March 27, 1956 E. W. GOSSWILLER 2,740,103

SIGNAL LAMP

Filed Sept. 11, 1953 5 Sheets-Sheet 1

Fig. 1.

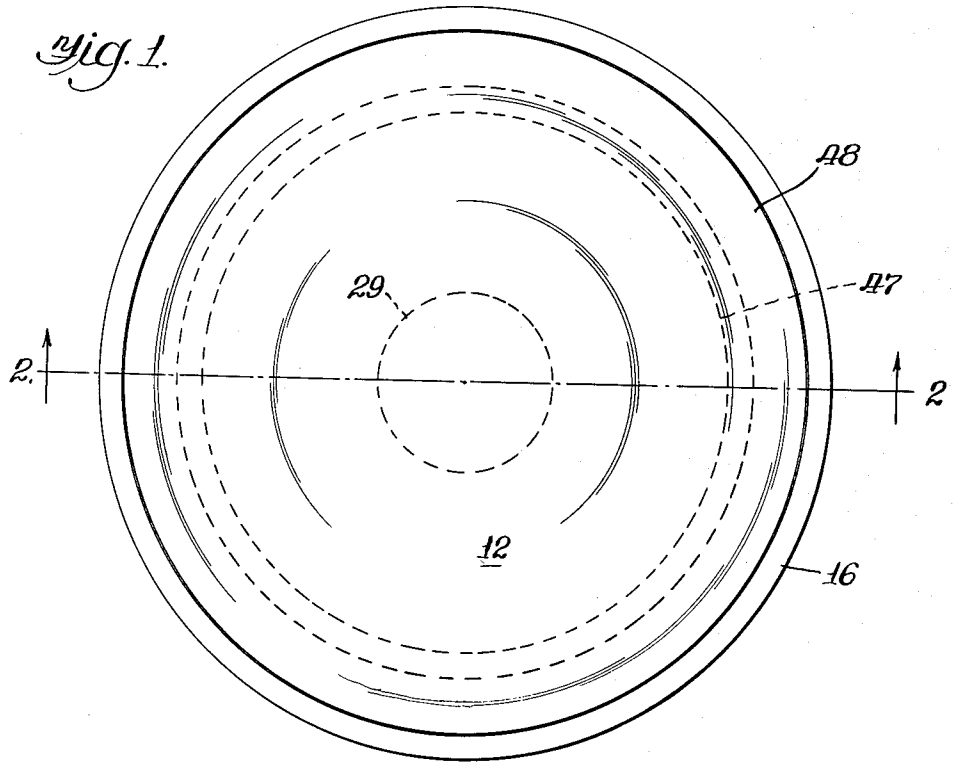


Fig. 2.

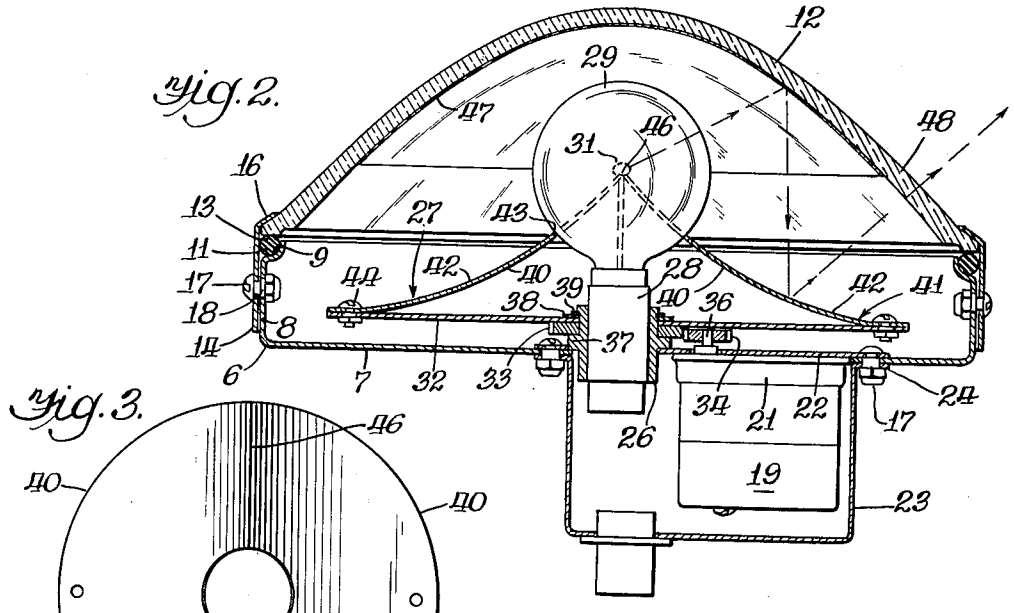


Fig. 3.

