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2,831,104

PHOTOGRAPHIC ILLUMINATING MEANS

Filed Jan. 30, 1956

2 Sheets-Sheet 1

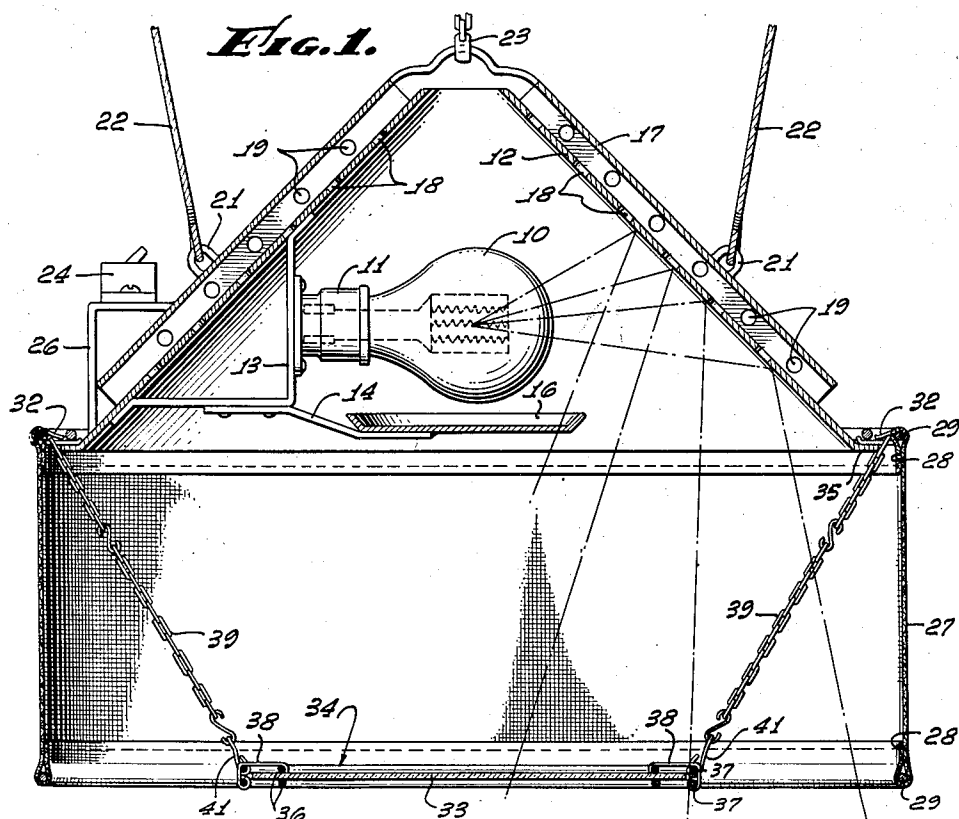


Fig. 2.

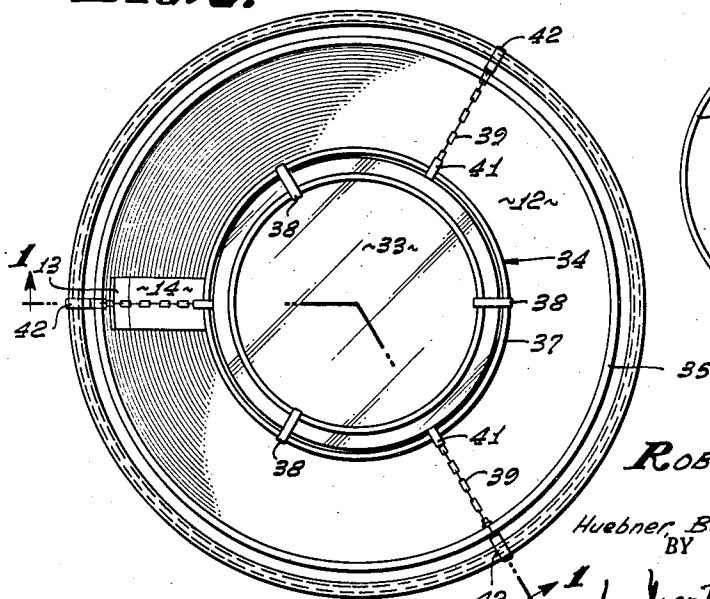
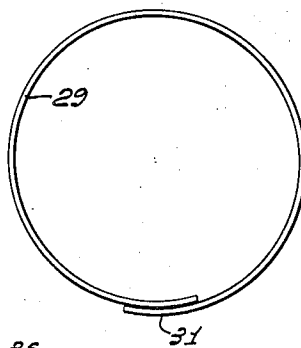


Fig. 3.



