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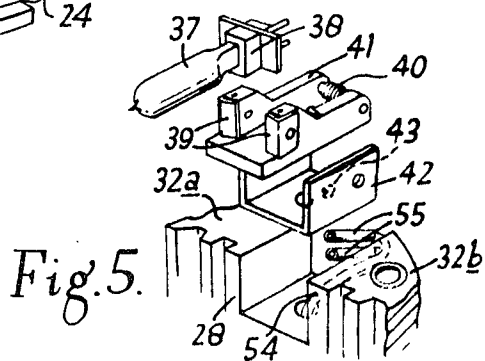


Fig. 5.

Fig. 2.

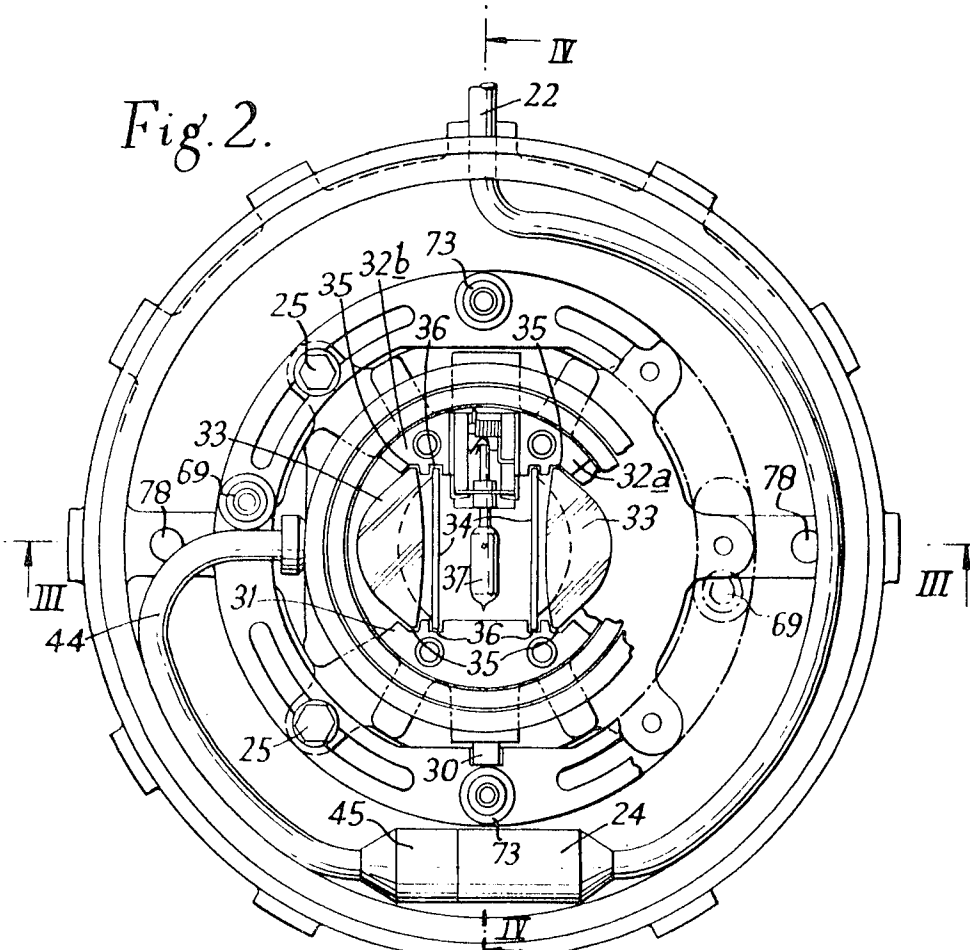


Fig. 3.