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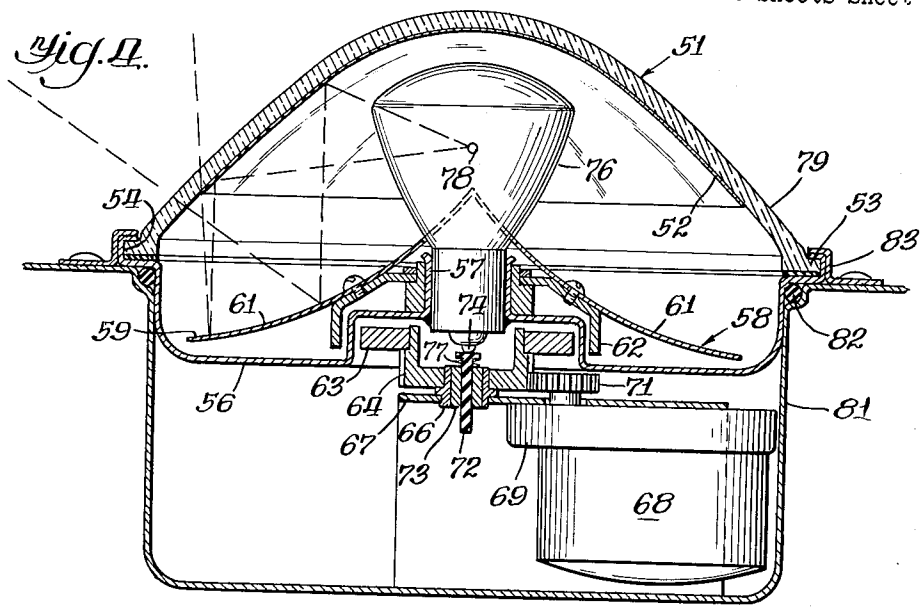
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Fig. 4.



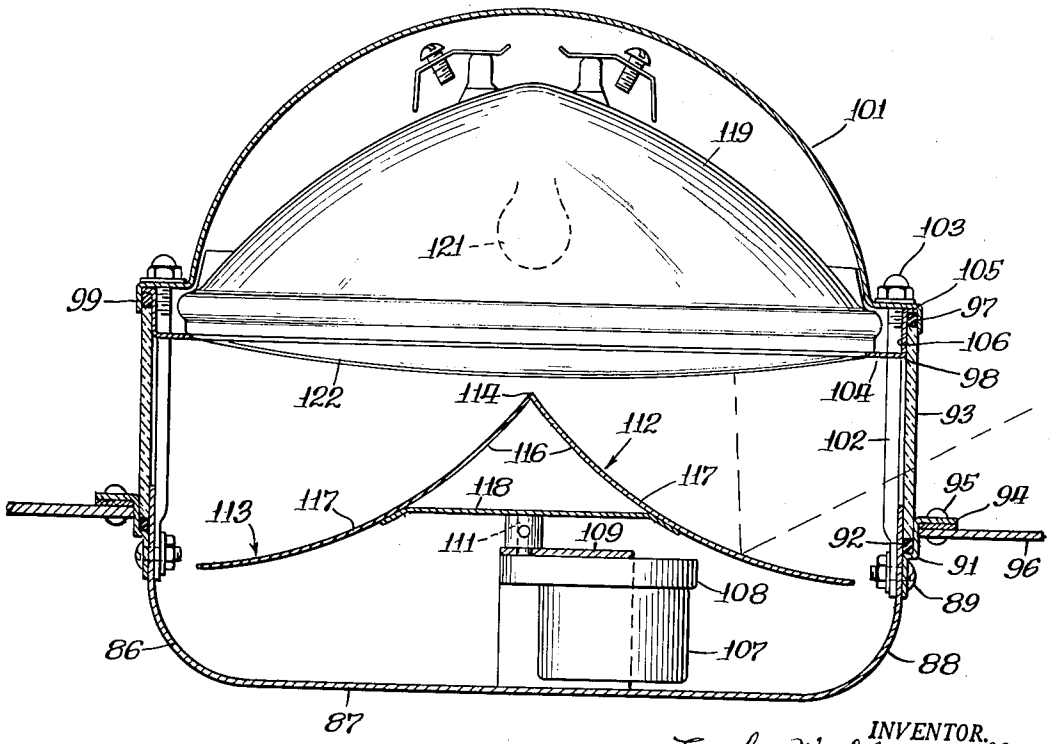


Fig. 5.

