

P. R. BASSETT.
 POCKET LIGHT.
 APPLICATION FILED OCT. 9, 1919.

1,380,344.

Patented June 7, 1921.

Fig. 1.

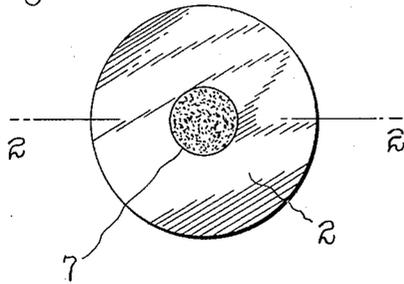


Fig. 2.

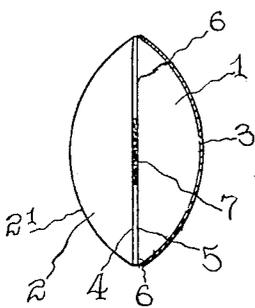


Fig. 4.

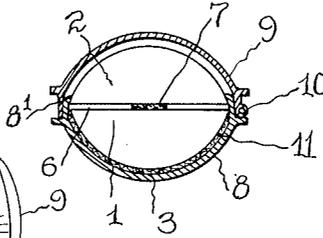


Fig. 3.

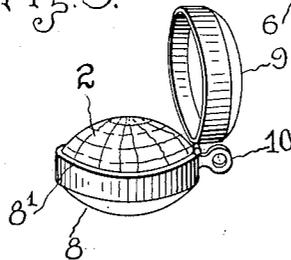


Fig. 5.

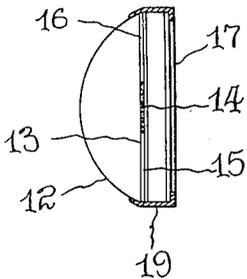
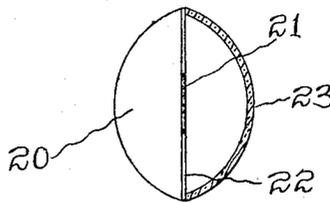


Fig. 6.



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POCKET-LIGHT.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PRESTON R. BASSETT, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Pocket-Lights, of which the following is a specification.

My invention relates to improvements in pocket lights and the object of my invention is to provide a convenient, simple and efficient device for the purpose of utilizing the light rays emitted from self-luminous materials. Self luminous materials such as mixtures of a phosphorescent salt and a radio-active material have been employed heretofore as a direct illuminant by applying the same to the thing to be illuminated such as characters and figures on dials, watch faces and the like but have not been used commercially as indirect sources of light, since the intensity of the light from such materials is so small that it has been impossible to see objects illuminated with it, at a distance of more than a small fraction of an inch from the materials. It is one of the objects of this invention to provide means whereby sufficient light may be gathered from a small amount of self-luminous material and projected in one direction, that it is possible to obtain a resultant illumination sufficient to make discernible dial faces or print, at a distance of an inch or more from the source of light. It is a further object of this invention to make possible the utilization of both sides of a thin patch of luminous material and to project the light from both sides thereof in the same direction. Heretofore, where self-luminous paint has been utilized at least one-half of the light has been lost by being emitted in the direction of the surface on which the paint is applied and is re-absorbed in the luminous material itself.

Due to the very low intensity of illumination obtainable from self-luminous materials, and as the intensity of the light from the material decreases as the square of the length of the path of the ray, it is essential that the material and its optical system should be extremely compact, so that the path of any ray of light passing from the luminous material to the object to be illuminated shall be a minimum.

Another object of my invention is to make use of the self-luminous material unmixed with any liquid menstruum. Mixed lumi-

nous paint has the disadvantage of having a considerable percentage of the light absorbed by the menstruum itself, especially when it crackles or becomes opaque as it ordinarily does in time.

Another object of my invention is to protect and preserve the illuminant. It is injurious to expose luminous paint or self-luminous material directly to air and dampness for long periods of time, as such exposure tends to materially decrease its luminosity.

Other objects will appear hereinafter:—

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a view of one form of my device.