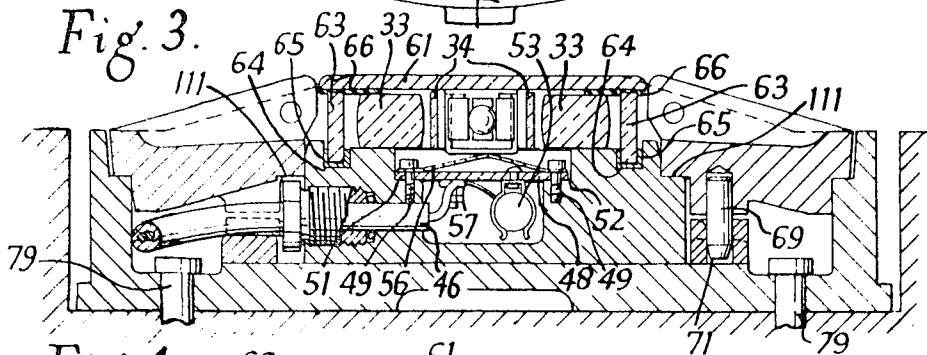
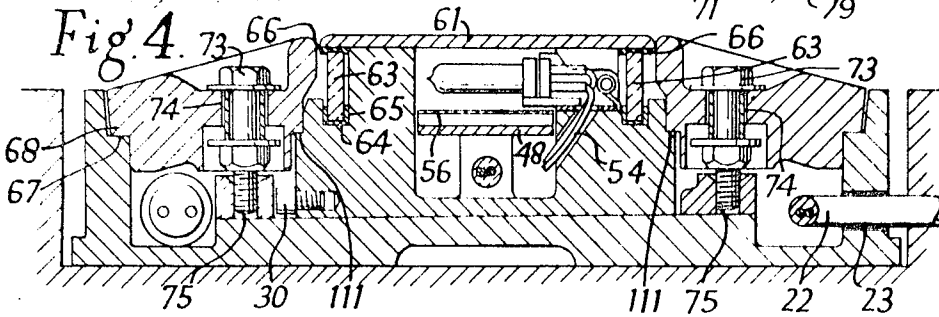


Fig. 4.



