

Jan. 21, 1930.

G. DIETZ ET AL

1,744,370

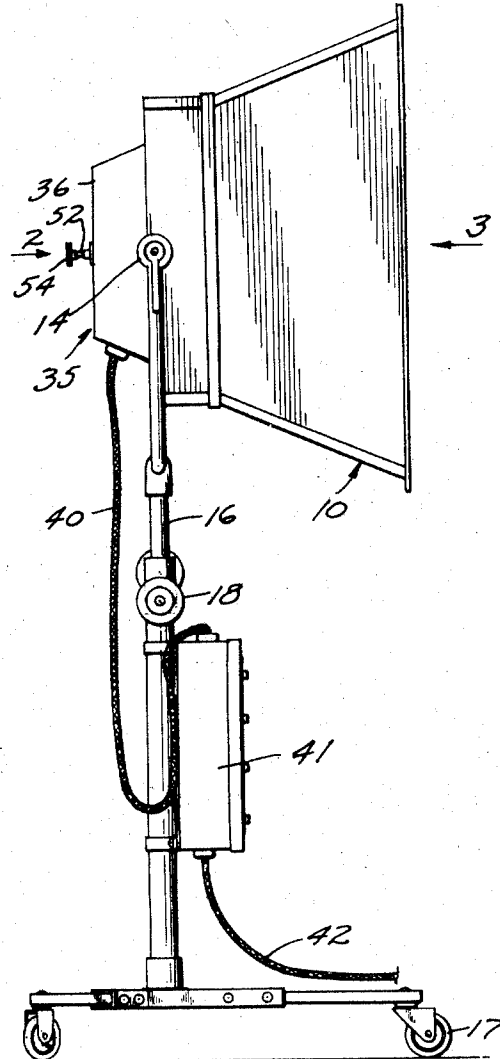
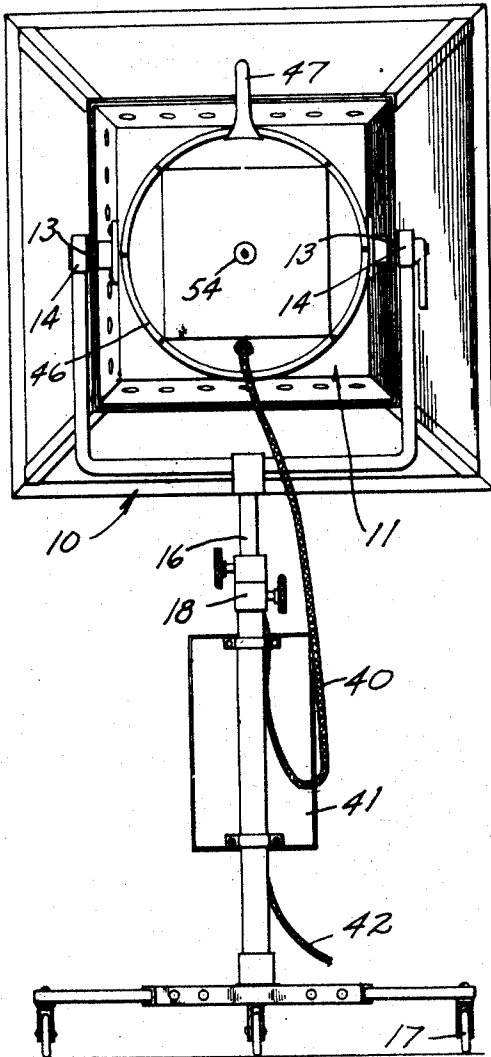
FLOODLIGHT

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2 Sheets-Sheet 1

Fig. 2.

Fig. 1.



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Fig. 3.

Fig. 4.

