Oct. 24, 1933. R. M. EATON 1,932,102

ELECTRIC ILLUMINATING DEVICE

Filed Oct. 21, 1931

Fig. 1

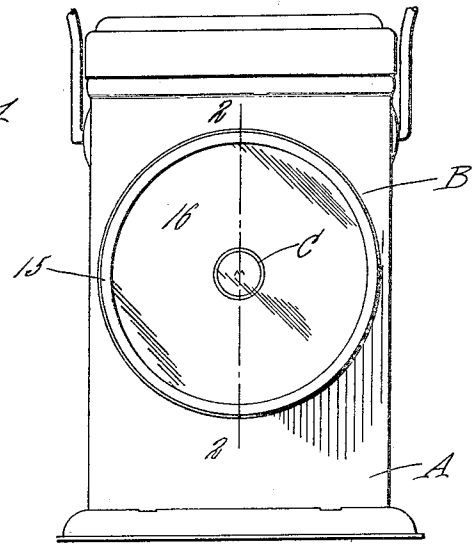


Fig. 2

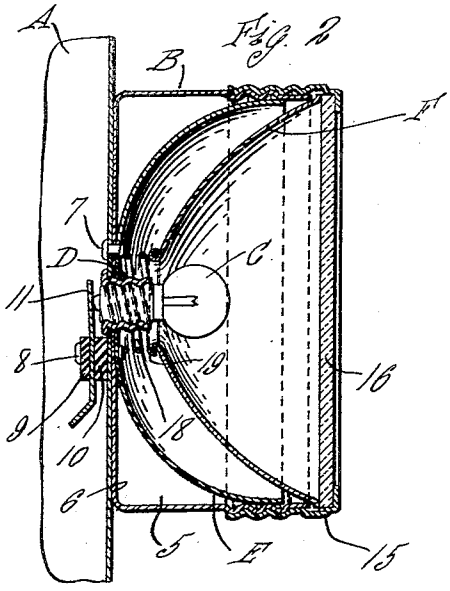
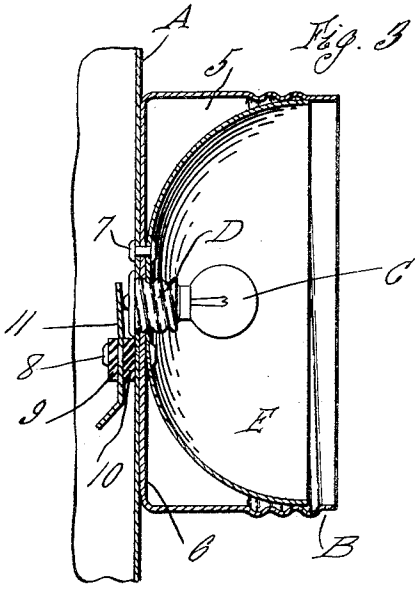


Fig. 3



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ELECTRIC ILLUMINATING DEVICE

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2 Claims. (Cl. 240—10.69)

This invention relates to improvements in portable electric illuminating devices, particularly of the type employing a primary battery as a source of power.

Portable lighting devices of this kind have two main uses, one for projecting a beam of light to a considerable distance beyond the device, in order to illuminate distant objects, and the other use is for general illumination in immediate proximity to the lighting device, as may, for example, be desired for reading or for providing illumination in a room or similar small space.

The objects of this invention are to provide a lighting device of this kind of improved construction, in which different reflectors may be used to produce different lighting effect; also to provide a lighting device of this kind, in which one reflector is permanently secured in a reflector housing and another reflector is removably arranged therein and nested in the first mentioned reflector, so that either reflector may be used when desired; also to provide a lighting device of this kind with two reflectors, one for focusing the light, and another for diffusing the light, both reflectors being contained in the same reflector housing and usable interchangeably; also to provide a device of this kind, in which a reflector for diffusing light is permanently arranged in a reflector housing, and in which a second reflector for focusing or concentrating the reflected rays of light is removably and adjustably arranged in the reflector housing; also to improve portable electric lighting devices of this kind in other respects hereinafter specified.

In the accompanying drawing:

Fig. 1 represents a face view of a lantern embodying this invention;

Fig. 2 is a sectional elevation thereof, on line 2—2, Fig. 1;

Fig. 3 is a similar sectional elevation, showing the reflector housing with the retaining ring and one of the reflectors removed therefrom.

This invention may be applied to a portable illuminating device of any desired construction and for purposes of illustration, the invention is shown in the drawing as applied to an electric lantern having a housing A, which may contain the battery or other source of power, not shown. This housing has a reflector housing B rigidly secured thereto on the front face of the lantern housing, and an electric light bulb or other source of light C may be suitably arranged in a socket D rigidly secured on the lantern housing A. The reflector housing B, in the particular construction shown, has a cylindrical outer wall 5 terminating at its inner end in a flat wall 6 which may be suitably secured to the lantern housing A, for example, by means of rivets 7 and 8. The rivet 8 also serves to secure together two insulating blocks or plates 9 and 10 for the purpose of clamping between them a conductor or spring 11 with which the inner or central contact of the light bulb may engage to supply power to the filament of the lamp, the outer shell of the lamp being connected electrically or grounded on the lantern housing A. The electrical connections are not shown and constitute no part of this invention. The spring contact member 11 may also be held in place in any suitable or desired manner.

The cylindrical shell of the reflector housing B is provided at its outer edge with any suitable means for securing thereto a bezel or retaining ring 15, screw threads being shown in the construction illustrated which are formed in the cylindrical portion 5 of the reflector housing and which cooperate with corresponding screw threads formed in the retaining ring 15. 16 represents a transparent disk or window, which is also held in place by the retaining ring 15.

