Sept. 20, 1932. F. C. HACHENEY 1,878,632

HEADLIGHT

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FIG. 2.

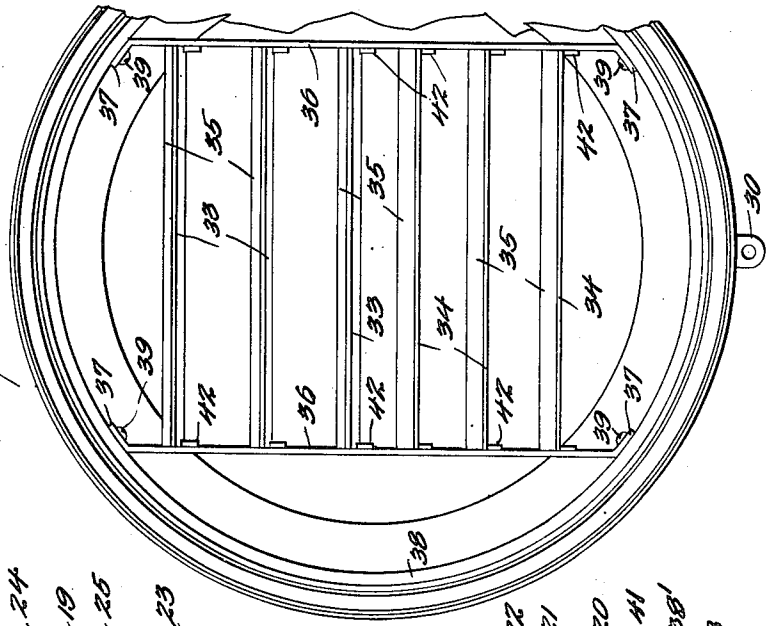
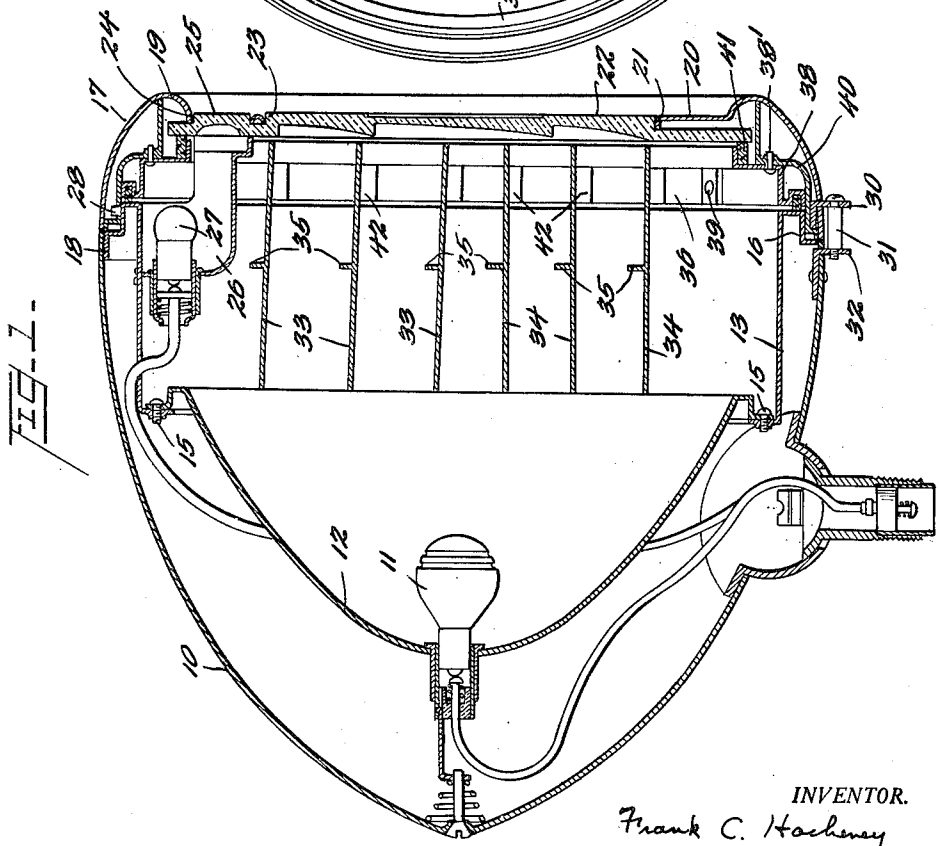


FIG. 1.



