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A. S. CRANDALL

LIGHT REFLECTOR

Filed March 11, 1926

Fig. 1.

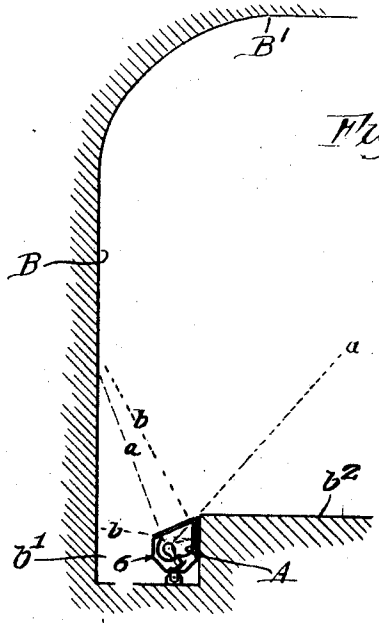


Fig. 2.

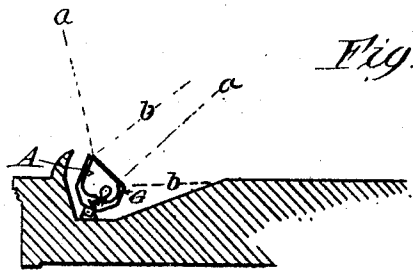


Fig. 5.

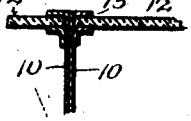
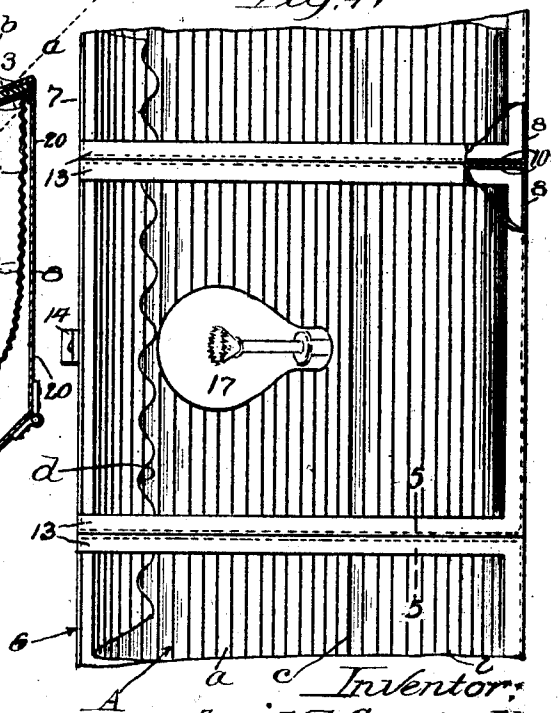


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ARVID S. CRANDALL, OF CHICAGO, ILLINOIS.

LIGHT REFLECTOR.

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This invention relates to light reflectors and its principal object is to obtain a more effective and uniform distribution of the light rays issuing from a lamp, to obtain a more uniform degree of illumination within the zone to be illuminated, and to distribute the light with uniform intensity, on adjacent and more remotely located surfaces.

With most, if not all of the reflectors now in common use in stage-lighting systems, sign illuminating devices, show case illuminating devices and the like, an unnecessary number of lamps is required, or higher powered lamps are required, to obtain the desired effect. One object of the present invention is to obtain more effective results by the use of a less number of lamps and with the expenditure of less current than has heretofore been required. Another object is to provide a reflector of novel form, capable of reflecting and diffusing the light rays in such manner that all of the area within the light zone of the lamp may be illuminated at practically the same intensity, and without the overlapping of bright and dull areas. With these and other objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and claimed.

The invention is clearly illustrated in the accompanying drawing, in which:

Fig. 1 is a vertical cross section taken through a fragment of a stage or other structure containing a dome, and showing a lamp containing one of the reflectors forming the subject matter of this specification, in place therein; Fig. 2 shows the device in use at the foot light section of a stage, the view being a vertical cross section; Fig. 3 is a detail, vertical cross section of the device; Fig. 4 is a plan of one lamp and fragments of two adjacent lamps; and Fig. 5 is a detail vertical, longitudinal section taken on line 5—5 in Fig. 4.

Referring to said drawing, the reference character 6 designates the casing of the device, which as a preference, comprises front and back walls 7, 8, a bottom wall 9 and side walls 10. The bottom wall 9 may have a hinged door 11 through which the interior of the case is rendered accessible. The top of the casing is open and is covered by a glass or other transparent plate or slide 12, which may be of any desired color. In obtaining curtain stage lighting effects, a number of lamps containing the invention are placed side by side, as shown in Fig. 4, and glass plates of the same color may be placed in the alternate lamps, or the lamps may be arranged in groups, one lamp in each group having a glass plate of a certain color, and the lamps with glass plates of the same color following in a regular sequence. Preferably the inner faces of the side walls 10 are in the nature of light reflecting surfaces whereby light rays are reflected in a sidewise direction. The top of the lamp casing inclines upwardly from front to back and has a grooved edge portion 13 in which the glass plate is held. A button 14 pivotally secured on the front wall 7 engages with the front edge of the glass plate and retains it in place in the groove.

Secured to the inner side of the casing is a bracket 15 which supports the socket 16 of an electric incandescent lamp 17 of desirable design and wattage for the purpose intended. A lug 18 is secured to the outer side of the bottom of the casing and is pivotally secured to a supporting post or bracket 19 whereby the lamp may be tilted to stand at any angle desired. Vent openings 20 are provided in the casing for the escape of heated air.

