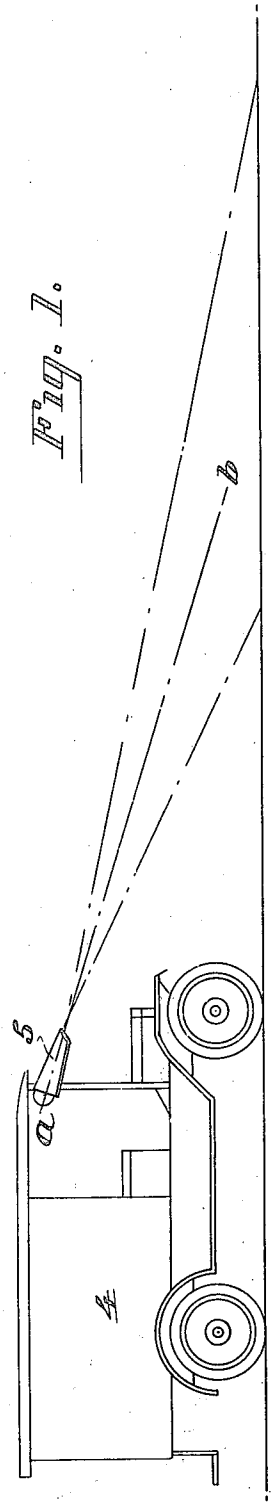
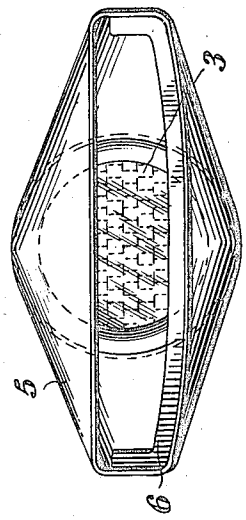
Oct. 23, 1923. 1,471,842

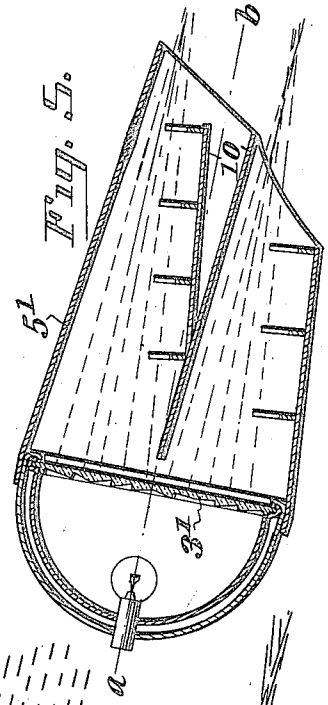
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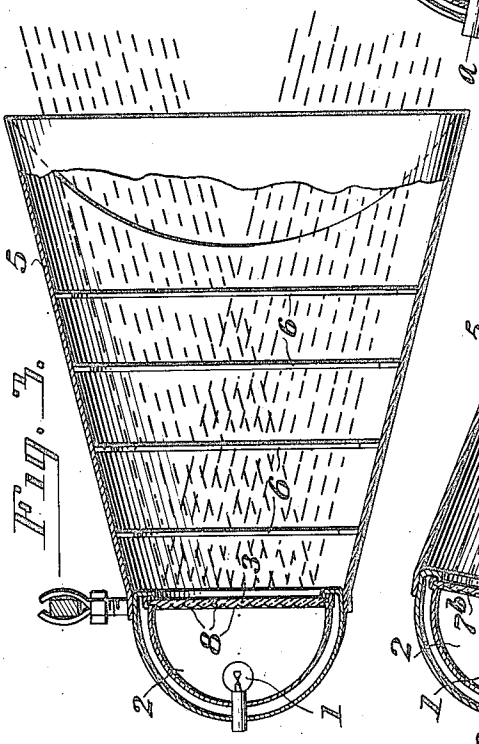
WAR ZONE DRIVING LIGHT

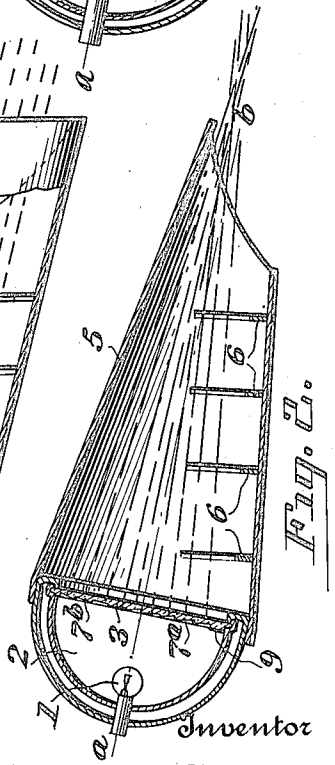
Filed June 17, 1918 2 Sheets-Sheet 1











Inventor

Henry Phelps Gage

By Dorsey & Co.