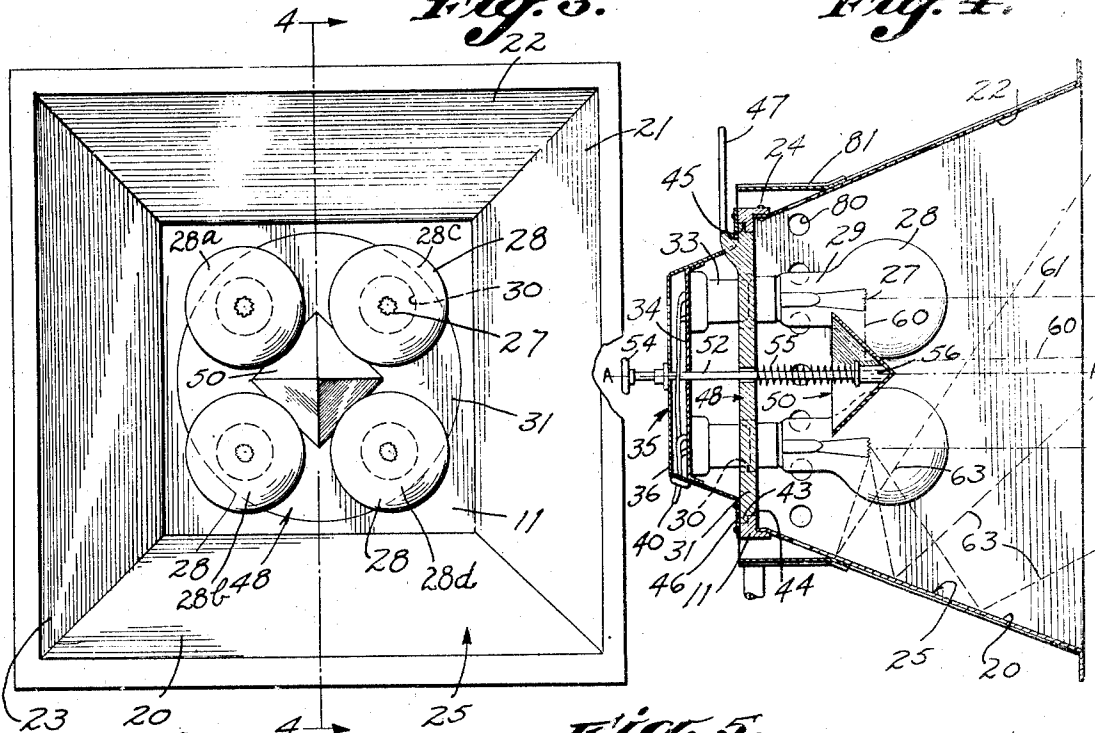


Fig. 5.

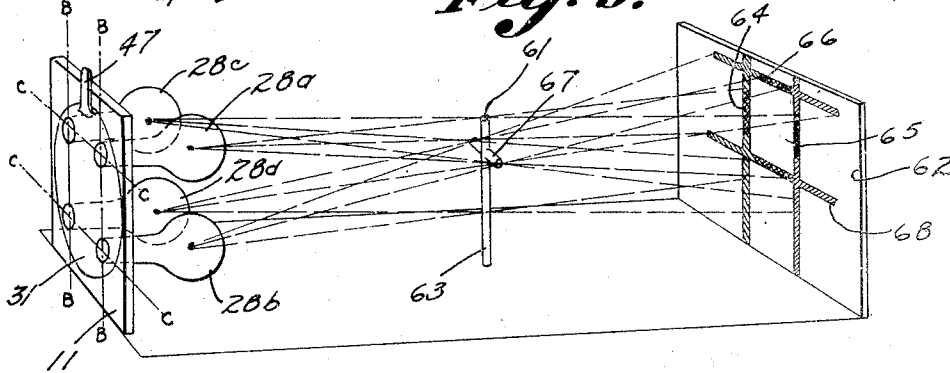
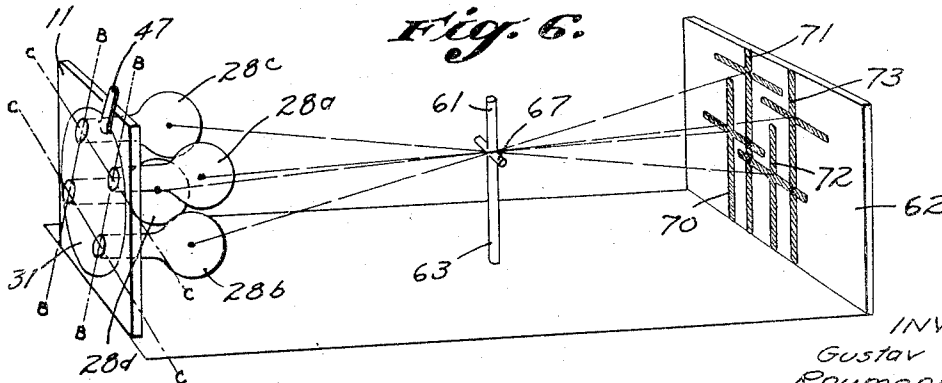


