on the axis, which point is known as the focal point of the parabola. Conversely, light originating at the focal point will be reflected as a cylindrical beam parallel with the axis of the parabola. As an automobile headlight reflector is only about eight inches in diameter, it is evident that satisfactory road illumination cannot be obtained with the source of light at the focal point. It is therefore the usual practice to adjust the lamp to such a position that the filament lies either to the front or to the rear of the focal point as it is thereby possible to obtain any desired dispersion of the light. If the source of light is to the front of the focal point, the reflected rays will emerge from the reflector as a cone whose apex lies to the front and this is known as a convergent ray adjustment. If the light is between the focal point and the reflector, the light will issue as a cone whose apex lies to the rear of the reflector. This is termed a divergent ray adjustment. With the light at the focal point, there will be no reflected rays that will cause a blinding glare to anyone outside of the narrow cylindrical beam but as soon as the light is moved away from the focal point, glare points will develop especially at that part of the reflector immediately surrounding the axis.

It is the object of this invention to so modify the construction of the reflector that all possibility of glare from the central part of the reflector will be eliminated and at the same time all of the light generated by the lamp utilized.

The above and other objects which will become apparent as the description proceeds are attained by means of a construction which I will now describe in detail, reference for this purpose being had to the accompanying drawing in which the invention has been illustrated and in which:

Fig. 1 is a plan view showing the distribution of light from a pair of spaced headlight lamps provided with my improved reflectors;

Fig. 2 is a section of one of the reflectors, taken on an axial plane and showing the position of the source of light and the path of the rays;

Fig. 3 is a front elevation of one of the reflectors and shows the appearance of the reflector with the lamp lighted; and

Fig. 4 is a side elevation showing the vertical distribution of the light.

In the drawings R and L (Fig. 1) represent respectively the right and left headlights of an automobile which are equipped with my improved reflectors. In the drawing these headlights have been so arranged that their axes converge. The lines O, X and O′ X represent the axes respectively of the reflectors R and L. The arrangement shown in Fig. 1 may or may not be followed as it is possible to have the axes of the reflectors parallel and still obtain good results but in the experiments carried out by applicant, the best results were obtained with convergent axes.

As the invention resides in the reflector, I will now proceed to describe the same and for this purpose reference will now be had more particularly to Fig. 2 in which one of the reflectors have been shown in section.

The line O, X represents the axis of the parabola with respect to which the reflecting surface is symmetrical. That portion of the reflector forming the zone P bounded by planes 2 and 3 has circular cross sections in planes perpendicular to the axis O, X and parabolic cross sections in planes passing through the axis.

The point F lies on the axis O, X and is the focal point of the reflector. If a concentrated source of light is located at F the rays of light which impinge on the reflecting surface between planes 2 and 3 will be reflected in a direction parallel to the axis. One such ray is indicated by F. 3. 4. That portion of the reflector between the axis and the locus of the intersection of the reflector with plane 2—2, instead of following the dotted lines so as to complete the parabola, is made into a truncated cone whose base is formed by the plane 2 and whose top is formed by plane 5. The apex of the cone lies at the focal point F.

It is now evident that rays of light that originate at F cannot impinge on the conical surface but are projected parallel with it and impinge on the parabolic surface P.

It has been explained above, that satisfactory road illumination cannot be obtained with the source of light at the focal point and it is therefore necessary to adjust the lamp to such a position that the filament lies to the front of the focal point. In order to illustrate the path of the light with the lamp in one operative position, I have indicated the filament at point 8. Rays of light 8, 9 and 8, 3 impinge on the parabolic reflecting surface and are reflected as rays 9, 10 and 3, 11 which converge and cross at 12 (Fig. 1). Rays 8, 13 strike the conical reflecting surface at 13 and are reflected along lines 13, 14 to the reflecting surface P from which they are reflected along lines 14, 15, which, in the example shown, are slightly divergent. It is evident that the angles at which the light emerges can be varied slightly by moving the lamp along the axis but as long as the source of light is to the front of the focal point F the greater part of the light will emerge as convergent rays while that part that strikes the conical surface 7 will emerge as divergent or parallel rays, depending upon the position of the light source 8.

As no light rays will be reflected outwardly from the cone 7, the latter will appear as a dark ring like that shown in Fig. 3.

By properly adjusting the light source 8, a good illumination can be obtained on the road surface without any objectionable glare.

It is evident that if the source of light is moved to the rear of the focal point F a wholly different distribution of the light will take place as the rays that strike the parabolic surface P will then be reflected as a divergent cone. If the source of light is moved far enough to the rear of plane 5, no light will strike the inner surface of the reflector.

From the above it will be apparent that I have produced a reflector of simple construction in which no glare can come from the portion immediately surrounding the axis, and which therefore makes it possible to produce good road illumination without causing inconvenience to drivers of cars that travel in the opposite direction.

Having now described the invention, what is claimed as new is:

1. A headlight comprising a reflector having a continuous reflecting surface consisting of a parabolic zone and a forwardly projecting truncated cone whose axis coincides with the axis of the parabolic reflector and whose vertex coincides with the focal point of the latter, and a source of light located within the reflector in front of the focal point.

2. A headlight comprising a reflector having a reflecting surface consisting of a parabolic zone and a substantially conical truncated surface whose axis coincides with the axis of the parabolic surface and whose vertex lies substantially at the focal point of the parabolic reflector, and a lamp within the reflector with its source of light on the optical axis and in front of the focal point thereof.

In testimony whereof I affix my signature.

LOUIS C. LAURENT.