June 4, 1940. J. GELB 2,203,410

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Fig. 1.

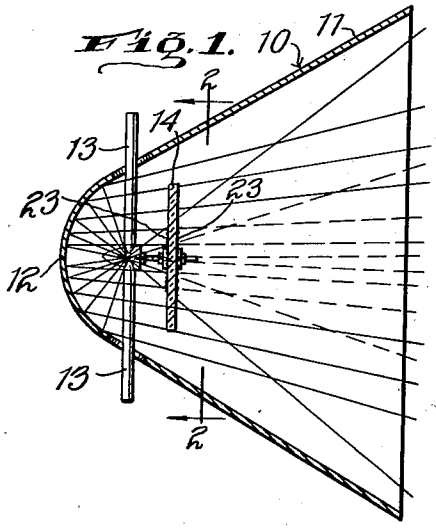


Fig. 2.

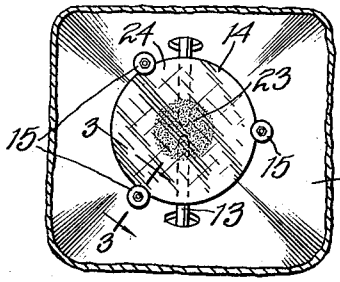


Fig. 3.

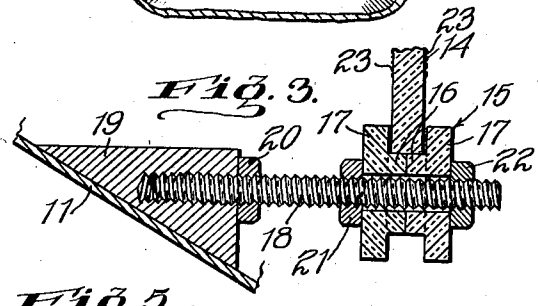


Fig. 4.

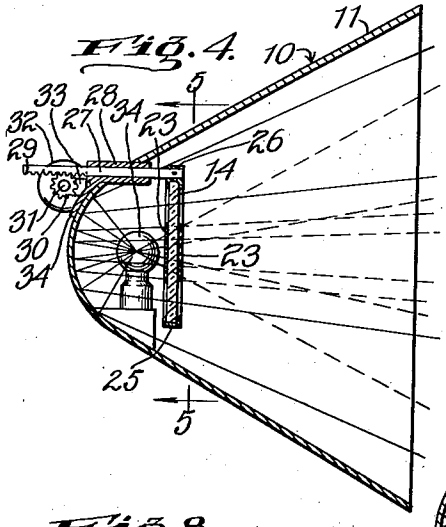
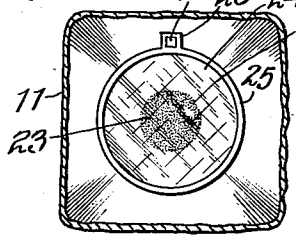


Fig. 5.



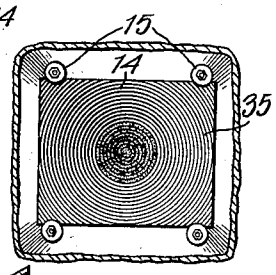


Fig. 6.

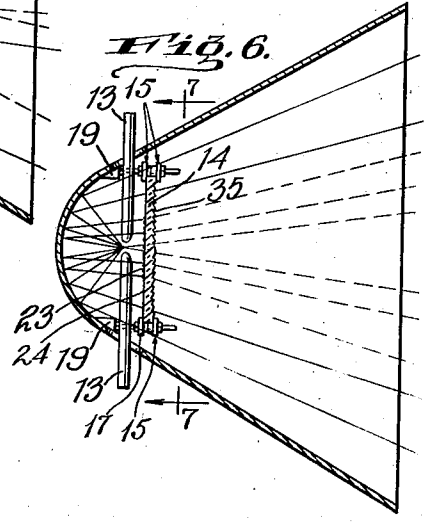


Fig. 7.

Fig. 7a.

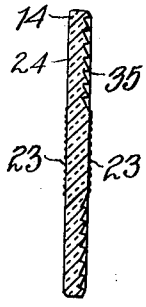
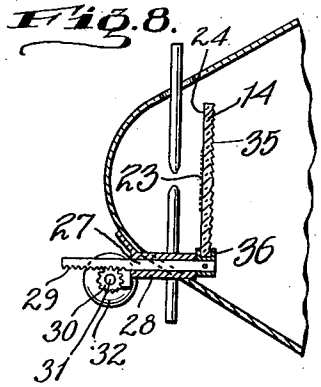


Fig. 8.