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2 Sheets-Sheet 2

Fig. 4.

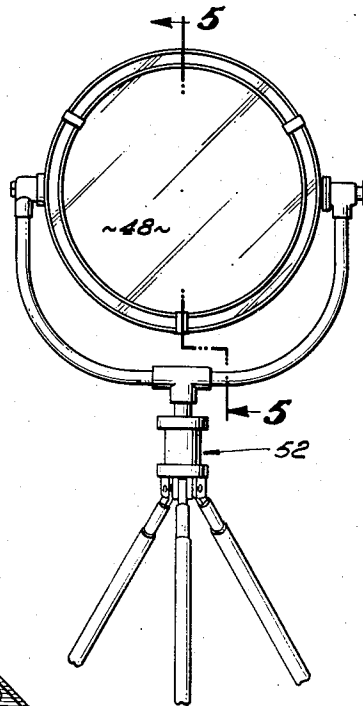


Fig. 5.

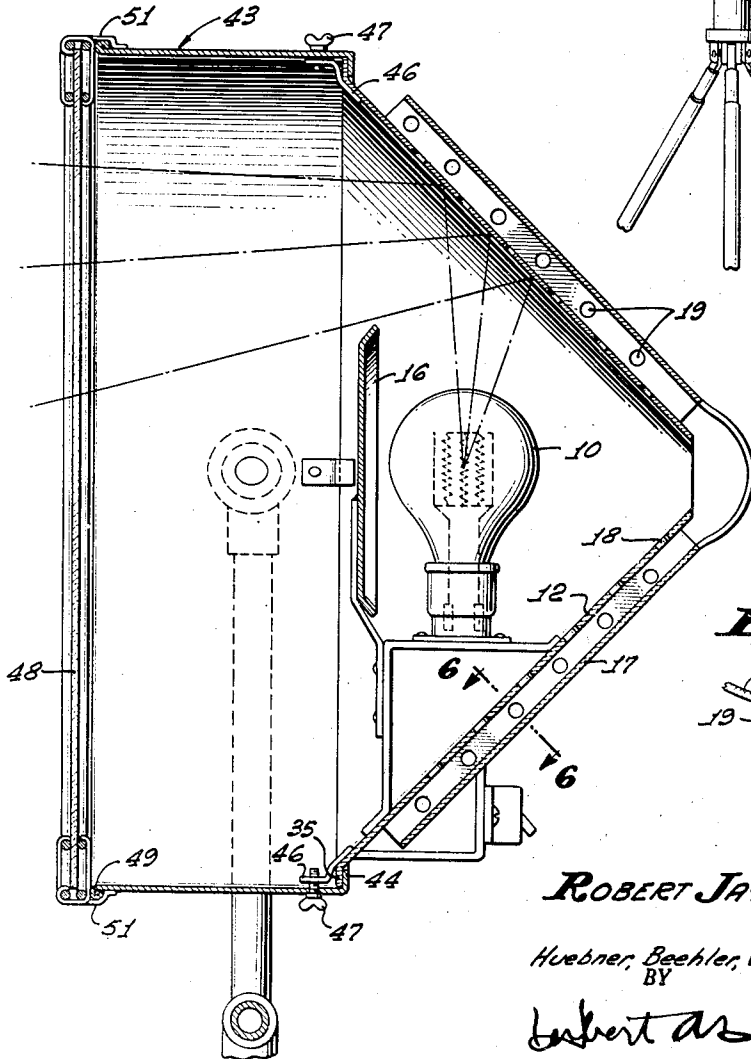
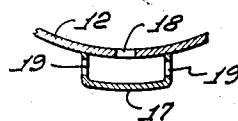


Fig. 6.



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PHOTOGRAPHIC ILLUMINATING MEANS

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3 Claims. (Cl. 240—1.3)

This invention relates to a source of illumination for color and black and white photography, and particularly to a fill light for producing diffused white light from an electric light source for television and motion picture photography.

