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SELF-LUMINOUS ARTICLE

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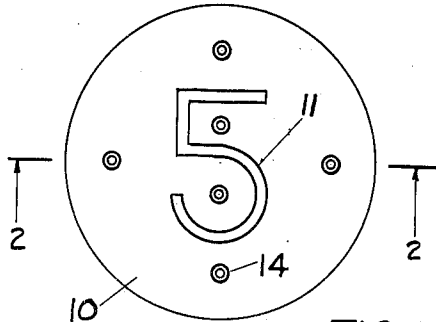


FIG. 1

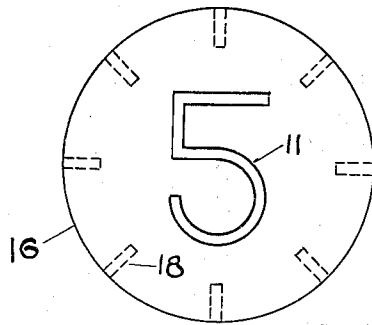


FIG. 3

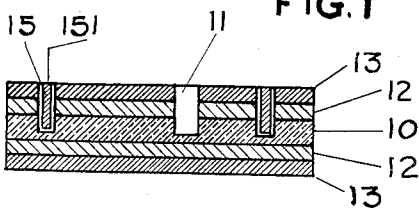


FIG. 2

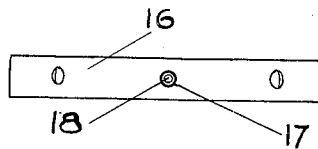


FIG. 4

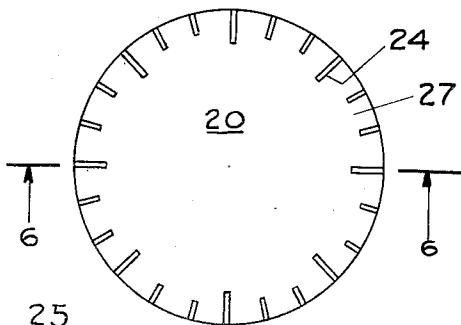


FIG. 5

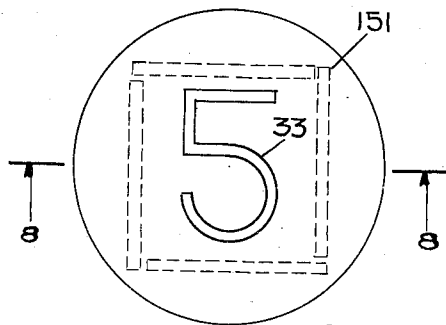


FIG. 7

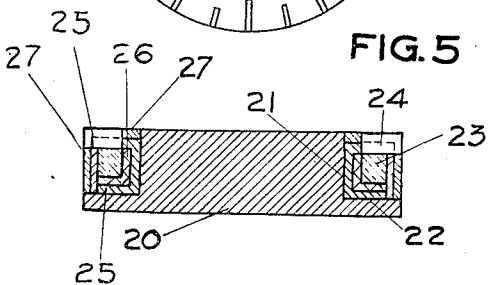


FIG. 6

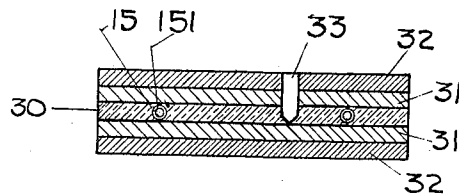


FIG. 8

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SELF-LUMINOUS ARTICLE

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8 Claims. (Cl. 250—72)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates to a self-luminous article, and has for an object to provide an improved self-luminous article visible in the dark without the aid of an external light source, and which may be manufactured and assembled without the aid of expert and trained personnel, and, furthermore, may be assembled without danger to the personnel.

Self-luminous or radioactive material, as applied to the manufacture of self-luminous articles in the present customary manner, such as clock dials, compass faces, and many other articles, is applied at great danger to the personnel, because the material is apt to get into the system of the personnel, causing fatal and incurable diseases. With the present method of application, it is customary to place the self-luminous material, mixed with an adhesive, directly on the numerals or indications intended to be visible, a problem involving a great deal of skill on the part of the personnel, and a lack of efficiency of the material, due to its dilution by the adhesive.