Attorney

Oct. 23, 1923. 1,471,842

H. P. GAGE

WAR ZONE DRIVING LIGHT

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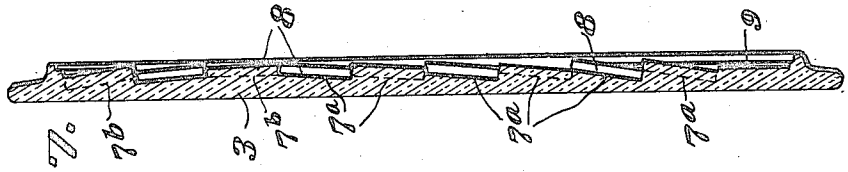


Fig. 7.

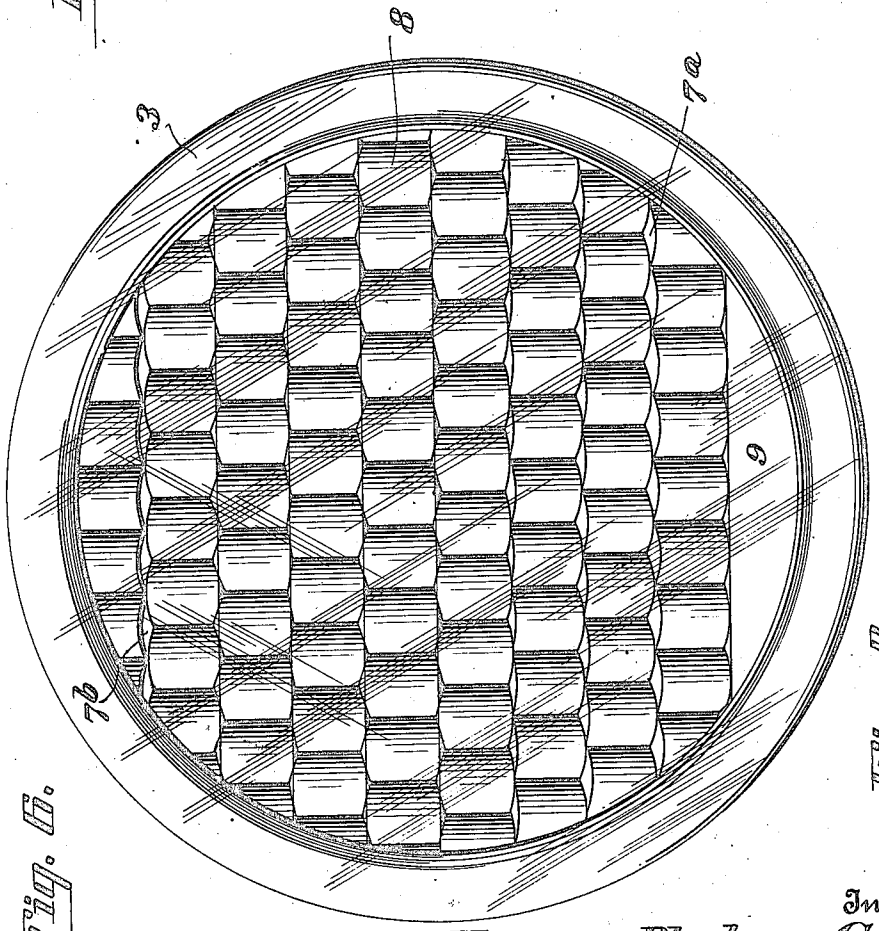


Fig. 6.

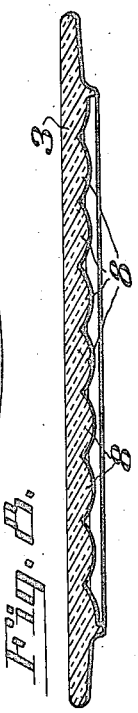


Fig. 8.

Inventor

Henry Phelps Gage

By Treyford

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Patented Oct. 23, 1923. 1,471,842

UNITED STATES PATENT OFFICE.

HENRY PHELPS GAGE, OF CORNING, NEW YORK, ASSIGNOR TO CORNING GLASS WORKS, OF CORNING, NEW YORK, A CORPORATION OF NEW YORK.

WAR-ZONE DRIVING LIGHT.

Application filed June 17, 1918. Serial No. 240,326.