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HEADLIGHT

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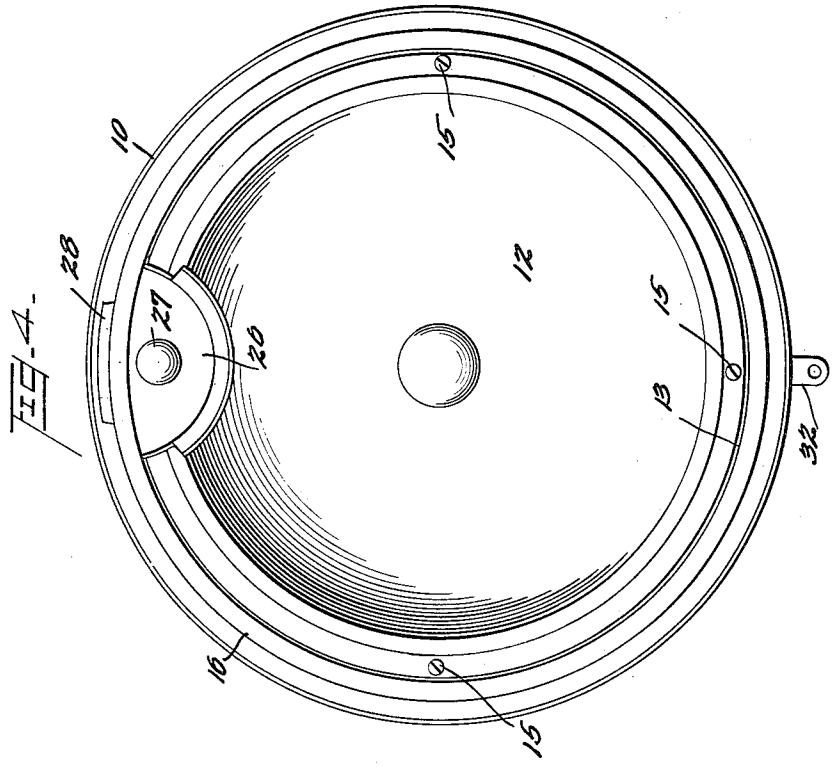


FIG. 4.

