

A NEW SYSTEM OF ILLUMINATION TO AVOID GLARE BY DIFFUSION.*

By Hans K. Ritter, E.E., Assoc. Mem. A.I.E.E.

There are three distinct devices which are utilized to make up a modern illuminant: First, the source of light or lamp; second, the reflector or redistributor of light; third, the diffuser or softener of light.

It is the combination of these three devices into an efficient unit, its framing into a supporting structure or fixture, and the final application to our many varied needs, that are the problems of the illuminating engineer of the present day.

The tungsten lamp, mercury arc, etc., have all distinct distribution characteristics of light flux emitted by them, inherent to them; that is, they are dependent on the mechanical arrangement of the light-emitting surfaces. These characteristics cannot in general be adjusted so that a fully satisfactory light-distribution for all the necessary applications of the lights is found. To accomplish the latter, the first accessory mentioned, the reflector, is now universally used.

Most modern illuminants have such a high intrinsic brilliancy that a correction is necessary to make them agreeable to our eyesight. To accomplish this, diffusing envelopes, such as globes, spheres, etc., are widely used.

At the present time, it is common practice to combine lamp and reflector, or lamp and diffusing globe. To combine lamp, reflector, and diffuser efficiently, many difficulties arise, as all know who have seriously attempted to make this combination. The failure to create such a unit accounts for the deficiency of many lighting installations.

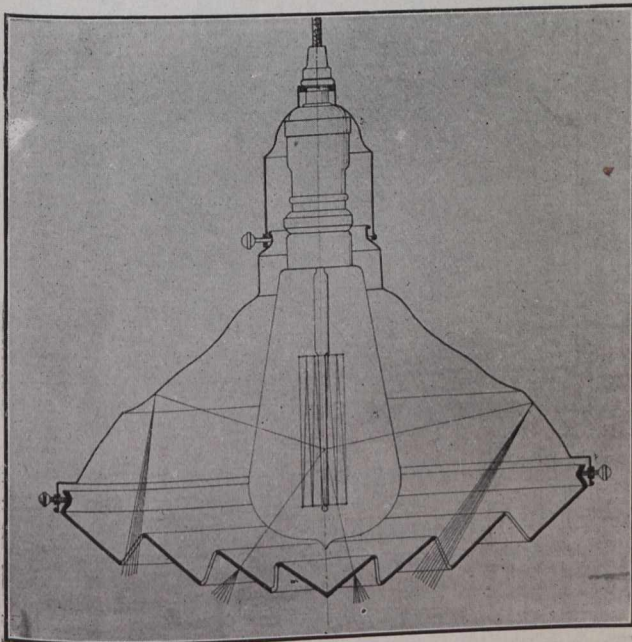


Fig. 1.

My experience shows me that it is a comparatively easy matter to make a reflector for a certain redistribution of light, but a much harder task is set if the reflector is to act as diffuser and efficiently shield the glaring source of light.

Most of the diffusing globes diffuse the light, but have no action in redistributing it efficiently.

However, to make certain a fully satisfactory arrangement, we are bound to combine lamp, reflector, and diffuser

into one unit, and only so are able to produce an illuminant which is hygienic and fully satisfies our demands for ease and comfort.

Many attempts have already been made to successfully solve this problem. The most common of them is the frosting of the electric lamp bulbs; but this remedy cannot be said to fully cover this problem, as the frosting leaves the reflector surface unscreened within the field of vision, and even then the lamp's intrinsic brilliancy is high. Incidentally, sand

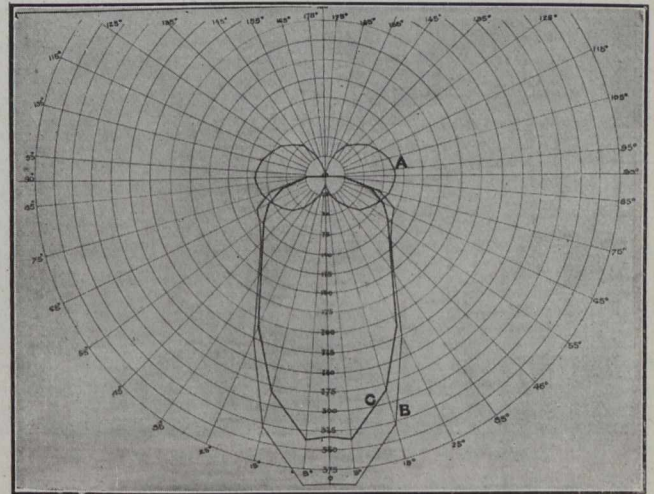


Fig. 2.

blasting the bulb tends to diminish the effective life of the lamp, reducing it to some degree and, according to several authorities, to a large extent. It is therefore better to use clear glass bulbs, screened by a diffusing envelope large enough to keep the intrinsic brilliancy down. Another method employed to screen the source of light is by means of indirect illumination. An investigation of this method shows that it cannot be generally adopted, as its applicability and efficiency, in most cases, are dependent on the preparation of ceilings and walls.

It was about the time when the Nernst lamp was at its height, and especially used for better lighting, that in the firm of Messrs. Ritter and Uhlmann, in Basel, fixture manufacturers of note in Switzerland, research tests were conducted under the direction of Mr. J. J. Ritter to find an arrangement which would embody in an efficient and proper manner the three fundamental components, namely, lamp, reflector, and diffuser in one unit, combined.

Especially the relation of many problems which arose in the practical and artistic application of fixtures to illumination and which had to be solved, was responsible for the creation of many new shades and types, and our efforts resulted finally in the invention of the combination that I am describing, patented in this country as well as abroad.

In principle, this combination comprises an upper reflector and a lower glass distributor or diffusing envelope. These totally enclose the light source in such a manner that no direct rays from the filament leave the fixture without coming from one or the other of the supplementary diffusing surfaces, the attached translucent glass, or the matt reflector within.

The lower disc, as you will see in the cut, Fig. 1, is made up of concentric, truncated cone surfaces, alternately erect and inverted. This embodies the fundamental principle of this invention. The inwardly sloping surfaces of the inverted cones are matted. The outwardly sloping surfaces of the erect cones are of clear glass.

*Paper read at the Annual Convention of the Illuminating Engineering Society, Niagara Falls, Ontario.