Jan. 21, 1930. G. DIETZ ET AL 1,744,369

PHOTOGRAPHIC LAMP

Filed July 18, 1927 3 Sheets-Sheet 1

Fig. 1.

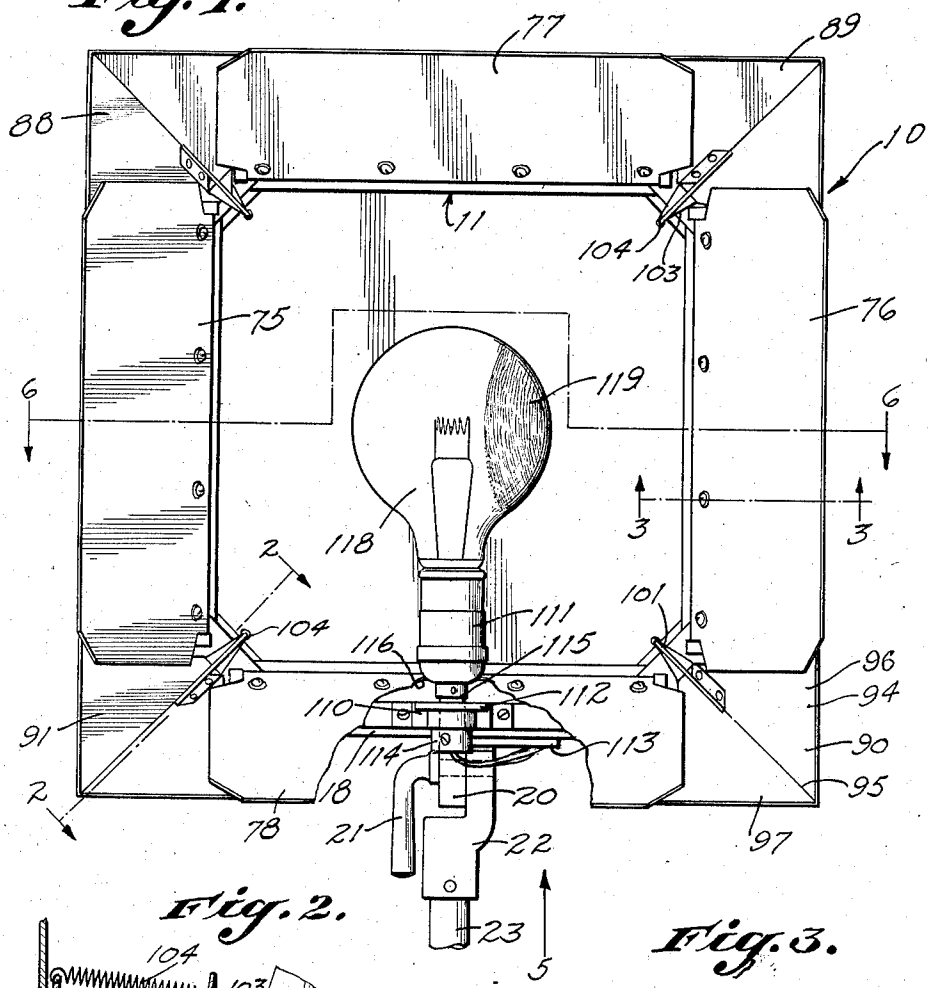


Fig. 2.

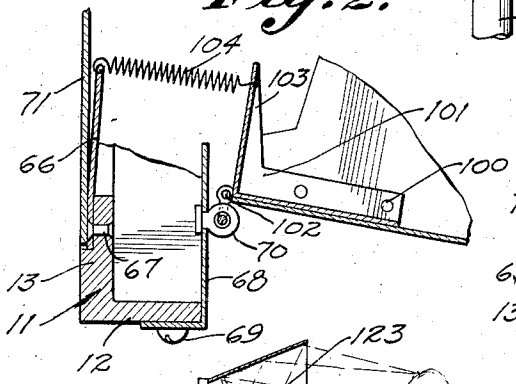


Fig. 3.