In addition to the key lights used in motion picture and television studios, it is desirable to have a fill light which will not destroy the effects of the high lights produced by the key lights, but will result in the production of pleasing pictures by lighting up the shadows so that they will not be too dark. The fill light should be a diffused light without glare, but with sufficient intensity to balance the lighting and avoid undesirable shadows such as those produced around the subject's chin, ears, and eyelashes, by harsh lighting. This is especially desirable in close-ups.

A properly designed fill light will permit the taking of close-ups without the subject's face appearing flat and lacking in roundness, while at the same time avoiding dark shadows and harsh lighting effects. Furthermore, for television and motion picture color photography purposes, the fill light should be a white light so that the pictures will not have a red or other colored overcast. The fill light should be designed to make efficient use of the energy from the light source to produce light of maximum intensity without over-heating and shortening of the life of the light source.

Accordingly, it is an important object of my invention to provide a source of illumination for efficiently producing diffused light for color and black and white photography which will serve as a fill light for lighting up undesirable shadows without destroying the high light effects produced by the key lights.

Another object is to provide an improved fill light for the efficient production of diffused white light substantially free of direct radiation and glare so that pleasing pictures in color can be obtained without the production of undesirable red or other colored overcasts.

A further object is to provide a fill light of economical design for the efficient production of diffused white light of maximum intensity without the production of overheating and consequent shortening of the life of the light source.

Additional objects will become apparent from the following description.

In general terms, my invention comprehends a source of illumination suitable as a fill light in photography comprising a light source mounted adjacent a reflector, a mask positioned in front of the light source to prevent the transmission of direct rays from the source to the subject, and light diffusion or shield means positioned in the light assembly to prevent the emission of direct rays from the light source and produce diffused light of maximum intensity without glare.

When an electric light source is employed, the reflecting surface of the reflector is painted or coated with a suitable material for absorbing the infra-red radiation of the light source, and producing reflected white light. The reflecting surface preferably is made conical in shape rather than parabolical so that parallel rays of light are

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not produced but instead, rays of light having different angles of reflection and resulting in a diffused light, are produced. The mask employed preferably is opaque, and is positioned in front of the light source to mask only that portion of the direct rays which would be transmitted centrally of the front of the light assembly.

A skirt or shield preferably is attached to the periphery of the base of the reflector to diffuse or shield the direct rays transmitted from the light source which pass between the reflecting surface of the reflector and the mask, so that these rays will be diffused by the skirt or reflected within the light source by the shield. Additional diffusion of light is produced by a diffusion means positioned in the face of the light source. This diffusion means preferably is a spun glass diffusion pane.

A more detailed description of specific embodiments of my invention is given with reference to the drawings, wherein:

Figure 1 is a sectional elevational view taken on the line 1—1 of Figure 2 showing one embodiment of the fill light mounted for overhead illumination as in the case of its use on a motion picture or television studio set;

Figure 2 is a bottom view of the light shown in Figure 1 drawn to a somewhat reduced scale and showing the face of the light assembly;

Figure 3 is a plan view showing a ring of the type used in the light of Figure 1 for holding and shaping a diffusion cloth skirt drawn to a still more reduced scale;

Figure 4 is a front elevational view drawn to a smaller scale than Figure 2 showing another embodiment of the fill light of my invention used as a stand lamp;

Figure 5 is a sectional elevational view taken on the line 5—5 of Figure 4 drawn to a somewhat enlarged scale; and

Figure 6 is a fragmentary cross-sectional view drawn to an enlarged scale and taken along the line 6—6 of Figure 5.

In the specific embodiment of my invention shown in Figures 1 to 3 of the drawings, an electric light bulb 10 is mounted in a socket 11. The socket in turn is mounted on the inside of a conical reflector 12 by a bracket 13. The bracket 13 may be bolted or brazed to the inside surface of reflector 12 in a manner to centrally position light bulb 10 inside the reflector. Attached to the bracket 13 is an arm 14 connected to a masking panel 16 constructed of an opaque material such as a metal, for example. The masking panel 16 preferably is dished as shown and is oriented in front of the light 10 to prevent direct rays thereof from being transmitted from the fill light assembly. The surface of the masking panel 16 adjacent bulb 10 may be given a mirror finish to reflect the masked direct rays of light backward to the surface of reflector 12.