Fig. 6.



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FLOODLIGHT

Application filed May 7, 1928. Serial No. 275,727.

Our invention relates to flood lights such as are used for illuminating purposes, especially in the photographic arts.

Harsh shadows are undesirable in most classes of photographic work. To soften these shadows it is customary to use screens and various other devices separate from the flood light itself. We have invented a flood light which gives a strong beam of diffused light, this flood light having reflecting surfaces which direct a beam of radiated and reflected light directly forward, this beam being crossed by auxiliary or softening beams of light reflected from a side reflector on the flood light.

It is an object of our invention to provide a flood light giving a strong central beam of light, this beam being transversed by auxiliary beams of reflected light.

It is another object of our invention to provide a flood light having side-reflecting faces which diverge from the axis of the main beam of light at an angle of less than forty-five degrees.

We have found that the use of a plurality of light sources in a flood light gives a much better diffusion of shadows than does a single light source. Furthermore, by mounting these light sources in non-horizontal and non-vertical relation to each other, the vertical and horizontal shadows cast by any object will be drawn together, evened out, and greatly softened, a very desirable result.

It is an object of our invention to provide a flood light having a plurality of light sources disposed in non-horizontal and non-vertical relation relative to each other.

We provide a pyramidal reflector situated between the light sources, and having reflecting surfaces so disposed as to strengthen the main beam of the light by reflecting rays from the light sources in a direction parallel to the axis of the main beam.

It is an object of our invention to provide a flood light having a reflecting surface for intensifying the main beam of light by introducing reflected rays of light parallel to the axis of this main beam of light.

Another object of our invention is to provide such an auxiliary reflecting surface

which is in the form of a pyramid, this pyramid also acting as a centralizing means for the light sources.

Still a further object of our invention is to provide a flood light having a plurality of light sources which are rotatable therein.

Further objects and advantages of our invention will be made evident hereinafter.

Referring to the drawings in which we illustrate one form of our invention:

Fig. 1 is a side elevational view of our flood light.

Fig. 2 is a rear view of our flood light, taken in the direction of the arrow 2 of Fig. 1.

Fig. 3 is a front view of our flood light taken in the direction of the arrow 3 of Fig. 1.

Fig. 4 is a sectional view taken on the line 4-4 of Fig. 3.

Figs. 5 and 6 are diagrammatic views illustrating the principle of our invention.

Referring particularly to Fig. 1, we illustrate a flood light 10 having a frame 11, best illustrated in Figs. 2 and 3. Extending outward from this frame is a pair of trunnions 13 which are journaled in bearings 14 carried by a standard 16. This standard has wheels 17 thereon and is adapted to adjustably position the flood light 10 in any desired vertical position, this adjustment taking place through an adjusting means indicated by the numeral 18. The trunnions 13 and bearings 14 cooperate to allow the flood light 10 to be pivoted on a horizontal axis.