Within the lamp casing is the reflector A, forming the subject matter of this specification. It is shown as composed of corrugated material, the corrugations being rounded and running from side to side of the case. The reflector comprises two curved, tough like sections *a*, *b*, joined at the place lettered *c*, the portion *a*, being substantially semi-circular or being parabolical in form and defined by the edges *c*, *d*, and the curved section *b* being approximately a fourth of a circle or parabolical in form and extending from the edge *c* to the place lettered *e*, where the curve merges into a straight part *f*, running to the top of the casing where its edge *g* defines its upper end.

The light center *h* of the electric lamp is preferably located adjacent the middle of the curved section *a*, and some of the direct light rays issuing from the electric lamp, 17, pass out through that part of the glass plate 12 contained between the edges *d*, *g*. Other light rays issuing from the electric lamp strike the curved section *a* of the reflector, and some are reflected out through the glass plate 12, and some are reflected upon the curved section *b*, and others upon straight

part *f*, all being eventually reflected out through the glass plate 12. It will be observed, therefore, that both direct and reflected light rays are sent out from the electric lamp, and distributed in such manner that all of the illuminated area receives substantially the same degree of illumination irrespective of its distance away from the lamp. By reason of the corrugated reflecting surface, the light rays are broken up and scattered over the surface to be illuminated.

In Figs. 1, 2 and 3 the light zone illuminated by the direct light rays is included in the angle formed by the dotted lines *a*, *a*, and that illuminated by the reflected light rays is included in the angle formed by the dotted lines *b*, *b*. These angles may vary, however, on account of the corrugations and precise location of the light centre.

Referring now more particularly to Fig. 1, which shows the lamp used for the purpose of illuminating an upright back ground wall or the like B, and a dome or ceiling B^1. The lamps may contain glass plates of the desired colors and are usually arranged in a row and placed in a trough or depressed place b^1, whereby all of the wall and dome may be visible above a floor line b^2. It will be observed that the direct and some reflected light rays are directed in a direction, extending generally upwards, and include the upper portion of the wall B and the dome B^1. Some of the light rays reflected by the curved section *a*, of the reflector pass upward and some pass to the curved and straight parts *b*, *f*, of the reflector, from which they are reflected back to the lower part of the wall B. Some of the light rays from the electric lamp strike the curved and straight parts *b*, *f*, of the reflector and are reflected back against the lower half of the wall B. It will be seen, therefore, that the entire surface within the light zone of the lamp is illuminated in an even manner throughout, and that there are no dark places visible on the illuminated surface. A wall and dome of this kind is often used at the back of theatrical stages where it is especially desirous of evenly illuminating the entire surface. Inasmuch as the inner sides 10 of the lamp casing act as reflecting surfaces, light rays are reflected from each side surface and intermingle with light rays reflected from adjacent lamps, thus affording a wide range of light beams in a transverse or lateral direction. The result is that the colored light from one lamp diffuses into the colored light from adjacent lamps, and a beautiful and uniform lighting effect is created.

In Fig. 2 the lamp is shown in use as a foot light. Here also that portion of the stage which derives its light from the foot lights is evenly lighted. Persons and other objects coming within the light zone of the lamps receive a uniform distribution of the light whereby all parts thereof are evenly illuminated. The use of the reflector is not limited to the situations mentioned, but it may be used in any situation where an even, uniform distribution of light is required on adjacent and more remote places.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention; I desire, therefore, not to limit myself to the exact form of the construction shown and described, but intend, in the following claims, to point out all of the invention disclosed herein.

I claim as new and desire to secure by Letters Patent:

1. A light reflector having two concave, curved, light reflecting faces, the concavity of one face being relatively deep and the curved end of one face joining a curved end of the other, and one of said curved faces merging into a substantially straight face, the opposite ends of said light reflecting faces being spaced apart to provide an opening for the passage of direct and reflected light rays issuing from a light source located in the deep concave space of the reflector, said opening extending transversely of the plane of the substantially straight light reflecting face whereby light rays reflected by said substantially straight light reflecting face cross the direct light rays issuing from said opening in transverse lines.

2. A light reflector comprising two concave, curved and corrugated light reflecting sections, the concavity of one section being relatively deep and a curved end of one section joining a curved end of the other, and one of curved sections merging into a substantially straight part, the other ends of said two sections being spaced apart to provide an opening for the passage of direct and reflected light rays issuing from a light source located in the deep concave section of the reflector, the deep curved section being arranged to reflect light rays to the other section, and said other section being arranged to reflect light rays out through said opening along lines transverse with respect to the general direction taken by the direct light rays passing from said lamp and through said opening.

3. A light reflector comprising a curved, relatively deep, trough like section, and a second curved, relatively shallow, trough like section, having a part merging into an approximately straight portion, the two sections being arranged side by side in such manner that light rays are reflected from the first mentioned section to the curved and approximately straight parts of the second named section, and both sections being adapted to receive direct light rays from a common light source located in the deep sec-

tion, there being an opening through which light issues from said reflector extending transversely of said straight light reflecting portion whereby light rays reflected by said straight light reflecting portion are directed transversely of the direct light rays passing through said opening.

4. A light reflector comprising a curved, relatively deep, trough like lengthwise corrugated section, and a second curved, trough like lengthwise corrugated section, having a part merging into an approximately straight portion, the two sections being arranged side by side in such manner that light rays are reflected from the deep section to the curved and approximately straight parts of the second named section, and both sections being adapted to receive direct light rays from a common light source located in the deep section, there being an opening through which light issues from said reflector extending transversely of said straight light reflecting portion whereby light rays reflected by said straight light reflecting portion are directed transversely of the direct light rays passing through said opening.

5. A light reflector comprising two spaced sides, the upper edges of which incline upwardly from front to back, a curved, trough like reflector section extending between said sides at the front portion thereof, a second curved, trough like section, extending between said sides at the rear thereof and having an approximately straight part extending to the top of the sides.

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