The inner surface of the reflector cone 12 is treated in a manner to absorb the infra-red radiation transmitted thereto from the light bulb 10. The surface of the reflector may be treated in any of various ways known in the art to accomplish the absorption of infra-red radiation. A preferred method of making this treatment is to paint the reflecting surface of the cone 12 with an infra-red radiation absorbing paint, so that the light reflected from the surface of the cone 12 will be color-corrected to reflect white light having substantially the same color composition as sunlight.

The cone 12, as well as other metallic parts of the light assembly, can be made of deep drawn steel. Other metals can, however, be used satisfactorily.

The bulb 10 has been shown mounted in the reflector 12 with its major axis at right angles to the axis of the conical reflector. Although this position is shown, it will

be understood that I can mount bulb 10 so that its major axis coincides with the axis of reflector 12.

The reflector 12 is provided on its outside with cooling and re-inforcing channels 17 shown in detail in Figure 6. The channels extend from the peak of the reflector toward its base. The reflector 12 is provided with rows of apertures 18 aligned with the channels 17, and communicating with their interiors. The sides of the channels 17 are provided with rows of apertures 19 communicating with the atmosphere. This arrangement permits convection currents of hot air to flow from the inside of reflector 12 through apertures 18 and 19 into the atmosphere. In this manner, the inside surface of the reflector 12 is cooled by the convection currents without the escape of appreciable amounts of light through the walls of the reflector, and to the rear of the fill light assembly.

Two or more channels 17 are attached to the outside of reflector 12. Each of the channels is provided with a hanging eyelet 21. The fill light assembly is suspended overhead by two or more cables 22 attached to the hanging eyelets 21, as best shown in Figure 1. At the peak of the conical reflector 12 is attached another cable or chain, as indicated at 23, for tilting the fill light at an angle to the horizontal, as desired. In this manner the intensity of the fill light can be balanced or varied in different areas of the set.

A snap switch 24 is connected to a source of electrical energy (not shown) and to the socket 11. The switch 24 is suitably mounted on a bracket 26 fastened to the outside of reflector 12 by any suitable means.

A skirt 27 of light diffusing cloth is mounted around the periphery of the base of reflector 12 to extend vertically downward in the form of a cylindrical section. Seams 28 are sewn at the upper and lower ends of the skirt 27 as indicated. A spring ring 29 having its ends overlapping at 31 is threaded into each of the seams 28 of the skirt. The spring rings 29 serve to hold the cloth tightly in the form of a cylindrical section by spreading the cloth outwardly through their springiness and by weighting it downwardly at the lower seam 28. The skirt 27 is fastened to the periphery of the base of the reflector 12 by three clips 32 fastened to a flange 35. Flange 35 is made integral with the conical reflector 12.

The skirt 27 is designed to prevent the passage of direct rays of light from lamp bulb 10 through the face of the light assembly. For this reason, the skirt 27 is made of cloth having a coarse mesh such that light striking it will be diffused and emitted from the outside surface of the cloth as a soft diffused light free of glare and direct rays of light. Batiste cloth has been found to be satisfactory for this purpose, but other kinds and types of loose mesh cloth made of natural or synthetic fibers, or metallic screens, can be used for this purpose.

The length of the batiste cloth skirt or other cloth skirt 27, is designed and positioned in relationship to the design and positioning of the masking panel 16 and the positioning of the lamp bulb 10 so that all downwardly directed rays from lamp bulb 10, which are not masked by the mask 16, and not reflected by the conical reflector 12, will strike the vertical inside wall of the skirt 27 and be diffused before being transmitted from the light assembly.

Inside the skirt 27, and preferably approximately in the plane passing through the lower end of the skirt, is mounted a diffusor pane 33. The pane 33 preferably is in the form of a flat disc and is centrally mounted inside the skirt 27 in alignment with the central axis of reflector cone 12 and the centers of lamp bulb 10 and masking panel 16. The purpose of the diffusor pane 33 is to additionally diffuse light reflected from the surface of reflector 12 to thus additionally insure against glare, and uneven intensity in the light transmitted from the light assembly.

The use of a spun glass disc as pane 33 has been found to be very satisfactory. The spun glass disc permits the

subject to look directly into the front of the fill light without squinting because the glare has been completely removed from the light rays projected from the light assembly. Other materials may be used instead of the spun glass disc in the diffusor pane 33. Such materials include ground glass, translucent plastics and gels, as well as other diffusing materials known in the art.