Referring particularly to Figs. 3 and 4, the frame 11 has side reflecting plates 20, 21, 22 and 23 which are secured thereto by any suitable means such as rivets 24. These side plates are secured together at their ends to form a diverging frusto-pyramidal reflecting surface 25. This reflecting surface is preferably brightly burnished so as to reflect a large amount of the light transmitted thereby by a plurality of light sources 27.

These light sources may conveniently be in the form of concentrated circular filaments enclosed in incandescent bulbs 28. Four of these bulbs are shown and are individually indicated by the numerals 28^a, 28^b, 28^c, and 28^d. These bulbs have neck portions 29 which extend through openings 30

formed in a plate 31. The base of each of the bulbs 28 is held in a socket 33, this socket being supported on a plate 34 supported in a lamp-supporting structure 35 secured to the rear of the plate 31 and extending therefrom. This lamp-supporting structure has a cover plate 36 which stops any escape of light rearwardly from the flood light 10.

Each of the sockets 33 is supplied with electrical energy through wires 40 which extend through the lamp-supporting structure 35 and enter a terminal box 41 mounted on the standard 16. Electrical energy is supplied to this terminal box by a cable 42 connected to any suitable source of electrical potential.

The plate 31 is preferably circular in form, and has a shoulder 43 extending outward from the periphery thereof. A circular opening 44 is formed through the frame 11 to receive the periphery of the plate 31, and a counter-bored portion 45 is formed in the opening 44 to retain the shoulder 43. A retaining plate 46 is secured to the rear face of the frame 11 and has an opening therethrough which permits this retaining plate to be passed over the lamp-supporting structure 35. This opening is not large enough to allow the shoulder 43 to pass therethrough, and the retaining plate 46 thus holds the plate 31 in pivotal relation to the frame 11. A handle 47 allows the plate 31 to be manually turned in the frame 11.

The plate 31 and the frame 11 are preferably highly burnished and cooperate to form a rear reflector plate 48. This rear reflector plate is adapted to reflect any rays of light impinging thereon from the light sources 27, this light being reflected forward, thus helping to form the main beam of the flood light having an axis A—A.

Also adapted to reflect rays in a direction parallel to the axis A—A is an auxiliary reflector 50 which is preferably formed in the shape of a pyramid, this pyramid having one surface for each of the light sources 27. This auxiliary reflector 50 is mounted on a rod 52 extending through the plate 31 and through the cover plate 36, this rod having a handle 54 formed on the rear end thereof. A compression spring 55 is compressed between a hub 56 of the auxiliary reflector 50 and the plate 31, this spring tending to force the auxiliary reflector into contact with each of the bulbs 28, thus acting as a centralizing means for these bulbs. The surfaces of this pyramidal auxiliary reflector 50 are preferably disposed at an angle of forty-five degrees to the rod 52, this rod lying along the axis A—A. This angle will vary with the placement of the light sources 27 and the bulbs 28, but for general purposes an angle of forty-five degrees will give the desired result.

This auxiliary reflector 50 is adapted to reflect rays received from the sources 27, the re-

flected rays being parallel to the axis A—A. One of these rays is indicated by the numeral 60 of Fig. 4, this ray lying in the plane of the filament before being reflected and thus having a maximum intensity.

The auxiliary reflector 50 and the rear reflector plate 48 also cooperate to direct rays of reflected light parallel to the axis A—A. Still other rays of light emitted by the sources 27 pass directly through the space defined by the side reflector plates 20 to 23 inclusive, these directly radiated rays being indicated by the numeral 61 of Fig. 4. This intense axial beam of light thus formed by the radiated rays from the sources 27 and the reflected rays from the rear reflector plate 48 and the auxiliary reflector 50, is modified and softened by the rays of light reflected by the reflecting surface 25 of the side reflector plates 20 to 23 inclusive. We have found that best results are obtained when the four reflectors 20 to 23 form an angle of less than forty-five degrees with the axis A—A. Thus, any rays of light emitted from the sources 27 which strike the surface 25 will be reflected across the axis A—A rather than parallel to this axis. Such rays are indicated by the numeral 63 of Fig. 4.

