

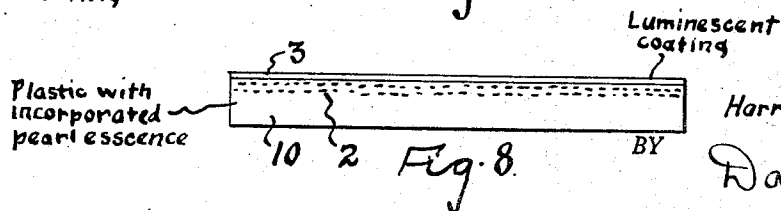
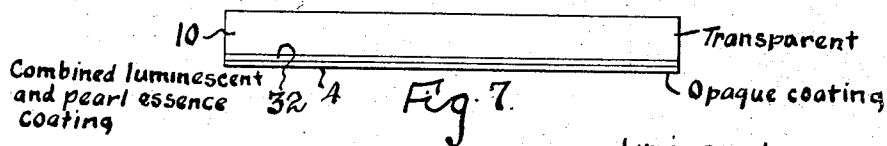
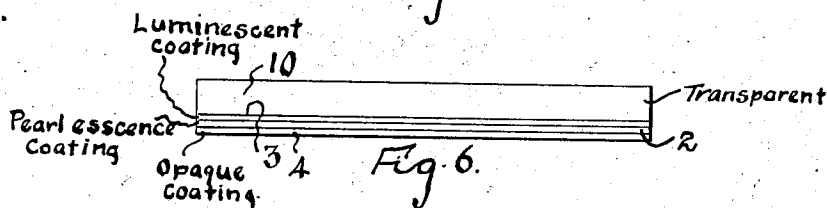
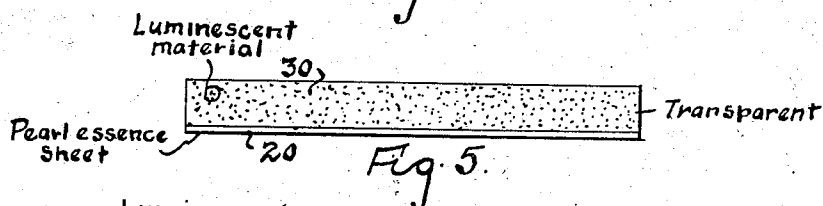
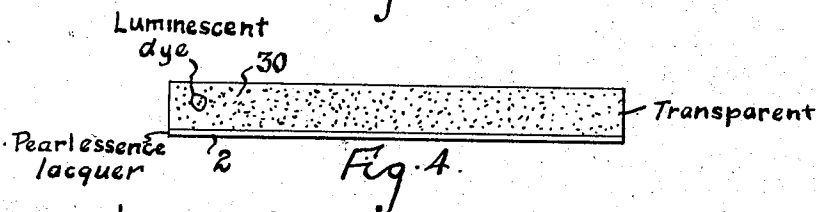
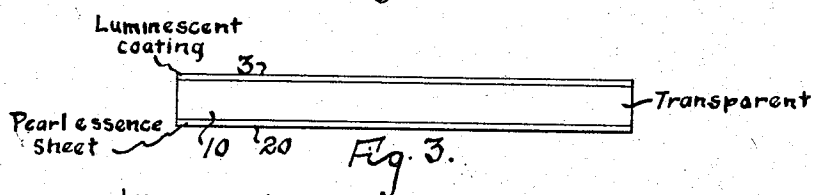
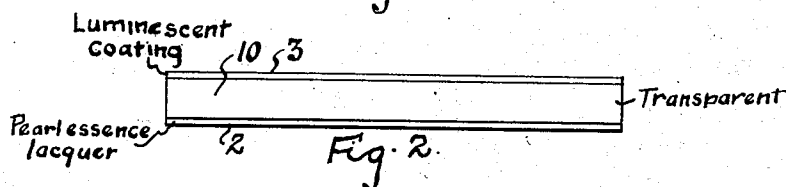
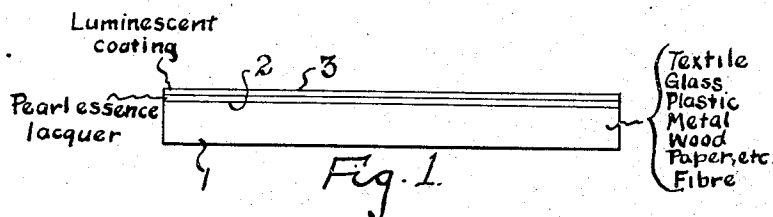
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LUMINESCENT MATERIAL

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2,318,089

LUMINESCENT MATERIAL

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14 Claims. (Cl. 250—81)

This invention relates to improvements in articles of manufacture of all kinds which are coated or impregnated with luminescent materials, particularly of the type which exhibit the phenomena of fluorescence and phosphorescence during and after excitation.

A prime object of the invention is to enhance the phenomena of fluorescence and phosphorescence so as to increase the brilliance and useful duration of illumination given off by fluorescing and phosphorescing materials.