It is an object of this invention to eliminate the necessity for the present method and to provide an improved method which more accurately controls the amount of luminosity present, enables the material to be applied with greater efficiency and much less skill on the part of the personnel, and at the same time with much less danger to the personnel, also making it possible to apply the self-luminous or radioactive material in undiluted powder form instead of in diluted form mixed with adhesive, it having been ascertained that the maximum brightness that can be expected with the diluted material mixed with adhesive is approximately 8 microlamberts, while in the undiluted material in the powder form a brightness of 30 microlamberts can readily be attained. Furthermore, when the brightness diminishes through aging, the aged material can be easily discarded and fresh material substituted therefor without the necessity of any particular skill.

A further object of this invention is to provide a self-luminous material which may be used to indirectly illuminate the indicia of a dial or clock face with a greater degree of brightness than is at present possible with the present known forms of directly illuminating self-luminous indicia thereon.

With the foregoing and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter described and illustrated in the drawing, in which:

Fig. 1 is an elevational view of a disc to which this invention has been applied through the face thereof.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a plan view of a disc to which self-

luminous material has been radially applied through the periphery thereof.

Fig. 4 is a peripheral end elevation of Fig. 3.

Fig. 5 is a plan view of a disc having indicia adjacent its peripheral edge.

Fig. 6 is a sectional view on line 6—6 of Fig. 5.

Fig. 7 is a plan view of still another application of this invention, and

Fig. 8 is a sectional view on line 8—8 of Fig. 7.

There is shown at 10, in Fig. 1, a disc having an indicia such as a numeral 11 which it is desired should be visible in the dark. The disc 10 is made of a transparent medium such as glass, quartz, "Lucite" (methyl methacrylate), "Bakelite Polystyrene" (transparent phenolic condensate products), or other suitable materials which are capable of transmitting the visible light given off by the self-luminous or radioactive material.

The top and bottom of the disc 10 is provided with an undercoat 12 of white reflecting material, an efficient reflecting and particularly non-absorbing white surface being such as white zinc paint, magnesium carbonate, or opaque white laminated phenolic material.

The undercoat 12 on the disc 10 is then covered with a black finish such as any suitable black paint or other non-reflecting material. The indicia numeral 11 is cut through the black finish 13 and white reflecting finish 12 and cut into the transparent disc 10, as clearly shown in Fig. 2.

A plurality of holes 14 are drilled parallel to the axis of the disc through the top thereof to receive self-luminous or radioactive material 15 therein. This material 15 may be in the form of a powder previously sealed in transparent pellets 151 of suitable length and diameter, or may be placed directly in the apertures 14. The self-luminous material 15 is placed in the holes 14 before the reflecting undercoat 12 and black finish 13 are placed on the disc. A suitable number of openings 14 may be placed throughout the surface of the disc 10, according to the luminosity desired.

In operation, the luminosity given off by the self-luminous material 15 travels through the transparent material, being confined therein by a reflecting undercoat 12, except where it can escape through the engraved indicia 11, making the same distinctly visible.

The form of invention shown in Figs. 3 and 4 differs from Figs. 1 and 2 in that in the species of Figs. 3 and 4 the radioactive material 18 is inserted in radial openings 17 around the circumference 16 of the dial, whereas the species of Figs. 1 and 2 permits the insertion of the radioactive material perpendicular to the plane of the dial and at any point so that the interior boundary line of an indication such as a zero may be rendered visible. This is of particular importance where the light transmitting medium is thin.

In the form of the invention shown in Figs. 5 and 6, the disc 20 is of opaque material such as metal or of opaque phenolic condensate product, and is provided with the reduced neck 21, providing a shoulder 22 for receiving a ring 23 of transparent material similar to the disc 10. The ring 23 is provided with a plurality of radial indicia markings 24 cut into the surface thereof. The surface of the neck 21 and shoulder 22 is covered with the same opaque material 25 which, in turn, is covered by a self-luminous or radioactive paste 26. The outside periphery and top surface of the ring 23 may be similarly covered with opaque reflecting material 25, and, if desired, with a black finish 27, except where the indicia 24 have been cut therethrough.

