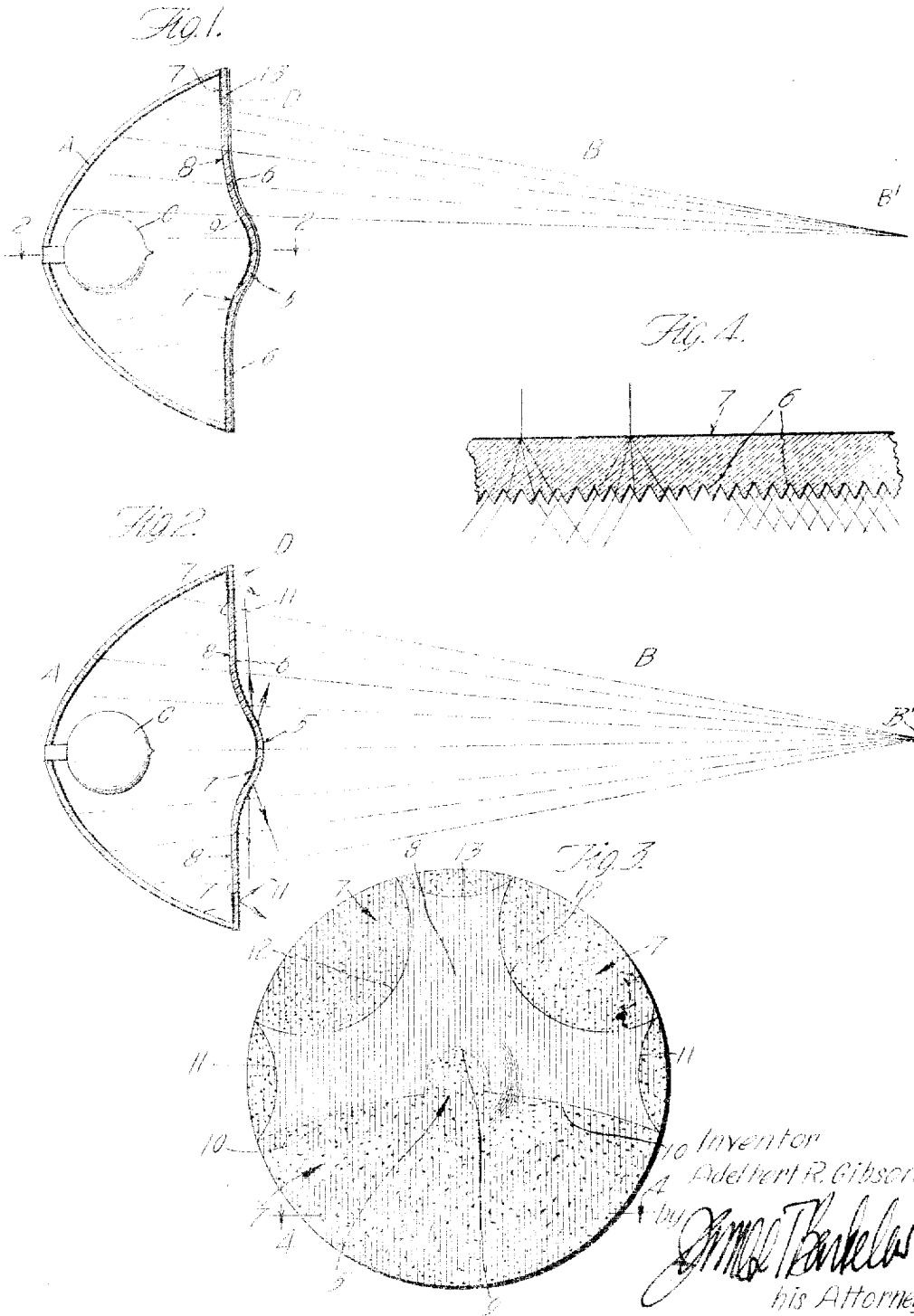


A. R. GIBSON.
HEADLIGHT LENS.
APPLICATION FILED JAN. 4, 1919.

1,846,705.

