This invention relates to an electric incandescent lamp comprising a filament and a reflector, and more particularly, to electric incandescent lamps intended to be used as signal lamps on vehicles.

The main object of the invention is to provide an incandescent lamp in which the beam is non-directional in a horizontal plane and directional in a vertical plane so that the beam is clearly visible in a wide circle around the vehicle.

According to the invention, an electric incandescent lamp including a filament comprises a reflector forming a portion of a surface of revolution defined by rotation of a portion of an ellipse about a line extending at right angles to the axis connecting the focal points of the ellipse and passing through one focal point, the portion of the ellipse employed to produce the reflector being located solely on that side of the line adjacent the other focal point. According to a further feature of the invention, the filament of the lamp is located along the line passing through the one focal point.

The term "ellipse" if to be understood in this case to include an ellipse in which one focal point lies at infinity, and which, consequently, is a parabola. The reflector may be constituted by parts of the bulb of the lamp or a member distinct from the bulb.

The invention will now be described with reference to the accompanying drawings in which:

Fig. 1 is a diagrammatic view of one form of incandescent lamp with cap in accordance with the invention in which reflector and lamp constitute a single assembly; Fig. 2 is a plan view of the lamp shown in Fig. 1; Fig. 3 is a diagrammatic view of another form of incandescent lamp in accordance with the invention, comprising a base plate; Fig. 4 shows a modification of the lamp shown in Fig. 3; Fig. 5 shows an incandescent lamp in accordance with the invention having a separate reflector; Fig. 1 shows an incandescent lamp in accordance with the invention constituted by a bulb 1 and a base 2. The bulb contains a filament 3 which is supported in the usual manner. The upper and lower parts of the bulb have the shape of portions of a surface of revolution obtained by rotation of an ellipse 4 (shown in dotted line) about an axis Y—Y indicated by a dot-and-dash line. This line Y—Y passes through one focal point F1 of the ellipse and is at right angles to an axis X—X connecting the two focal points of the ellipse. The filament 3 is also located at this focal point F1. The second focal point or focus of the ellipse falls outside the drawing and may be located at infinity, the ellipse then changing to a parabola. However, the shape of the bulb is determined by the figure of revolution of such parts of the ellipse as are located between the two focal points, that is to say, by revolution of the line portions AB and CD. These portions of the bulb are provided, either internally or externally, with a conventional type of reflecting layer, whereas the portions of the bulb between the circles passing through points A and D are transparent, and may be either clear or colored.

The filament 3 preferably coincides as far as possible with the axis of revolution Y—Y thereby increasing the symmetry of the light beam being produced. Two rays 5 and 6 of this light beam are shown.

In the plan view (Fig. 2), circles passing through points A and D are shown in dotted lines. This figure furthermore shows the angle α representing the wide-angle radiation of the beam in the horizontal plane, which, as shown here, is almost 360°, since the beam is interrupted only at the lamp base 2. However, for most practical purposes, a smaller angle α will be sufficient.

Fig. 3 shows a modification of the invention, in which the beam exhibits a horizontal radiation pattern of 360°, comprising a base plate 11, e.g. of glass. A plurality of pins 12 are pressed into base plate 11. Two such pins have welded on them wires 13 for supporting the lower end of a filament 14. For reasons of stability, two supporting wires are employed which are interconnected at their upper ends. If desired, one supporting wire only would suffice.

Four other pins 12 have welded to them supporting wires 15 which carry two reflector members 16 and 17, having the shape of cups and provided with apertures through which rods 15 are passed and subsequently welded in position. These reflectors form portions of a surface of revolution defined by a rotating ellipse in accordance with the invention. It is evident that many variations in the manner of supporting the reflectors 16 and 17 are possible. A bridge 18 carrying the upper ends of filament 14 is welded between the upper ends of two rods 15 located diametrically opposite each other. The upper end of the filament extends through an aperture of the upper reflector 17. The filament could alternatively be connected directly to this portion of the reflector. However, the construction shown offers the advantage that the mounting and centering of the filament is simplified. After the assembly has been mounted on the base plate 11, it is surrounded by a bulb 19 which is sealed along its edge at 20 to the base plate 11. The lamp furthermore comprises an exhaust tube, which is not shown for simplicity. If desired, one of the pins 12 may be used as such a tube.

The lamp shown in Fig. 4 is a modification of that shown in Fig. 3 and comprises a reflector, of which one portion 31 is constituted by the bulb 32 and the other portion is constituted by a metal cup 33. This lamp otherwise substantially corresponds to that shown in Fig. 3.

The lamp according to the invention shown in Fig. 5 externally comprises two reflector portions 41 and 42, which are connected along their flanged edges to a transparent cylindrical member 43. An incandescent lamp 44 proper is secured with its cap 45 in the cylindrical member 46.

In the foregoing discussion of the shape of the light beam, no allowance has been made for the dimensions of the filament. The beam produced thereby exhibits certain stray effects as a result of said dimensions and this is even desirable for clear visibility of the lamp. In view thereof, it is not necessary for the portions of the reflector to form an exact ellipsoid of revolution or paraboloid. Small deviations from this shape are possible within the scope of the invention.

While we have described our invention in connection with specific embodiments and applications, other modifications thereof will be readily apparent to those skilled in this art without departing from the spirit and scope of the invention as defined in the appended claims.
What we claim is:

1. An electric incandescent signal lamp for vehicles for obtaining a non-directional beam in a horizontal plane and a directional beam in a vertical plane comprising in said bulb a filament and a reflector, said reflector in said bulb forming a surface of revolution defined by a substantially 360° rotation of a portion of an ellipse about a line extending at right angles to an axis connecting the focal points of the ellipse and passing through one of said focal points, said portion of said ellipse being located solely on the side of said line adjacent the other of said focal points, the filament being located substantially along said line.

2. An electric incandescent lamp as claimed in claim 1 in which the other of said focal points is located at infinity.

3. An electric incandescent lamp as claimed in claim 1, in which the lamp comprises a bulb, a portion of said reflector being integral with a portion of said bulb.

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