

May 31, 1966

R. LOWELL
REFLECTING DEVICE

3,254,207

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2 Sheets-Sheet 1

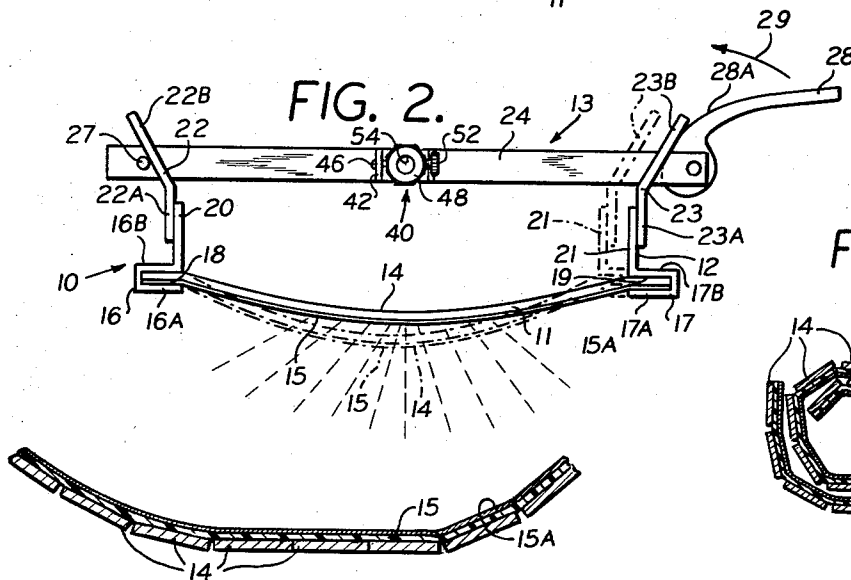
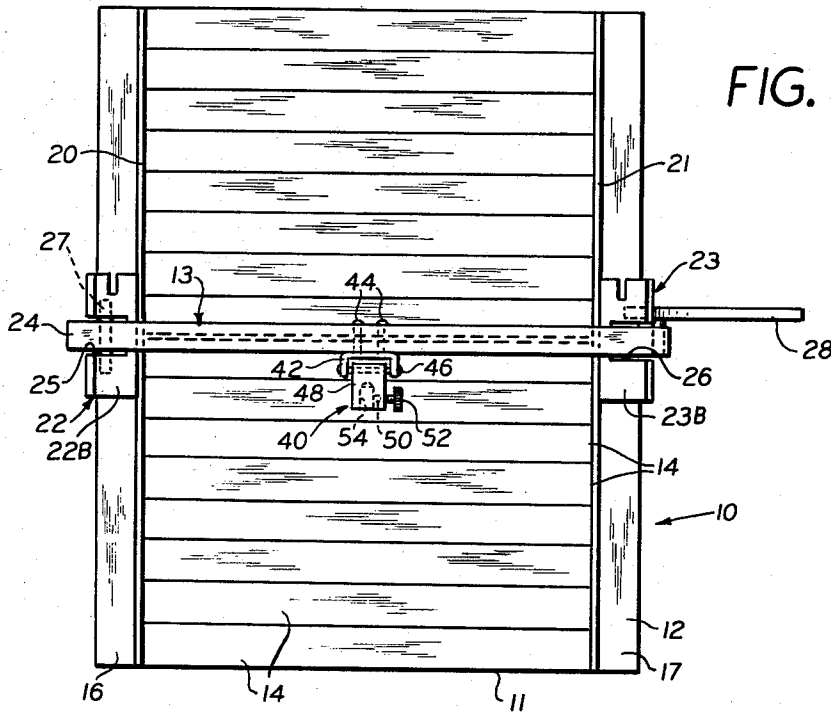


FIG. 3A.

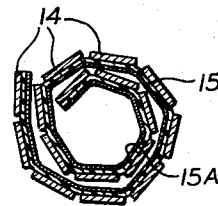
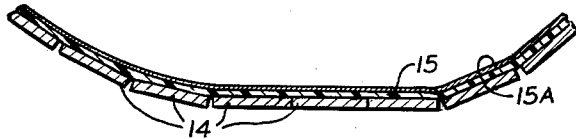


FIG. 3.