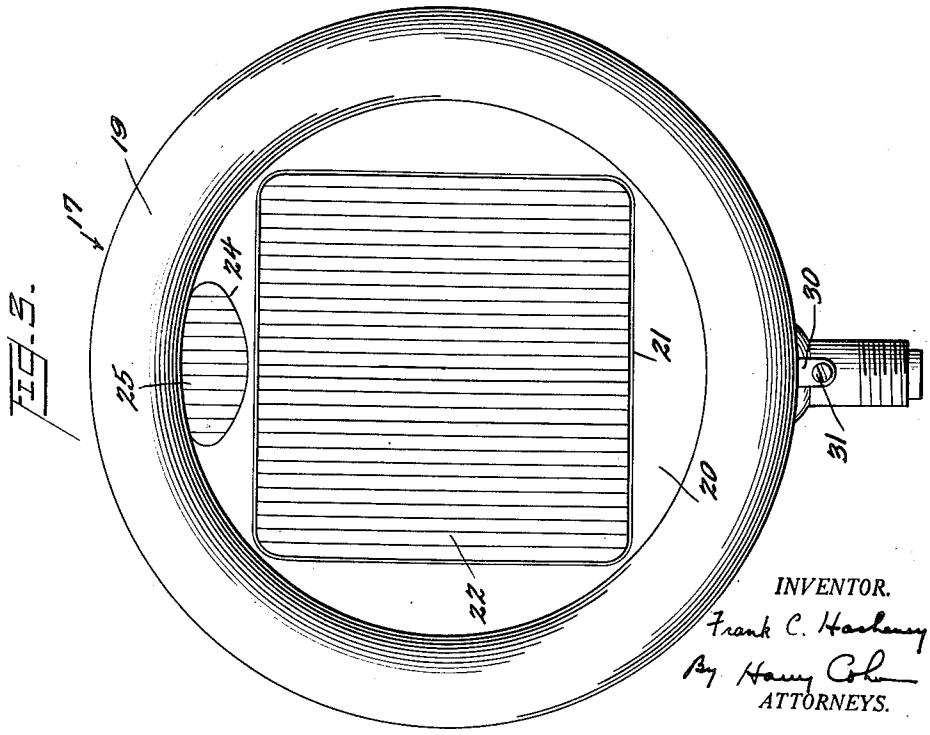


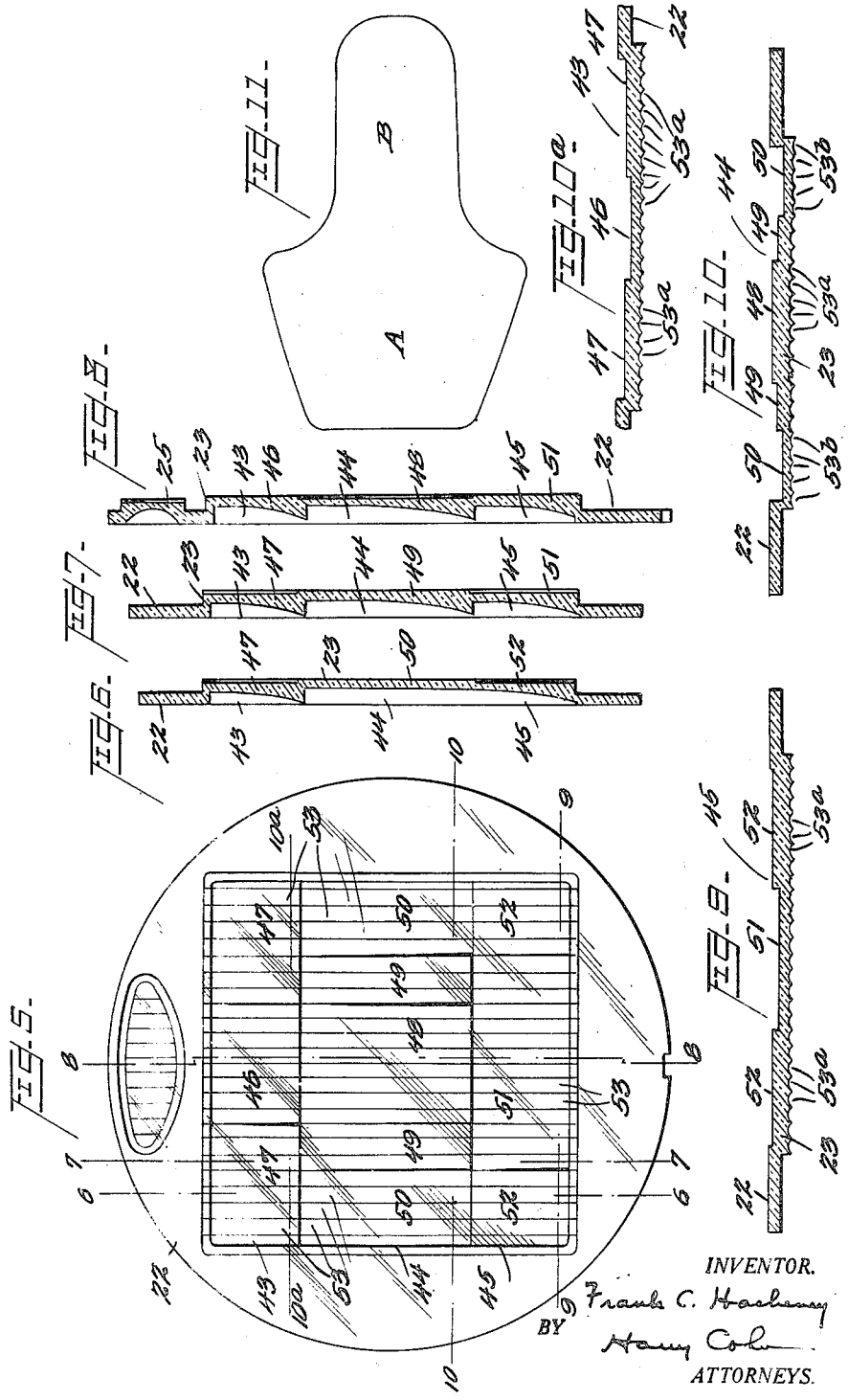
FIG. 3.

