Feb. 14, 1933. J. L. LEHMAN 1,897,202

HEADLIGHT OR SEARCHLIGHT

Filed March 12, 1931

Fig. 1.

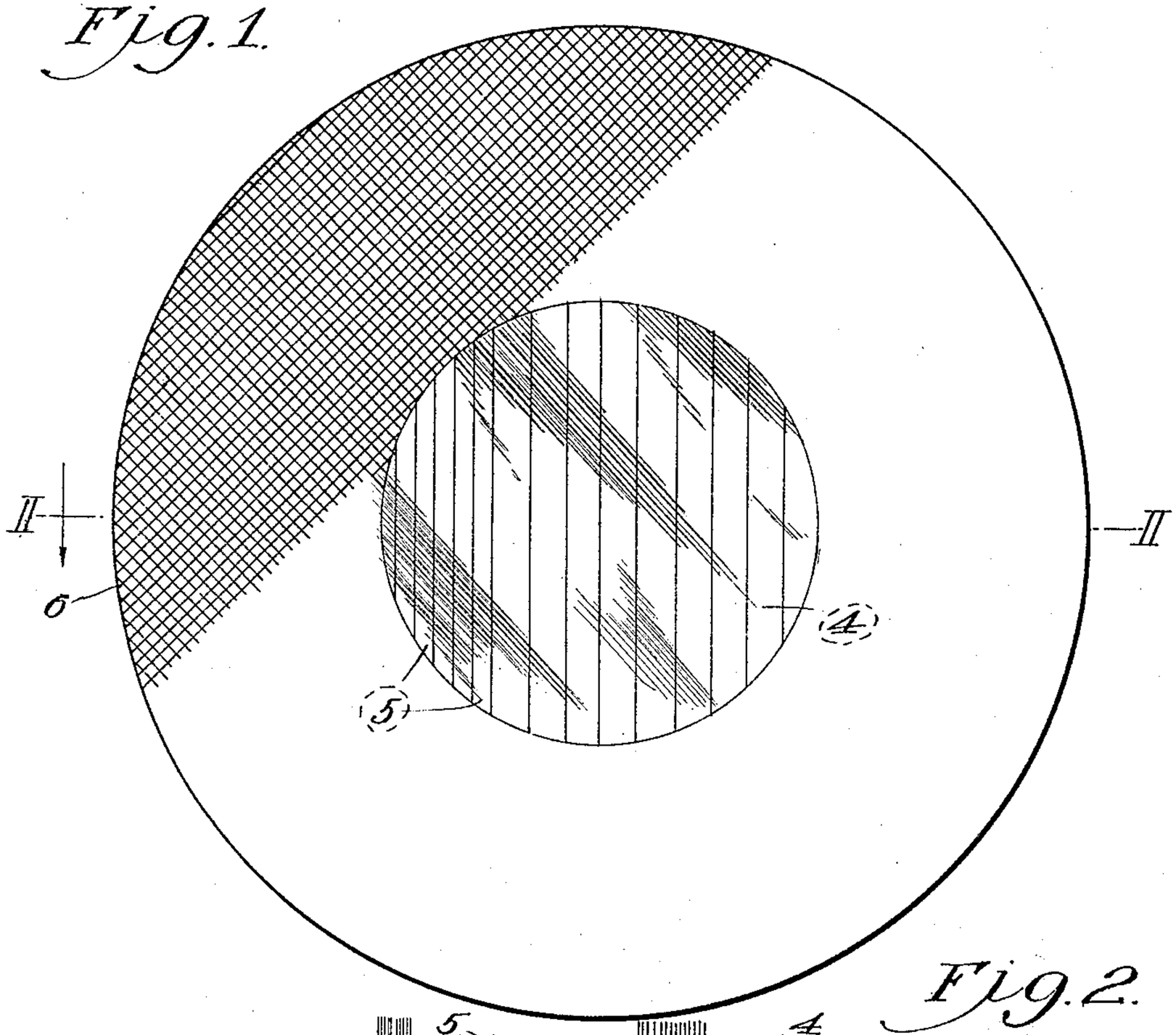

Fig. 2.