To all whom it may concern:

Be it known that I, HENRY PHELPS GAGE, a citizen of the United States of America, and a resident of Corning, New York, have invented certain new and useful Improvements in War-Zone Driving Lights, of which the following is a specification.

My invention relates to a driving light, which, while affording sufficient light for safe driving will not be observable from the front, sides, or above, and will not project light observable from a comparatively short distance in any direction. As an instance of a case where such a light is desirable, reference is made to regions under fire from an enemy, as for instance those immediately behind the firing line of a battle front. As far as known to me, ambulances and other vehicles are now driven at night in the danger zone of the present war without lights.

In carrying out my invention I have sought to apply a construction in which;

1. The emissive, reflecting and refracting surfaces, or such of them as are present, are shielded from direct observation from the front and sides of the vehicle or from above, and

2. The quality of the light projected is such that while it gives sufficient illumination within the illuminated field for driving, it is not readily noticeable as light. This latter is of importance, in preventing the "spotting" of the vehicle by means of the light thrown down on the roadway.

The first of these objects I obtain by the mechanical arrangement of the parts, and for compactness therein I prefer to introduce optical features, while the second object is accomplished by selecting for the projected beam a color which approximates closely the light afforded by the moon and sky at night.

My invention further consists in the construction, arrangement and combination of the various parts of which it is composed as will hereinafter be described and claimed.

Referring to the accompanying drawings which illustrate my invention,—

Figure 1 is a side elevation of a vehicle having my invention applied thereto.

Figure 2 is a vertical section through the driving light shown in Figure 1.

Figure 3 is a central longitudinal section taken at right angles to Figure 2, the end of the hood being shown in plan.

Figure 4 is a front view thereof.

Figure 5 is a view similar to Figure 2, but showing a modified form.

Figure 6 is a front view of a suitable cover glass for the purposes here named.

Figure 7 is a vertical central section thereof.

Figure 8 is a horizontal section taken through Figure 6.

The structure, as shown, consists of a suitable lamp having as usual a light source in the form of a lamp bulb 1, a reflector 2 and a cover glass 3 located in the opening. The lamp (or two of them, if preferred) is mounted on the forward part of the vehicle 4, preferably at more than the usual height from the ground, with its principal axis *a*—*b* pointing downwardly and forwardly.

A hood 5 projects forwardly from the lamp, having bottom, top, and side walls, its rear end embracing the lamp-casing, and its forward end being flattened out vertically and widened horizontally. The forward end of the top member is located at some distance in front of the lamp, and not substantially above the horizontal level of the bottom of the transparent or translucent surface of the cover glass, and preferably below such level, and at a point sufficiently low to prevent such part of the cover glass being seen by any one standing at a selected distance in front of the vehicle on a level road on which the vehicle is standing or moving. Experience has shown that between sixty and one-hundred feet may be selected for this distance. The front of the side walls are located so as to prevent observation of the cover glass from the side, they being, however, separated a sufficient distance to permit illumination by the projected beam of a desired width of road. The bottom member projects sufficiently to intercept light which would otherwise fall on the fore part of the vehicle, and by illuminating the latter, give an indication of its position. Thus the front opening of the hood is of less height than the height of the light-transmitting portion of the cover glass and of greater width than such portion.

Inasmuch as the upper face of the bottom member would be otherwise observable from the front, and the upper face of the hood thereof is illuminated by the light issuing from the lamp, I prefer to place on such upper face of the bottom member, trans-

verse flanges or ribs 6, the front faces of which, while observable from the front, are not illuminated from the lamp. The inside of the hood is desirably blackened to prevent reflections therefrom.

The cover glass, preferably used, also embodies features of my invention. In the form shown, it consists of a disk of transparent material, usually glass, having thereon a series of prisms adapted to deflect the light vertically. The lower rows of prisms 7^a have their bases upward, and the upper row or rows 7^b have their bases down, so that the upper rows tend to bend the rays projected onto them by the reflector downwardly in respect to the principal axis *a—b* of the headlight, while the lower rows bend the light upwardly, the rays from the sets of prisms converging vertically and crossing each other before striking the ground, as is illustrated in Figures 1 and 2. As shown in the drawings and particularly in Figure 2, thereof, the rays from the several prisms should intersect each other substantially in a horizontal line located immediately adjacent to and below the forward front edge of the top of the hood 5. Due to this convergence, the vertical height of the forward opening of the hood may be less than the vertical height of the headlight glass, and due to the downward divergence of the rays from the upper prisms in respect to the principal axis, the top member of the hood may have its inclination to such axis increased over what it could otherwise be. This is of importance in permitting the use of a shorter hood without raising the level of its lower edge. Obviously the angle of the prisms will in practice be varied to suit the inclination to which the axis *a—b* of the lamp is to be set. A series of vertical ungulas or ribs 8 may be superimposed on the cover glass, and specifically in the prisms, and are designed to give side spread to the beam projected by the headlight.

