March 3, 1959 G. H. SELIGSON 2,876,338

PHOTOGRAPHIC LIGHTING UNIT

Filed April 9, 1956

FIG. 3

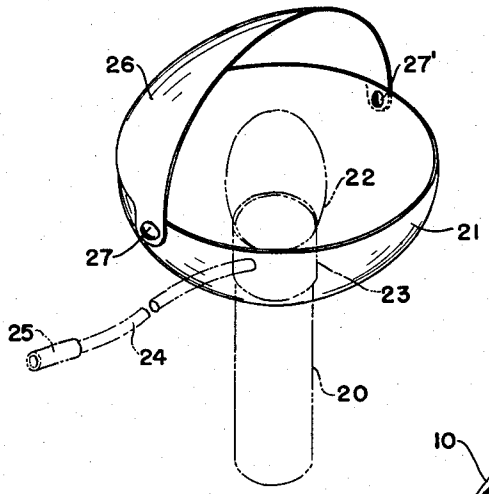


FIG. 4

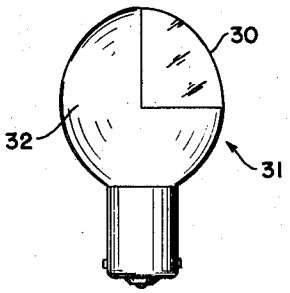


FIG. 2

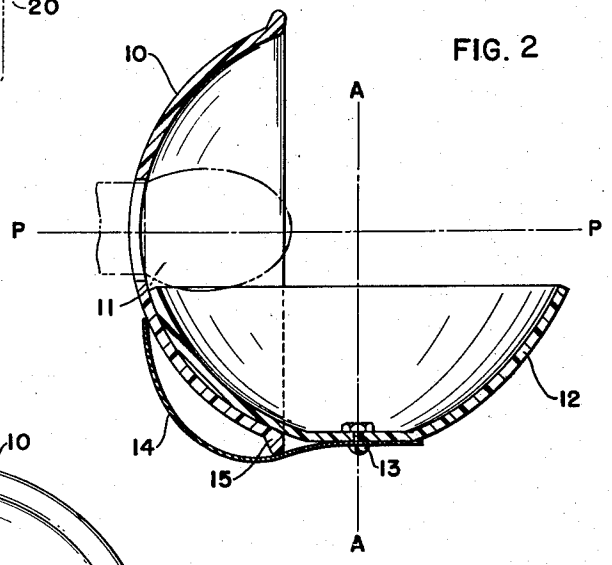
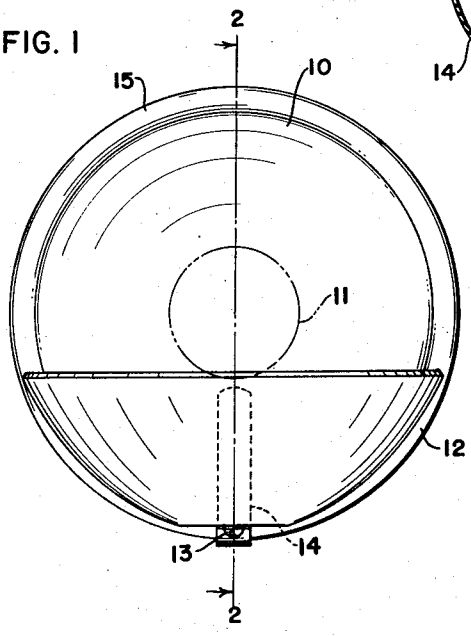


FIG. 1



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PHOTOGRAPHIC LIGHTING UNIT

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2 Claims. (Cl. 240—1.3)

This invention relates to photography and in particular to a photographic light reflector unit adapted to distribute light emanating from a single bulb in such a manner as to effect both direct and indirect illumination of the subject matter to be photographed.