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HEADLIGHT

Filed June 5, 1930 3 Sheets-Sheet 3



Patented Sept. 20, 1932

1,878,632

UNITED STATES PATENT OFFICE

FRANK C. HACHENEY, OF VANCOUVER, WASHINGTON

HEADLIGHT

Application filed June 5, 1930. Serial No. 459,354.

My invention relates to light projectors and more particularly to lamps of the headlight type for use on auto-motive vehicles.

The primary object of the invention is the provision of a headlight adapted to yield sufficient illumination on the roadway in advance of the vehicle and to minimize or obviate glare to a considerable degree.

Another object of the invention is to provide a headlight adapted to project light to illuminate a wide zone immediately in front of the vehicle and a comparatively narrower zone ahead.

A further object of the invention is to provide a headlight having a series of reflector plates mounted in the front-piece or lens holder and removable as a unit therewith.

Another object is to provide a lens and lens holder or front-piece for the lamp casing constructed and arranged to prevent circumferential displacement of the lens as well as axial displacement.

A further object of the invention is generally to improve the construction of automobile headlights.

These and other objects of the invention which might hereinafter appear are attained in the construction hereinafter described and illustrated, it being understood that while the described construction is the one I prefer, the principles of the invention may be embodied in other specific constructions. I therefore do not wish to be limited to the construction disclosed except as required by this specification and the claims appended hereto.

In the drawings:

Fig. 1 is a longitudinal sectional view of the headlight;

Fig. 2 is a view of the inside of the front-piece or lens holder;

Fig. 3 is a front view of the headlight;

Fig. 4 is a view of the casing in front of the parking lamp chamber;

Fig. 5 is a front view of the lens;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a section on the line 7—7 of Fig. 5;

Fig. 8 is a section on the line 8—8 of Fig. 5;

Fig. 9 is a section on the line 9—9 of Fig. 5;

Fig. 10 is a section on the line 10—10 of Fig 5;

Fig. 10*a* is a section on the line 10*a*—10*a* of Fig. 5.

Fig. 11 is illustrative of the zones or areas illuminated by the headlight embodying this invention.

The headlight comprises a casing 10 having a light source such as an electric lamp 11 and a parabolic reflector 12. A cylindrical shell 13 is positioned within the casing contiguous with the reflector 12 and is secured thereto at one end by screws 15, the other end of said shell extending beyond the front of the casing at 16 to provide an annular seat for the front-piece 17. The end 16 of the shell is reflexed inwardly and is secured to or tightly fits into the casing 10 as indicated by the reference numeral 18.

The front-piece 17 comprises a front plate 19 having inwardly extending webs 20 defining an opening 21 closed by a lens 22 which together constitute the light outlet of the headlight. The opening 21 is preferably non-circular and the lens 22 has a raised portion 23 which projects into and fits the opening whereby circumferential displacement of the lens is prevented. The front-piece 17 is also provided with an opening 24 which receives a raised portion 25 of the lens covering the chamber 26 in which the parking light 27 is housed. The chamber 26 comprises a bent metal wall secured to the top of the shell 13, as shown more clearly in Fig. 4. A lug 28 extends from the inside of the shell 13 at the end 16 thereof and engages a recess in the front piece 17, and the bottom of the rim has an apertured ear 30 engaged by a screw 31 which engages an ear 32 on the casing 10 thereby to secure the front-piece removably to the casing.