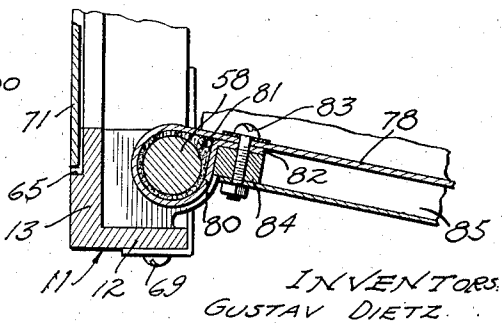
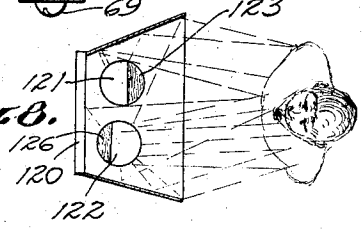


Fig 8.



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Filed July 18, 1927 3 Sheets-Sheet 2

Fig. 4.

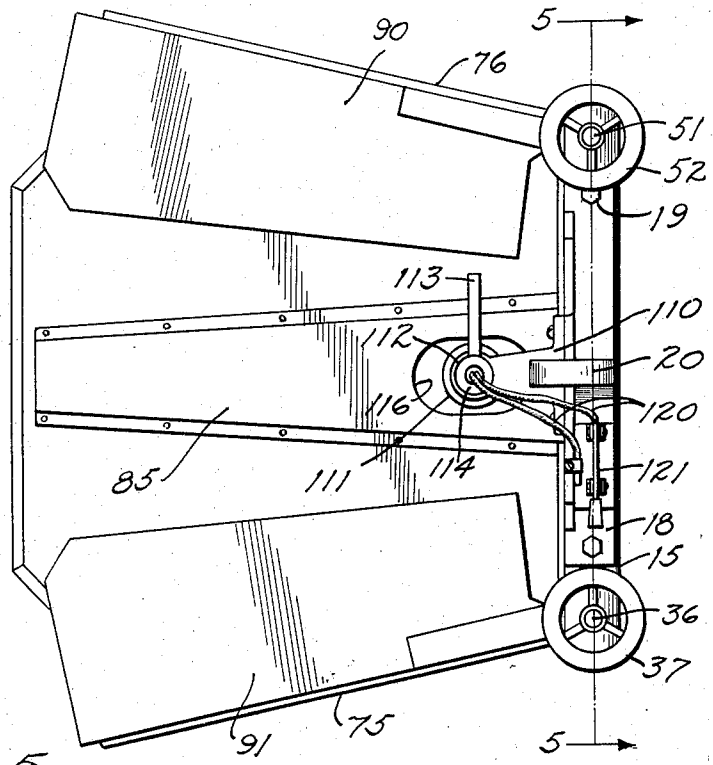
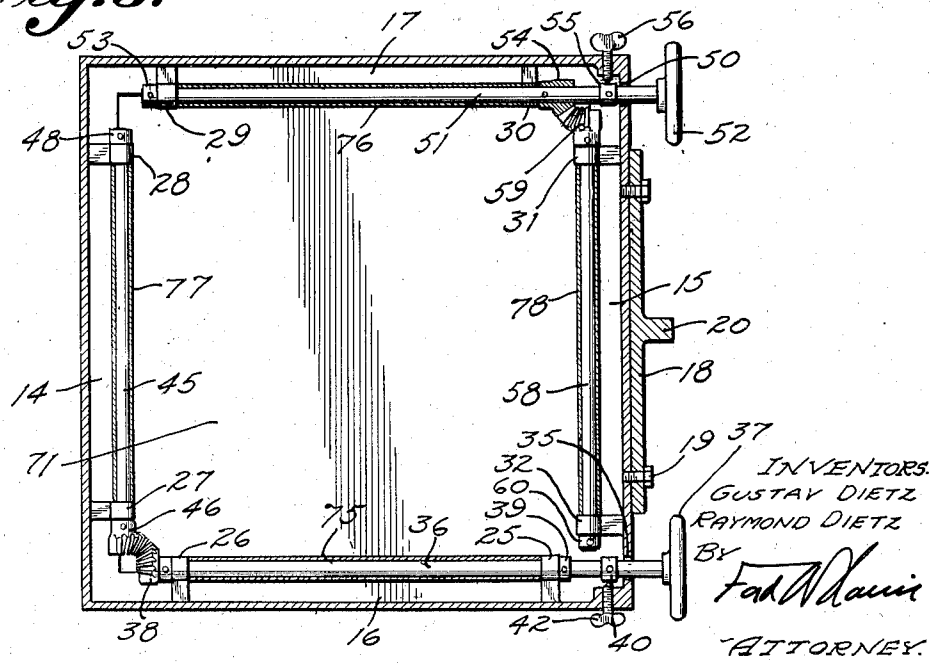


Fig. 5.