In my copending application Serial No. 525,149, filed July 29, 1955, for "Multiple Photoflash Unit," I have described photoflash equipment capable of providing both direct illumination and indirect, ceiling-reflected illumination of the subject to be photographed, so as to obtain portraits, etc. free of deep and conflicting shadows and possessing a pictorial quality greatly superior to that heretofore obtainable with simple, portable photoflash units. Other advantages in photographic quality, and also in ease of operation, are pointed out. In the specific embodiment there described, two flash bulbs and associated reflectors are employed, and the beams are approximately at right angles to each other.

The present invention is directed to a photoflash assembly in which an auxiliary reflector is designed and associated with a single photoflash light source and primary reflector (which may follow conventional practice) in such a manner as to provide direct and indirect illumination of the subject being photographed, thereby giving results of the same general character as that described in my aforesaid application, but with less expensive equipment.

In conventional photoflash units, a light reflector in the form of a concave substantially full surface of revolution is associated with a flash bulb so as to direct light toward the subject to be photographed. In accordance with the present invention, an auxiliary light reflector is provided which has a concave reflective surface in the form of at least half a surface of revolution, and the auxiliary reflector is associated with the primary reflector with the respective axes substantially at right angles. The auxiliary reflector overlaps a portion of the primary reflector, or at least is adjacent an arc of the lip of the primary reflector, and at least a half surface of revolution lies outside of the primary reflector.

The auxiliary reflector may be made as a separate unit for attachment to a conventional photoflash assembly, or may be made a part thereof. If the latter, provision can be made for rotating the auxiliary reflector to an inoperative position, if desired, so as to enable the assembly to be used either in conventional manner or in accordance with the present invention.

With this reflector configuration a portion of the light is reflected in one general direction by the primary reflector, and in a direction at a substantially different angle by the auxiliary reflector, and this results in many advantages heretofore unobtainable in single light source reflector units. For example, in indoor photography with the axis of revolution of either the primary or auxiliary reflector horizontal and the other approximately vertical, the subject is exposed to both direct and indirect illumination of a superior quality which virtually eliminates the need for a plurality of spaced reflector units. In addition, it is possible to photograph a variety of indoor subjects without changing the light conditions, thus eliminating the need for recurrent setting of camera aperture.

These and other advantages of the present invention will now be described in detail in connection with the accompanying drawing, in which:

Fig. 1 is a front view of a reflector unit in accordance with this invention in which the primary reflector is represented as being part of an existing conventional photoflash reflector unit and the auxiliary reflector is clipped thereon;

Fig. 2 is a sectional view of the reflector configuration of Fig. 1 taken along line 2—2;

Fig. 3 is a perspective view of a portable photoflash reflector unit in accordance with this invention; and

Fig. 4 is a side view of a flash bulb embodying my invention.

Referring to Figs. 1 and 2, reflector 10, hereinafter referred to as a primary reflector, and a photoflash light source (bulb 11) form part of a conventional photoflash reflector unit. Reflector 10 comprises a concave full surface of revolution about its axis P—P. Light bulb 11 is located on axis P—P. The surface of reflector 10 may be contoured in any of the conventional reflector shapes such as parabolic, spherical, etc. and is preferably smooth to provide specular reflection.

Reflector 12, hereinafter referred to as an auxiliary reflector, is adapted to convert the conventional reflector unit into a unit having a reflector configuration in accordance with the invention. Reflector 12 comprises a concave substantially full surface of revolution about its axis A—A. The surface of reflector 12 may also be contoured in any of the conventional reflector shapes and, again, is preferably specularly reflective. To form the desired reflector configuration, auxiliary reflector 12 is adapted to be arranged with respect to reflector 10 so that its axis A—A is oriented at an angle of approximately 90° with respect to axis P—P of reflector 10. The auxiliary reflector 12 is also formed and adapted to fit partially within the primary reflector 10 so that it overlaps the lip 15 of the primary reflector and extends outwardly therefrom with at least half of its surface of revolution lying outside the primary reflector.