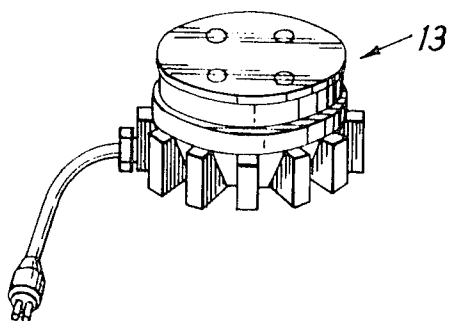
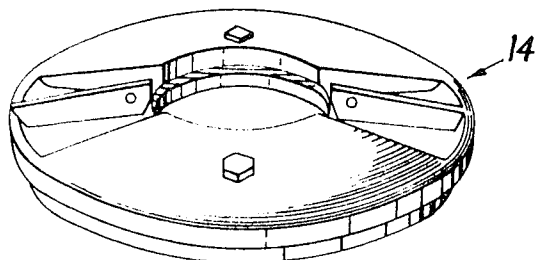
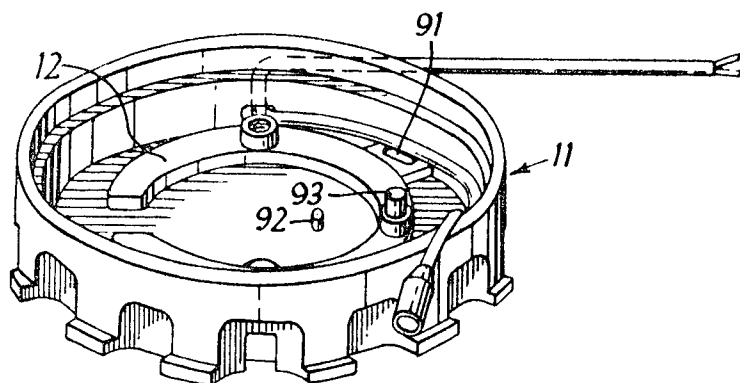
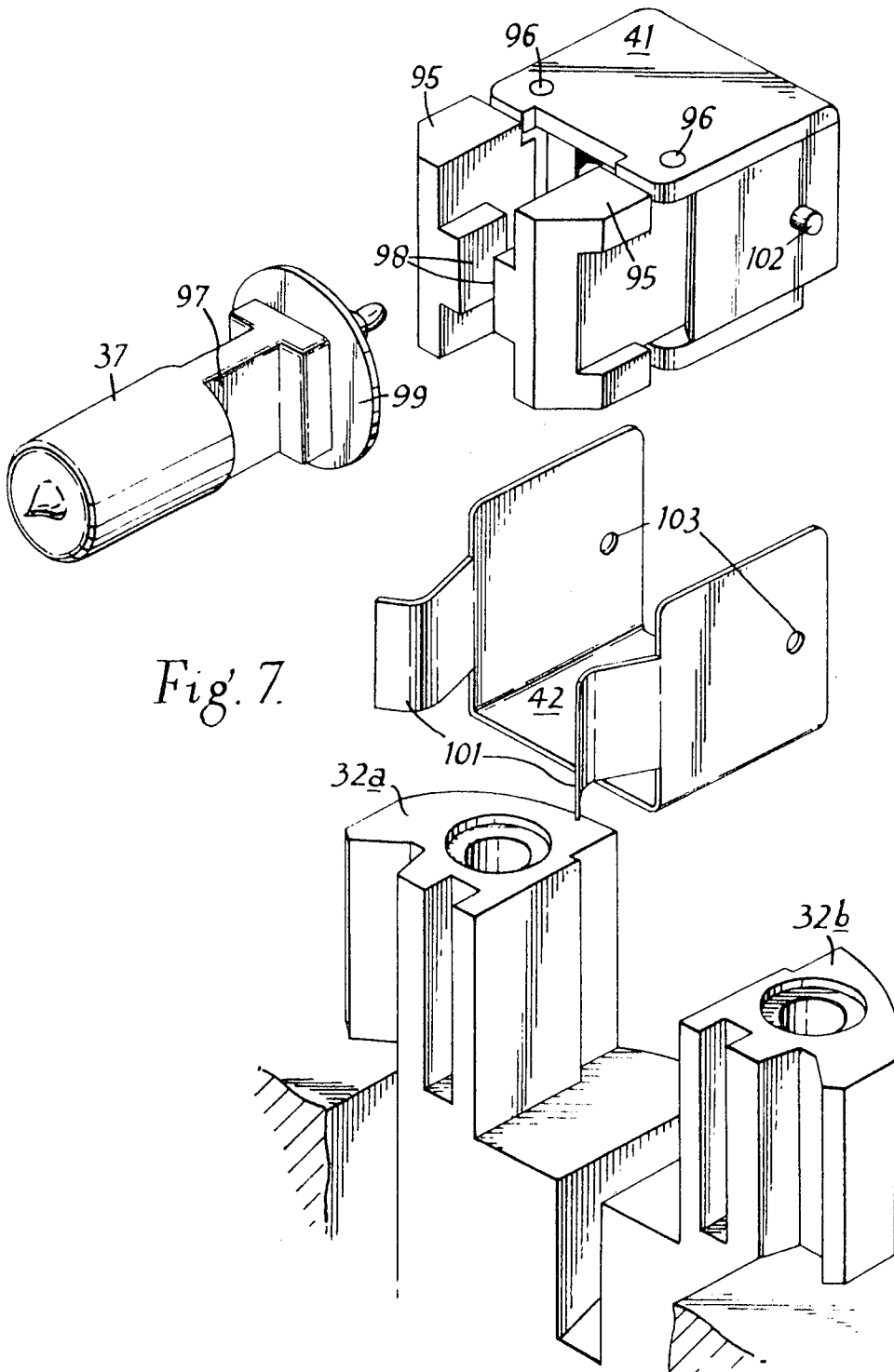


Fig. 6.