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Fig. 9.

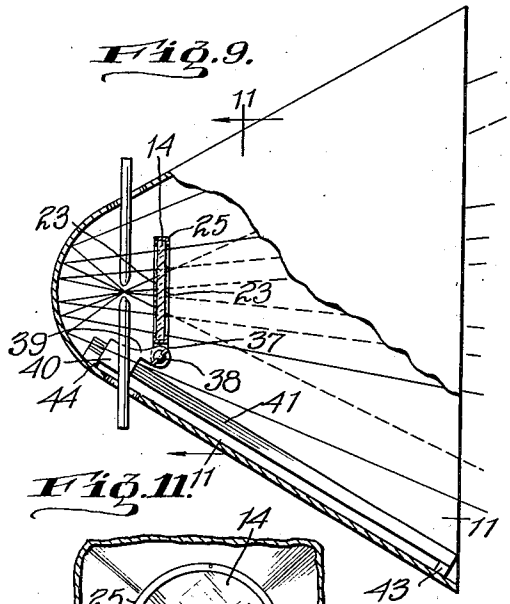


Fig. 10.

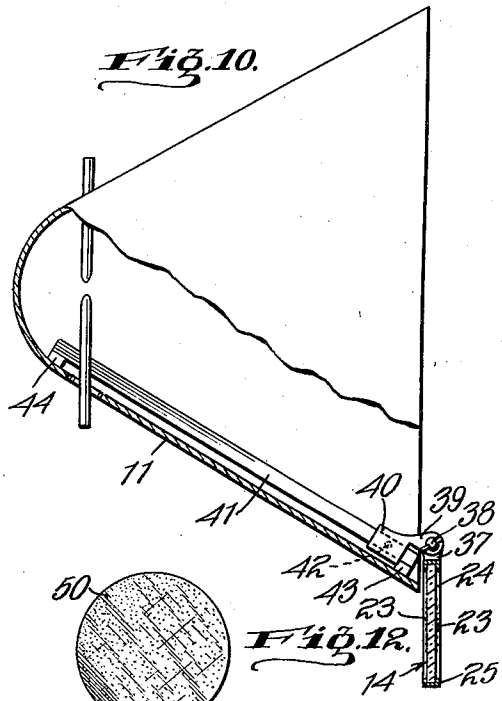


Fig. 11.

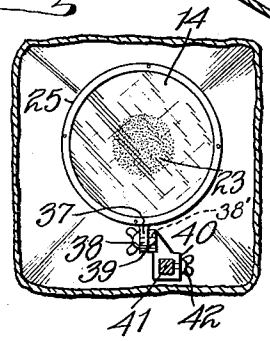


Fig. 12.

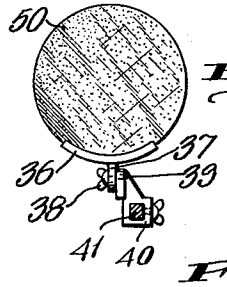


Fig. 13.

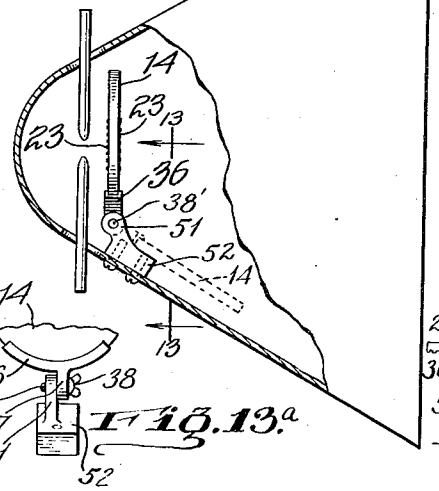


Fig. 13.a

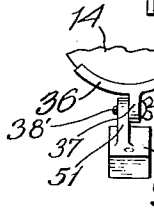


Fig. 14.

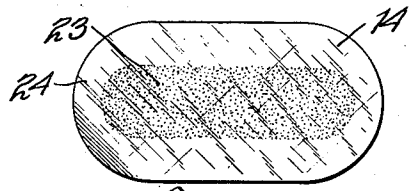


Fig. 15.