We prefer to utilize four bulbs 28, the filaments of these bulbs lying in the same plane. The openings 30, through which the neck of these bulbs pass, are axially aligned with the axis of each socket and the four axes formed by the respective bulbs define the corners of a square as indicated in Fig. 3. When the bulbs 28 are in this position, any object placed in the beam of the flood light 10 will cast relatively soft horizontal and vertical shadows. This is best illustrated in Fig. 5 which diagrammatically illustrates the frame 11 and the plate 31 rotatable therein.

In this figure we have illustrated the bulbs 28 as being vertically and horizontally aligned with each other so that the axes B—B of the pairs of bulbs 28^a and 28^b, and 28^c and 28^d will be vertical. Similarly, the axes C—C of the pairs of bulbs 28^a and 28^c, and 28^b and 28^d will be horizontal. If, now, an image in the form of a cross 61 is placed in the beam of the rays radiated from the bulbs 28, this cross will cast a shadow on a screen 62. Each of the bulbs 28 will tend to cast a separate shadow of the cross 61 on the screen 62. However, the shadows cast by a vertical leg 63 of the cross 61 due to bulbs 28^a and 28^b will superimpose, forming the vertical shadow indicated by the numeral 64. Similarly, bulbs 28^c and 28^d will cast a superimposed vertical shadow 65 of the vertical leg 63. In a similar manner the bulbs 28^b and 28^d cast a superimposed horizontal shadow 66 of a horizontal leg 67 of the cross 61, while the bulbs 28^a and 28^c cast a superimposed shadow 68 of this horizontal leg. Also, the auxiliary reflector acts as a fifth light source and tends to cast

an intermediate shadow, not shown, which lies between the two leg shadows 64 and 65 and the two arm shadows 66 and 68.

If, however, the plate 31 is rotated through an angle of less than forty-five degrees, the bulbs 28 will be in non-vertical and non-horizontal relationship relative to each other and the resultant effect is to soften the shadows. Such a condition is shown in Fig. 6, the axes B—B and C—C at this time being respectively non-vertical and non-horizontal.

Each of the bulbs 28 will now cast its individual shadow on the screen 62, and the shadows cast by any two lamps will not be in alignment, or superimposed. Thus, the bulbs 28^a, 28^b, 28^c and 28^d respectively cast shadows 70, 71, 72 and 73. It will be noted that the four shadows of the vertical leg 63 are parallel but not superimposed. Similarly, the four shadows cast by the horizontal leg 67 will be parallel but not superimposed, these shadows being disposed at different elevations on the screen 62. Thus, by rotating the plate 31 slightly, the bulbs 28 are thrown into non-vertical and non-horizontal relationship relative to each other, and the number of shadows cast by rays directly radiated from these bulbs are doubled. The auxiliary reflector will also act in a manner described above to still cast its intermediate shadow between the legs of the shadows 71 and 72 and between the arms of the shadows 70 and 73.

If an object larger than the cross illustrated is placed in the path of these directly radiated rays, the result will be an overlapping of the shadows and the resultant shadow will be large and soft.

Due to the effect illustrated in Figs. 5 and 6 the shadows cast by the non-vertical and non-horizontal position of the lamps 28 will form a softer shadow than would be formed by the lamps 28 when in a vertical and horizontal position relative to each other.

The effect of the reflected rays added to these directly radiated rays also acts to soften the shadows inasmuch as each of these reflected rays acts to cast a separate shadow, usually of less density than the shadows illustrated.

We have found that the bulbs 28 emit rather large quantities of heat and it is desirable to vent the space inside the side reflector plates through openings 80 formed in each reflector near the rear thereof. These openings communicate with the exterior of these plates, and a shield 81 is secured to the outer faces of the side reflector plates 20, 21, 22, and 23 inclusive, for the purpose of stopping any rays of light which would otherwise be transmitted through the openings 80. This shield extends rearward to a point substantially in line with the retaining plate 46.

