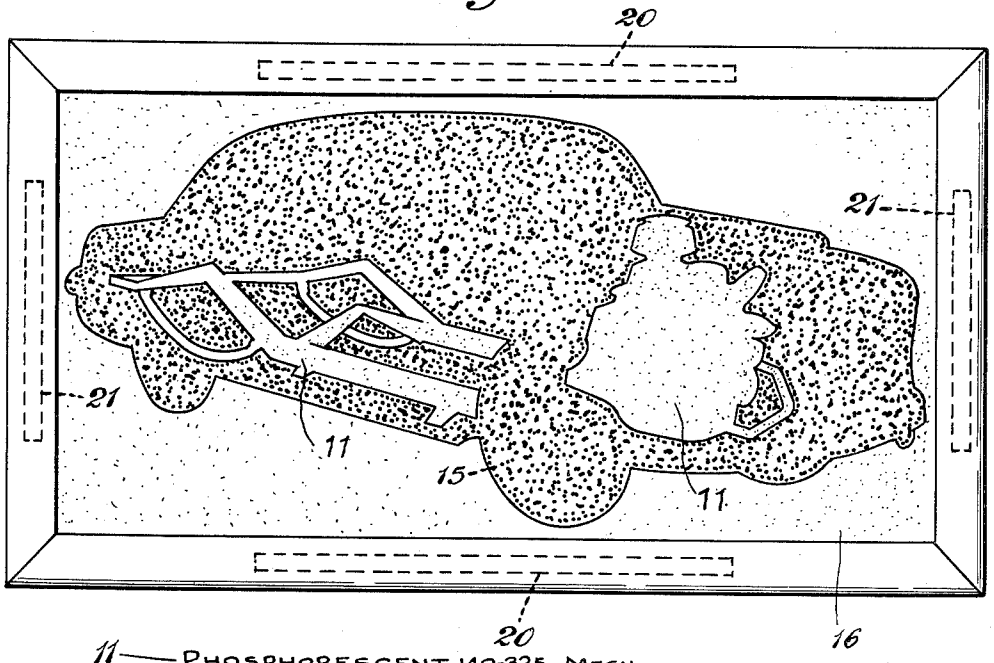
Oct. 13, 1953 G. R. HARRISON 2,654,971

LUMINOUS SIGN

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Fig. 1



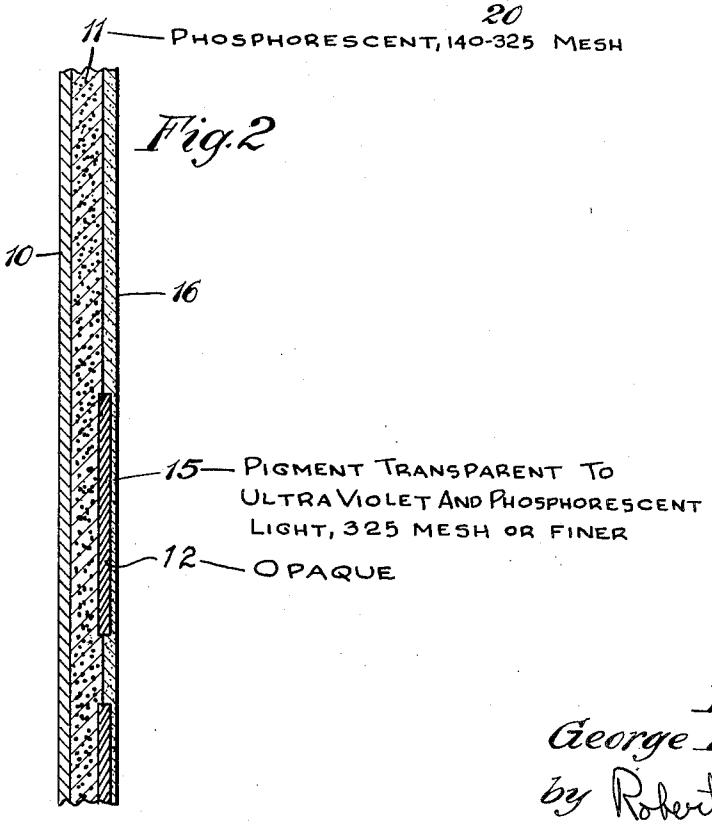


Fig. 2

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LUMINOUS SIGN

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4 Claims. (Cl. 40—134)

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This invention relates to a luminous sign and particularly to a sign having different appearances under ultra-violet, visible light and a combination of the two.