The full details and objects of this invention will be best appreciated from the following detailed description of various embodiments thereof, and therefore no further specific delineation of objects will be set forth.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be explained in full detail hereinafter.

In the accompanying drawing, wherein the same reference numerals will be employed to indicate the same or similar parts,

Figure 1 is a side elevational view of a sheet, block, body or article of manufacture in accordance with this invention, wherein the main support may be opaque, translucent, or transparent.

Figure 2 is a similar view of a modified form of the invention wherein the main sheet, block, body, or article is transparent.

Figure 3 is a similar view of a further modification employing a transparent body.

Figure 4 is a similar view of another modification employing a transparent body impregnated with a luminescent material.

Figure 5 is a similar view of a slight modification of the structure of Figure 4.

Figure 6 is a further modified form employing a transparent body.

Figure 7 is a modification of the structure of Figure 6.

Figure 8 is a final modification wherein the body is transparent.

There are many chemical compounds now well known by reason of their present extensive use in the fluorescent lighting field which are luminescent under proper excitation, and many of which continue to be luminescent for some time after excitation ceases. The property of these compounds of giving off light during excitation, as for example by ultraviolet light, is defined as fluorescence.

Many of these compounds continue to visibly glow in the darkness after excitation ceases, and this is frequently defined as phosphorescence. In

the case of both fluorescence and phosphorescence the amount of visible energy radiated is not very great, for many purposes. It is of course recognized that the modern fluorescent lighting unit is capable of producing excellent light quality of usable intensity. However there are many possible uses for fluorescent and/or phosphorescent compounds which would be greatly enhanced for the conditions of excitation available if the visible energy radiated could in some way be made to appear at least to have a greater intensity.

The general object of this invention is to provide a new combination of elements wherein relatively feebly excited fluorescent and phosphorescent compounds may be made to appear at least to give off visible light of relatively greater intensity and for longer periods of time. The basic idea of this invention is to associate with a supporting body of a configuration depending upon the use of the article, a coating of luminescent material, or to impregnate the body with a suitable luminescent material, some of which occur in the form of dyes, and associate with the luminescent material a layer or quantity of pearl essence which by reason of its highly reflective and other light affecting qualities, causes the light of luminescence or phosphorescence to appear to have a greater intensity than it would otherwise have in the absence of the pearl essence.

It is hardly necessary to attempt to enumerate all the many uses to which such a combination may be put, but as an example such a combination renders articles so prepared of greater utility, for example during war time blackout periods, or when employed on markers, watch dials, airplane instrument dials, and the like.

Since the subject matter of the invention is capable of use in widely divergent fields, the articles illustrated in the drawing are generalized in that they do not pretend to represent any particular article of manufacture.

It is likewise noted that no particular luminescent compound is mentioned herein, in view of the wide and detailed knowledge of such subjects now common to the lighting industry, for example. Any compound or mixture of compounds suitable for the particular purpose to which the article is to be put may be employed.

Referring to Figure 1, the supporting body 1 may be any suitable material such as a plastic, a metal, wood, glass, paper, or cardboard, fibre, textiles, and the like. In this form of the invention this supporting body may be either trans-

parent, translucent, or opaque, as exemplified by the fact that the luminescent coating and its associated pearl essence are disposed on the top or outer face thereof.

Over the outer face of the body 1 there is spread in any suitable manner, as by painting, spraying, dipping or otherwise, a layer of pearl essence, preferably in the form of a lacquer. Pearl essence, or essence d'Orient, is a lacquer likewise well known, but briefly it may be stated to be the guanine crystals principally recovered from fish scales, and usually available either in aqueous or non-aqueous suspensions.

Pearl essence is commonly available in the form of a lacquer, in which the crystals are suspended in a solution of amyl acetate and Celluloid, although it is of course carried in other lacquer bases. Such a lacquer, as stated above, is spread on the surface of the body 1 in a layer of suitable thickness, and preferably after it is dry there is applied thereover, in any suitable manner as by painting, spraying, or the like, a coating of any suitable luminescent material or mixtures thereof. Materials may be used depending upon the requirements, which fluoresce under excitation and do not exhibit the quality of phosphorescence or after-glow when excitation ceases, or they may exhibit both characteristics.

It has been found that the association of the pearl essence with the luminescent material causes the visible radiations to be intensified, and in the case of phosphorescence, to in fact increase the duration of effective after-glow by reason of the efficient reflection of the available visible light.

The basic feature of this invention, as will be explained in connection with the other figures of the drawing, may be employed in various ways. With regard to Figure 2, the main body 10 is in this case transparent, and may be of glass, clear plastic, and the like. Upon the rear face thereof is applied the pearl essence coating 2, while the luminescent coating 3 is applied to the front face thereof. Such articles exhibit the increase in apparent light intensity previously described in detail. If desired, the pearl essence layer may be coated over with the coating of opaque material of any suitable type, as for example paints, lacquers, and the like, so as to protect the coating and prevent the transmission of any light through the coating.