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Filed July 18, 1927 3 Sheets-Sheet 3

Fig. 6.

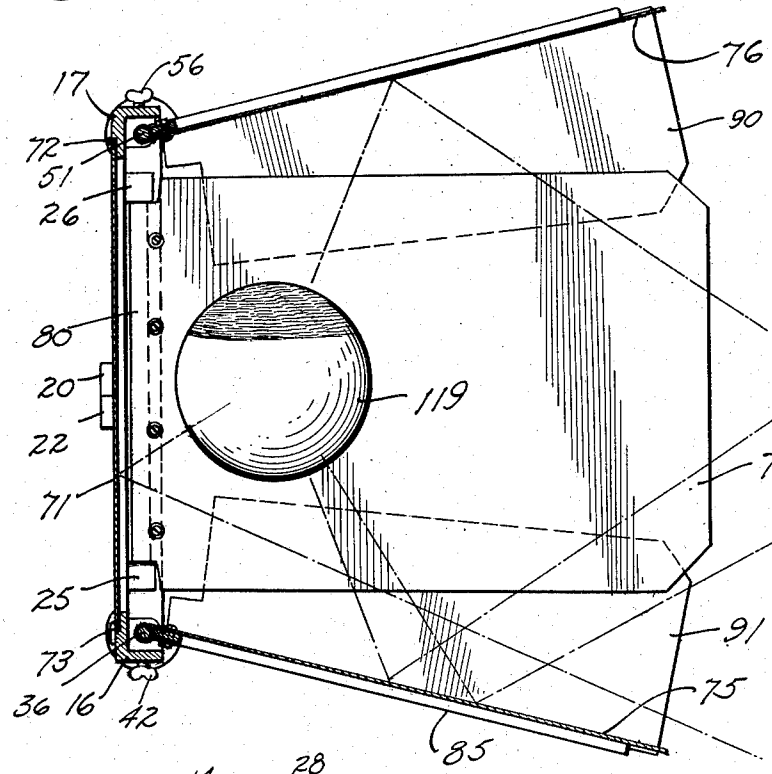
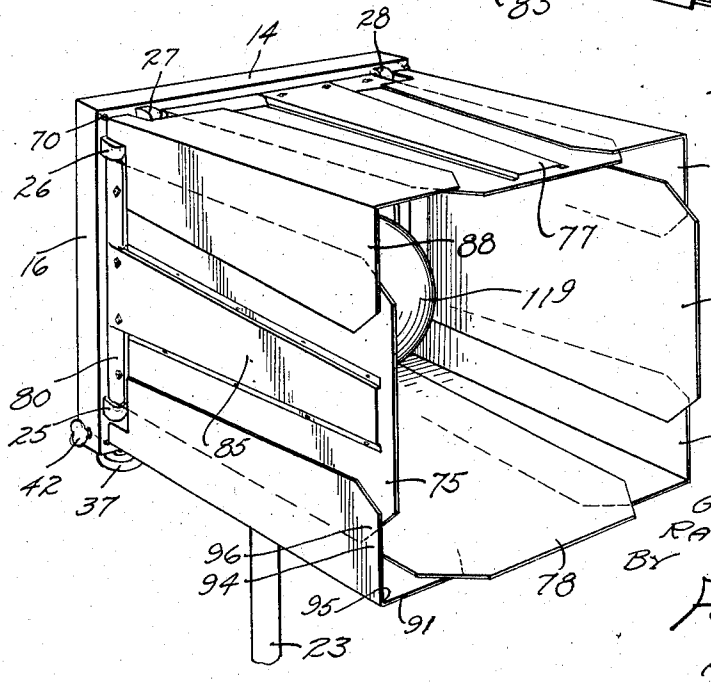


Fig. 7.