In many displays it is desirable to depict the exterior of an object under one kind of light and to depict certain hidden portions of the object under a different kind of light and to depict both the exterior and hidden portions simultaneously under mixed lights. Thus as a simple example, in displaying an automobile, it is desirable to show the body of the car and then be able to show at the same time certain mechanical parts of the car, such as the frame, engine and the like against the body. Other displays where similar objectives may be desired, are also possible.

The invention, in general, provides for a picture or display of luminous paint material over which may be superimposed a more or less conventional picture. A display embodying the present invention is characterized by remarkable depth as well as substantial brightness under ultra-violet light simultaneously with the showing of a conventional picture under visible light.

While luminous paints have been used for making pictures and may have been used in combination with conventional paints, I have found, that unless certain precautions are observed, the resulting display will be poor in quality and relatively ineffective.

It is essential that a display have substantial visibility as regards the luminous portion under moderate intensity of ultra-violet light and that such luminous picture compare favorably in intensity with visible light reflected from more or less conventional paint surfaces.

The invention, in general, contemplates the use of phosphorescent or luminescent material in relatively coarse granular form as the base for a picture or display to be visible under ultra-violet light. The thickness of the phosphorescent material should be great enough so that there is sufficient material to provide substantial visible effects under moderate intensities of ultra-violet light. Superimposed over part or all of the phosphorescent layer is a conventional display of pigment which must be substantially transparent to ultra-violet light and must also transmit to a substantial degree the phosphorescent light emitted by the luminous layer. While all pigments are not suitable for this purpose, a large number of pigments may be used, the desirable pigments being determinable easily by simple test. The pigment forming the visible picture as the outer layer must be in granular form substantially finer than the phosphorescent material.

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It is important that the relative granular size of the pigment and phosphorescent material be observed in order to obtain the results possible by the use of this invention. While the reason for this is not fully understood, it is believed that dispersion effects may be a substantial factor. Thus the luminous material may be in granular form of the order of about 140 to 325 mesh. Within this range of grain size best results are obtained with grains just large enough to pass through a 200 mesh screen, though the other mesh sizes are satisfactory. For the non-luminous or outer pigment material, the grain size must be quite fine at least of the order of about 325 mesh and preferably finer.

The base material upon which the entire display may be mounted or disposed is preferably of light material such as white canvas or wood or metal and should be sufficiently rigid and strong to retain the various layers of material so that the same shall not flake off. The phosphorescent material may be disposed in any suitable vehicle such as water, oil, linseed oil, shellac or varnish preferably having little or no color. The pigment forming the outer or visible light picture may also have any desired vehicle such as oil, water or a binder and it is essential that the vehicle used for the pigment resembles the pigment itself in regard to transmitting ultra-violet light and transmitting the phosphorescent or luminous glow from the base material. The entire picture or display may be covered with a transparent layer of varnish or shellac or lacquer transparent to both ultra-violet light and visible light and also transparent to the fluorescent or luminescent glow.

The degrees of transparency, in some measure, are governed by the relative colors emitted by the luminous layer and absorbed by the outer pigment layer. Thus in general, the luminous picture will have generally light tones. If the pigment layer has substantially darker tones, then a higher degree of transparency in general will be required.

Generally, the finished picture will show an outer layer visible under ordinary light, such outer layer depicting any desired object in the usual fashion. Shining through this outer layer under the influence of ultra-violet light is a second picture. This second picture may be obtained in any desired manner. Thus the second picture may result from outlining the object with fluorescent material against a blank background or having a background of fluorescent material with undesired areas blocked off with opaque material such as white paint. In practice, a combi-

nation of the two may be used most advantageously. Thus shading of the fluorescent portion of the picture may be obtained by applying varying thicknesses of white paint over all or part of the fluorescent picture. White paint is desirable since it does not affect the coloring of the outer picture layer.