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FIG. 4.

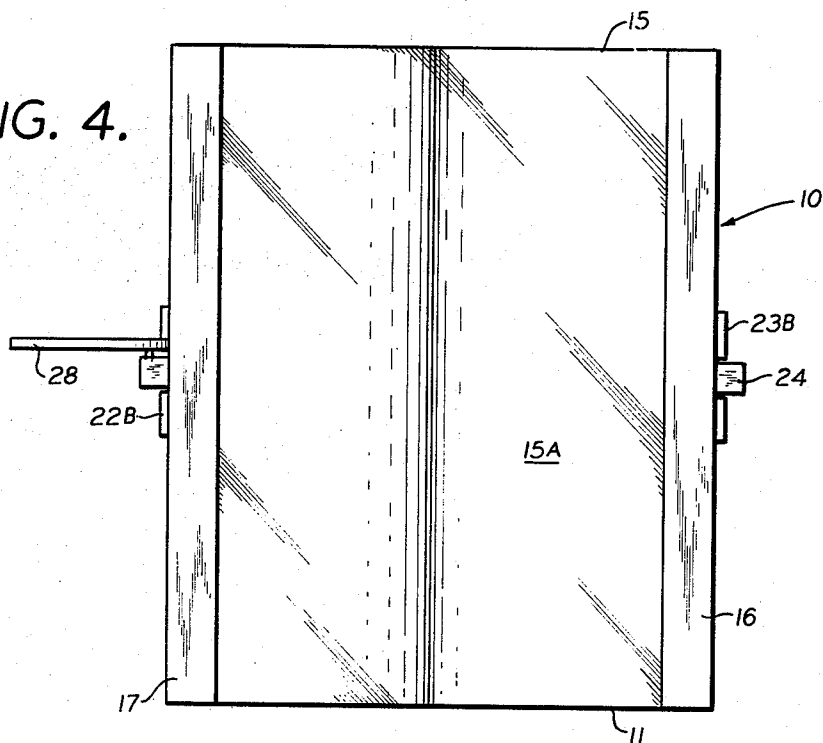


FIG. 5.

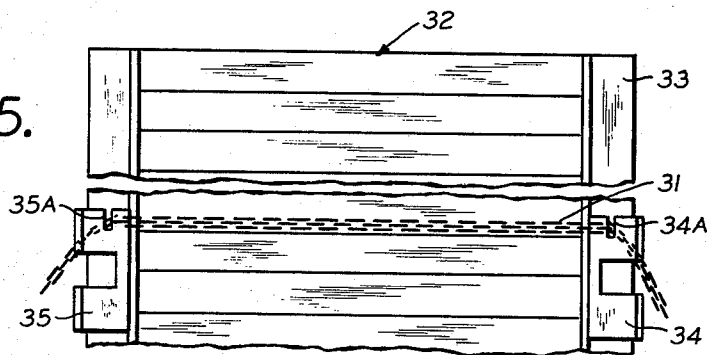
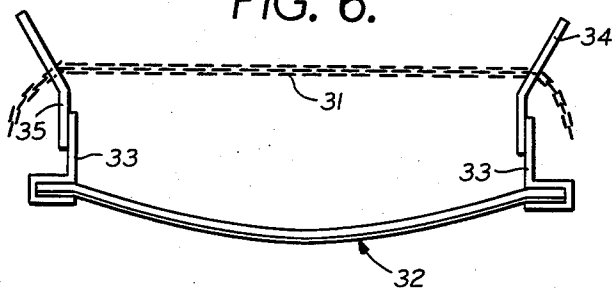


FIG. 6.



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REFLECTING DEVICE

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6 Claims. (Cl. 240-103)

This invention relates in general to a reflecting device and reflector therefor, and more specifically to a readily portable knock-down reflecting device and reflector therefor for use in photography.