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Patented Jan. 21, 1930

1,744,369

UNITED STATES PATENT OFFICE

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PHOTOGRAPHIC LAMP

Application filed July 18, 1927. Serial No. 206,743.

Our invention relates to photographic equipment and more particularly to the lighting apparatus included in this equipment.

In the photographic art and particularly in the photography of moving pictures, it is frequently necessary to make what is known as a "close-up" photograph. In a close-up the camera is placed close to the object to be photographed and if this is a person's face, surface defects such as wrinkles become apparent which could not be seen in a more distant view. It has been found that these wrinkles may be practically eliminated by "cross-lighting" or directing lights against the face from different angles. This is usually accomplished by a large number of lights and independent screens placed at various angles and distances. The setting up of these lights and screens is a tedious task consuming a large amount of time of the entire company of actors and technicians and thus involving an enormous item in the expense of making moving pictures.

It is a general object of our invention to provide a photographic lamp which is adapted to deliver light upon an object from a number of different directions.

It is another object to provide a photographic lamp of this nature which may be easily controlled.

In eliminating wrinkles in close-up views of a person's face, it is necessary to light the face by rays which cross in planes which are perpendicular to each other so that both vertical and horizontal wrinkles will be lighted.

A still further object of our invention is to provide a photographic lamp which will deliver light in a manner to smooth out both the vertical and horizontal wrinkles from close-up photographs.

In taking a close-up photograph, it is desirable that a slight shadow fall upon one side or the other of the face being photographed. This shadow may not have a sharp outline, but must gradually merge into the more highly lighted portion of the face.

It is therefore another object of our invention to provide a photographic lamp which is adapted to light the face of a person for a close-up photograph and which will cause a slight shadow to appear on one side or the other of the face being photographed.

In a close-up photograph of a person, it is highly desirable that only a single light be reflected in his eyes and yet it is essential that a light of fairly high intensity illuminate his face. In order to obtain sufficient illumination and yet have but a single high light, it has previously been the practice to employ but a single source of light which, on account of its brilliancy, has been exceedingly fatiguing to the eyes of the person being photographed especially where this is an actor who must subject his eyes to these lights frequently.

It is yet another object of our invention to provide a photographic lamp adapted for taking a close-up photograph of a person in which the face will not only be properly flooded with diffused light of high intensity, but where the eyes will reflect but a single high light which will be generated by a source of such small intensity that it will not injure the eyes of the person being photographed.

Further objects and advantages will be made manifest in the following description and in the accompanying drawings in which a preferred embodiment of our invention is illustrated.

In the drawings, Fig. 1 is a front elevation of the lamp of our invention taken from the direction in which it faces.

Figs. 2 and 3 are detailed sectional views taken on the lines 2—2 and 3—3 respectively of Fig. 1.

Fig. 4 is a bottom plan view of the lamp shown in Fig. 1.

Fig. 5 is a vertical sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a horizontal sectional view taken on the line 6—6 of Fig. 1.

Fig. 7 is a perspective view of the lamp of our invention.

Fig. 8 is a horizontal diagrammatic view illustrating a modification of our invention.

Referring specifically to the drawings, 10 indicates a photographic lamp having a substantially square frame 11 which is preferably cast so as to have a cross section, as shown in Figs. 2 and 3, of angle iron shape,

including a peripheral web 12 and a radial web 13. As indicated in Fig. 5, the frame 11 has top and bottom members 14 and 15 and side members 16 and 17. A mounting bracket 18 is secured by screws 19 to the frame member 15. Formed on the bracket 18 is a vertical lug 20 which is secured by a manually operable lever screw 21 to a head 22 of a supporting standard 23. The standard 23 is preferably telescopic about three or four feet in height and is provided at its lower end with a tripod having rubber tired casters (not shown).

As clearly shown in Fig. 5, the frame 11 has inward extending studs 25, 26, 27, 28, 29, 30, 31, and 32. These studs are provided with suitable bores, the axes of all of which lie in the same plane. A hole 35 is provided in the web 12 of the member 15 in alignment with the bearing bores of the lugs 25 and 26, and a shaft 36 extends inward through the hole 35 and journals in the bearing bores of lugs 25 and 26. A hand wheel 37 is provided upon the outer end of the shaft 36. Longitudinal movement of this shaft is prevented by a sector beveled gear 38 mounted upon its inner end and a collar 39 secured to the shaft adjacent to the lug 25. A collar 40 is rigidly secured to the shaft 36 just inside the hole 35 and a thumb screw 42 is threadedly received in a suitable hole bored in the corner portion of the frame formed in the juncture between the frame members 15 and 16 so that, by rotation of the thumb screw 42 its inner end is brought to bear against the collar 40 to lock the shaft 36 against rotation.