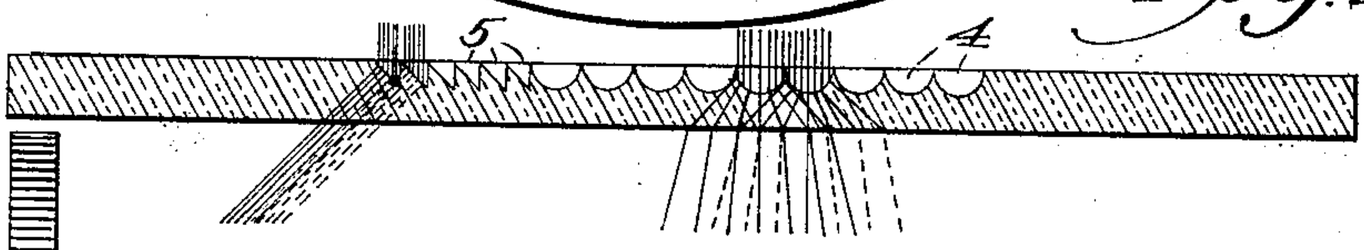

Fig. 6.

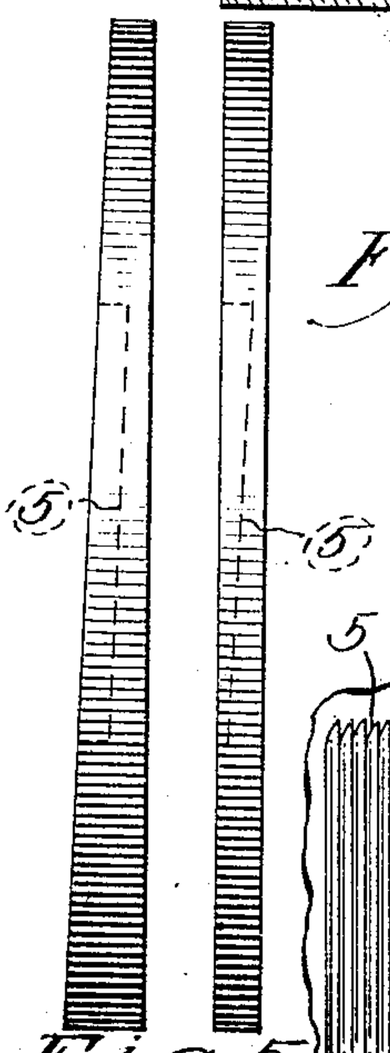

Fig. 5.

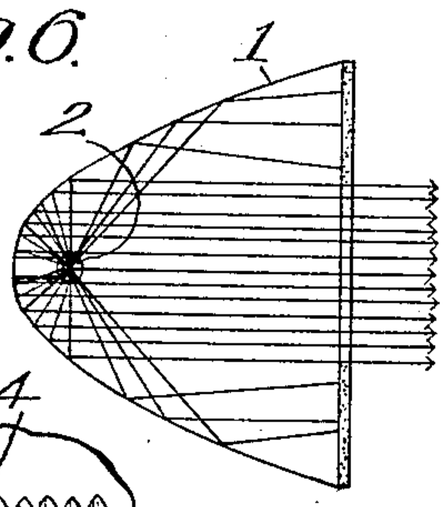

Fig. 3.

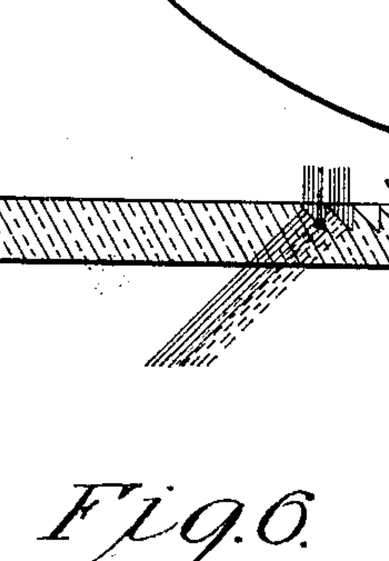

Fig. 7.