In photography, and especially in the motion picture and television industries, much of the time it is necessary to go on location out-of-doors to photograph desired subjects. In such instances it is necessary for the photographer to use reflectors to effect the desired lighting for photographing the subject and/or background. To date, the known reflector constructions for such purposes have been relatively large, heavy, bulky, cumbersome devices which are particularly difficult to ship and/or transport. The size, shape, and construction of the known reflectors of the type to which the invention relates were particularly difficult and expensive to transport by air when time was of the essence. Further, the storage of prior art reflectors, when not in use, has been a chronic problem due to their bulk.

Therefore, it is an object of this invention to provide a readily portable reflector which is light in weight, and which can be readily knocked down and packaged so as to occupy a minimum of shipping and/or storage space.

It is another object to provide an improved reflector which can be readily adjustable to provide the reflecting surface required for lighting a given subject.

Still another object is to provide a novel frame construction for supporting a reflecting surface in a manner for readily effecting a variance in the curvilinear surface of the reflector.

Still another object is to provide a readily knock-down reflector device which can be readily assembled and disassembled without the need of any tools in a minimum of time and with a minimum of effort.

In accordance with this invention, the above objects, and other features and advantages are attained by a reflector device comprised essentially of a readily foldable reflecting surface supported in the assembled position thereof between a pair of holder frame members connected by a means for adjusting the spacing between the frame holders so as to vary the curvilinear surface of the reflector. Essentially the reflector comprises a plurality of resilient backing slats disposed in side-by-side relationship and which are joined together by a sheet of flaccid material. One surface of the flaccid material is formed to function as a reflecting surface as by metallizing. Accordingly, the reflector can be readily rolled or folded in the knock-down position thereof into a compact roll.

Means in the form of a pair of spaced apart holders define the frame for supporting the reflector in the assembled position thereof. Means for adjusting the spacing between the frame holders is provided whereby the degree of curvature imparted to the reflector positioned between holders can be varied in accordance with the lighting intensity and "spread" or coverage.

A feature of this invention resides in the provision in which the reflecting device is relatively simple in construction, can be inexpensively produced, and is positive in operation. Another feature resides in the improved construction of the reflecting surface which permits it to be readily folded into a knock-down compact roll.

Still another feature resides in the provision in which the curvilinear surface of the reflector can be readily

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varied to increase the area covered by the reflected light or to reduce its intensity when working at close range or when only relatively little reflected illumination is required.

Other features and advantages will become more readily apparent when considered in connection with the accompanying description and drawings, in which:

FIG. 1 is a rear elevation view of the instant reflector device in the assembled position thereof;

FIG. 2 is a bottom view of the reflector device of FIG. 1;

FIG. 3 is a detail sectional of the reflector constructed in accordance with this invention shown in a partially folded position;

FIG. 3A is a sectional view of the reflector shown in its rolled knock-down position.

FIG. 4 is a front elevation of the reflector device in the assembled position;

FIG. 5 is a fragmentary rear elevation view of a modified form of the invention;

FIG. 6 is a bottom view of the reflector device of FIG. 5.

Referring now to the drawings in detail, there is shown in FIGS. 1 to 4 an embodiment of the instant reflecting device 10. It comprises essentially a reflector 11, a frame 12 for supporting the reflector in the assembled position thereof, and a means 13 for varying the curvature of the reflector 11 as may be required to effect the proper lighting of a given subject to be photographed.

Essentially the reflector 11 comprises a plurality of resilient or flexible backing slats 14 which are arranged in adjacent or contiguous and preferably abutting side-by-side relationship. Preferably the backing slats 14 may be formed of plastic, aluminum or other suitable light weight resilient material that can be readily flexed or bowed. Secured to one side of the respective slats 14 is a sheet of flaccid material 15 which serves to hingedly connect or join the respective slats 14 together. The sheet of material 15 may be of any flaccid sheet such as, for example, polyethylene sheet, polypropylene sheet or preferably polyester sheet such as that sold under the trademark Mylar. Accordingly, the outer surface 15A of the sheet is formed so as to be smooth to provide a reflective surface, the inner surface of the sheet preferably being metallized in either event. With the construction described, it will be noted that the reflector 11 can be readily folded or rolled as shown in FIGS. 3 and 3A in the knock-down position thereof to define a compact roll which is polygonal in shape. As used herein a "smooth" surface is one which is either optically flat or is slightly roughened or patterned as by embossing so as to give a slightly light diffusing effect.