A shaft 45 is rotatably journalled in the bearing bores of the lugs 27 and 28 so as to be disposed at right angles to the shaft 36. A sector beveled gear 46 is rigidly mounted upon one end of the shaft 45 so as to mesh with the sector gear 38. The opposite end of the shaft 45 has a collar 48 rigidly secured thereon, the collar 48 and the sector gear 46 preventing longitudinal movement of the shaft 45.

A hole 50 is formed in the web 12 of the frame member 15 in alignment with the bearing bores of the lugs 29 and 30 and a shaft 51 extends inward through the hole 50 so as to journal in the bores of the lugs 29 and 30. The outer end of the shaft 51 has a hand wheel 52 rigidly secured thereto. The inner end of the shaft 51 has a collar 53 rigidly secured thereto and a beveled sector gear 54 is rigidly secured upon the shaft 51 so that the collar 53 and the gear 54 cooperate to prevent longitudinal movement of the shaft 51. A collar 55 is rigidly secured to the shaft 51 inside the frame 11 from the hole 50. A thumb screw 56 is threadedly received in a suitable hole bored in the frame 11 at the juncture of the frame members 15 and 17 so that when the thumb screw 56 is screwed inward its inner end will engage the collar and lock the shaft 51 against rotation.

A shaft 58 is journalled in the bores of the studs 31 and 32. A beveled sector gear 59 is rigidly secured to one end of the shaft 58 so as to mesh with the gear 54. On the opposite end of the shafts 58 a collar 60 is rigidly secured to cooperate with the gear 59 to prevent longitudinal movement of the shaft 58.

The web 13 of the frame 11 is provided with a recess 65 which extends about the entire edge of the inner opening of the frame 11. Corner plates 66 are secured within the corners of the recess 65 by rivets 67, as shown in Figs. 2 and 3. Exterior corner plates 68 are provided, one of which embraces each corner of the frame 11 and is secured thereto by machine screws 69. Eyes 70 are secured to the plates 68, as clearly shown in Fig. 2, for a purpose to be described later. A rear reflector plate 71 is mounted on hinges 72 on the frame member 17 so that when it is swung inward its edges will rest within the recess 65, and it is adapted to be held in this recess by a suitable latch 73 provided upon the opposite frame member 16.

The shafts 36 and 51 are provided with side reflector plates 75 and 76 and the shafts 45 and 58 are provided with top and bottom reflector plates 77 and 78, all of these reflector plates being mounted upon their respective shafts in the same manner which will be made clear by a description of Fig. 3, in which the mounting of the plate 78 upon the shaft 58 is shown. As shown in this figure, the inner edge of the reflector plate 78 is bent around the shaft 58 to form a tubular clamp 80. The space between the shaft 58 and the tubular clamp 80 is filled with friction packing 81 and the edge 82 of the plate 78 is drawn toward the body thereof by suitable bolts 83. The outer ends of the bolts 83 pass through a metal bar 84 which tends to reinforce the reflector 78 and assist the clamping action of the bolts 83.

A reinforced channel member 85 is riveted or suitably secured otherwise to the outer face of each of the reflector plates 75, 76, 77 and 78 so as to rigidify these plates. The inner end of each of the members 85 laps over the bar 84 and extends beneath the nut of the bolt 83 so as to be gripped thereby. The clamps 80 of each of the reflector plates 75, 76, 77 and 78 grip their respective shafts with sufficient force so as to normally retain these plates in whatever position they may have relative to their shafts. The friction between the clamps 80 and these shafts, however, is insufficient to prevent the manual adjustment of these plates relative to the shafts, if this is desired.