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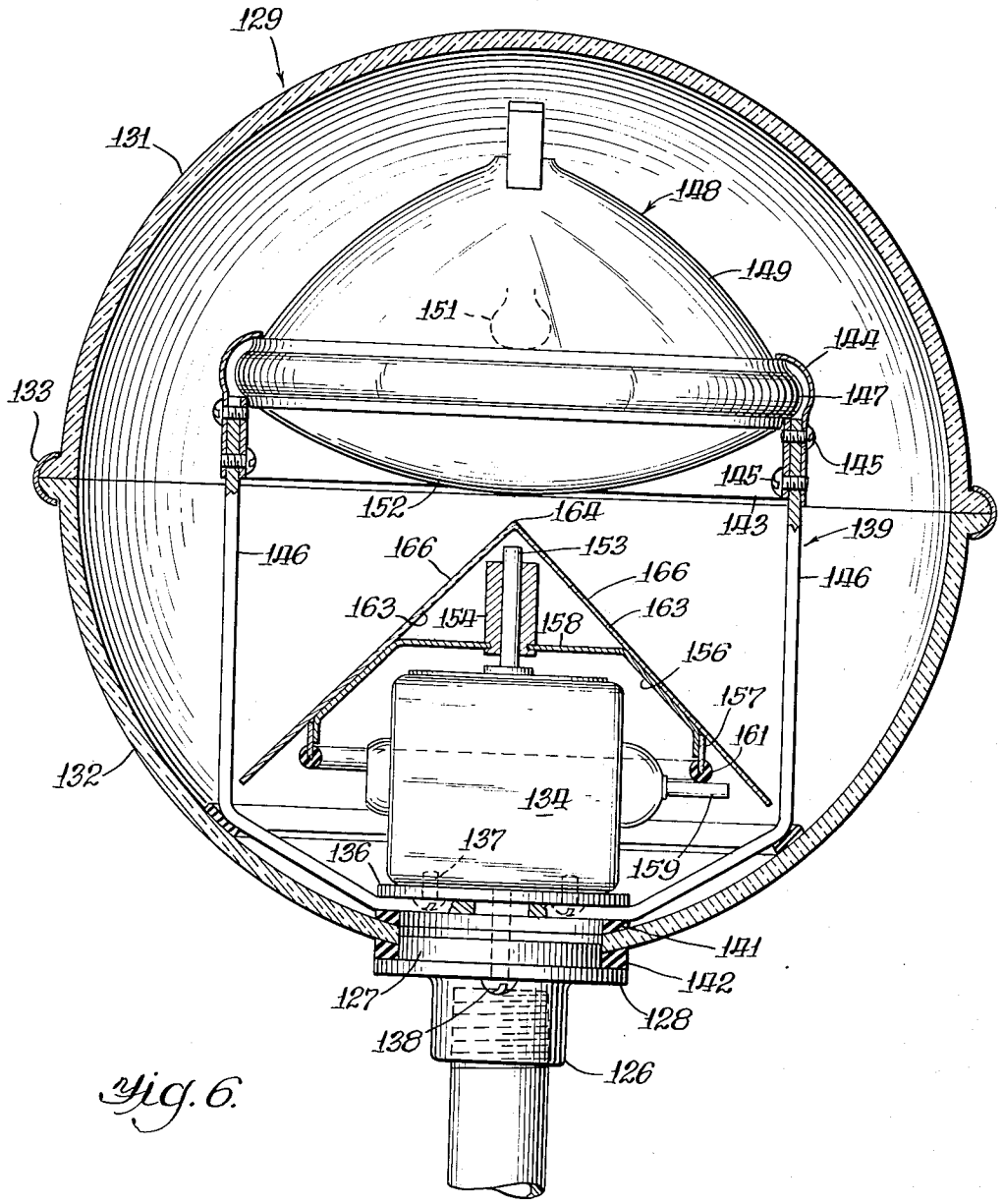


Fig. 6.