In this embodiment of the invention the auxiliary reflector is removably attached to the primary reflector by means of a spring clip 14 affixed to reflector 12 by suitable means such as bolt 13. Spring clip 14 is arranged so that the auxiliary reflector may be attached to the primary reflector by slipping the primary reflector between the clip and the auxiliary reflector. By this means the auxiliary reflector may be moved about with respect to the primary reflector until the proper orientation is achieved. By attaching the spring clip at the axis of the auxiliary reflector as shown, or near thereto, and by selecting its length so that the outer end thereof presses against the reflector adjacent the lip thereof as shown, the axis of the auxiliary reflector is readily maintained approximately perpendicular to that of the primary reflector. This auxiliary reflector arrangement is quite versatile and permits existing conventional reflector units to be simply and rapidly converted into the reflector configuration of the invention when so deisred. Of course other means for attaching the auxiliary reflector to the primary reflector may be employed if desired.

Without auxiliary reflector 12 light emanating from bulb 11 would be reflected into a conventional light beam which under most circumstances provides direct illumination of the subject. With the auxiliary reflector in position, a portion of the light beam reflected by the primary reflector (the inner portion of the auxiliary reflector is closely adjacent the corresponding portion of the primary reflector and may be considered to be part thereof)

is redirected by the auxiliary reflector in an upwards direction. In general, by orienting the axis of revolution of either the primary or auxiliary reflector horizontally, a portion of the light may be directed forward toward a subject to produce direct illumination while another portion may be directed upwards toward a ceiling to produce indirect illumination. The indirect illumination eliminates deep and conflcting background shadows and creates an even background regardless of room color while the direct illumination fills in forward details such as the eyes and face of a person being photographed. In addition the subject is exposed to illumination of a three-dimensional nature thereby avoiding flatness of shape and giving a live appearance to material texture, the latter advantage being of particular importance to fashion photography.

The versatile light beam provided by the reflector configuration of the invention also produces superior results under a great variety of photographic conditions. Thus repeated estimating and resetting of subject exposure because of variations in the placement of illuminating means and the complexity of resulting light conditions is eliminated by the use of the described unit. It has also been found possible with the use of this unit to leave the aperture (*f* stop) of an associated camera substantially unchanged as long as the distance of the ceiling from the unit and camera combination remains the same. In fact, it has been found practicable to estimate the *f* stop simply by multiplying the height of the ceiling in feet by 2 and dividing the guide number of the film employed by this figure. The distance between the camera and subject is adequately taken care of by the latitude and exposure of modern films. The unit therefore lends itself to ease and speed of operation since fewer and simpler estimations of camera aperture size are needed and independent accessories are eliminated.

In the field of photographic portraiture it has usually been found desirable to use a lower intensity of direct illumination than indirect illumination in order to secure portraits of high quality. The reflector assembly of Fig. 2 has been satisfactory for this purpose. Where desired, however, the relative intensities of the portion of light directed upwards and the portion of light directed forward may be controlled by changing the relative sizes of the auxiliary and primary reflectors. When the axis of revolution of the primary reflector is horizontally oriented (as is customarily the case when it is part of a conventional unit adapted to be attached to a camera), the auxiliary reflector could advantageously be of such a size as to cover the primary reflector at least to or beyond the axis P—P in Fig. 2. In addition to throwing more of the light upwards, this configuration helps to conceal the light bulb, thereby eliminating its dazzling effect upon the subject.

Referring now to Fig. 3, the reflector assembly illustrated therein is portably mounted to permit either the axis of the primary or auxiliary reflectors to be horizontally oriented. The reflector assembly comprises a holder **20** upon which are mounted a primary reflector **21**, a flash bulb **22**, a socket **23** and a cable **24** adapted by means of a connecter **25** to be electrically connected to a power pack (not shown). The light bulb is again located on the axis of revolution of the primary reflector.

