July 31, 1923. 1,463,677

A. L. DAVIS

AIRCRAFT LAMP

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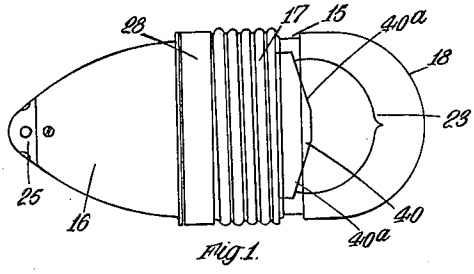


Fig. 1.

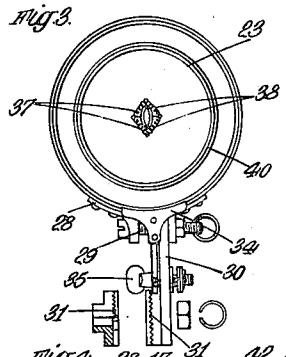


Fig. 3.

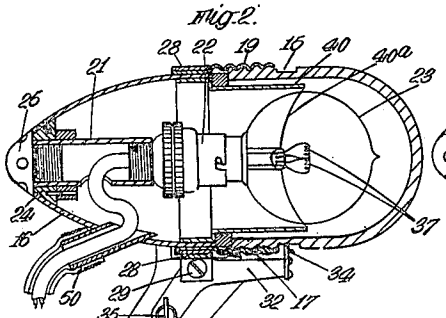


Fig. 2.

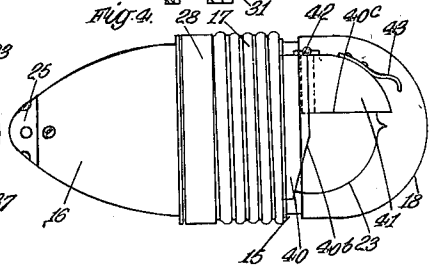


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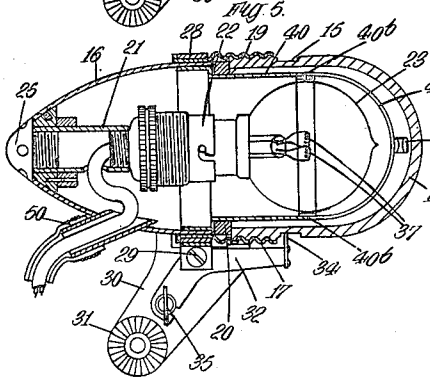


Fig. 5.

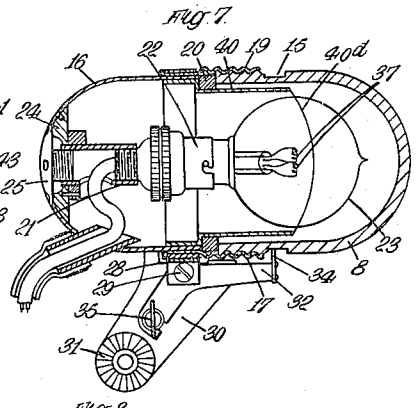


Fig. 7.

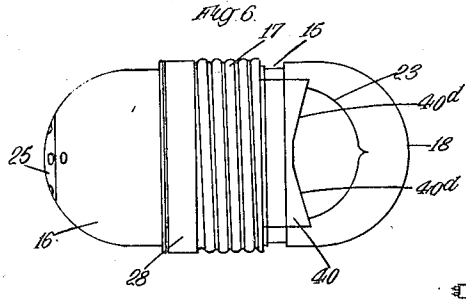


Fig. 6.

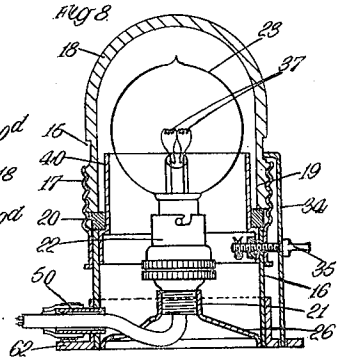


Fig. 8.

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Fig. 10.