A frame means 12 is provided for supporting and holding rigid the reflector 11 when in use. As shown the frame means 12 includes a pair of opposed holders 16 and 17. Each holder is provided with a longitudinally extending channel shaped portion 16A, 17A to define a slot 18, 19. Connected to the rear flange 16B, 17B of the channel shaped member 16A, 17A is a co-extensive flange 20, 21, respectively.

The width of the slots 18, 19 in the respective holders 16, 17 is sufficiently wide to receive snugly the longitudinal sides of the reflector 11. It will be noted, as seen in FIG. 1, that the slats 14 forming the backing for the reflector sheet 15 extend transversely between the respective holders 16, 17, with the ends thereof received in the respective slots 18, 19. Thus it will be noted that to assemble the device, the ends of the reflector 11 need be simply inserted into the slots 18, 19 of the respective frame holders 16, 17.

Means for securing the frame holders 16, 17 and for

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adjusting the spacing therebetween is provided. The means includes a fixture 22, 23 which is connected to the flange 20, 21 of the respective holders 16, 17 intermediate the ends thereof, and preferably at the mid-point thereof. Each fixture 22, 23 is defined as a bent plate member having a vertical portion 22A, 23A secured to flange 20, 21 and an outwardly bent portion 22B, 23B. The outwardly bent portions 22B, 23B have formed in their respective ends a notch 25, 26 respectively.

In the form of the invention shown in FIGS. 1, 2 and 4, an adjusting tie bar 24 is detachably connected between fixtures. As shown the end portions of the tie bar 24 are detachably received in the notches 25, 26 of the respective fixtures 22, 23. A pin 27 extended through one end of the bar 24 serves to maintain its respective end in position in the notch 25 of the fixture 22. The other end of the bar 24 has rotatably connected thereto a camming lever or dog 28. As shown the bar 24 is positioned in the respective fixtures so that the stop pin 27 and camming lever 28 are disposed outboard of their respective fixtures 22, 23.

Referring to FIG. 2, it will be noted that the reflector 11 can be provided with a curvilinear surface by reducing the spacing between holders 16, 17. This is readily attained by pivoting the camming lever 28. The camming surface 28A of the lever 28 is specifically shaped so that by pivoting the same in the direction indicated by the arrow 29, the cammed surface 28A thereof will bear against the angular portion 23B of the adjacent fixture 23 whereby holder 17 is forced toward holder 16 as shown by the dash lines of FIG. 2, thereby causing the reflector 11 to bow outwardly as seen in FIG. 2. It will be noted that the curvature of the reflector 11 can be varied to attain the desired lighting intensity and coverage. While the illustrated embodiment discloses a convex bowing of the reflector 11, it will be apparent that concave bowing may also be used, although such concave bowing in a reflector is not usually desired. The bowing of reflector 11 controls its reflective property to the extent that the intensity of the reflected light on any given point can be controlled by the bowing. This eliminates the need for black mesh netting or moving the reflectors further away conventionally used with prior art devices to control light intensity. The bowing of reflector 11 also causes the reflected light to spread over a wider area than would the same size reflector if it were planar. Accordingly, a smaller reflector of my design may be employed to light a wider area.

In a modified form of the invention as shown in FIGS. 5 and 6, a link chain 31 may be utilized in lieu of the locking bar 24, above described. In this form of the invention, the construction of the reflector 32 and its holder 33 is similar to that described with reference to FIGS. 1 to 4. However, in this form of the invention the fixtures 34 and 35 are each formed with a notch 34A, 35A which opens in the side edge of the respective fixture. Accordingly, a link chain 31 is stretched between fixtures, the chain being held within the notch 34A and 35A of the respective fixtures 34, 35. Thus, it will be noted that the chain 31 can be drawn as tightly as desired to adjust the curvature of the reflector 32.