With this form of invention minute types of indicia typically represented as at 24, become visible on the disc 20 without the necessity of individually forming each one of them with radioactive or self-luminous material, as at present necessary.

The construction shown in Figs. 7 and 8 refers to a laminated material rather than to a disc. One lamination comprises the light transmitting medium 30, a second lamination comprises a white reflecting material 31, a third lamination comprises an opaque black sheet 32 for contrast with an illuminated marking 33, and fourth and fifth laminations, similar to laminations 31 and 32, are provided for added strength purposes. This laminated construction also permits the reduction of the light transmitting medium 30 to a thickness of the order obtained with a clear lacquer film. In this instance other laminations are necessary for strength purposes. It should be noted in this construction that the light transmitting medium can be made the same thickness as the tubes 151 containing the luminous material 15, thus increasing the efficiency of the luminous material by requiring it to illuminate only the thickness of the light transmitted medium, which is necessary for good visibility in the dark.

In each of the three constructions described above the method of assembly may be varied by making holes or slots in the light transmitting medium and inserting the radioactive powder 15 directly rather than installing the powder 15 in transparent containers 151.

Other modifications and changes in the proportions and arrangements of the parts may be made by those skilled in the art without departing from the nature of the invention, within the scope of what is hereinafter claimed.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A self-luminous article, comprising a transparent medium, opaque reflecting material enclosing the surface of said transparent medium, self-luminous material extending into apertures within said transparent medium, and indicia engraved into said transparent medium and extending through the opaque covering thereof.

2. A self-luminous article, comprising a transparent medium, opaque reflecting material enclosing the surface of said transparent medium,

self-luminous material extending into apertures within said transparent medium, and indicia engraved into said transparent medium and extending through the opaque covering thereof, said self-luminous article being in the form of a disc, the apertures for said self-luminous material extending parallel to the axis of said disc and spaced about said indicia.

3. A self-luminous article, comprising a transparent medium, opaque reflecting material enclosing the surface of said transparent medium, self-luminous material extending into apertures within said transparent medium, and indicia engraved into said transparent medium and extending through the opaque covering thereof, said self-luminous article being in the form of a disc, the apertures for said self-luminous material extending radially through the periphery of said disc and spaced about said indicia.

4. A self-luminous article, comprising a transparent medium, opaque reflecting material enclosing the surface of said transparent medium, self-luminous material extending into apertures within said transparent medium, and indicia engraved into said transparent medium and extending through the opaque covering thereof, said self-luminous article being in the form of a disc, the apertures for said self-luminous material extending in a chord of the circle of said disc and spaced about said indicia.

5. A self-luminous article, comprising a transparent medium, opaque reflecting material enclosing the surface of said transparent medium, self-luminous material extending into apertures within said transparent medium, and indicia engraved into said transparent medium and extending through the opaque covering thereof, said self-luminous material in said disc being in powder form.

6. A self-luminous article, comprising a transparent medium, opaque reflecting material enclosing the surface of said transparent medium, self-luminous material extending into apertures within said transparent medium, and indicia engraved into said transparent medium and extending through the opaque covering thereof, said self-luminous material in said disc being in powder form, said powder being sealed within transparent pellets.

7. A self-luminous article, comprising a transparent medium, self-luminous material placed into contact with said transparent medium, opaque reflecting material enclosing said transparent medium and said self-luminous article, and indicia engraved into said transparent material and extending through the opaque covering thereof.

8. A self-luminous article, comprising a transparent medium, self-luminous material placed into contact with said transparent medium, opaque reflecting material enclosing said transparent medium and said self-luminous article, and indicia engraved into said transparent material and extending through the opaque covering thereof, said transparent medium being in the form of a ring rectangular in cross-section, said indicia being located on one surface of said ring and said self-luminous material being in the form of a paste in contact with at least one of the remaining surfaces of said ring.