It should be understood that we are not limited to the use of four lamps 28, this number being used for the purposes of illus-

tration and without limiting ourselves thereto. We have found, however, that four bulbs arranged in a manner indicated in the drawings will give very satisfactory results. A rectangular placement of the lamps will also give satisfactory results.

The revolving plate 31 is important to our invention inasmuch as the type of shadows cast by the flood light may be altered by rotating this plate slightly, but this invention also comprises the use of light sources which are fixed in position relative to the side reflectors, such light sources being in either vertical and horizontal relationship relative to each other or disposed in non-vertical and non-horizontal relationship.

We claim as our invention:

1. In a flood light, the combination of: a substantially vertical rear reflector plate; a plurality of light sources in front of said reflector plate, said sources being disposed in non-vertical and non-horizontal relationship with each other; side reflector plates surrounding said light sources and reflecting rays from said sources across the axis of the beam of said light; and an auxiliary reflector disposed between said light sources and adapted to direct rays of light from said sources into the beam of said light.

2. In a flood light, the combination of: a frame; a plate rotatably mounted in said frame; a plurality of light sources in front of said plate and movable therewith; and side reflector plates surrounding said light sources and diverging from said frame to reflect light from said light sources across the axis of the beam of said light.

3. In a flood light, the combination of: a frame; a plate rotatably mounted in said frame; a plurality of light sources in front of said plate and movable therewith; and a pyramidal auxiliary reflector between said light sources, said auxiliary reflector being adapted to direct rays of light from said sources in a direction parallel to the axis of said light.

4. In a flood light, the combination of: a frame; a plate rotatably mounted in said frame; a plurality of light sources in front of said plate and movable therewith; side reflector plates surrounding said light sources and diverging from said frame to reflect light from said light sources across the axis of the beam of said light; and a pyramidal auxiliary reflector between said light sources, said auxiliary reflector being adapted to direct rays of light from said sources in a direction parallel to the axis of said light.

5. In a flood light, the combination of: a rear reflector plate having holes therein; a lamp supporting structure behind said rear reflector plate; incandescent lamps carried by said lamp supporting structure and extending through said holes; and side reflector plates extending forward of said rear reflector

tor plate and surrounding said lamps, said side reflector plates diverging at an angle of less than forty-five degrees from the axis of the beam of said light.

5 6. In a flood light, the combination of:
a rear reflector plate; a plurality of light
sources mounted in front of said reflector
plate; and side reflector plates in number
equal to the number of said light sources
10 and mounted to diverge from said rear re-
flector plate, said light sources being so ar-
ranged that a line connecting any two adja-
cent sources is non-parallel to the plane of the
reflector plate adjacent these two adjacent
15 sources.

7. In a flood light, the combination of: re-
flecting means; a plurality of light sources
enclosed in glass bulbs and cooperating with
said reflecting means to form a beam; and an
20 auxiliary reflector around which said light
sources are grouped, said auxiliary reflector
contacting each of said bulbs and directing
rays from all of said sources into said beam
and substantially parallel to the axis thereof.

25 8. In a flood light, the combination of: re-
flecting means; a plurality of light sources
enclosed in glass bulbs and cooperating with
said reflecting means to form a beam; an aux-
iliary reflector contacting each of said bulbs
30 and acting as a centralizing means therefor,
said auxiliary reflector directing rays from
all of said sources into said beam; and re-
siliant means for holding said auxiliary re-
flector in contact with said bulbs.

35 9. In a flood light, the combination of: re-
flecting means; a plurality of light sources
enclosed in glass bulbs and cooperating with
said reflecting means to form a beam; and
an auxiliary reflector around which said
40 sources are grouped, said auxiliary reflector
being in the form of a pyramid contacting
each of said bulbs in centralizing relationship
and directing rays from all of said sources
into said beam and substantially parallel to
45 the axis thereof.

In testimony whereof, we have hereunto set
our hands at Los Angeles, California, this
1st day of May, 1928.

GUSTAV DIETZ.
RAYMOND DIETZ.

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