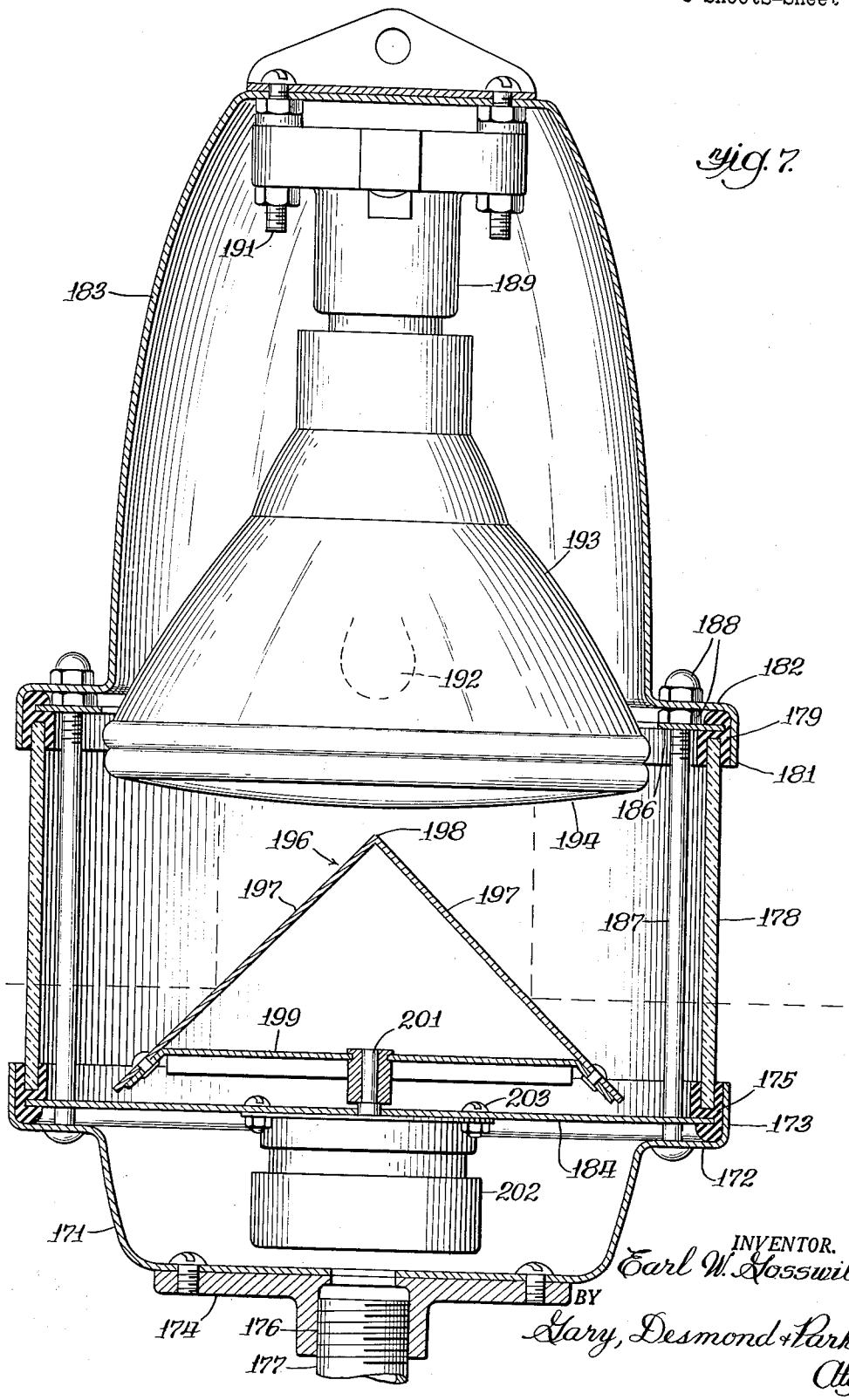
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Fig. 7.



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Fig. 8.

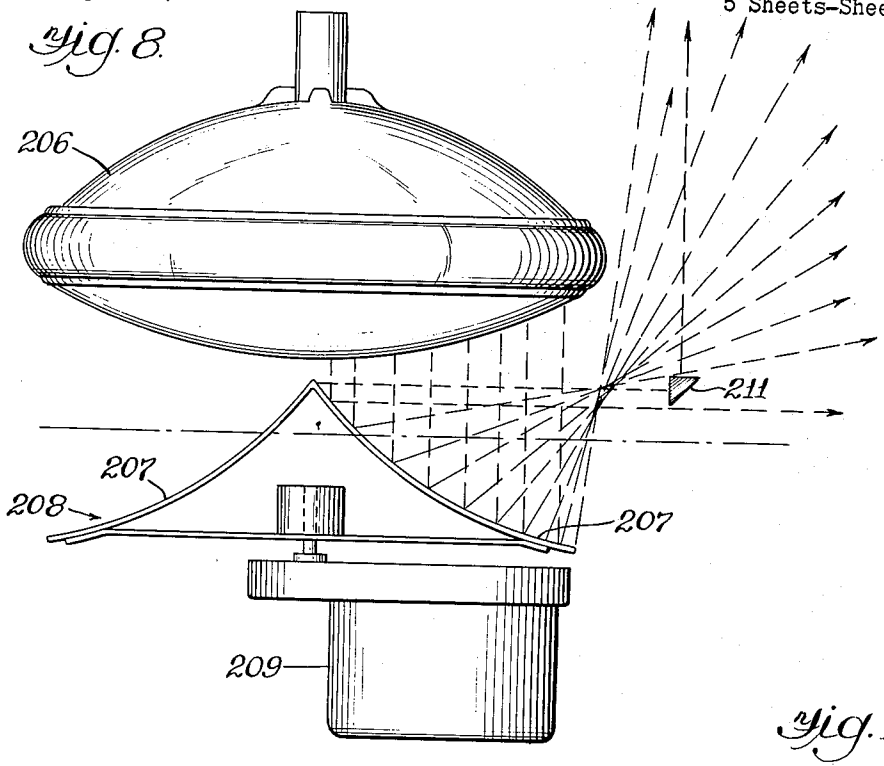


Fig. 10.