In order to diffuse the light from the light source or filament C in such a manner that the illuminating device may be used for general illumination and for reading, a reflector E is provided in the reflector housing B, the curvature of the reflector E being such as to reflect light rays from the light source in different directions so that a general illumination in the vicinity of the front of the lantern results. This reflector may be made of sheet metal having its reflecting surface silvered and polished in the usual manner, and in the construction shown, this reflector is held in place by means of the rivets 7 and 8, which also serve to hold the reflector housing on the lantern housing A. The middle portion of the reflector is preferably provided with an aperture which registers with similar apertures in the reflector housing B and lamp housing A to receive the lamp socket D. Any other means for securing this reflector in place may be employed.

F represents a focusing reflector, also silvered and polished, which may be employed when the lantern is to be used out-of-doors, or for illuminating an object at a considerable distance from the illuminating device. This reflector, for example, may be of a paraboloid form so as to reflect all rays substantially parallel to each other to form a concentrated beam which may be projected a considerable distance beyond the lantern.

This reflector is also arranged within the reflector housing B and because of its shape may nest within the reflector E or extend at least partially into the concavity thereof. This reflector is removably arranged within the reflector housing in such a manner that the axis of the paraboloid curvature of this reflector will pass through the light source or filament of the lamp C. In order to hold this reflector in correct relation to the reflector housing, suitable means are provided for resiliently pressing the reflector F outwardly toward the bezel or retaining ring 15, and in the construction shown, a coil spring 18 is employed for this purpose. If desired, the outer coil of this spring may be secured to the reflector F by means of a bent-over portion or bead 19 on the inner portion of the reflector around the central aperture thereof, so that the reflector and spring may be removed as a unit. Any other means for pressing the removable reflector F outwardly may, however, be employed, if desired.

As a result of the construction described, when it is desired to use the illuminating device for producing diffused light, the bezel ring 15 is unscrewed from the reflector housing B and the reflector F is removed, together with the spring 18. The bezel or retaining ring 15 and glass disk 16 may then again be placed on the reflector housing, or if desired, the lantern may also be used without attaching the bezel ring and transparent plate 16 thereto, as indicated in Fig. 3. If the lantern is to be used for projecting a concentrated ray of light at a distance, the reflector F is put into position on the lantern and held in place by means of the bezel or retaining ring 15.

By means of this construction, the lantern or illuminating device serves two purposes by using only one additional reflector. For ordinary use, both reflectors are nested in the reflector housing and do not increase the size or bulk of the device and the removable reflector covers the diffusing reflector, so that the latter in no way interferes with the projecting of a beam of light by the device.

Another advantage of the construction described is that because of the threaded connection of the bezel or retaining ring with the reflector housing B and because of the spring or retaining member 18, the focusing reflector F may be adjusted relatively to the light source to produce different focusing effects. If, for example, the reflector F is set by means of the retaining ring 15 into a position in which the filament of the lamp is in the focus of the paraboloid curvature of the reflector F, the rays of light from the light source will be reflected in substantially parallel relation to each other, so that a small beam of light will be formed which may be projected to the maximum distance. If it is desired to project a somewhat wider beam of light to illuminate a larger surface at a shorter distance, the reflector F may be moved so that the focus of the paraboloid will be a slight distance away from the light source, in which case, a more diverging beam of light will be reflected. The diffusion of light by having the focus of the paraboloid surface of the reflector F out of registration with the source of light will, however, not be nearly so great as that obtained by the use of the reflector B.

By means of the construction described, the lighting device may be adapted for all purposes for which such a device is usable, and this is done by a very slight addition to the lantern, namely, by the use of one additional reflector, so that the advantages of this construction can be obtained in an illuminating device at a very slight added cost, and without duplicating any of the parts of the device other than the reflector.

I claim as my invention:

1. In a portable electric flash lamp, a casing, a light source secured in fixed relation to said casing, a reflector housing secured to said casing and arranged to enclose said light source, a concave polished reflector secured in fixed position within said reflector housing for diffusing the light rays from said light source, a polished, parabolic reflector removably arranged within said housing and extending into the concavity of said first mentioned reflector and adapted to concentrate light rays from said source into a beam, a retaining ring adjustably arranged on said reflector housing, a spring secured to and pressing said second reflector outwardly with reference to said housing toward said retaining ring, said retaining ring being removable from said reflector housing to enable said second reflector and its attached spring to be removed therefrom to expose said first reflector for use, and said ring being adjustable on said housing lengthwise of the axes of said reflectors to hold said second reflector in different operative positions lengthwise of said reflector housing to vary the concentration of the rays of light reflected from said second reflector.

2. In an electric hand flash lamp, a casing for the reception of a primary battery and which casing includes a side wall, an opening therein in which an electric light bulb is fixed in operative relation to said battery to provide a light source, a reflector housing fixed to and projecting from said side wall and disposed about and extending lengthwise of the axis of said light source, a polished concave diffusing reflector fixed therein concentric with said light source for diffusing the light rays from said source, a polished parabolic reflector nested in said diffusing reflector for concentrating the light rays from said source into a beam, a retaining ring adjustably mounted upon and movable lengthwise of said housing and which bears against said parabolic reflector, a coil spring secured to the rear of the latter and bearing against said first reflector to urge said second reflector against said ring whereby said parabolic reflector may be adjusted to change the beam of light reflected therefrom, and said ring being detachable from said housing to enable said parabolic reflector and its attached spring to be removed from said housing so as to expose said diffusing reflector for use.

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