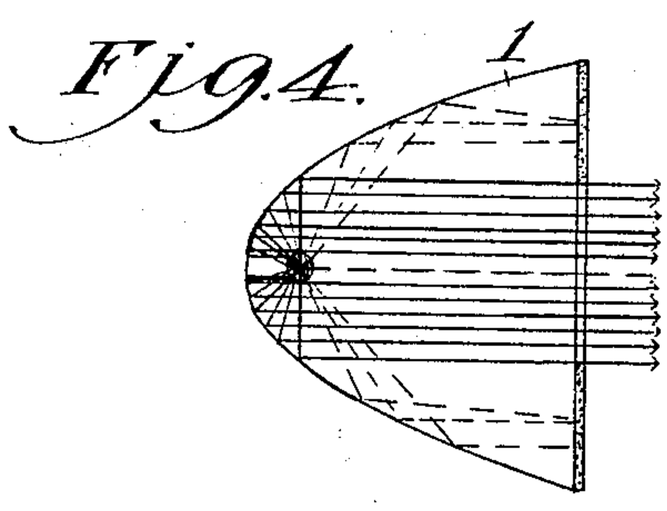

Fig. 4.

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UNITED STATES PATENT OFFICE

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HEADLIGHT OR SEARCHLIGHT

Application filed March 12, 1931. Serial No. 521,895.

This invention relates to head or search lights for either fixed or mobile use and is particularly adapted for motor car headlights where it is desirable to prevent glare in the eyes of approaching drivers or pedestrians, one of the chief objects of the invention being to make use mainly of the more effective beam produced by a parabolic reflector, and to so refract this beam as to throw a strong well defined light directly in front and a considerable distance ahead of the car and at the same time to provide a side beam or beams directed to the side or margin of the roadway for the clear illumination thereof.

The object of the invention is accomplished by directing and controlling the chief illuminating light beam, which has been found to always bear a fixed relation to the directrix and focus of a parabolic reflector. Actual experimentation has shown that the beam of light reflected from the closed end of a parabolic reflector, bounded by the line of intersection of the reflector and a plane through the focus at right angles to the horizontal axis, is, figuratively speaking, a solid mass of light, and may be termed a hot beam, and all the other rays outside of this area are more like and function as individual rays and consequently the illumination obtained from them is much less efficient.

It has further been discovered that if these said individual rays, which would otherwise be produced by the front area of the reflector are reflected or diffused and the center beam is properly refracted, that the most efficient and desirable illumination is produced. It has been found that the theoretical cross-sectional area of said center or hot beam is about 15% of the open end area of a parabolic reflector, but that the percentage of light in said beam is materially greater than the percentage of light reflected by the portion of the reflector ahead or in front of the above-defined area. This central beam has so large a volume of useful light that, in addition to adequate independent head-on illumination, there can also be sufficient and adequate side illumination, analogous to spot-lighting, through equipping the reflector with proper refractor means, such as the lens of the invention.

A further object of the invention is to produce a lens made of clear and transparent glass as distinguished from the more or less translucent glass as now commonly employed for automobile headlight lenses, the construction being such that a single contact single filament bulb will produce sufficient light for driving purposes and without glare in the eyes of approaching drivers or pedestrians, it being thus possible to produce a construction in which a single headlight, as for example, one mounted at the top of the radiator at the center-line of the car, will perform the function of the two headlights now employed, with a result that fully 50% of the wiring and connections now employed, will be saved.

With the objects mentioned in view and others as will hereinafter appear, the invention consists in certain novel and useful features of construction and organization of parts as hereinafter described and claimed; and in order that it may be fully understood, reference is to be had to the accompanying drawing, in which:—

Figure 1 is a view of a lens embodying the invention as it will appear for use with a standard bulb.

Figure 2 is a section on the line II—II of Figure 1, and indicates the spreading of the rays passing through a portion of the refracting area of the lens.