The diffusor pane 33 is mounted in a frame 34 known as a jelly frame. The frame is made up of four rings, two inner rings 36 and two outer rings 37 of somewhat greater diameter than the inner rings. The inner rings 36 are of approximately the same diameter and are spaced one above the diffusor pane 33 and the other below the pane. The edge of the diffusor pane abuts the outer rings 37 as they are positioned one above the other. The annular edge of the pane 33 is beveled to fit into the annular crevice formed by the abutting outer rings 37, as indicated.

The inner rings 36 and the outer rings 37, with the diffusor pane 33 mounted in the rings as shown are held together in a diffusor pane assembly 34 by three clips 38. The clips 38 tightly engage the upper inner ring of the pair of inner rings 36, pass tightly around the upper outer ring of the pair of rings 37, and tightly engage the lower outer ring of the rings 37, as best shown in Figure 1.

The diffusor pane assembly 34 is held in position inside skirt 27 by three chains 39. The chains 39 are fastened to the diffusor assembly 34 in any convenient manner, such as by hooks 41 passing around the upper outer ring of the pair of outer rings 37, as shown in Figure 1. The upper ends of the chains 39 may be attached to the light assembly in any convenient manner, such as by means of clips 42 engaging the upper ring 29 in the upper seam 28 of the skirt 27.

In mounting the light assembly shown in Figures 1 to 3, the light assembly is hoisted by cables 22 to the proper overhead elevation on a television or motion picture set, for example. If it is desired to change the vertical direction of the light striking the set, the light can be tilted out of the horizontal plane by applying a tension to the chain connected to the apex of the conical reflector 12 at 23. By applying the proper degree of tension at 23, at an angle to the vertical, the light assembly can be tilted so that the general direction of the light projected from the assembly will be adjusted to the desired degree.

When an overhead battery of lights is used, a fine balance of the lighting can be accomplished by snapping off some of the lights at a snap switch 24. In this manner, a very satisfactory fill light of white quality, the desired degree of intensity and balance, as well as direction, can be projected on a motion picture or television studio set for both black and white, as well as color photography.

Pleasing true color pictures are produced by using the fill lights produced by the light assembly described above. Especially satisfactory close-ups are made in black and white as well as in color. These close-ups contain well-lighted faces free of unpleasant and distracting shadows such as are frequently noted at the chin, ears, around the eyes, under the nose, and on the cheeks when prior art, harsh lighting is used. These effects of harsh lighting have been eliminated by using the light assembly described above for both color and black and white television and motion pictures, without destroying or burning up the high lights produced by the key light effects.

The light assembly can be made in various sizes having diameters at the periphery of the base of the reflector cone 12 ranging from about 12 inches to about 39 inches, for example. In the larger sized lamp, a 5 kilowatt bi-post light bulb 10 is used, whereas in the smaller-sized lamps, a 2 kilowatt bulb is used. It has been found that a light producing about 250 foot candles at 20 to 25 feet therefrom will be a satisfactory fill light when used with the proper key lighting.

When using the larger 39 inch size light, the use of a skirt 13 inches high and a masking panel 16 having an overall diameter of 11 inches has been found to give satisfactory results. The diameter of the diffuser pane 33, in a light assembly of this size may vary from about 39 inches to about 29 inches, or less, depending on the results desired.

Because of the high degree of efficiency of the light assembly described above, and the relatively cool operation of the light, the life of the bulbs 10 has been greatly increased as compared to the relatively short life of the bulb in prior art lights. The light bulb replacement and repair costs of the present light assembly have been reduced to a point where the use of a relatively large number of such fill lights is feasible on a motion picture or television set.

In the embodiment of my invention shown in Figures 4 and 5, the skirt 27 has been replaced by a shield 43 in the general shape of a cylindrical section. The inner end of the shield 43 is formed into an inwardly extending flange 44 adapted to fit snugly over the peripheral flange 35 of the reflector 12. The shield 43 is attached to the reflector 12 at the flanges 35 and 34 by clamps 45. Clamps 46 are provided with threaded holes for threaded engagement with wing bolts 47. The wing bolts 47 pass through apertures in the side wall of the shield 43, as best shown in Figure 5.

In this embodiment, the diffuser pane 48 preferably is made of a larger diameter than that of diffuser pane 33 in the overhead embodiment of Figures 1 to 3. The diffuser pane 48 can be mounted in a jelly frame of the type described in connection with the mounting of pane 33. Diffuser pane 48 requires a larger frame. Also, as shown best in Figure 5, the jelly frame is fastened to the rolled end 49 of shield 43 by clips 51.