SHEET 4 OF 4



# 1

## LIGHTING DEVICE

The present invention relates to a lighting device suitable for use in connection with aerodrome runways and the like to delineate or indicate their edges or center lines. Such a lighting device is designed to be mounted in a hole in the ground with only an upper portion from which light is emitted extending above ground level.

According to the present invention there is provided a lighting device including a cover having a domed outer surface with at least one recessed portion extending from its center to its periphery and a base on which the cover is mounted wherein the cover is formed with a central opening and a lamp assembly having a body portion which carries a lamp holder and a lens is mounted on the base and extends through the central opening so that light from a lamp held in the lamp holder will pass through the lens and emerge from the lighting device through the or each recessed portion of the cover.

Advantageously, space is provided between the interior of the outer wall of the cover or the base and the body portion of the lamp assembly. In this space a connection between a cable from the mains supply of electrical power and a cable for supplying this electrical power to the device may be accommodated.

The lamp assembly may include resilient means biasing the lamp holder against the body portion of the lamp assembly, to facilitate heat transfer. This arrangement facilitates servicing and replacement of a lamp fitted in the lamp holder and ensures that correct focusing of the lamp is maintained, should the cover of the device be disturbed e.g. by an aircraft passing over it.

In a preferred embodiment of the invention, there is provided a locating ring, so secured to the base that its orientation with respect to the base can be adjusted, within which is mounted the lamp assembly so adapted that it can have only a fixed orientation with respect to the locating ring. Preferably, the margin of the central opening in the cover cooperates with the body portion of the lamp assembly and thus, when in position, holds the lamp assembly on the base.

Two embodiments of the invention will now be described by way of example, with reference to the accompany drawings in which:

FIG. 1 is an exploded perspective view of a lighting device,

FIG. 2 is a plan of the assembled lighting device shown in FIG. 1, with the cover removed,

FIG. 3 is a section along III—III in FIG. 2,

FIG. 4 is a section along IV—IV in FIG. 2, and

FIG. 5 is an exploded perspective view of the lamp holder,

FIG. 6 is an exploded perspective view of an alternative design of lighting device,

FIG. 7 is an exploded perspective view of an alternative form of lamp holder.

The lighting device shown in FIGS. 1-5 in the drawings comprises a base 11, a locating ring 12, a lamp assembly 13 and a cover 14.

The base 11 is in the form of a cylinder closed at one end having a sidewall 15 and a bottom 16 with a central upstanding portion 17 from which eight bosses 18 project along the bottom 16. The exterior of the base 11 is formed with a plurality of lugs 19 and recesses 21. A cable 22, through which the lighting device is coupled to a source of electric power, passes through an opening 23 in the sidewall 15 and terminates in a socket 24.

The locating ring 12 is secured to the central upstanding portion 17 of the base 11 by four bolts 25 that engage respectively in four holes 26 in the bosses 18. The four bolts 25 pass respectively through four slots 27 in the locating ring 12, enabling the orientation of the locating ring 12 on the base 11 to be adjusted.

The lamp assembly 13 comprises a body portion 28 formed externally with a plurality of fins 29 one of which carries a dowel 30 that engages in a recess in the inner axially extending surface of the locating ring 12, to ensure correct positioning of the lamp assembly 13 to the locating ring 12. Three upstand-

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ing portions 31, 32a and 32b of the body portion 28 serve to secure in position two lenses 33 and two flat filters 34. The lenses engage in grooves 35 and the filters in grooves 36 in the upstanding portions 31, 32a and 32b. A lamp 37 is mounted between the projecting portions 32a, 32b (as shown in detail in FIG. 5) in a prefocus base 38 which is secured by clips 39 to a mounting 41 which is pivotally mounted within a channel-shaped member 42 held rigid with the body 28 by a screw 43. The pivotal connection between the mounting 41 and the channel-shaped member 42 includes a spring 40 by which the mounting 41 is biased towards the body 28 to hold the mounting 41 against the member 42. This facilitates cooling of the lamp assembly by increasing the efficiency of heat transfer from the mounting 41 of the body 28.