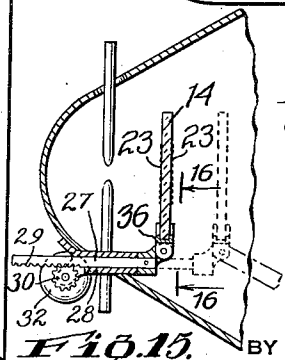
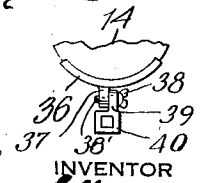


Fig. 16.



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Patented June 4, 1940 2,203,410

UNITED STATES PATENT OFFICE

2,203,410

LAMP

Joseph Gelb, New York, N. Y.

Application March 2, 1937, Serial No. 128,593

1 Claim. (Cl. 240—45)

The present invention deals with illumination and is particularly directed to an improved lamp adapted to be employed in connection with photography and more particularly is concerned with an arc lamp wherein the intensity of the beam of light emanating from the light source is controlled to provide a zone of light of substantially uniform intensity. Heretofore and in so far as I am aware light diffusers have been employed in connection with photographic projection printing and in this connection attention is directed to the U. S. patent to E. C. Rogers 1,633,228 June 21, 1927. In this patent a composite diffusing or light conditioning plate is shown. This diffusing plate consists of a marginal lightly ground portion surrounding a centrally arranged relatively heavy grounded part. In practice, a composite light conditioning ground plate of the type disclosed in the Rogers patent is remotely disposed in respect to its light source whereby its direct rays and even its indirect or reflected rays are diffused by it. In the Rogers patent, the light conditioning plate does not serve as a flame protector because of the excessive spatial relation of the light source and composite ground plate and because in this type of arrangement the reflected light rays are diffused, the light emanating from the composite ground plate although softened appreciably is not of substantially uniform intensity.

Accordingly a primary object of the invention is realized in the provision of an effective and serviceable light diffusing means having a centrally arranged translucent ground portion for conditioning the direct and most intense rays emitted from a light source and including a marginal unground transparent portion for transmitting the indirect reflected or less intense light rays to provide a zone of light of substantially uniform intensity emanating from the light diffusing means. The invention further comprehends as an object the provision of light conditioning means adapted to be adjusted longitudinally of a reflector containing the light source whereby the light conditioning means may be disposed in close but spatial proximity to the latter whereby the direct and most intense light rays impinge upon the central portion of the light conditioning means, whereby the reflected but less intense light rays impinge upon the marginal portion of the light conditioning means, and whereby the even less intense light but reflective rays are transmitted forwardly without impinging the light conditioning means. The invention has as a further object to provide a novel and improved light conditioning means adapted to be disposed adjacent a light source and act as a flame protector.

Although the lamp according to the invention is particularly applicable for use in connection with photography, it is to be understood that the invention is not limited in this respect, for it may be used in connection with any luminating means where uniform light intensity is desired and where it is desired to prevent glare incident to the sharp rays emitted by the light source.

Other objects, features, and advantages of the invention are in part obvious and in part hereafter more particularly pointed out and for a clearer understanding of the invention attention is directed to the several embodiments illustrated in the accompanying drawings and more particularly described in the light of the following specification.

In the drawings:

Fig. 1 is a longitudinal and sectional view of my improved arc lamp according to the invention.

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2 on a larger scale.

Fig. 4 is a longitudinal sectional view of another lamp according to the invention.

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

Fig. 6 is a longitudinal sectional view of another embodiment according to the invention.

Fig. 7 is a sectional view on the line 7—7 of Fig. 6.

Fig. 7a is a sectional view of the light conditioning plate shown in Figs. 6 and 7.

Fig. 8 is a fragmentary longitudinal and sectional view of another embodiment according to the invention.

Fig. 9 is a side elevational view of another form of lamp, partly broken away and partly in section to show the adjustable means for the light conditioning plate.

Fig. 10 is a view similar to Fig. 9, however, illustrating the diffusing plate arranged outside of the reflector.

Fig. 11 is a sectional view on the line 11—11 of Fig. 9.

Fig. 12 illustrates a front elevational view of another form of light diffusing plate which may be used in place of the diffusing plate illustrated in Fig. 1.

Fig. 13 is a view similar to Fig. 9 but wherein the diffusing plate is merely hingedly related in respect to the reflector.

Fig. 13a is a sectional view on the line 13—13 of Fig. 13.