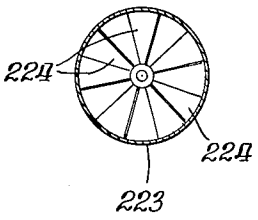
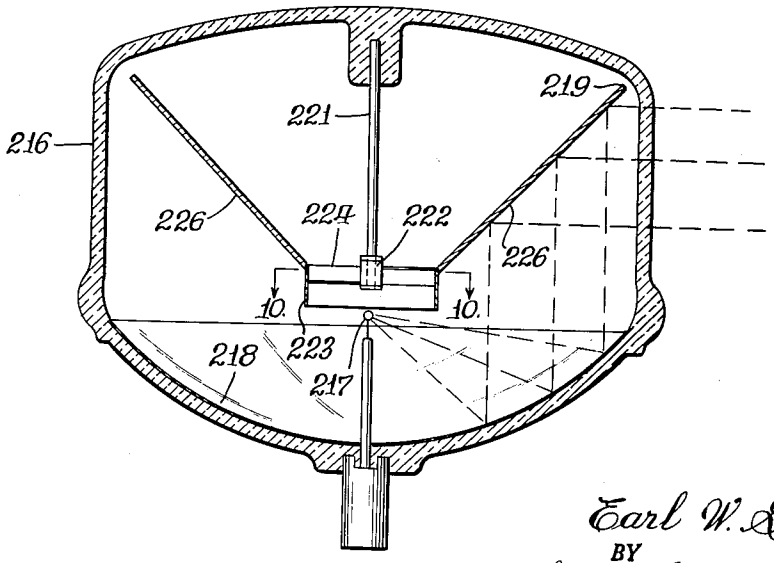


Fig. 9.



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United States Patent Office 2,740,103 Patented Mar. 27, 1956

2,740,103

SIGNAL LAMP

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Application September 11, 1953, Serial No. 379,517

5 Claims. (Cl. 340—50)

This invention relates to signal lamps and more particularly to a lamp effective to produce rays of light which, to an observer, appear to blink or flash.

Briefly, the present invention comprises generally a light source, such as an electric light bulb, associated with a parabolic reflector which receives light rays from the light source and reflects the rays along parallel lines toward a rotating mirror formed and disposed to divide the light rays and to reflect the divided rays in opposite directions. During rotation of the mirror, the light rays appear to an observer to blink or flash.

An object of the invention resides in the provision of a signal lamp effective in operation without interrupting the flow of current to the light bulb to produce blinking or flashing signal lights visible to observers located at relatively long distances from the lamp.

Another object of the invention resides in the provision of a signal lamp in which the several parts thereof are formed and arranged to provide a compact watertight unit which will not be rendered inoperative due to adverse weather conditions when the lamp is employed for use on airplanes, landing fields, police cars, etc.

A further object of the invention resides in the provision of a signal lamp structure in which the reflector and mirror are coaxial with and disposed on opposite sides of the light source.

Another object of the invention resides in the provision of a signal lamp embodying a mirror having light reflective side walls converging toward the axis of the reflector and merging along a vertical plane adjacent said axis whereby parallel light rays from the reflector are divided at the apex of the mirror and reflected radially by the side walls in opposite directions through an annular window adjacent the reflector, the rays from each side wall forming a light beam extending almost 90° around the axis of the mirror.

Another object of the invention resides in the provision of a signal lamp adapted to be mounted on the wing or other part of an airplane, the portion of the lamp exposed above the wing surface being formed of glass or other transparent material of concavo-convex section coated on a portion of its inner concave surface with a suitable light reflective material to define a parabolic reflector encircled by an annular window through which light rays are reflected from angularly disposed side walls of a rotatable mirror. To provide a more compact lamp structure having a minimum height, the mirror may be formed with an axial opening to receive a light bulb, and with concave light reflective surfaces.

A further object of the invention resides in the provision of a signal device in which a conventional "sealed beam" headlight is fixed within a housing to direct light rays against a mirror disposed coaxial with the headlight and journaled for rotation within the housing.

Another object of the invention resides in the provision of simple and inexpensive means to impart rotational movement to the mirror.

This invention embodies other novel features, details

of construction and arrangement of parts which are hereinafter set forth in the specification and claims, and illustrated in the accompanying drawings, wherein:

Fig. 1 is a top plan view illustrating a signal lamp embodying features of the invention.

Fig. 2 is a transverse sectional view of same.

Fig. 3 is a detail top plan view of the mirror.

Fig. 4 is a transverse sectional view illustrating a modified form of the invention.

Fig. 5 is a transverse sectional view illustrating another modified form of the invention.

Fig. 6 is a transverse sectional view illustrating another modified form of the invention.

Fig. 7 is a transverse sectional view illustrating another modified form of the invention.

Fig. 8 is a schematic side elevational view illustrating another form of the invention.

Fig. 9 is a transverse sectional view illustrating another modified form of the invention.

Fig. 10 is a sectional view taken along the line 10—10 of Fig. 9.

Referring now to the drawings for a better understanding of the invention and more particularly to Figs. 1 to 3 therein, the signal lamp is shown as comprising a housing 6 having a bottom 7 and an annular side wall 8 formed at its upper end with an annular recess 9 to receive an O ring gasket 11.