The structure shown in Figure 3 is a modification of that of Figure 2. In this case a transparent body 10 has a luminescent coating 3 on the face thereof, and the pearl essence is applied to the back of the body in the form of a sheet of pearl essence 20. Pearl essence sheets are likewise known and available, and simply consist of a sheet of the desired thickness of some plastic material, as Celluloid, having incorporated in or coated on one face thereof a layer of pearl essence. This sheet may be cemented or attached to the body 10 in any suitable manner. In the case of thermosetting plastics, the pearl essence sheet can be welded to the plastic body 10 under the proper heat and pressure conditions. Here again, if desired, the rear face of the pearl essence sheet may be coated with any suitable opaque substance.

A modification of the subject matter of this invention is clearly illustrated in Figure 4. In this case the body 10 is again of transparent material and may consist of a clear plastic, glass, or the like, which has directly incorporated thereon a powdered luminescent material or a

luminescent dye 30. Of course in the case of a glass body 10 the luminescent powder or dye must have the proper heat stability to withstand its incorporation into molten glass. The body 10 is of course given any desired shape, and the rear face thereof, as before, is coated with a pearl essence lacquer, as indicated at 2.

The structure of Figure 5 is quite similar to that of Figure 4, but in this case the pearl essence is applied in the form of a pearl essence sheet 20, as previously described, to the rear face of the body 10 and cemented or otherwise welded thereto, depending upon the material of the body 10.

A still further modification is illustrated in Figure 6, wherein the main body 10 is again transparent. In this case the luminescent coating 3 is first applied to the rear face of the body 10. A coating 2 of pearl essence is applied thereover and this, in turn, is protected by an opaque coating 10.

The combination of Figure 6 is similar to that of Figure 1, but whereas the combination of Figure 6 may only be applied to transparent bodies, the combination of Figure 1 may be applied to any type of material, whether it be transparent, opaque, or translucent.

In the modification of Figure 7 the main body 10 is again transparent. In this combination the luminescent material is mixed with the pearl essence lacquer and the two applied to the rear face of the body 10 in a coating in any suitable way. Thus the two are combined in a single layer. While this arrangement is not as effective as those previously described, it is disclosed as a useful variant. This coating may be protected, as before, by means of the opaque coating 4.

In the modification of Figure 8 the transparent body 10 has incorporated in it the pearl essence 2. On the upper face thereof is applied the coating of luminescent material, as indicated at 3. It will be at once apparent that Figure 8 is also illustrative of the idea of simply coating a pearl essence sheet with luminescent material on its surface or side at which the pearl essence is exposed.

A final modification of the invention, which is not illustrated and which is not as useful as the others, would be that wherein a mixture of pearl essence and luminescent material is incorporated directly in a transparent body, such as a body of plastic material. In this case, as in the others where the pearl essence is incorporated in the transparent body, as in the pearl essence sheet, the guanine crystals are all oriented in one direction to form a surface or layer which is reflective. Material of this type is known.

From the above description of a number of modifications of the invention, it will be apparent that it is capable of considerable variation without departing from the central idea thereof, namely of backing a fluorescent or phosphorescent coating or dye with a layer of pearl essence to take advantage of the light reflective and modifying properties of the guanine crystals. I do not, therefore, desire to be strictly limited to the disclosure as given herein for illustrative purposes, but rather by the scope of the claims granted me.

What is claimed is:

1. An article of manufacture as described, comprising pearl essence and a luminescent material overlying the pearl essence.

2. An article of manufacture comprising a supporting body intended to be viewed from one

side having a quantity of pearl essence mounted thereon, and a coating of luminescent material overlying the pearl essence.

3. An article of manufacture comprising a supporting body, a layer of pearl essence thereon, and a layer of luminescent material overlying the pearl essence. 5

4. As an article of manufacture, a body of transparent material, a coating of pearl essence mounted on said body, and a coating of luminescent material also mounted on said body. 10

5. As an article of manufacture, a body of transparent material, a coating of pearl essence mounted on said body, and a coating of luminescent material overlying the pearl essence coating. 15

6. As an article of manufacture, a body of transparent material having a layer of pearl essence on one side and a coating of luminescent material on the opposite side.

7. As an article of manufacture, a body of transparent material having a layer of pearl essence on one side, a coating of luminescent material on the opposite side, and a layer of protective material on top of the pearl essence. 20

8. An article of manufacture comprising a body of clear plastic material having a layer of pearl essence incorporated therein, and a coating of luminescent material on one face. 25

9. As an article of manufacture, a laminated body of clear plastic having a layer of pearl essence interposed between the laminations, and a coating of luminescent material on one face thereof.

10. A body of transparent material having a luminescent material incorporated therein, and a layer of pearl essence on one face thereof.

11. As an article of manufacture, a body of transparent material having pearl essence incorporated therein and a layer of luminescent material on one face thereof.

12. As an article of manufacture, a body of opaque material having superimposed layers of pearl essence and luminescent material on at least one face thereof.

13. As an article of manufacture, a body of transparent material having layers of pearl essence and luminescent material on a pair of opposite faces thereof.

14. As an article of manufacture, a body of transparent material having layers of pearl essence and luminescent material on a pair of opposite faces thereof, and a protective coating overlying the pearl essence layer.

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