Fig. 14 is a front elevational view of another form of light diffusing or conditioning plate according to the invention.

Fig. 15 illustrates a fragmentary longitudinal and sectional view of another embodiment wherein the light diffusing plate is both slidably and hingedly disposed within the reflector and

Fig. 16 is a sectional view on the line 16—16 of Fig. 15.

Illustrative of the embodiments disclosed, the lamp generally indicated 10 comprises a frustroconical reflector 11 having a rearwardly disposed light reflecting curved end portion 12. Within the reflector is arranged a suitable light source constituted by the carbon electrodes 13 having their adjacent poles appropriately spaced apart to define an electric arc gap as is well understood.

Slightly spaced from the light source is a vertically arranged light transmitting and diffusing or conditioning plate 14. This plate is loosely and rotatably sustained by several insulating bearings each designated 15 and each comprising a collar 16 including an annular retaining flange 17, the arrangement being such that the spaced flanges 17 loosely straddle the front and rear faces of the light conditioning plate 14 shown in Fig. 3.

Each of the bearings 15 is mounted on a threaded shank 18 adjustably associated with a bracket or lug 19 anchored to the reflector 11. A lock nut 20 is utilized to hold shank 18 in a set position and a pair of adjustable clamping members 21 and 22 serve as means for properly adjusting bearing 15 longitudinally of the shank 18.

As illustrated in Figs. 1 and 2, the light conditioning plate 14 is in the form of a disc of glass which may be heat resisting or heat absorbing. More particularly however this plate 14 has its central portion 23 of the front and rear faces ground and the remaining marginal portions unground or transparent. The ground portion 23 therefore reduce the intensity of non-reflected or the most intense and direct light of the light beam projected thereon by the light source, that is, the hottest and the most intense part of the light beam is modulated by these ground portions and softened. Also it should be noted that an intermediate portion of the beam of light is reflected or projected indirectly onto the marginal transparent portion 24 of the light conditioning plate 14 and through the latter while marginal portions of the beam of light is reflected by the reflector and projected forwardly without impinging the conditioning plate 14.

By the present arrangement the copy board, not shown, has projected thereon a zone of light of substantially uniform intensity since the brightest rays of the light source are severally conditioned, the less intense but reflected rays are not softened and even the less intense light rays of the light source are merely reflected without impinging the conditioning plate 14.

According to the form illustrated in Figs. 4 and 5, the light conditioning plate 14 is of the type shown in Fig. 2, but it is appropriately sustained in the vertically disposed channel ring 25 which includes a perforated hollow lug 26 fixedly secured to one end of rod 27 slidably sustained by the sleeve or bushing 28 fixed to the reflector or casing 11. The other end of rod 27 is provided with a plurality of teeth 29 to constitute a rack which is in mesh with pinion 30 fixed to shaft 31 to which is secured manipulator wheel 32. Shaft 31 is appropriately journalled in a suitable yoke 33 associated with tail portion 34 depending from bushing 28.

By rotating wheel 32, rod 27 is slidably displaced and therefore conditioning plate 14 may be adjusted to be within close proximity to the light source which in this case is an electric incandescent lamp 34 although a pair of carbon electrodes may be utilized instead.

With the form according to Figs. 6 and 7, the light conditioning plate 14 has the form of a square and is adjustably and loosely sustained between flanges 17 of the bearings 15 in a manner disclosed in connection with Fig. 3. In Figs. 6 and 7, however the conditioning plate 14 is provided on its front face with a plurality of concentric but closely spaced ribs 35 to produce a prismatic effect whereby the rays emanating from the conditioning plate 14 are converged while the rear face of the latter includes the centrally arranged ground portion 23. In Fig. 7a the conditioning plate 14 is of the type shown in Figs. 6 and 7 except the front central part of its outer face is also provided with a ground portion 23 while about this ground portion the several annular prismatic and concentrically disposed ribs 35 are arranged. In Fig. 8, the conditioning plate 14 of the type shown in Fig. 7 is fixed in a channeled arcuate shoe 36 carried by the adjustable and slidable rod 27 adapted to be operated in the manner illustrated in Fig. 4.

Referring now to the form disclosed in Figs. 9 to 11 inclusive, the conditioning plate 14 is loosely supported within channel ring 25 which has a depending perforated ear 37 which receives a threaded stud carried by a bracket 40, the latter being formed with a squared aperture to slide upon a bar 41, the bar being carried by the reflector casing. The threaded stud which receives ear 37 carries a wing nut 38.