Corner reflectors 88, 89, 90 and 91 are mounted in an identical manner on the cor-

ners of the frame 11. Each of these corner reflectors includes a plate 94 which is bent at 95 to form wings 96 and 97, which wings are adapted to engage the reflector plates which are adjacent thereto, as clearly shown in Figs. 1 and 7. The character and mounting of these corner reflector plates being identical, the description of the corner plate 91, as shown in Fig. 2, will serve for all. Disposed in the lower end of the bend 95 and rigidly secured by rivets 100 to the wings 96 and 97 is a corner reflector mounting bracket 101 providing an eye 102 which is looped through the eye 70, and a lever arm 103 which is connected by a tension spring 104 to the corner plate 66, disposed therebeneath. The corner spring 104 on each of the corner reflectors 88 to 91 urges that reflector in constant engagement with that side plate and the top or bottom reflector plate to which it is adjacent.

A light supporting bracket 110 is rigidly secured to the mounting bracket 18 of the lamp and extends horizontally and forward just below the reflector plate 78. An electric light socket 111 is rotatably mounted upon the head 112 of the bracket 110 and the socket 111 may be rotated on the bracket by a finger lever 113 extending from a collar 114 which is provided upon the stem 115 of the socket 111. The socket 111 when thus mounton the bracket 110 extends upward through a hole 116 provided in the reflector plate 78 and in the channel member 85 secured thereto. The socket 111 is adapted to receive an electric light bulb 118 which is preferably a lamp of fairly high candle power. A spot 119 on the outer surface of the bulb 118 is preferably frosted to render it semi-transparent for a purpose to be described later, or this spot may be rendered opaque by any well-known means. The bulb 118 may be supplied with current by suitable conductors 120 which lead from the socket stem 115 to a suitable switch 121 provided upon the frame 11.

The operation of our invention is as follows:

A lamp 10 is supported on the standard 23, as clearly shown in the perspective view of Fig. 7 and the lamp is energized so that rays of light emanate therefrom, as shown in Fig. 6. The subject is now placed before the lamp and the intensity of the light upon his face is observed. If the light is too concentrated, or if it is desired to diffuse the light to one side and upward, the thumb screw 42 is released and the hand wheel 37 is rotated in a left-hand direction so as to rotate the reflector plate 75 outward and the reflector plate 77 upward, after which the thumb screw 42 is set again. The corner reflectors 88, 89, and 91 accommodate themselves automatically to these changes in position of the reflector plates 75 and 77.

If the lighting is now satisfactory excepting for the absence of a suitable shadow on a given part of the face, the bulb 118 may be rotated by the manipulation of the finger lever 113 to position the spot 119 so that the spot acts to shield a certain portion of the subject from the direct rays of the light generated in the bulb 118. If the reflector plates 76 and 78 remain in a relative inward position while the plates 75 and 77 are relatively distended, concentration from the light of the bulb 118 in the lower right-hand portion of the subject will be effected while the light which is directed against the upper left hand portion of the subject will be diffused.

The reflector plates 76 and 78 may be coordinately adjusted in the same manner by manipulation of the thumb screw 56 and the hand wheel 52.

It is wished to call attention to the fact that at no time is a curved surface reflector utilized in reflecting light upon the subject. Thus no concentrated high lights or spots of light will be formed which will create an illusion of distortion so as to spoil the picture. Moreover, the perfect adjustability of the reflecting plates, as well as their easy coordinate adjustment in pairs, renders it possible to secure any desired lighting effect in a minimum of time. The cooperation between the shield spot 119 and the reflector plates of the lamp is also of immense advantage in securing the desired high lights and shadows for the purpose of close-up photography in the making of moving pictures.

As diagrammatically shown in Fig. 8, a lamp 120 may be used which is identical with the lamp 10 excepting that two light bulbs 121 and 122 are used in the place of the single light bulb 118 of the lamp 10. In the lamp 120 the bulbs are rotatable in the manner as described for the bulb 118.

Rotation of the bulb 121 is for the purpose of adjusting the position of a spot 123 formed thereon in the same manner as the spot 119 is formed on the bulb 118. The lamp 122 provides means for obtaining a single high light in the eyes of the subject without subjecting his eyes to too powerful a light. For this reason the bulb 122 is less powerful than the bulb 121 so that the high light in the eyes is formed by the light 122, but the flood of diffused light necessary for illuminating the features of the subject is supplied by the bulb 121, the subject being shielded from receiving the direct rays of the bulb 121 by the spot 123.