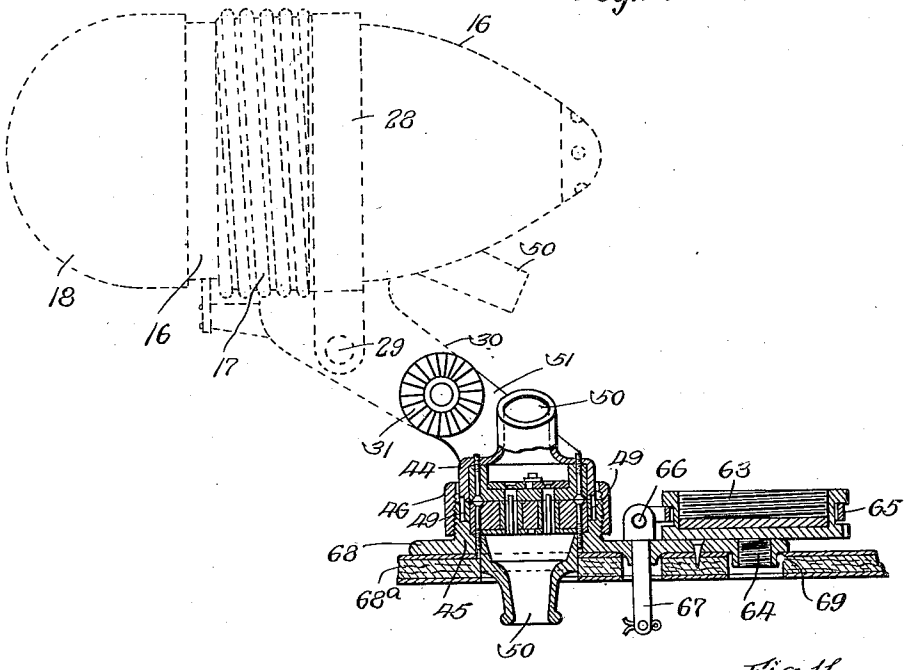


Fig. 9

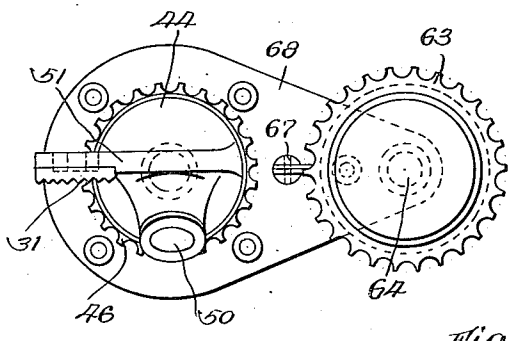


Fig. 11

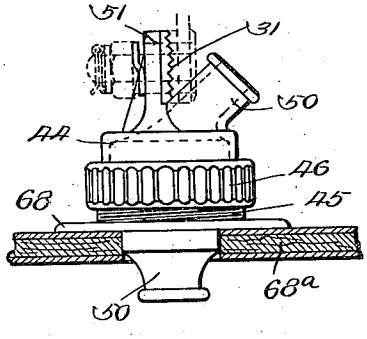
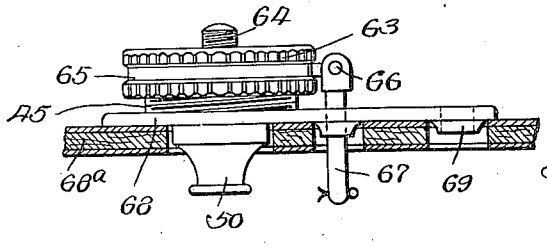


Fig. 12.



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Patented July 31, 1923. 1,463,677

UNITED STATES PATENT OFFICE.

ALBERT LEWIS DAVIS, OF KINGSWAY, LONDON, ENGLAND, ASSIGNOR TO VICKERS LIMITED, OF WESTMINSTER, LONDON, ENGLAND.

AIRCRAFT LAMP.

Application filed August 8, 1922. Serial No. 580,480.

To all whom it may concern:

Be it known that I, ALBERT LEWIS DAVIS, a subject of the King of Great Britain, residing at the Air Ministry, Alexandra House, Kingsway, in the county of London, England, have invented certain new and useful Improvements in or Relating to Aircraft Lamps, of which the following is a specification.

This invention relates to improvements in electric navigation lights for aircraft, such as upward identification lights, head lights, tail lights, and port and starboard lights.

The invention has for its objects, inter alia, to provide enclosed electric lamps and light masks to distribute and restrict the light in the required directions, to adapt the various lights so that their parts are readily adjustable, dismountable and interchangeable, to provide weatherproof electric fittings, and to provide means for supporting or suspending the lights on or from the aircraft as required.

Broadly, the invention comprises a navigation light in which an electric lamp, preferably enclosed within a transparent dome, in its position of use gives a large angle of visibility in both the vertical and horizontal planes, and a mask is provided around the lamp, the edge of which mask limits both the vertical and horizontal angles of visibility to predetermined but large angles according to the function of the light.

The vertical angle of visibility may be approximately 180° and the horizontal angle of visibility may be larger or smaller than the vertical angle according to the function of the light as hereinafter described. In some cases the mask may be provided with a hood for masking the light at one side so as to limit the visibility to the other side of the light without interfering with the vertical angle.

The dome may be mounted upon an opaque body piece which is itself adjustably mounted on a pivoted bracket so arranged as to provide uninterrupted visibility throughout the large vertical and horizontal angles of visibility provided for by the mask.

