Nov. 10, 1925. 1,560,793

J. M. DUNLEA

HEADLIGHT LENS

Filed Aug. 13, 1923

Fig. 1.

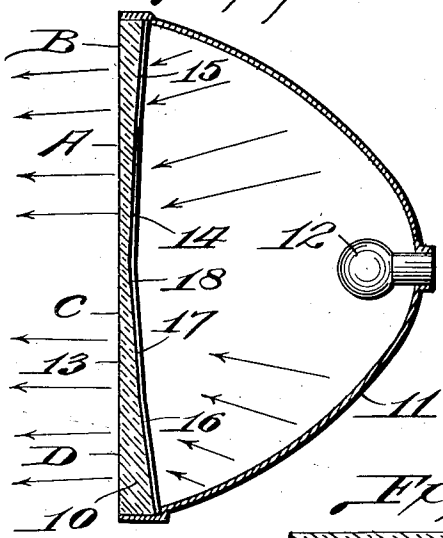


Fig. 2.

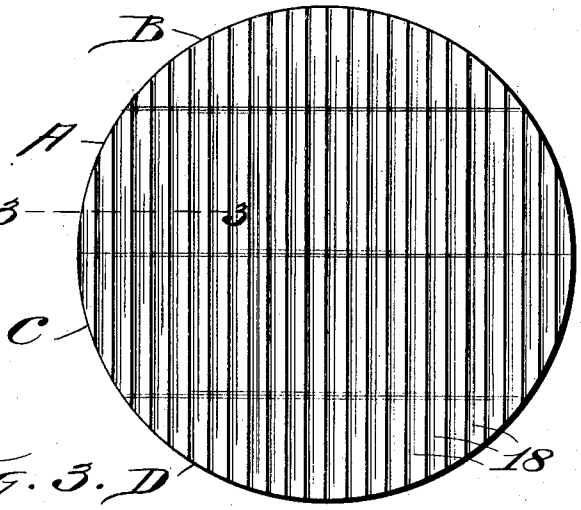


Fig. 3.



Fig. 7.

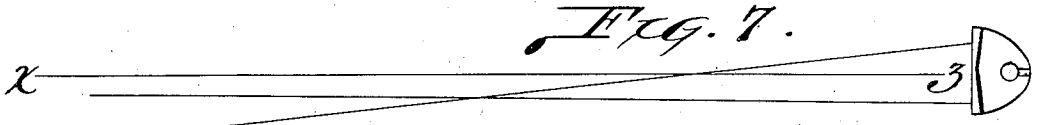


Fig. 4.

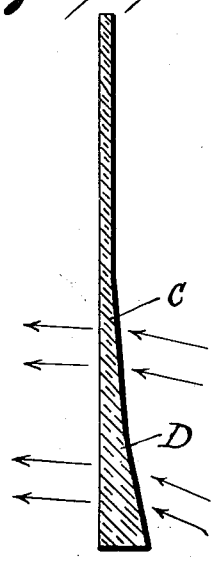


Fig. 5.

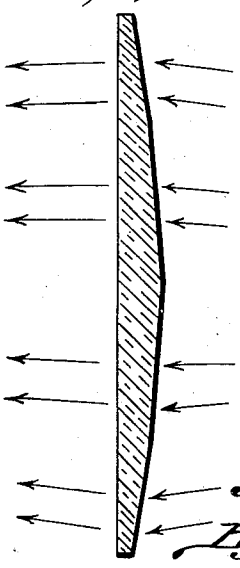
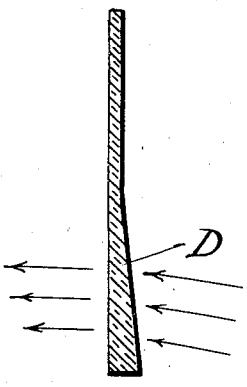


Fig. 6.



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By Martin P. Smith, Atty.