In general, it may be said that by preference, the lower prism is designed to throw its beam upon the ground at the most distant point it is desired to illuminate, while the other prisms each successively illuminate the road closer to the car, the several zones of illumination overlapping each other, while the ungulas corresponding to each row of prisms and thus optically associated therewith, have a curvature calculated to give an annular spread of the beam projected by such prism proper for the distance, such beam striking the ground in front of the car, so that the section formed by the cutting of the beam by a horizontal plane is substantially a parallelogram. Thus the curvature of the upper ribs is less than the curvature of the lower ribs, and generally speaking, the dispersive power of the several ribs is inversely to the distance the rays passing there-through strike the ground in front of the car.

By preference, the cover glass is calculated so that the beam projected thereby fills the elongated front opening of the hood, and that as little as possible of such projected rays are intercepted by the hood. This is desirable both from a standpoint efficiency as reducing scattering light by reflection from the inside of the hood which might otherwise be observable. As shown in Figures 2 and 6 at 9, the bottom of the cover glass may be rendered opaque (by painting, etc.) to reduce the vertical height of the light opening.

By the arrangement above described, I have provided means for projecting a beam of light upon a road, and at the same time protecting from observation any surface of the projecting instrument capable of emitting or reflecting light. In order to reduce the visibility from a distance of the road lighted by the projected beam, not only is the brightness of the lighted area, (which for good driving should, within good limits, be as bright as compatible with other conditions) of importance, but the color of the light forming the beam is also of importance, I have found by experience that the beam should, for the purposes had in view, preferably approximate the color of moon-light or star-light. This is possible when using artificial light sources, by using a blue glass to absorb the excess of red rays from the source, so that the transmitted light is white or bluish white. This screen may preferably be formed by making the cover 3 of glass of the proper color.

As a specific example of best arrangement now known to me to accomplish the end in view, and without limiting my invention thereto, I give the following:—

The light source is an electric filament, and the cover glass is that known as "Lunar white" (see article by Churchill read at the meeting of the Railway Signal Association, October 1905). The hood is so proportioned, and the inclination of the headlight to the horizontal is such that the front edge of the illuminated area is about sixty or seventy feet in front of the vehicle, the lamp being about six feet from the ground. The prisms are so calculated that the light from the lower prism strikes the ground at the forward portion of the illuminated area, and the light from the upper prism at about twenty feet in front of the lamp, the several rows of ribs being such as to produce a beam eighteen feet across. Two such driving lights mounted on a vehicle, with their fields of illumination superimposed, and each having a fifteen candle-power, six-volt lamp, fed at from three and one-half, to four volts, produced on a moonless night, an illumination sufficient for

safe driving, and at the same time neither the vehicle nor the illuminated area of the road was observable from a distance less than two-hundred feet in front of the vehicle, while no indication of the presence of the vehicle or of the light therefrom was observable from an aeroplane at heights over one-thousand feet.

In Figure 5 is shown a modification in which the hood 5 is provided with medial transverse webs 10 in effect forming two hoods, one superimposed on the other. The cover glass 3' used with this type of hood in general consists of two cover glasses, each having the optical properties before discussed, located the one above the other. This arrangement with the same diameter of cover glass, permits the use of a shorter hood.

Having thus described my invention what I claim, and desire to secure by Letters Patent is,—

1. In a device of the character described, the combination with a vehicle, of a lamp carried thereby and having a light-transmitting front opening, and a hood located in front of the lamp, and having side walls, and top and bottom walls, which respectively diverge and converge from the lamp forwardly.

2. In a device of the character described, the combination with a vehicle, of a lamp carried thereby and having a light-transmitting front opening, and a hood comprising top and side walls, the lower edges of which are so disposed with respect to the light opening as to prevent such light opening being seen by a person standing at a selected distance in front of the vehicle, and a bottom wall, intercepting light from the lamp which would otherwise be thrown on the forward part of the vehicle.

3. In a device of the character described, the combination with a vehicle, of a lamp carried thereby and having a light-transmitting front opening, and a hood located in front of the lamp and having side walls which diverge forwardly for allowing illumination of a desired width of road, and having top and bottom walls which converge from the lamp forwardly, the edge of the top wall at the forward end of the hood being so disposed with respect to the light opening as to prevent said light opening from being seen by a person standing at a selected distance from the vehicle.