Patented July 13, 1920.



Inventor
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by *James B. Binkley*
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UNITED STATES PATENT OFFICE.

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TO ESSENTIALS MFG. COMPANY, A CORPORATION OF ILLINOIS.

HEADLIGHT-LENS.

1,346,705.

Specification of Letters Patent.

Patented July 13, 1920.

Application filed January 4, 1919. Serial No. 269,638.

To all whom it may concern:

Be it known that I, ADELBERT R. GIBSON, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Headlight-Lenses, of which the following is a specification.

This invention relates to a lens suitable for vehicle lamps and is particularly adapted for headlights.

A desideratum of vehicle headlights is first, the distribution of light so that the path ahead of the vehicle is illuminated over a comparatively broad transverse area with an intense part of the field of light at a considerable distance in advance of the vehicle; second the diffusion of the upper part of the light so that it is not intense enough to blind; and third, the production of a soft but thorough illumination immediately adjacent and to the sides of the lamp and vehicle.

The broad object of my invention is to provide a lens, which will distribute the light projected from a lamp in a manner just described. Another object of this invention is to provide a lens which will cause thorough illumination out directly to the side of the lamp; and will uniformly and brilliantly light a space which is rectangular in form, the edge of illumination at the side of the lamp being at one hundred degrees to the forward direction.

I accomplish these objects by means of the embodiment of my invention illustrated in the accompanying drawing, in which:

Figure 1 is a central vertical section through my improved lens with a reflector and lamp shown conventionally; Fig. 2 is a central section taken on the line 2-2 of Fig. 1; Fig. 3 is a front face view of the lens; and Fig. 4 is an enlarged fragmentary section taken on the line 4-4 of Fig. 3.

Referring more particularly to Figs. 1 and 2, a reflector A is shown directing rays B converging to a point B' ahead of the lamp. Disposed at the focus of the reflector is a lamp C, preferably an incandescent lamp. Covering the front of the reflector is my improved lens D.

Referring more particularly to the lens D, which is shown in all of the figures, the glass or other transparent body is circular in front and provided with a concentric dished portion, hereafter termed the bell.

The bell is indicated by 5, and its concave side is disposed toward the lamp. The entire outer face of the lens is provided with vertical corrugations 6 producing a fluted surface which has the general function of diverging or diffusing the light rays side-wise but not vertically.

Referring particularly to Fig. 3, the inner face of the lens is ground or frosted as indicated by 7 with the exception of a clear space or field 8 of peculiar shape. The lower boundary or base has an arcuate part 9, which is concentric with the lens but of less diameter than the bell. Curved lines 10 extend from the arcuate part of the edge of the lens and are disposed below the horizontal diameter. Broadly speaking, the clear field converges toward the top of the lens. In the specific form shown herein, there are side boundary lines 11 of curved form, which meet curved lines 12 of larger radius. The latter extend to the top of the lens and are joined by a top curved boundary line 13. The peculiar shape of the boundary lines with the exception of the general convergence toward the top is due to the convenience in the usual method of grinding the lens and is not essential to the invention.

It will be noted from an inspection of Figs. 1 and 2 that the light would be thrown by the reflector (alone) so as to converge in a point. The frosted inner surfaces of the lens diffuses the light which strikes those surfaces, while the vertical corrugations diffuse and refract the light horizontally. In general, the combination of frosted and fluted surfaces diffuse the light and spread it in a horizontal direction. However, there is a clear field 8 which has only the corrugations 6 thereon, and the light projected through this clear field is more intense, but it is also spread horizontally. The lower portion of the clear space permits the light to be thrown forward and intensely and widely illuminate the ground farthest in advance of the vehicle. The intensity decreases toward the upper portion of the lens due to the convergence of the clear field of the lens toward the top. Of those rays which would normally be thrown by the upper part of the reflector closest to the vehicle, the greater part are diffused by the upper part of the ground surfaces. The bell refracts the light so that the rays are directed transversely to the main beam and at very small