Patented Nov. 10, 1925. 1,560,793

UNITED STATES PATENT OFFICE.

JOHN M. DUNLEA, OF LOS ANGELES, CALIFORNIA.

HEADLIGHT LENS.

Application filed August 13, 1923. Serial No. 657,056.

To all whom it may concern:

Be it known that I, JOHN M. DUNLEA, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Headlight Lenses, of which the following is a specification.

My invention relates to lenses of the type generally used on the headlights of motor vehicles and the principal objects of my invention are, to provide a lens of relatively simple structure, that will be effective in bending or refracting light rays that tend to travel upwardly from the headlight of a motor vehicle or the like, downwardly into a predetermined horizontal plane or level, thereby effectually preventing bright and glaring rays from being thrown into the eyes of the drivers of approaching vehicles, and also, to concentrate the light rays that emanate from a headlight into a relatively narrow horizontal zone, that covers the area most desired, viz, the roadway for a reasonable, or at the required distance directly in front of the equipped vehicle.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawings in which;

Fig. 1 is a vertical section taken through the center of a lens constructed in accordance with my invention and showing same associated with a reflector and source of light.

Fig. 2 is an elevational view looking against the inner face of the lens.

Fig. 3 is an enlarged section taken on the line 3—3 of Fig. 2.

Fig. 4 is a vertical section through the center of a modified form of the lens.

Fig. 5 is a vertical section through the center of a further modified form of the lens.

Fig. 6 is a vertical section taken through the center of a third modification.

Fig. 7 is a diagrammatic view showing the projection of light rays from one form of my improved lens.

Referring by numerals to the accompanying drawings and particularly to the form of lens illustrated in Figs. 1, 2 and 3, 10 designates the disc-like body of the lens that is in front of a conventional form of parabolic reflector 11 and there being a suitable source of light, preferably an incandescent electric lamp 12 arranged within said reflector.

The outer face 13 of the lens is flat and smooth, while the inner face, or the face that is adjacent to the source of light, is formed with a plurality of inclined faces that are arranged and disposed so as to provide a plurality of horizontally disposed prisms, the same being divided into two sets with one set located above the horizontal medial line of said lens and the other set below said medial line.

In Figs. 1 and 2 I have shown each set as comprising two prisms, and while this number is ample and convenient for all practical purposes, it is obvious that the number of prisms in each set may be increased or diminished, as desired.

In the particular construction illustrated in Fig. 1, the lower prism A of the upper set, or that prism directly above the horizontal medial line of the lens is formed with its inner or rear face 14 disposed at a slight angle relative to a vertical plane, or the plane occupied by the outer face 13.

The upper prism B of the upper set, or the prism that constitutes the upper portion of the upper half of the lens body, has its rear or inner face 15 inclined to a slightly greater degree than the inclination of the rear face of lens A, so that when viewed in vertical section, or looking against the side edge of the lens, the upper half gradually increases in thickness toward the top, and with the rear or inner face of the upper portion of said upper half, inclined to a slightly greater degree than the corresponding face of the lower portion of said upper half.

The lower half of the lens body is made up of prisms C and D that are very similar to the prisms A and B respectively, but said prisms C and D are reversely or oppositely arranged with respect to said prisms A and B and, the angularity of the two lower prisms, is slightly greater than the angularity of the corresponding faces of the upper prisms. Thus the light rays passing through and emerging from the lower

prisms are bent or refracted to a slightly greater degree than the rays that pass through the upper prisms.

Thus the relatively narrow upper edge of prism C unites with the narrow lower edge of prism A, at the horizontal medial line of the lens body and the relatively narrow upper edge of the lower prism D joins the relatively wide lower edge of prism C.

Thus the lower half of the lens body gradually increases in thickness toward its lower edge and with the inner face 16 of the lower prism D occupying a slightly greater angle relative to a vertical plane or the plane occupied by the outer face 13 of said lens body, than the inner face 17 of prism C.