From the foregoing description, it will be noted that the reflector 11 or 32 and the holders therefor can be made of relatively light weight material. The device in either form described can be readily knocked down by first moving either the locking bar 24 or chain 31 from engagement with its respective fixtures. This can be readily attained simply by manually flexing the reflector until the ends of the locking bar 24 or chain 31 are freed from their respective retaining notches. The frame holders can then be readily slipped off the ends of the reflector. The reflector 11 or 32 can then be rolled or folded with a compact roll as shown in FIG. 3A. The completely disassembled device can then be compactly assembled in a small circular carton or carrying case to

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render it readily transportable by rail, air or motor vehicle and readily storable at minimum space occupancy. To assemble the reflector device, the above steps are reversed. Thus it will be noted that the reflector device can be assembled and disassembled without the use of any tools, and with a minimum of effort and in a matter of a very short time. The entire device can be inexpensively constructed of light weight material, and can be shipped or stored in a minimum of space. The construction of the reflector 11 is such that it can be readily folded to form a compact roll, yet when operative is provided with an uninterrupted reflecting surface which is quite rigid. Also the degree of curvature of the reflecting surface can be varied in a readily simple manner so as to attain the lighting effects desired. In the assembled form of the invention it may be readily mounted on any of a number of devices which are presently known and which can hold it steady in any of a number of attitudes in all but the highest velocity winds. In addition, for placing the assembled device for use, it may be hooked by the tie bar 24 or chain 31 on various protuberances from walls, tress, shrubs and the like. The reflector assembly 10 may also be secured in any desirable fashion to a supporting means which supporting means preferably holds the reflector 11 in a desired fixed position whereby to prevent flapping or the like which will cause variations in lighting that may prove undesirable. While the supporting means and the means for attaching the reflector to the supporting means form no part of the present invention, one suitable attaching means for a support is illustrated herein in FIGS. 1 and 2, the attaching means being designated by the reference numeral 40. As shown in FIGS. 1 and 2 the attaching means 40 includes a U-shaped bracket 42 which is fixed to the tie bar 13 as by rivets 44 although other securing elements may be employed. Extending through the legs of the U-shaped bracket 42 is a bolt 46 which also extends through an end of a drilled out fitting 48 for holding said fitting in pivotal relation on the bracket 42. The side wall of the fitting 48 is tapped as at 50 to threadedly receive a set screw 52. The drilled out cavity 54 in the fitting 48 is adapted to receive the end of a vertical rod forming part of a stand or support and with the rod so inserted the set screw 52 may be tightened to secure the reflector assembly 11 to the stand or support. The reflector may be turned about the vertical axis of the stand rod and then held fixed by the set screw 52. The reflector 11 may be pivoted about a horizontal axis defined by bolt 46 which is adapted to frictionally hold the reflector in any desired position. As previously noted this is only one manner of securing the reflector assembly 10 to a supporting means. Other suitable means may be employed without departing from this invention.

It will also be recognized that the device is easily maintained as the reflecting surface may be washed with soap or detergent and water or it may be dusted without deleterious effects.

As is true with knocking down the reflector, it will be seen that it can be assembled with great ease and in a matter of a very short time. All that need be done is to flatten out rolled reflector 11, dispose the edges of the reflector in the slots of the two holders, then dispose the tie bar (or chain) as shown and adjust the tension.

While for general use the flaccid sheet is normally metallized with silver colored metal, other colors may be employed to produce desired effects. For example, a gold colored metallized coating may be employed. It will be recognized that if different colored reflectors are employed, or if it is desired to use reflectors with different surface treatments, it is not necessary to have a complete reflector device 10 for each reflector 11, the reflectors 11, being interchangeable.

While it has been emphasized herein that the present invention has maximum utility in connection with out-of-doors photography and cinematography, the present

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invention also has useful application in connection with indoors photography where it can provide diffuse, shadowless "fill in" light by reflecting window light or artificial light. Accordingly, it is not intended to limit the scope of this invention to out-of-doors reflectors.