In this embodiment of the invention the auxiliary reflector is pivotally attached to the primary reflector. Auxiliary reflector **26** in this case is approximately half a surface of revolution and is attached to the primary reflector by means of friction bolts **27** and **27'**. The friction bolts are adapted to permit rotation of the auxiliary reflector thereabout and to retain the reflector in a selected position. The positions of bolts **27** and **27'** are arranged so that the auxiliary reflector may be rotated until, in accordance with the invention, the axis of revolution of the auxiliary reflector is oriented at approximately a right angle with respect to the axis of revolution of the primary reflector and the auxiliary half surface of revolution extends outward from the lip of the primary reflector. A slight overlap is desirable so that light does not pass through a gap between the auxiliary and primary reflectors.

This friction bolt attachment permits the reflector unit to be converted into a conventional reflector unit or, alternatively, into a reflector configuration in accordance with the invention simply by rotating the auxiliary reflector. It will also be noted that existing conventional reflector units may be simply converted into a unit of the type illustrated in Fig. 3 by drilling appropriately located holes in the primary reflector and attaching an auxiliary reflector made in accordance with the invention to the primary reflector by means of friction bolts.

In the reflector units so far described the auxiliary reflector is either a separate unit for attachment to a conventional photoflash assembly or is attached to the conventional assembly as a part thereof. The reflector unit may also be made as a single continuous reflective piece shaped to form auxiliary and primary reflective portions in accordance with the invention. Thus, in the configuration of Fig. 2, reflectors **10** and **12** may be made in one piece, and in Fig. 3 reflectors **21** and **26** may be made in one piece.

If desired, the reflective surfaces may be applied to the light source itself. Such an embodiment is illustrated in Fig. 4 in which the transparent envelope **30** of a flash bulb **31** is partially coated with reflective material **32**. The reflective coating thus substantially forms primary and auxiliary reflective surfaces of revolution oriented and shaped in accordance with the invention, with the auxiliary reflector portion extending outwardly from the lip of the primary reflector portion as a continuation thereof.

Throughout the specification, the reflector units have been described in association with sources of photoflash illumination. Although such illumination is preferred for most applications, it should be noted that other photographic light sources, such as floodlamps, may be employed if desired.

Preferred embodiments of the invention have been described. Various changes and modifications however may be made in accordance with the scope of the invention as set forth in the appended claims.

I claim:

1. In combination, an auxiliary light reflector for a photoflash unit, a primary light reflector in the form of a concave substantially full surface of revolution and a concentrated light source, said primary reflector having an open, totally unobstructed end for the emission of light therefrom, said auxiliary light reflector comprising a concave reflector in the form of a substantially full surface of revolution fitting partially within said primary light reflector with the overlapping portions of the primary and auxiliary reflectors in closely adjacent relationship, and a spring clip attached to the outside of the concave reflector of the auxiliary light reflector near the axis thereof and extending toward the lip of the primary reflector with the outer end of the clip pressing against the primary reflector remote from the lip thereof, the auxiliary light reflector being clipped onto said primary light reflector with the respective axes approximately at right angles and with at least a half surface of revolution of the auxiliary reflector lying outside the primary reflector whereby when the light reflected from one of the reflectors directly lights up a subject, the light reflected from the other reflector will light the subject by bounce illumination.

2. In combination, an auxiliary light reflector for a photoflash unit, a primary light reflector in the form of a concave substantially full surface of revolution, a concentrated light source, said primary reflector having an open totally unobstructed end for the emission of light

therefrom, said auxiliary light reflector comprising a concave reflector in the form of a substantially full surface of revolution the curvature of which is in substantial continuity with the curvature of the primary reflector, both of said reflectors having reflective surfaces and the reflective surface of the auxiliary reflector being in substantial continuity with the reflective surface of the primary reflector, and quick detachable means for securing the auxiliary light reflector to the primary light reflector, the auxiliary light reflector being thus secured to the primary light reflector with the respective axes thereof approximately at right angles and with at least a half surface of revolution of the auxiliary reflector lying outside the primary reflector whereby when the light reflected from one of the reflectors directly lights up a subject, the light reflected from the other reflector will light the subject up by bounce illumination.

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