4. In a device of the character described, the combination with a vehicle, of a lamp carried thereby and having a light-transmitting front opening, and a hood located in front of the lamp and having in its forward end an opening of less height than the vertical height of the front opening of the lamp, and of greater width than the width of such opening, the top of the hood opening being so disposed with respect to the light opening as to prevent such light opening being seen by a person standing at a selected distance in front of the vehicle.

5. In a device of the character described, the combination with a vehicle, of a lamp carried thereby, and having its principal axis inclined downwardly and forwardly, and having a light-transmitting front opening, and a hood located in front of the lamp and having in its forward end an opening of less height than the vertical height of the light opening and of greater width than the width of the opening.

6. The combination with a lamp and reflector, of a transparent cover glass having thereon vertically refractive prisms, the prisms on the top and bottom of the cover refracting light falling thereon from the reflector downwardly and upwardly, respectively, in respect to the principal axis of the lamp, and horizontally dispersive ribs on the cover associated with the several prisms, the dispersive powers of the several ribs varying directly with the vertical angle formed by the ray projected thereby with the horizontal.

7. In a device of the character described, the combination with a vehicle, of a lamp including a reflector mounted thereon, the axis of the lamp being inclined forwardly and downwardly, of a transparent cover for the lamp having thereon prisms refracting downwardly the light falling thereon from the reflector, the upper and lower of such prisms refracting such light downwardly and upwardly, respectively, in respect to the principal axis of the lamp, so that the rays from the upper prisms strike the road closer to the vehicle than the rays from the lower prisms, and horizontally dispersive ribs associated with the several prisms, and whose dispersive power is inversely as the distance at which the rays from such ribs strike the road in front of the vehicle.

8. In a device of the character described, the combination with a vehicle, of a lamp carried thereby, a light-transmitting cover for the lamp having thereon vertically refractive prisms so arranged that the rays from the lower and upper prisms cross before striking the ground, and a hood in front of the lamp having an opening in its forward end of less height than the height of the light-transmitting cover, said hood opening being located adjacent to the crossing of the rays.

9. In a device of the character described, the combination with a vehicle, of a lamp carried thereby, a light-transmitting cover for the lamp havng thereon vertically refractive prisms so arranged that the rays from the lower and upper prisms cross before striking the ground, and a hood in front of the lamp having an opening in its

forward end, the hood opening being located adjacent the crossing of the rays and being of less height than the height of the light opening of the transmitting cover, the hood being so disposed with respect to the cover glass as to prevent such cover glass being seen by a person standing at a selected distance in front of the vehicle.

10. In a device of the character described, the combination with a vehicle, of a lamp carried thereby, a light-transmitting cover for the lamp havng means for directing downwardly the rays passing through the upper portion of the light-transmitting cover, and having means for directing upwardly, the rays passing through the lower portion of the light-transmitting cover, so that the downwardly and upwardly directed rays cross before striking the ground, and a hood in front of the lamp having an opening at its forward end of less height than the height of the light-transmitting cover, the opening being arranged adjacent to the crossing of the rays.

11. In a device of the character described, the combination with a vehicle, of a lamp carried thereby, a light-transmitting cover for the lamp having means thereon for directing downwardly the rays passing through the upper portion of the light-transmitting cover, and having means for directing upwardly the rays passing through the lower portion of the light-transmitting cover, so that the downwardly and upwardly directed rays cross before striking the ground, and further having means for horizontally diffusing the rays, and a hood in front of the lamp having a front opening of less height than the height of the light-transmitting cover, and of a width greater than the width of the light-transmitting cover.

12. In a device of the character described, the combination with a vehicle, of a lamp carried thereby and having means for projecting rays of light downwardly from the upper portion of the lamp, and upwardly from the lower portion of the lamp so that the rays from the upper portion of the lamp, and the lower portion of the lamp, respectively, cross each other, and a hood having a restricted opening located in front of the lamp and adjacent to the crossing of the rays.

13. In a device of the character described, the combination with a vehicle, of a lamp carried thereby, a light-transmitting cover for the lamp adapted to project rays downwardly and across each other in front of the lamp, and a hood having an opening located in front of the lamp, said hood being so disposed with respect to the light-transmitting cover as to prevent such cover being seen by a person standing at a selected distance in front of the vehicle.

14. In a device of the character described, the combination with a vehicle, of a lamp carried thereby, a light-transmitting cover for the lamp having means to project rays of light crossing each other in front of the lamp, and a hood having an opening located adjacent to the crossing of the rays.

In testimony whereof I hereunto affix my signature this 15th day of June, 1918.

HENRY PHELPS GAGE.