A construction embodying this invention comprises an opaque body piece furnished with a socket secured at one end, a white or coloured glass dome with parallel sides formed with external screw threads which engage the socket, an electric lamp supported in the body piece, and a cylindrical mask shield supported in the body piece around the lamp and between the same and the parallel sides of the dome.

An adjustable mounting strap may embrace the body piece to permit rotation of the latter about its longitudinal axis, and a bracket support for the mounting strap with a pivotal clamp to permit of end on tilting of the body piece may be used. A locking lever may be pivoted on the bracket support and adapted with a locking plate for engaging the plain exterior of the glass dome or a groove therearound and preventing it from becoming accidentally unscrewed from the socket or falling out.

The electric lamp may comprise a filament or filaments arranged in compact form and located in or near a plane at right angles to the longitudinal axis of the lamp and passing through diametrically opposite points on the edge of the mask, to concentrate the light emission surface within a small space and to distribute the light over the required angles with sharply defined boundaries. The filament may be made of a double formation, with the two halves in parallel to provide against total light extinction should one filament break.

The masks have their edges made or shaped in various forms to determine the angles of visibility in both the vertical and horizontal planes. The hood when used may be hinged to the mask to facilitate access to the electric lamp.

The electric connections may comprise a weatherproof plug and socket union composed of two units, one carrying the plugs connected to the electric cable or lamp connections, and the other carrying the sockets connected to the electric cable or battery or the like connections to be joined together and a surrounding union nut embracing one unit and adapted to draw a flange on it against the other unit by engaging a screw thread on the latter, to permit the body piece and all parts joined thereto to be readily dismounted as a whole. Fairleads are formed on the units. The body piece may be mounted on the aircraft by a

bracket support with a pivotal clamp extending from one of the union plug and socket units.

A weatherproof cap with screw threaded interior and having a screw threaded external centre pin may be used with the socket unit. The cap is turnably mounted in a hinged collar ring on a security pin which is slidably mounted in a base plate of the socket unit. In one position, the cap is held by its centre pin being screwed into a second hole in the base plate, when the plug and socket unit are connected; and in another position the cap is secured with its interior threaded over the exterior threads on the socket unit so as to cover and protect the latter against access of moisture.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which:—

Figure 1 is a plan, Figure 2 a sectional elevation and Figure 3 a front elevation of a head light embodying this invention.

Figure 4 is a plan and Figure 5 a sectional elevation of a starboard light.

Figure 6 is a plan and Figure 7 a sectional elevation of a tail light.

Figure 8 is a sectional elevation of an upward identification light.

Figure 9 shows in plan a weatherproof plug and socket union with bracket support for the lamp body piece and with a weatherproof cap.

Figure 10 is a sectional elevation thereof, showing the light in position, and

Figure 11 is a view at right angles to Figure 10 the light being omitted.

Figure 12 is an elevation showing the socket in use with the weatherproof cap and without the light.

16 indicates a lamp body piece having a screw threaded socket 17. 18 is a glass dome, screw threaded at 19, and formed with a peripheral groove 15, and engaging the socket 17 and an india rubber seating ring 20.

The dome and the body piece are of streamline formation. 21 is a tubular support for a lamp holder 22, in which is a filament lamp 23. In Figures 2, 5 and 7 (head, starboard and tail lights) the tubular support 21 is shown as held in a metal seating 24. The seating is held fast at the aft end of the lamp body piece 16, and the support 21 is clamped to the seating by means of a clamping nut 25. In Figure 8 the tubular support extends from a holder plate support 26.

Referring particularly to Figures 1 to 7, which will be described together as they show lights of the same general construction, 28 is a mounting strap frictionally embracing the body piece 16 under the action of a clamping screw 29. 30 is a bracket support which is integral with one end of the strap 28, and has an angle lock washer connection 31. The strap 28 allows the light to be adjusted around its longitudinal axis.

In Figures 2, 5, 7 and 8, 32 is a locking lever or tongue pivoted at 29, and having a locking plate 34 for engaging the groove 15 in the glass dome 18, when locked by a thumb screw 35, which engages a slot or hole in the locking member. This ensures secure fixing of the dome in place and permits it to be readily removed for access to the interior.

23 is a spherical bulb of a filament lamp which has two independently supported coil filaments 37, 38 and is supported in the holder 22 in the tubular support 21. As shown, the lamp filaments lie in a transverse plane at right angles to the longitudinal axis of the mask 40 and passing through diametrically opposite points on the edge of the mask. Looking in the direction of the axis of the mask, the filament appears as of a generally square contour. The adjacent sides 37 (Figure 3) of the square form one filament unit, and the opposite adjacent sides 38 form the other filament unit, both units being independently connected in parallel.