The wing nut 38 is utilized to hold and clamp ring 25 supporting the conditioning plate 14 in a desired tilted position against lug 39. If wing nut 38 is rotated in one direction, ear 37 and a lug 39 are frictionally disengaged, thus permitting the conditioning plate to be tilted or swiveled on the fulcrum shank 38'. If wing nut 38 be rotated in another direction, ear 37 and lug 39 are frictionally engaged and are therefore clamped together.

With the frame or ring 25 firmly held against tilting, it may be adjusted towards and away from the light source by sliding sleeve 40 along rod 41. Having been set in a desired position the shank of winged stud 42 is moved and clamped against rod 41 to hold sleeve 40 in a set position within the reflector.

Where however it is not desired to use the conditioning plate, it may be readily removed from the reflector casing 11. To this end, the sleeve 40 is moved along rod 41 until limited by the front stop 43 to the position shown in Fig. 10. Thereafter the winged head 38 is turned to permit the frame 25 to be tilted downwardly and out of the reflector. The conditioning plate may be quickly set to be adjacent the light source by, swinging frame 25 upwardly, actuating winged head 38 to clamp lugs 37 and 39 together and moving sleeve 40 upwardly along the rod 41 until the desired spatial relation of the plate 14 in respect to the light source is attained after which set stud 42 is tightened against guide rod 41. Lug 44 which serves to space rod 41 from the re-

flector also acts as stop means to limit displacement of sleeve 40.

In Fig. 12, the arcuate shoe 36 of the type shown in Fig. 8 carries the conditioning disc 50 which in this instance has its entire front and rear face appropriately ground. By this construction a larger zone of the beam of light is diffused or conditioned and if desired it is within the province of the invention to employ the conditioning plate 50 in place of the conditioning plate 14 hereinbefore specifically described.

The swiveled connection shown in Fig. 12 is of the type disclosed in connection with Figs. 9–11 inclusive and accordingly light conditioning plate 50 may be adjusted and set in a desired position within close proximity to the light source or it may be withdrawn from the reflector or tilted in respect to the light source.

In the case of the form illustrated in Fig. 13, the conditioning plate 14 is carried by the arcuate shoe 36 which in this instance has its depending lugs 37 swiveled on threaded shank 38' carried by lug 51 of a bracket 52 fixed to the reflector. Thus upon rotation of winged head 38 lugs 37 and 51 may be appropriately clamped after conditioning plate 14 has been set in a desired tilted position.

The light conditioning plate 14 shown in Fig. 14 is approximately elliptical in configuration and comprises a centrally disposed relatively elongated and approximately elliptical ground zone 23 to cut out the most intense rays of one or more light sources while the marginal portion 24 thereof is transparent to transmit the indirect or reflected light rays from the several light sources.

The embodiment according to Figs. 15 and 16 includes the conditioning plate 14 appropriately secured to the arcuate shoe 36 having perforated lug 37 pivotally sustained on stud 38' of the clamping member 38 which when controlled is utilized to hold lugs 37 and 39 together against tilting. Depending from lug 39 is the hollow sleeve or collar 40 to which is fixedly secured the rack rod 27 adjustably controlled in the manner disclosed in connection with Figs. 4 and 8.

By manipulating wheel 32, plate 14 may be moved towards and away from the light source and by loosening clamping member 38, plate 14 may be tilted relative to the rack rod 37, which is guided in bushing 28 and the latter has its forward end constituting a stop to limit rearward displacement of the sleeve 40.

I claim:

In a lamp, a reflector having an open forwardly projected flared portion, a light source within the reflector at the rear thereof, a bracket carried by the reflector adjacent the light source, a supporting frame pivotally carried by the bracket, a light conditioning plate carried by said frame, the plate being made of heat-resisting glass and having a central translucent area normally positioned to receive the more intense and direct rays of said light source and having a substantially transparent area surrounding the translucent area, the plate being substantially spaced from the inner wall of the reflector, and manually operable means for frictionally holding the plate in adjusted positions relatively to the bracket and light source, and a bar carried by and within the reflector and extending longitudinally thereof, the bracket being mounted upon the bar to slide longitudinally thereof, and a manually operable clamping device for clamping the bracket in adjusted position upon said bar.

JOSEPH GELB.