The bulb 122 also has a spot 126 which may be positioned to the front by turning the bulb 122 so that the direct rays of neither of the bulbs 121 and 122 are directed toward the front. Only reflected light rays are then directed from the lamp 120. Arc lamps may be used in the lamps 10 or 120 in place of bulbs, in which case asbestos shields are used in place of the spots 119, 123, and 126.

We claim as our invention:

1. In a photographic lamp, the combination of: means for generating a light at a given position; a series of plane surface reflectors disposed about said light; means for rotating said reflectors about given axes relative to said light; a shield disposed close to said light and adapted to intercept rays of light radiating directly from said light in a given direction; and means by which said shield may be selectively positioned around the vertical axis of said light-generating means.

2. In a photographic lamp, the combination of: means for generating a light at a given position; a series of plane surface reflectors disposed about said light; means for rotating said reflectors about given axes relative to said light; a shield disposed close to said light and adapted to intercept rays of light radiating directly from said light in a given direction; and means controllable at a point outside said reflectors by which said shield may be revolved about an axis passing through said light and nonparallel with the direction in which said lamp faces.

3. In a photographic lamp, the combination of: means for generating a light at a given position; a series of plane surface reflectors disposed about said light; means for rotating said reflectors about given axes relative to said light; corner reflectors engaging adjacent pairs of the aforesaid reflectors; and means for maintaining said corner reflectors in engagement with the aforesaid reflectors during a movement of the latter.

4. In a photographic lamp, the combination of: means for generating a light at a given position; a series of plane surface reflectors disposed about said light; means for rotating said reflectors about given axes in groups, a reflector in each group being rotated coordinately with another reflector in that group relative to said light; corner reflectors engaging adjacent pairs of the aforesaid reflectors; and means for maintaining said corner reflectors in engagement with the aforesaid reflectors during a movement of the latter.

5. In a photographic, the combination of: means for generating a light at a given position; a series of plane surface reflectors disposed about said light; means for rotating said reflectors about given axes relative to said light; corner reflectors engaging adjacent pairs of the aforesaid reflectors; and means for automatically maintaining said corner reflectors in engagement with the aforesaid reflectors during a movement of the latter.

6. In a photographic lamp, the combination of: means for generating a light at a given position; a series of plane surface reflectors disposed about said light; means for rotating said reflectors about given axes relative to said light; and corner reflectors engaging adjacent pairs of the aforesaid reflectors.

7. In a photographic lamp, the combination of: a frame; a light source mounted on said frame; a plurality of shafts pivoted in said frame; a reflector plate carried by each of said shafts; means for simultaneously turning a pair of adjacent shafts to regulate the angle of the beam of light transmitted; and means extending between adjacent reflector plates to form an enclosure of said light source in a plane perpendicular to the beam of light transmitted by said lamp.

8. A combination as defined in claim 3 in which said corner reflectors have wings which engage adjacent reflectors and lie in planes parallel to said reflectors.

9. In a photographic lamp, the combination of: a series of plane reflectors; corner reflectors extending between said plane reflectors; means for rotating said plane reflectors; means for holding said corner reflectors in contact with said plane reflectors as said plane reflectors are rotated; a light source; a semi-transparent shield adjacent said light source; and means for shifting said shield around the vertical axis of said light source.

10. In a photographic lamp, the combination of: a socket having a vertical axis; an incandescent electric light bulb in said socket; a plurality of vertical reflectors extending on three sides of said bulb and adapted to reflect rays therefrom; and a semi-transparent shield formed on the side of said bulb, the position of said shield being shiftable around the vertical axis of said socket when said bulb is rotated so as to vary the character of the beam of light derived from said lamp.

11. In a photographic lamp, the combination of: a light source; a series of plane surface reflectors disposed about said light source; means for rotatably mounting said reflectors, so that they may be rotated both singly and in groups about given axes relative to said light; corner reflectors engaging adjacent pairs of said plane surface reflectors; and means acting to force said corner reflectors into engagement with said plane surface reflectors when the latter reflectors are rotated.

In testimony whereof, we have hereunto set our hands at Los Angeles, California, this 28th day of June, 1927.

GUSTAV DIETZ.
RAYMOND DIETZ.