The metal mask shield 40 restricts the angle of visibility or the distribution of the light in a vertical plane over an angle of 180°, and in a horizontal plane over an angle of 220° for the head lights (Figure 1), over an angle of 110° for the starboard (Figure 4) and port lights (both of which are similar but with horizontal visibility at opposite sides) and over an angle of 140° for the tail light (Figure 6). A complete hemisphere of visibility above the level of the upper edge of the mask is left for the upward identification light (Figure 8). In Figures 4 and 5 (starboard light) a hemispherical hood 41 is hinged at 42 on the mask shield to facilitate access to the filament lamp and provide for the horizontal angle of 110° at one side. 43 is a finger spring for re-acting against the glass dome and retaining the hood closed when the light is in use.

The angle of visibility is varied in the different lights by specially shaping the outer edge of the masks. In the head light Figures 1, 2 and 3, the mask edge 40^a lies in two vertical planes which converge in the direction of the free end of the mask and are equally inclined to the axis of the light; in the port and starboard lights, Figures 4 and 5, the mask edges 40^b and 40^c lie in two vertical planes which intersect in the axis of the light and one of which contains the axis of the light and the other of which converges towards the axis of the light in the direction of the free end of the mask; in the tail light, Figures 6 and 7, the mask edge 40^d lies in two vertical planes which diverge outwardly in the direction of

the free end of the mask and are equally inclined to the axis of the light; and in the upward identification light, Figure 8, the mask edge 40^e lies in a single horizontal plane.

In Figures 9 to 12, the lamp body piece 16 is supported through the strap 28 and bracket 30 by the angle lock washer 31, engaging an arm 51, uprising from the union plug unit 44 which is connected to a union nut 46 that engages a flange and screw threads on the units. 49, 49 are position pins for the connection and 50 are fair leads for the electric cables.

63 is a protecting screw cap having a screw threaded centre pin 64. 65 is a collar loosely surrounding the cap and hinged as at 66 to a security pin 67, which is slidable in a base plate 68 of the socket unit 45, the plate 68 being secured on a member 68^a of the aircraft. When the light is in use, the cap has its centre pin 64 screwed into a hole 69 in the base plate 68 and when the light is out of use and detached from its socket 45 the cap 63 is detached from the plate 68 at its pin 64, turned over at its hinge 66 and screwed over the socket 45, as shown in Figure 12.

In Figure 8 the lamp body piece is directly supported by a base plate flange 62 the supporting members of Figures 9 to 12 not being required for the upward light.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a navigation light for aircraft, comprising a lamp, a transparent dome within which the lamp is enclosed, a lamp casing provided with a socket for the dome, a tubular mask carried by the lamp casing and a reduced portion thereof closely encircling the lamp, said portion being spaced from the socket, and water-tight means interposed between the dome and mask when the dome is in position in the socket.

2. In a navigation light as claimed in claim 1, a hood fitting upon the end of the said mask at one side of the lamp so as to limit the visibility to the opposite side of the lamp without interfering with the vertical angle.

3. A navigation light for aircraft, comprising an electric lamp, a transparent dome within which the lamp is enclosed, adapted to give with the light in position on the aircraft a large angle of visibility in both the vertical and horizontal planes, and a mask fitted around the lamp, the edge of which mask limits both the vertical and horizontal angles of visibility to predetermined large angles, an opaque body piece upon which the transparent dome and lamp are mounted and a pivoted bracket carried by the aircraft, upon which bracket the said body piece is adjustably mounted, said bracket extending rearwardly whereby the body piece and bracket provide uninterrupted visibility throughout the large vertical and horizontal angles of visibility provided for by the mask.

4. A navigation light for aircraft comprising a body piece, a glass dome provided with a groove, secured in the body piece, a lamp, a mask for the said lamp placed within the dome and means carried by the body piece adapted to engage the groove in the glass dome for securing the dome in position.

5. A navigation light for aircraft, comprising a lamp, a transparent dome within which the lamp is enclosed, adapted to give with the light in position on the aircraft a large angle of visibility in both the vertical and horizontal planes, a mask fitted around the lamp, the edge of which mask limits both the vertical and horizontal angles of visibility to predetermined large angles, and a body piece to which the transparent dome is secured and a supporting strap embracing the said body piece and permitting of rotation of the latter about its longitudinal axis.

6. A navigation light for aircraft, comprising a lamp, a transparent dome within which the lamp is enclosed, adapted to give with the light in position on the aircraft a large angle of visibility in both the vertical and horizontal planes, a mask fitted around the lamp, the edge of which mask limits both the vertical and horizontal angles of visibility to predetermined large angles, a body piece carrying the said transparent dome, a carrier strap embracing the body piece and permitting of rotation of the latter about its longitudinal axis, and a bracket support for the said strap and a pivotal clamp for the said bracket permitting end-on tilting of the body piece.

ALBERT LEWIS DAVIS.