A cable 44 terminating in a plug 45 passes through the body 28 via a passage 46 which is sealed by a gland 47 with a silicone rubber O-ring (not shown). The plug 45 is inserted in the socket 24 to couple the lamp assembly to the electric supply. An insulated board 48 is secured by screws 49 to two steps 51 and 52 on the inner part of the body 28. On the board 48 are provided a cutout 53 and two terminals (one of which is shown at 57 in FIG. 3) for the lighting device. The cable 44 is connected at its end remote from the plug 45 to the terminals. A further length 54 of cable connects the terminals to the lamp 37 via sockets 55 and the cut out 53 is connected across the terminals. Above the insulated board 48 is mounted a reflector 56 to shield the cutout and terminals from the heat dissipated by the lamp 37.

The lamp assembly 13 is provided with a lid 61 which is secured by four screws 62 which pass through the body 28 are locked by nuts (not shown) and removal of this lid gives access to the lamp 37. When the lid 61 is fastened in position it renders the fitting watertight. A circular Pyrex window 63 is mounted in a groove 64 in the body 28 by means of a U-section silicone rubber gasket 65 and surrounds the lenses 33 and the lamp 37. A shaped gasket 66 is held between the window 63 and the lid 61 and extends inwardly to retain the lenses 33 in position.

The cover 14 is seated inside the base 11 by means of the cooperation of a step 67 on the interior of the base 11 with a reentrant portion 68 of the cover 14. The cover is located in the correct position on the base by two dowels 69 that engage respectively in two sockets 71 provided on the locating ring 12. The outer surface of the cover is domed and is provided with two recessed portions 72 which extend from a central opening 70 and to enable light from the lamp 37 to emerge. When the cover 14 is secured to the base 11, a shoulder 111 formed on the underside of the cover 14 engages with the top surfaces of the fins 29, thus clamping the body portion 28 of the lamp assembly 13 to the base 11. Two captive bolts 73 pass respectively through two holes 74 in the cover 14 and engage respectively in two sockets 75 on the locating ring 12. Two upstanding walls 76, integrally formed with the cover 14, extend from the recessed portions 72 and are provided with eye holes 77 by which the cover can be lifted from the base after the bolts 73 have been disengaged from the sockets 75. The bolts 73 are provided with nuts 81, washers 82 and tubes 83 which cause the cover 14 to be ejected when the bolts 73 are turned.

The lighting device is mounted in a hole in the ground, as indicated in FIG. 3, and is assembled by placing the base 11 in a hole in the ground, correctly positioned to receive the electric power cable and securing it by means of bolts 79 passing through two openings 78 in the base. The lugs 19 and recesses 21 help to retain the base in the correct position. The locating ring is secure to the base by the bolts 25 and its orientation adjusted by the rotational motion allowed by the slots 27. The lamp assembly is placed on the base 11 inside the locating ring 12 with the dowel 30 engaged in the recess in the locating ring and the plug 45 inserted in the socket 24. The cover 14 is then seated on the base 11, located by means of the dowels 69, and secured by the bolts 73. The small sealed lamp assembly 13 is readily detached from the other parts of the device and can be

easily stored and carried and permits ready exchange of lamp assemblies.

FIG. 6 shows a modified lighting device in which the base 11 and the locating ring 12 are formed as a unit which is secured to the ground, in a manner similar to that employed in the embodiment first described, by bolts (not shown) that pass through elongated slots, one of which is shown at 91 in FIG. 6. These elongated slots allow about 10° of adjustment of the orientation of the device. The lamp assembly 13 is mounted on the base 11 inside the locating ring 12 and its orientation determined by an upstanding pin 92 that engages in a socket (not shown) in the underside of the lamp assembly 13. The cover 14 is secured by bolts as described for the first embodiment, but is located by a single dowel 93 projecting from the locating ring 12.