A plurality of reflector plates 33 and 34 extend between the parabolic reflector 12 and the lens 22. The upper reflector plates are downwardly inclined whereby to reflect light downwardly to a greater degree than the light reflected by the lower plates 34. It will be understood that the lower surfaces of the plates 33 and 34 are highly reflective and that the upper surfaces are to be a consider-

able degree non-reflective. Each of the plates has an upwardly extending fin 35 which is designed to conceal the light source from approaching vehicles without impeding the passage of light through the lens. As will hereinafter appear, the lens 22 is designed to project the light whereby to illuminate a wide zone immediately in front of the vehicle and a comparatively narrow zone ahead, as illustrated in Fig. 11. I have found that the reflector plates 33 and 34 substantially improve this illumination. More specifically, to point out one aspect of this improvement, I have found that the reflector plates cooperate with the lens to minimize to a considerable extent light dispersion at the edges of the illuminated zones.

An important feature of the present invention is the provision for mounting the reflector plates 33 and 34 on the front-piece 17 so that these plates and the front piece are removable as a unit from the casing 10 whereby access may be had to the interior of the casing, for replacing an electric lamp and for other purposes, by merely removing the front-piece. For this purpose there is provided a support secured within the front-piece. This support comprises two spaced vertically extending straps 36 having reflexed ends 37 secured to a ring 38 by screws 39 whereby the support may be detached from the ring 38 when necessary. The reflector plates have reflexed side portions 42 secured to the straps 36 by being soldered or welded thereto. As here shown the ring 38 serves also to hold the lens 22 in place and is secured removably by screws 38, to a shell 40 which is soldered or welded to the front-piece 17. A cork ring 41 is preferably placed between the lens 22 and the ring 38. While I have shown the ring 38 in one piece for carrying the straps 36 and for holding the lens 22 in place, these functions may be provided for in seperate members, one for holding the lens and one for carrying the reflector plate support.

Another important feature of my invention resides in the construction of the lens 22, shown in detail in Figs. 5 to 10. As previously explained the lens is designed to yield the illuminated road pattern illustrated in Fig. 11. For this purpose the central raised portion 23 is provided with light refracting prisms on its inner surface and cooperating light dispersion controlling surfaces on its outer surface. The light refracting prisms on the inner surface of the lens serve to refract the light downwardly toward the road at varying distances in advance of the vehicle, and the light dispersion controlling surfaces on the outer surface of the lens serve to control the lateral dispersion of the light and are related to the inner prisms and cooperate therewith whereby the light refracted downwardly to the greater extent is also laterally dispersed to a greater extent whereby to illuminate a wide zone A immediately in front of the vehicle and a narrower zone B ahead.

The light refracting prisms are arranged in the upper portion 43, the central portion 44, and the lower portion 45. The upper row 43 comprises a central prism 46 and side prisms 47, the latter having a wider base than the former. The central row 44 comprises a center prism 48, side prisms 49, and end prisms 50. The center prism 48 has the widest base, the prisms 49, narrower bases, and the prisms 50, the narrowest bases. The lower row 45 comprises a center prism 51 and side prisms 52, the latter have wider bases than the former. The prisms 52 are about as wide at their bases as the prism 48. The prisms 49 have bases about as wide as the base of the prisms 47 and somewhat wider than the base of the prism 46. The prisms 50 have the least refractive power and the prism 46 while refracting the light to a greater degree cooperate with the prisms 50 to illuminate the more distant zone B. Thus, the lens 22 has a plurality of zones of varying refractive power for downwardly deflecting light passing therethrough, comprising upper lateral and central zones including the prisms 47 and 46, respectively, and lower lateral and central zones including the other above described prisms. It will be understood that zones illuminated by the several prisms overlap to some extent and that all the prisms cooperate with each other and with the light dispersion control elements on the outer surface of the lens as will presently appear.

The light dispersion control elements comprise vertically extending curved depressions designated generally by the reference character 53 in Fig. 5. The depressions vary in depth and curvature in accordance with the dispersion required in the various prism zones of the lens. The zones corresponding to the prisms 48 and 52 have the deepest depressions 53*a* since these prisms have the greatest refractive power. The zones corresponding to the prisms 50 have depressions 53*b* of least depth, since these prisms have the least refractive power. Similarly the other elements 53 have depressions of depth and curvature whereby to control the dispersion of the light in accordance with the amount of downward refraction thereof. Thus, the control elements 53 cooperate with their associated prisms to refract and control the dispersion of light in such a way as to project light to illuminate a wide zone close to the vehicle and a narrower zone ahead.