While the instant invention has been illustrated and described with reference to particular embodiments thereof, it will be appreciated that variations and modifications thereof may be made without departing from the scope or spirit of the invention.

What I claim is:

1. A readily portable knock down reflector device comprising,

- (a) a readily foldable reflector,
- (b) said reflector including a plurality of elongated slats,
- (c) said slats being disposed in contiguous side-by-side relationship,
- (d) a sheet of flaccid material secured to the surface of the respective slats for joining the same together whereby the reflector so formed can be readily folded into a roll in the knock down position thereof,
- (e) a frame for supporting said reflector in the operative position thereof,
- (f) said frame including a pair of holders,
- (g) each of said holders having a slot formed therein adapted to receive an end portion of said reflector in the assembled position of said device,
- (h) the respective slats of said reflector extending transversely between said holders,
- (i) and means connected between said holders for adjusting the spacing therebetween so as to impart a variable smooth curvilinear surface to said reflector positioned between said holders in the assembled position thereof.

2. The invention as defined in claim 1 wherein said adjusting means includes,

- (a) a cross bar connected between said holders intermediate the ends thereof,
- (b) and means for effecting movement of one of said frame holders relative to the other to vary the curvature of the reflector disposed therebetween.

3. The invention as defined in claim 1 wherein said adjusting means,

- (a) includes a flexible chain connected between said holders, and
- (b) means for taking up and holding the chain in adjusted position.

4. A readily portable knock down light weight reflector device comprising,

- (a) a readily foldable reflector,
- (b) a frame means for supporting said reflector in the assembled position of said device,
- (c) said frame means including a pair of holders,
- (d) each of said holders being formed with a slot for receiving the ends of said reflector in the assembled position so that it extends transversely between said holders,
- (e) a fixture having a laterally outwardly disposed extension connected to the rear of each of said holders,
- (f) each of said extensions having a notched out portion in the end thereof,
- (g) a removable cross bar arranged to be removably positioned in the respective notched out portion of said fixtures,
- (h) and a camming dog pivotally connected adjacent

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the other end of said bar whereby the positioning of said camming dog effects adjustment of the spacing between the frame holders to impart a variable curvilinear surface to the reflector supported therebetween, as may be required to effect proper lighting of a subject to be photographed.

5. A readily portable knock down light weight reflector device comprising,

- (a) a readily foldable reflector,
- (b) said reflector including a plurality of elongated resilient backing slats,
- (c) said slats being disposed in contiguous side-by-side relationship,
- (d) a sheet of flaccid material having one side thereof secured to each of said slats for joining the same together whereby the same can be readily folded to assume a roll of polygonal shape,
- (e) said sheet having its other surface formed to reflect light,
- (f) a frame means for supporting said reflector in the assembled position of said device,
- (g) said frame means including a pair of holders,
- (h) each of said holders being formed with a slot for receiving the ends of the backing slats of said reflector in the assembled position so that said slats extend transversely between said holders,
- (i) a fixture having a laterally outwardly disposed extension connected to the rear of each of said holders,
- (j) each of said extensions having a notched out portion in the end thereof,
- (k) a removable cross bar arranged to be removably positioned in the respective notched out portion of said fixtures,
- (l) and a camming dog pivotally connected adjacent the other end of said bar whereby the positioning of said camming dog adjacent said fixture effects adjustment of the spacing between said frame holders to impart a variable curvilinear surface to the reflector supported therebetween, as may be required to effect proper lighting of a subject to be photographed.

6. A readily portable knock-down reflector device comprising, a reflector including a plurality of elongated resilient slats in side by side relation, a flaccid sheet of reflecting material secured to said slats for hingedly securing them to one another, a frame for supporting said reflector in the operative position thereof, said frame including a pair of holders, each of said holders having a slot formed therein to receive the end portions of said reflector in the assembled position of said device, and means connected between said holders for adjusting the spacing therebetween so as to impart a variable smooth curvilinear surface to said reflector positioned between said holders in the assembled position thereof.

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