In a modified form of lamp holder shown in FIG. 7, the mounting 41 includes two pinch contact arms 95 hinged to the main part of the mounting 41 by pins 96. Connections (not shown) for receiving the terminals of a lamp 37 are provided on the mounting 41. The contact arms 95 are arranged to pivot outwardly about the pins 96 to enable a lamp 37 having a pinch seal 97 to be fitted in the mounting 41. The contact arms 95 are provided with inwardly extending portions 98 which grip the pinch seal 97 when the lamp 37 is mounted in the lampholder. The correct positioning of the lamp 37 is ensured by the provision of a prefocus ring 99 which engages behind the rear edges of the contact arms 95.

The mounting 41 is normally located within a channel-shaped member 42 having two resilient inwardly biased arms 101 which act on the contact arms 95 to hold them inwardly against the pinch seal 97 of the lamp 37.

The mounting 41 is pivotally mounted between the projecting portions 32a and 32b by means of two pins 102 provided on each side of the mounting 41 which extend through holes 103 in the member 42 and are received in sockets (not shown) in the portions 32a and 32b.

In order to remove the lamp 37 from the holder, the resilient arms 101 are opened and the mounting 41 pivoted upwardly about the pins 102. The contact arms 95 can now be opened out, by pivoting about the pins 96, to allow the lamp 37 to be withdrawn.

We claim:

- 1. A lighting device comprising:
  - a cover;
  - a domed outer surface of said cover;
  - a central opening in said cover;
  - at least one recessed portion extending from the said central opening to the periphery of said cover;
  - a lamp assembly;
  - a body portion of said lamp assembly;

a lamp holder and a lens carried by said body portion; a base, said lamp assembly being mounted on said base and extending through said central opening whereby light from a lamp held in the lamp holder will pass through the lens and emerge from the lighting device through the or each recessed portion of the cover; and a locating ring, so secured to the base that its orientation with respect to the base can be adjusted within which is mounted the lamp assembly which is so adapted that it can have only a fixed orientation with respect to the locating ring.

2. A lighting device according to claim 1, wherein the locating ring is formed with a plurality of slotted openings and a plurality of bolts are provided which pass through the slotted openings and engage in a plurality of bores on the base to secure the locating ring to the base.

3. A lighting device according to claim 1 wherein an outwardly projecting dowel is provided on the body portion of the lamp assembly which engages with a recess in the inner axial surface of the locating ring whereby the orientation of the lamp assembly with respect to the locating ring is determined.

- 4. A lighting device comprising:
  - a cover;
  - a domed outer surface of said cover;
  - a central opening in said cover;
  - at least one recessed portion extending from the said central opening to the periphery of said cover;
  - a lamp assembly;
  - a body portion of said lamp assembly formed with two upstanding portions between which a channel-shaped heat-conducting member is secured;
  - a mounting having means for releasably holding a lamp pivotally housed within the channel-shaped member which facilitates heat dispersion from a lamp held in the mounting;

a lamp holder and a lens carried by said body portion; a base, said lamp assembly being mounted on said base and extending through said central opening whereby light from a lamp held in the lamp holder will pass through the lens and emerge from the lighting device through the or each recessed portion of the cover.

5. A lighting device according to claim 4 wherein a spring is provided for biasing the mounting against the channel-shaped member.

6. A lighting device according to claim 4 wherein the mounting comprises a main part on which are provided electrical connections for a lamp and to which are hinged two arms arranged to be pivoted inwardly by two resilient, inwardly biased arms provided on the channel-shaped member so as to engage a lamp and hold it in the mounting.

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