Figure 3 is a diagrammatic vertical section through a headlight to indicate the effect of the reflector and lens.

Figure 4 is a diagrammatic vertical section through a lens and is similar to Figure 3, but indicates the effect of a special bulb having its forward or front portion of translucent character.

Figures 5 and 6 represent side views of a modified lens, two forms being shown, to refract the forward beam in a downward direction.

Figure 7 is a reduced fragmental plan view similar to Figure 1, to illustrate a lens in which the refracting area has been ground rather than pressed or molded as in Figure 1.

Referring to the drawing in detail, 1 indicates the conventional parabolic reflector of a headlight having for its source of light ray emanation, an incandescent light bulb 2, shown in Figure 3 as of the conventional clear or transparent type, and in Figure 4 with its front half made translucent as by frosting or other treatment. As shown in Figures 3 and 4, for best results, the center of the filament is preferably at or slightly behind the focus of the parabolic reflector.

The transparent refracting area of the lens comprises a central field having an area at least as great as the area of the central beam of the light, said field being composed of a series of segmental or arcuate grooves 4 for directing a portion of the light beam directly in front of the car and at the same time throwing off some rays at an angle for short range side illumination, and a series of ratchet-shaped refracting grooves 5 disposed to the right or left, or at both sides of the central area, if a single headlight is employed, for illuminating the margins of the roadway, these side refracted rays functioning as a long range spot-light to highly illuminate the edges of the road for a comparatively long distance in front of the car.

In the drawing, it will be noted that the beam directly central or grooved transparent area is shown as of round shape with the grooves abruptly terminating at their extremities, the area of the lens surrounding said grooves being made transparent, translucent or refractory, according to the type of bulb and perfectness of the reflector. However, this central area may be ground if desired, in which case the grooves will terminate in tapering points as shown in Figure 7.

In the construction shown by Figure 5, the lens is made of wedge-shape or prismatic in vertical cross-section, so that the rays of light shall be refracted downwardly toward the roadway, or the same result may be accomplished with a lens of equal thickness throughout, but with the grooves or indentations cut or formed on inclined planes as shown in Figure 6.

With any of the construction described, it will be noted that the reflecting area of the reflector is substantially 15% of the total area of the open end of the parabolic reflector, this being the beam of light to which the invention is primarily directed, and that a portion of this beam is directed straight ahead of the car or refracted downwardly with a wedge-shaped or prismatic lens as described, while another portion of said beam is refracted either to the right or left, or to both sides, to provide a spot-light effect for the side margins of the roadway, while the non-efficient rays which are hard to control due to the irregularities mentioned, are diffused, either by a frosting or translucent area on the bulb itself or on the lens outside and surrounding the transparent central refracting area above-described.

From the above description, it will be apparent that while I have described and claimed the preferred embodiment of the invention, it is to be understood that I reserve the right to make all changes falling within the spirit of the invention and without the ambit of the prior art.

I claim:

1. A light comprising the combination of a parabolic reflector, and an electric light bulb, a lens closing the open end of the reflector and having a central refracting area corresponding in extent to the diameter of a beam of light reflected by that portion of the reflector rearward of a vertical line passing through the focus of the reflector, and a surrounding, diffusing or interrupting surface to prevent concentration of any light except that transmitted through the central refracting area, said central refracting area comprising a plurality of concave cylindrical portions to diffuse a fixed part of said light horizontally and a plurality of plane triangular prisms to produce a fixed concentrated lateral or side beam.

2. The combination in a headlight of a parabolic reflector and an electric light bulb in cooperative relation thereto, and a lens closing the open end of the reflector, said lens having two refracting areas facing the bulb, one of concave cylindrical nature adapted to widely diffuse the light horizontally and having in juxtaposition at one side of said cylindrical area, a series of upright plane triangular prismatic portions adapted to throw a lateral or side beam of concentrated character, the lens proper or said refracting areas being of prismatic nature in vertical section to direct both beams downwardly and the said refracting areas being surrounded by a diffusing area.

In testimony whereof I affix my signature.

JOHN L. LEHMAN.