Where this form of lens is used in connection with a reflector and source of light that is focused to produce converging rays, the reflected rays in passing through the upper half of the lens or that portion embodying the prisms A, B, will be refracted or bent upwardly in the vertical plane, while the reflected rays in passing through the lower half or through prisms C, D, will be bent or refracted downwardly in the vertical plane, but to a relatively less angular degree than angularity of the rays emerging from the upper half of the lens.

Thus my improved lens materially lessens the vertical angle between the rays emanating from the upper and lower halves of the reflector and, as a result, the zone or area of light is flattened or reduced in vertical dimensions. At the same time the light rays are concentrated and directed in a general downward direction, so that they are kept within a horizontal plane below the plane where they would otherwise strike the eyes of pedestrians or the drivers of approaching vehicles.

This lowering and concentration of the light rays throws the volume of light where it is most needed viz, for a few feet above and upon the roadway for a considerable, or the legally required distance in front of the equipped vehicle.

Fig. 7 illustrates graphically the control of headlight rays with a lens of my improved construction and it will be seen that the rays emanating from the upper half of the lens and which rays are raised by the prisms A, B, intersect the rays emanating from the lower half of the lens or the prisms C, D, at a point a considerable distance away from the headlight and in a plane below the center line or axis x—z of the reflector and source of light.

Thus my improved lens materially lessens the vertical angle between the rays reflected from the upper and lower halves of the reflector and concentrated volume of light is maintained in a relatively low horizontal plane where it is most needed.

If desired, either face of the lens may be provided with relatively narrow vertically disposed grooves or ribs 18, having rounded faces and this provision spreads the volume of light sidewise or laterally, thereby illuminating the side portions of the street or roadway that is being traversed by the equipped vehicle.

These ribs or grooves are preferably placed on the same side of the lens with the angular faces of the prisms as such arrangement leaves the outer face of the lens, when in service, smooth, and capable of being easily kept clean.

In the modified construction illustrated in Fig. 4, the lower half only of the lens is formed with the horizontally arranged prisms D and C as contemplated by my invention and, where this construction is employed, the rays of light passing through the upper half of the lens are not bent or refracted vertically, while the rays passing through the lower half, are refracted or bent downwardly.

The modification illustrated in Fig. 5 and which embodies a practically reverse arrangement of the prisms from the arrangement illustrated in Fig. 1, is designed for refracting and decreasing the vertical angularity of rays that diverge from a reflector.

Thus the rays passing through the upper half of the lens are refracted or bent downwardly and the rays passing through the lower half of said lens are refracted or bent upwardly.

In the construction illustrated in Fig. 6, one half of the entire lens is of prismatic formation as designated by D, thereby refracting or bending the light rays upwardly or downwardly, depending, of course, upon the arrangement of the prism portion of the lens at the top or at the bottom.

Thus it will be seen that I have provided relatively simple, practical and effective means for refracting or bending the rays of light that travel in an upward direction from a headlight or the like, down to a predetermined level and concentrating said light rays into the desired zone or area.

Obviously the specific forms of the lens herein shown and described may be modified in various details, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim:

1. A headlight lens having a front plane surface, a rear surface comprising two groups of horizontal prisms, the lower group being disposed with their bases downwardly and having progressive refractive power downwardly, the upper group being disposed with their bases upwardly and having progressive refractive power upwardly and vertically disposed cylindrical prisms on said rear surface.

2. A headlight lens having a front plane surface, a rear surface having a horizontal prism located wholly below the horizontal center of the lens body and extending entirely across the latter with the base of said prism lowermost so that said prism has refractive power downwardly, said rear surface also having a horizontally disposed prism located wholly above the horizontal center of the lens body and extending entirely across the latter with its base uppermost, so as to have refractive power upwardly and vertical cylindrical prisms on said rear surface.

In testimony whereof I affix my signature.

JOHN M. DUNLEA.