A concavo-convex cover 12 formed of glass or other transparent or translucent material is provided with an annular surface 13 seated against the gasket 11 to thus provide a leak-proof joint between the housing 6 and the cover. A cover retaining ring 14 sleeved over the cover and housing is formed with an annular inturned flange 16 engaging the outer surface of the rim portion of the cover to maintain the latter in snug annular sealing engagement against the gasket 11. The ring 14 is preferably detachably secured to the housing by means of bolts 17 having sealing gaskets 18 thereon.

An electric motor 19 with gear reduction unit 21 thereon is secured to a base plate 22 and enclosed by a casing 23 having an annular flange 24 formed with apertures to receive bolts 17 having sealing gaskets 18 thereon, the bolts also passing through apertures in the base plate and the bottom 7 of the housing 6. A sleeve bearing 26 extends through and is secured to the base plate 22 to support a mirror structure, indicated generally at 27, for rotational movement thereon. A lamp socket 28 is secured in the bearing 26 to receive an electric light bulb 29 having a filament at 31.

The mirror structure 27 is shown as comprising a mirror support plate 32 having a gear 33 secured to the lower side thereof for driving engagement with a pinion 34 keyed on the driving shaft 36 of the motor driven gear reduction unit 21, the support plate and gear being journaled on the bearing 26 between a shoulder 37 and a washer 38. A resilient snap ring 39 is engaged in a recess formed in bearing 26 to prevent displacement of the washer 38.

A mirror 41 is shown as formed from an annular blank of sheet metal to provide diametrically opposed walls 40—40 having concave light reflective surfaces 42—42. The mirror is formed with a central opening 43 to receive the light bulb 29 and is secured to the support plate 32 by bolts 44. As illustrated in Fig. 2, the surfaces 42—42 converge upwardly from the support plate 32 to intersect at 46 along a plane axially of the signal lamp.

The inner side of the cover 12 is coated with a suitable light reflective material 47 having a parabolic contour to reflect light rays from the light bulb 29 toward the light reflecting surfaces 42—42 of the mirror 41 from which the light rays are reflected outwardly through the annular window 48 of the cover as defined between the

cover retaining ring 14 and the marginal edge of the light reflective material 47.

When the electric motor 19 and light bulb 29 are connected to a suitable source of electric current, it will be noted that opposed light beams are directed through the annular window 48 by the opposed light reflective surfaces 42—42 of the mirror 41 and that the light beams are caused to rotate about the axis of rotation of the mirror to present the appearance of a blinking or flashing light to an observer. The signal lamp thus shown and described is particularly adapted for use on airplanes as only the cover 12 need be exposed outside a wing or other part of a plane. It is also apparent that light beams from the present lamp would be visible from a greater distance than light rays from conventional lamps presently employed on planes.

Fig. 4 illustrates a modified form of the invention in which the signal lamp is shown as comprising a concavo-convex cover 51 formed of transparent or translucent material, such as glass, and having a parabolic inner surface coated at 52 with a suitable light reflective material. To provide a leak-proof structure, the cover is provided with an annular rim portion 53 sealed within an annular seat portion 54 of a base 56 formed of non-magnetic material.

The base 56 is provided axially thereof with a tubular post 57 projecting toward the cover 51 to support a mirror structure 58 for rotational movement, the mirror structure comprising a mirror 59, similar to mirror 41, having arcuate light reflective surfaces 61—61 curving inwardly and axially toward the cover to merge along a plane axially of the base. A soft iron armature 62 is secured to the mirror 59 and journaled on the post 57 for rotational movement responsive to rotation of a magnet 63 mounted coaxial therewith outside the base 56.

The magnet 63 is secured to a gear 64 journaled on a collar 66 which is secured on a bracket 67 mounted on the base 56, the bracket having an electric motor 68 mounted thereon for driving engagement with the gear through a reduction gear unit 69 and driving pinion 71. A contact pin 72 is mounted for axial movement within a bushing 73 of electrical insulating material secured within the collar 66, and is urged against the contact post 74 of a light bulb 76 by a spring 77.

The light bulb 76 is cemented or otherwise secured in leakproof engagement within the post 57 and provided with a filament at 78 from which light rays are reflected from the coated parabolic surface 52 of the cover 51 toward the light reflective surfaces 61—61 of the mirror 59 and thence outwardly radially through the annular uncoated window portion 79 of the cover.

The electric motor 68 acts through the reduction gear unit 69 and pinion 71 to rotate the gear 64 and magnet 63 which, in turn, acts through the armature 62 to rotate the mirror 59. During rotation of the mirror, diametrically opposed rotating light beams are directed through the annular window 79.

In this form of the invention, the signal lamp is adapted to be mounted within a cup-shaped casing 81 in sealed engagement therewith by means of an O ring gasket 82 and a clamping ring 83 to protect the motor 68 and other parts exterior of the base 56 from moisture, dirt, etc.