angles to the surface of the lens. Thus, light is thrown to the sides of the lamp in its immediate vicinity; as this action is particularly helped by the ground part at 9 on the bell which is in advance of the plane of the lens. This part also cuts off the direct forward glaring rays from the lamp C. The action of diffusion and reflection is indicated diagrammatically in Fig. 4. All rays striking the ground surface 7 are diffused and are thrown at different angles through the glass and against the front corrugations. Now these rays, being projected at different angles and striking the corrugation faces at different angles (see the left hand picture of Fig. 4), and the corrugation faces being in intersecting planes, the result is that rays of light are thrown out sideways from the corrugation faces at different angles and these rays cross and interfere with each other (see the right hand portion of Fig. 4). The result is that all points at the side of the lamp are lighted by numbers of rays from different points. The side illumination is exceptionally uniform because the rays are very uniformly distributed.

It will be noted that while the ground surfaces of course diffuse in all directions, the corrugations diffuse and deflect only horizontally. Then, all the light which strikes the ground surfaces is diffused to a certain extent in all directions, but mostly horizontally; and all such light, when thus diffused assists in illuminating the ground close to and at the side of the lamp. But it will be particularly noted that all light which would normally (by the reflection alone) be thrown upwardly, is diffused so as to be non-glaring. The small ground surface at 13 performs particularly the function of diffusing that light which would normally be thrown down closest to the vehicle; and the ground surfaces at 11 perform particularly the function of diffusing the light from the center edge portions of the reflector and lens.

It is obvious that I have provided a lens structure, which distributes the light in such a way that it is unobjectionable to the person in the roadway, whether on foot or in other vehicles, and which distributes the light on the ground in the places most desired and with the intensity most desired. In fact the distribution is very even, and the light very intense, over a large area which is very nearly rectangular in form. The side illumination is very good, as is also the illumination far in advance of the vehicle, and an important feature is that the light is thrown strongly at right angles to the

forward direction, giving an illumination over a side area close to the vehicle.

Having described a preferred form of my invention, what I claim is:

1. A lens, comprising a transparent body having a vertically fluted surface substantially entirely covering a face thereof, and a face thereof having clear and translucent parts, the translucent part surrounding the clear part and the clear part comprising that part of the face which is bounded below by a line substantially horizontal and chordal and near the center of the lens and bounded on opposite sides by lines which have a general convergency from near the outer ends of the chordal boundary to a point near the top center of the lens; the transparent body having a central dished part and said lower chordal boundary having a substantially central semi-circular upward projection into the dished part, so that the whole center portion of the dished part is translucent.

2. A lens, comprising a transparent body having a vertical fluted surface substantially entirely covering a face thereof, and a face thereof having clear and translucent parts, the translucent part surrounding the clear part and the clear part comprising that part of the face which is bounded below by a line substantially horizontal and chordal and near the center of the lens and bounded on opposite sides by lines which have a general convergency from near the outer end of the chordal boundary to points near the top center of the lens; each of said side boundary lines extending first generally upwardly from the end of the chordal boundary and then extending sharply inwardly and then upwardly to the top of the lens, so that the clear portion of the lens is substantially of the shape of an inverted T with a comparatively wide part below and a comparatively narrow part above, which narrow part is much narrower horizontally in comparison with the horizontal width of the lens at that point than is the wide part in comparison with the horizontal width of the lens at its center; the lens having a central dished portion and said lower chordal boundary having a substantially central semi-circular upward projection in the dished part, so that the whole center portion of the dished part is translucent.

In witness that I claim the foregoing I have hereunto subscribed my name this 27th day of December, 1918.

ADELBERT R. GIBSON.

Witness:

VIRGINIA I. BERINGER.