The light assembly of the embodiment of Figures 4 and 5 is mounted in a stand or tripod 52, as best shown in Figure 4. The light assembly preferably is mounted for rotation about a horizontal axis, and about a vertical axis, as well as for adjustment of the angles of these axes by the tripod, so that the light can be directed in any desired direction, as will readily be understood.

In use of the stand lamp of Figures 4 and 5, the shield 43 serves to prevent the formation of a halo of light in the projected fill light produced by this embodiment of my invention. The design and the relationship of the light bulb 10 and the masking panel 16 is again such that no direct rays of the light can pass from the light bulb through the diffuser pane 48. The height of the shield 43 is made sufficient to avoid the transmission of any direct rays of light beyond the edge of the masking panel 16 and through the diffuser pane 48. This prevents the formation of an undesirable halo of light in the projected illumination.

In other respects, the construction and operation, as well as the results and advantages of the fill light of Figures 4 and 5 are similar to those described in connection with the embodiment of my invention described above in connection with Figures 1 to 3.

Although my invention has been described above as applied primarily to provide fill light illumination for television and motion picture photography, it will be understood that it is applicable as a source of illumination for numerous other purposes where a soft, diffused light of high intensity, casting no, or insignificant shadows, is desired. An example of such other applications, requiring illumination of such character, is found in an operating room. The careful and precise work of the surgeon demands illumination which lights up the internal organs of the body without casting dark shadows, and without producing glare by reflections from the surfaces of the viscera. Another example is use in dentists' offices where the same advantages contribute to the convenience and efficiency of the attending dentist and technician. Such lighting is, of course, also advantageous

when color television is employed in the operating room as a teaching aid for students of surgery.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent structures.

Having described by invention, what I claim as new and desire to secure by Letters Patent is:

1. A source of illumination comprising a reflector means of generally conical shape, an electric light source mounted in front of the reflector means for transmission of light from the source to the reflector means, the reflector means being provided with a surface which absorbs infra-red light and reflects white light to the front of the light source, shield means projecting from the reflector means, diffuser means positioned in front of the reflector means for diffusing rays of light reflected from the reflector means, and mask means positioned in front of the light source for masking direct rays of light emitted therefrom, the mask means being positioned relative to the shield means and the light source for prevention of transmission of direct rays of light from the light source beyond the shield means.

2. A source of illumination comprising a reflector means of generally conical shape, an electric light source mounted in front of the reflector means for transmission of light from the source to the reflector means, a reflecting surface on the reflector means which absorbs infra-red light and reflects white light from the reflector means, a light-diffusing skirt means extending from the reflector means for diffusing direct rays of light emitted from the light source, diffuser means comprising a spun glass pane positioned in front of the reflector means for diffusing rays of light reflected from the reflector means, and mask means comprising an opaque panel positioned in front of the light source for masking direct rays of light emitted therefrom, the mask means being positioned relative to the skirt means and the light source for prevention of transmission of direct rays of light from the light source beyond the shield means.

3. A fill light comprising a conical reflector, a reflecting surface painted on the inside of the reflector with paint that absorbs infra-red light and reflects white light, an electric light source mounted centrally inside the reflector for transmission of light from the source to the reflecting surface and for the reflection of diffused white light from the reflecting surface, a skirt of light-diffusing cloth extending from the base of the reflector for diffusing direct rays of light emitted from the light source and transmitting diffused fill light, light diffuser means comprising a spun glass pane positioned in the skirt for diffusing rays of light reflected from the reflector means, and mask means comprising an opaque panel positioned in front of the light source for masking direct rays of light emitted therefrom toward the spun glass pane, the opaque panel being oriented with respect to the skirt and the light source so that direct rays of light strike the skirt but are not transmitted directly from the light source beyond the fill light assembly.

References Cited in the file of this patent

UNITED STATES PATENTS

2,280,402	Greppin	Apr. 21, 1942
2,433,982	Clarkson et al.	Jan. 6, 1948
2,469,412	Roebken	May 10, 1949
2,494,058	Ries et al.	Jan. 10, 1950
2,688,271	Gretener	Sept. 7, 1954

FOREIGN PATENTS

234,530	Great Britain	June 2, 1925
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