Fig. 5 illustrates another modified form of the invention in which the signal lamp is shown as comprising a base 86 having a bottom 87 and an annular wall 88 provided with circumferentially spaced apertures to receive bolts 89. A window retainer ring 91 encircles the wall 88 and is secured thereto by the bolts 89, the ring and wall defining an annular recess to receive an O ring gasket 92 and the inner end of a tubular window 93 formed of transparent or translucent material permitting the passage of light rays therethrough. The retainer ring 91 is provided with a flange 94 adapted to be secured by rivets 95 on a mounting member 96 forming part of an airplane, vehicle, or other structure on which the signal lamp is employed for use.

The outer end of the window 93 and an O ring gasket 97 are mounted within an annular recess defined by a lamp retainer ring 98 and an annular flange 99 on a cover 101, said ring and cover being provided with bolt apertures to receive bolts 102 having their inner ends formed with eyes to receive their respective bolts 89 and their outer ends threaded to receive nuts 103. The retainer ring 98 is preferably of Z-section having axially spaced inner and outer flanges 104 and 105 interconnected by a web 106 which is engaged between the bolts 102 and the inner surface of the window 93.

An electric motor 107 having a built-in reduction unit 108 is supported on a mounting bracket 109 secured to the bottom 87 of the base 86, the reduction unit having a drive shaft 111 coaxial with the base, cover and window to support and rotate a mirror structure 112 similar to the mirrors heretofore described in connection with the other forms of the invention.

The mirror structure is shown as comprising a mirror 113 formed from a disk of sheet metal bent transversely at 114 to provide a pair of arcuate side walls 116—116 converging toward their juncture 114, the side walls having light reflective surfaces 117—117 and being mounted upon the ends of a cross strap 118 secured on the drive shaft 111.

A conventional sealed lamp structure comprising a parabolic reflector 119, filament 121 and lens 122 is secured to the cover 101 by the flange 104 of the retainer ring 98 and is adapted to be connected to a suitable source of current to direct light rays axially through the lens onto the light reflective surfaces 117—117 of the mirror 113 from which the rays are divided and reflected radially through diametrically opposed sides of the window 93. As the mirror 113 is rotated by the motor 107, the light beams from the surfaces 117—117 revolve about the axis of the signal lamp and appear to an observer as flashing or blinking lights.

Fig. 6 illustrates another modified form of the invention in which the signal lamp is shown as comprising a base 126 adapted to be secured to a vehicle and having a reduced diameter stem 127 projecting above a flange 128 through an aperture formed in a spherical hollow housing 129 of transparent or translucent material, such as glass. The housing is shown as formed of upper and lower sections 131 and 132 joined together by a split ring 133 engaging opposed annular rims on the sections.

An electric motor 134 is secured to a mounting plate 136 by screws 137, and the plate is secured to the flange 128 by screws 138. A U-shape lamp support bracket 139 is formed with an aperture in its base to receive the upper end of the stem 127 and is secured thereon by the mounting plate 136. Resilient gasket rings 141 and 142 are mounted on the stem on opposite sides of the lower section 132 of the housing, remote sides of the rings being engaged by the bracket 139 and flange 128, respectively.

Coaxial inner and outer retainer rings 143 and 144 are secured by screws 145 on the free ends of the legs 146—146 of the bracket 139 to engage opposite sides of an annular rim portion 147 of a sealed lamp 148 which is of conventional construction comprising a parabolic reflector 149, filament 151 and lens 152.

A journal 153 is provided on the motor 134, coaxial with and projecting upwardly toward the lamp 148, to receive a bearing 154 on a mirror support structure 156. The structure 156 is shown as comprising a ring 157 engaged at diametrically opposite sides thereof to the ends of a cross member 158 having the bearing 154 mounted thereon. An armature shaft 159 projects from one end of the motor 134 to engage and drive the mirror support structure. As shown in Fig. 6, a rubber ring 161 may be provided on the lower end of the ring 156 for frictional driving engagement with the shaft 159,

but it is apparent that a ring gear may, if desired, be provided on the ring 157 for meshing engagement with a pinion on the shaft 159 to provide a positive driving engagement between the motor and mirror support structure.

A mirror 162 is secured to the cross member 158 and is shown as formed from a disk of sheet metal bent along a transverse line to provide a pair of upwardly converging side walls 163—163 merging at 164 adjacent the upper end of the journal 153. The side walls 163—163 are provided with light reflective surfaces 166—166 to reflect light rays from the lamp 148 outwardly through the housing 129 in the form of two light beams diverging radially from and rotatable about the axis of rotation of the mirror responsive to operation of the motor 134, the light beams appearing to an observer in their path as a flashing light with the rate of flashing dependent upon the speed of rotation of the mirror.