Fig. 2 is a section on the line 2—2 in Fig. 1 with the light rays shown by extended lines.

Fig. 3 is a view of the device inclosed in a case.

Fig. 4 is a sectional view of the same with the case closed.

Figs. 5 and 6 are views of modified forms of the device.

Similar characters refer to similar parts throughout the several views.

The optical system in the preferred form consists of two plano-convex lenses 1 and 2 to one of which lenses 2 is applied a silvered mirror coat 3 on the convex side. These two lenses 1 and 2 have their two plane surfaces 4 and 5 cemented together around their periphery with some colorless cement 6 such as Canada balsam or the like. The central, or uncemented portion of the plane surface contains a thin film of the luminous material 7 so packed that it is held firmly in place although it is in powder form, and is sealed by the lenses 1 and 2 and the surrounding cement 6 in an airtight chamber. This thin patch of luminous material 7 is thus incorporated in the optical system in a manner which seals it airtight between glass surfaces and makes it possible to hold the luminous material in the form of a thin film or patch without having to mix it with a liquid to form a paint. The path of every ray of light emitted from this patch of material 7 passes directly through the glass to one of

the convex surfaces. The rays striking the unsilvered convex surface 2', are converged in the form of a somewhat spreading beam parallel to the axis of the two lenses. The rays striking the silvered surface 3 are reflected within the glass from this concave mirror 3, whereupon they pass through the unsilvered convex surface and are also in turn converged along the same axis as the direct rays. It is even found possible to utilize the light which strikes the silvered surface directly in back of the patch 7 since these rays are reflected back through the patch itself and out into the beam. This is apparently due to the fact that the luminous material is so thin that some of the light passes back through the interstices.

An advantage of this optical system is that it is optically a single piece. The source of light 7 is embedded in a uniform medium. The cement 6 having the same index of refraction as the glass lens 1 and 2, acts as though the two lenses were of the same piece of glass. This arrangement does away with all inner surface reflections and refractions which are unavoidable when light passes from one medium to another of different refractive index and which cause a serious loss of light.

In the optional form of the device illustrated in Figs. 3 and 4, I provide a protective case in which the lenses are contained.

This preferably comprises a container 8 of suitable design having a cover 9 which may be hinged to the container at point 10. In the container I preferably provide a packing or pad 11 to form a seat for the silvered side 3 of the lens 1. The lenses may be held in the container by pinching over the lip 8' of the container.

In the optional form of the device illustrated in Fig. 5, I use a plano-convex lens 12, on the plane surface 13 of which, I set a thin disk of self-luminous material 14 and secure the same in position by means of a thin sheet of glass 15 cemented on the plane surface of the lens 12 by a transparent ce-

ment 16 and at a position in the rear thereof I provide a mirror 17 which is preferably held in position by means of a suitable case 19.

A further optional form of the device is illustrated in Fig. 6 in which I provide upon the plane surface of a plano-convex lens 20 a thin disk 21 of self-luminous material secured in position by a thin sheet of glass 22 and in the rear thereof I provide a concave mirror 23.

The operation of these optional forms shown in Figs. 5 and 6 is as above explained and these forms may also be used alone or with a suitable case or cover as illustrated in Figs. 3 and 4.

Having thus described my invention, what I claim is:

1. An apparatus for producing light consisting of a thin patch of self-luminous material, cemented between the flat sides of two plano-convex lenses, one of which is silvered on the convex side.

2. In a device of the character described the combination of a plano-convex lens, a disk of self-luminous material on the plane surface thereof, a sheet of glass over the said disk and secured to the lens, a transparent cement between the sheet of glass and the lens to seal the disk upon the lens and a reflecting surface substantially as shown and described.

3. In a device of the character described the combination of two plano-convex lenses, a thin disk of self-luminous material between the plane surfaces thereof, and one of said lenses having a reflecting surface substantially as shown and described.

4. In a device of the character described the combination of a plano convex lens, a thin disk of self-luminous material on the plane surface thereof, a glass cemented on the plane surface over the self luminous material and a reflecting coating on the said glass.

In testimony whereof I affix my signature.
PRESTON R. BASSETT.