I claim:

1. A headlight comprising a casing, a light source therein, a front-piece detachably secured to said casing, said front-piece having an opening, a lens closing said opening, re-

movable means for holding said lens in place, a plurality of reflector plates detachably secured to said front piece, and a support for said plates detachably secured to said removable lens holding means whereby said support and lens holding means are removable as a unit and said reflector plates are removable from said front piece independently of said lens holding means.

2. A headlight comprising a casing open at the front, a front piece constituting a closure for said casing, a reflector within said casing terminating at its forward end rearwardly of the front of said casing, a shell within said casing extending from the forward end of said reflector and having a portion projecting beyond the front of said casing, said projecting portion of the shell having an outwardly reflexed radial portion and an inwardly reflexed circumferential portion, said front piece having an inner ring member engaging said outwardly reflexed radial portion of the shell and a peripheral member extending beyond said ring member and engaging said inwardly reflexed portion of said shell, a plurality of spaced horizontally disposed reflector plates secured to said front piece and extending into said shell, and means for detachably securing said front piece in position.

3. A headlight comprising a casing open at the front, a front piece constituting a closure for said casing, a reflector within said casing terminating at its forward end rearwardly of the front of said casing, a shell within said casing extending from the forward end of said reflector and having a portion projecting beyond the front of said casing forming a seat for said front piece, said front piece having an opening in the front thereof and a rearwardly extending rim engaging said seat with the rear edge of said rim in engagement with the front edge of said casing, a lens mounted in said front piece and closing the opening therein, and a plurality of horizontally disposed reflector plates secured within said front piece and extending from said lens to said reflector.

4. A headlight comprising a casing open at the front, a front piece constituting a closure for said casing, a reflector within said casing terminating at its forward end rearwardly of the front of said casing, a shell within said casing extending from the forward end of said reflector and having a portion projecting beyond the front of said casing forming a seat for said front piece, said front piece having an opening in the front thereof and a rearwardly extending rim engaging said seat with the rear edge of said rim in engagement with the front edge of said casing, a lens mounted in said front piece and closing the opening therein, a plurality of horizontally disposed reflector plates secured within said front piece and extending from said lens to said reflector, and means detachably securing said front piece in position on said seat.

5. A headlight comprising a casing open at the front, a front piece constituting a closure for said casing, a reflector within said casing terminating at its forward end rearwardly of the front of said casing, a shell within said casing extending from the forward end of said reflector and having a portion projecting beyond the front of said casing, said projecting portion reflexed inwardly forming a seat for said front piece, said front piece having an opening in the front thereof and a rearwardly extending rim engaging said seat with the rear edge of said rim in engagement with the front edge of said casing, a lens mounted in said front piece and closing the opening therein, and a plurality of horizontally disposed reflector plates secured within said front piece and extending from said lens to said reflector.

6. A lamp comprising a casing, a source of light and a reflector therein, and a lens for directing light projected from said casing, said lens comprising upper and lower horizontal rows of prisms, each row comprising a central prism and side prisms, the side prisms in the upper row having a higher refractive power than the central prism whereby to deflect the light passing through said side prisms downwardly to a greater degree than the light passing through the central prism, the lower row also having prisms of different refractive power.

7. A lamp comprising a casing, a source of light and a reflector therein, and a lens for directing light projected from said casing, said lens comprising upper central and lateral zones of varying refractive power and lower central and lateral zones of varying refractive power, the upper lateral zones of said lens having greater refractive power for downwardly deflecting light passing therethrough than the upper central and at least part of the lower lateral zones of the lens, and said lower central zone having a higher refractive power for downwardly directing light passing therethrough than said upper lateral zones.

In testimony whereof I hereunto affix my signature.

FRANK C. HACHENEY.