Fig. 7 illustrates another modified form of the invention in which the signal lamp is shown as constructed for use as a beacon light for motels, gasoline stations, and other places to which it may be desirable to attract attention.

In this form of the invention, the signal lamp is shown as comprising a cup-shape base 171 having an annular web 172 merging with an annular flange 173, the base being secured to a flanged fitting 174 threaded internally at 176 to receive the threaded end of a support member 177. A resilient rubber ring gasket 175 is seated against the web 172 within the flange 173 and embraces the lower annular edge of a tubular window 178 formed of glass or other transparent or translucent material.

A resilient rubber ring gasket 179 embraces the upper edge of the window 178 and is snugly engaged within an annular flange 181 and against an annular web 182 provided on a cover 183. The marginal portion of a motor mounting plate 184 is embedded within the ring gasket 175, and the marginal portion of a window retaining ring 186 is embedded within the ring gasket 179. The webs 172 and 182, plate 184 and ring 186 are formed with aligned apertures to receive bolts 187 having nuts 188 thereon.

A lamp socket 189 is mounted within the cover 183 by bolts 191 to receive a filament 192 which is enclosed by a suitable reflector 193 and lens 194 to direct light rays downwardly against a mirror 196 having downwardly diverging light reflective surfaces 197—197. The mirror is similar to the forms heretofore described in that it may be formed from a disk of sheet metal bent at 198 along a line extending transversely of the disk.

The mirror 196 is secured to a cross member 199 keyed to the shaft 201 of an electric motor 202, the motor being secured against the lower face of the plate 184 by means of bolts 203 and adapted to be connected to a suitable source of current to rotate the mirror to reflect light rays from the filament 192 in the form of two light beams diverging radially through opposite sides of the window 178.

Fig. 8 is a schematic view illustrating another modified form of the invention in which a signal lamp may be of the type illustrated in Figs. 1 to 3, or other type, having a lamp 206 to direct light rays against light reflective surfaces 207—207 of a mirror 208 rotated by a motor 209. In this form of the invention, some of the light rays from the mirror are directed to one or more prisms 211 which serve to change the line of travel of the intercepted rays. The prisms may be in the form of circumferentially spaced segments, or the prism may be in the form of a ring coaxial with the lamp.

Figs. 9 and 10 illustrate a modified form of the invention in which the signal lamp is shown as comprising a gas-filled housing 216 formed of glass and provided with a light filament 217 and a parabolic light reflective surface 218.

A mirror structure 219 is journaled for rotational movement on a stud shaft 221 and is shown as comprising a bearing 222 interconnected to a sleeve 223 by means of radially disposed inclined fan blades 224. Mirrors 226 are mounted on the sleeve 223 to reflect light rays from the surface 218 outwardly through the housing 216. Convection currents induced by the heated light filament pass through the sleeve 223 and between the fan blades 224 to cause the mirror structure to rotate about the shaft 221.

While this invention has been shown in several forms, it is obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit and scope of the claimed invention.

I claim as my invention:

1. In a signal lamp, a housing comprising a cylindrical transparent window disposed between a cover and a base, upper and lower resilient ring gaskets mounted on opposite ends of the window to engage said cover and base, respectively, a motor mounting plate having its marginal portion mounted in said lower ring gasket, an electric motor secured to the lower surface of said mounting plate and having a shaft projecting upwardly therethrough, a mirror secured to said shaft, light means within said cover to direct light rays toward said mirror for reflection therefrom through said window, and bolt means interconnecting said cover and base.

2. A signal lamp according to claim 1 in which the window and light means are in axial alginment with the axis of rotation of the mirror.

3. A signal lamp according to claim 2 in which the mirror is provided with two light reflective faces arranged to reflect light rays passing thereto from the light reflective surface through diametrically opposed portions of said annular window.

4. In a signal lamp, a housing comprising a cylindrical transparent window disposed between a cover and a base, upper and lower resilient ring gaskets mounted on opposite ends of the window to engage said cover and base, respectively, a motor mounting plate having its marginal portion mounted in said lower ring gasket, an electric motor secured to the lower surface of said mounting plate and having a shaft projecting upwardly therethrough, a mirror secured to said shaft, light means within said cover to direct light rays toward said mirror for reflection therefrom through said window, and bolt means interconnecting said cover and base, and means on said base for detachable engagement with a post.

5. In a signal lamp, a housing comprising a cylindrical transparent window disposed between a cover and a base, upper and lower resilient ring gaskets mounted on opposite ends of the window to engage said cover and base, respectively, a motor mounting plate having its marginal portion mounted in said lower ring gasket, an electric motor secured to the lower surface of said mounting plate and having a shaft projecting upwardly therethrough, a mirror secured to said shaft, light means within said cover to direct light rays toward said mirror for reflection therefrom through said window, and bolt means interconnecting said cover and base, a window retaining ring embedded in said upper ring gasket, said cover, retaining ring, motor mounting plate and base having aligned apertures to receive said bolt means.

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