In order that the invention may be understood it will now be explained with reference to the drawing wherein Figure 1 shows a sign illustrating the invention. Figure 2 is a sectional detail of a modified sign.

The sign, as a whole, may comprise backing 10 of wood, canvas, metal or any other material to which paints or pigments will adhere. Backing 10 may have any suitable coating as a preparation or base. Disposed over backing 10 directly over the prepared surface thereof, is layer 11 of phosphorescent material in a suitable carrier. This material may be applied in any number of ways, such as for example, with a brush or by spraying.

The phosphorescent material may depict the engine of an automobile and the springs, for example. The actual outlining of the engine and springs may be obtained either by limiting the phosphorescent material to the areas required to outline the engine and springs as in Figure 1 or by applying the phosphorescent material over the entire base and blocking out undesired portions of the phosphorescent material which are not to be visible. Different areas may have different phosphorescent material for various colors.

In practice, phosphorescent material may be applied initially to outline an engine or springs, such application being either by way of a brush or by spraying or other means. Thereafter, white paint 12, particularly paint containing white lead, or zinc white may be sprayed or applied with a brush to outline sharply the limits of the phosphorescent material and may also be used to shade the phosphorescent material. This is shown in Figure 2. Thus, by applying a thick layer of paint, the phosphorescent material will be completely blocked off and be invisible under ultra-violet light. On the other hand, by applying a rather thin layer of paint, the phosphorescent material will glow under ultra-violet light but not as brightly as the same phosphorescent material without any paint at all. By judicious application of white paint or other opaque material, it is possible to obtain substantial shading effects of the phosphorescent material.

As previously pointed out, the phosphorescent material or luminescent material is preferably in coarse granular form having the fineness previously indicated. After the phosphorescent or luminescent layer 11 has been applied and shading obtained or after white paint 12 has been applied, if any is to be applied, a clear layer of shellac or varnish may be applied, if desired, prior to the application of the outer layer of pigment. Such layer of shellac or varnish may be used merely for the purpose of separating the phosphorescent material from the pigment material so that chemical interaction does not occur. It is understood that the shellac or varnish is transparent to ultra-violet light.

Thereafter, layer 15 of pigment is applied with or without a suitable carrier and in the granular form previously indicated. Thus in the picture as illustrated, the phosphorescent portion of the picture may show the engine and springs and possibly the interior of the car in one or more colors. Thus the engine and springs may be shown in one color and the car interior may be shown in a different color. Or a background for the entire car may be provided. Layer 15 of pigment may be applied either by brush or by spraying and may be used to indicate the body of the automobile as shown in the figure.

It is understood that the pigment may be applied over all or portions of the phosphorescent material. Thus under ordinary light, the phosphorescent material is not visible and the picture shown in Figure 1 for example, depicts a conventional automobile with a body. When ultra-violet light is provided, the glow from the phosphorescent material passing through the pigment shows the engine and springs and car interior or any other desired portions of the automobile, this portion of the picture appearing in rather warm tones.

The entire picture may have a protective layer of varnish or the like for waterproofing and weatherproofing. This layer generally indicated by 16 may be applied either by brush or by spraying and will naturally be transparent to both visible and ultra-violet light.

Inasmuch as luminescent or phosphorescent materials are well known, no examples of such materials need be given. It is understood however, that any or all of such materials may be used. With regard to the pigment materials, the general considerations determining the choice of such materials and the binder or carrier have been previously set forth. However, examples of materials which may be used are herewith given: Indigo blue, logwood purple, cochineal, scarlet-crimson-orange, saffron, aniline violet, raw umber, burnt umber, raw sienna, yellow ochre, flesh ochre, green earch, Indian yellow, Naples yellow, gold ochre, soft limestone-white, grey, buff, red, yellow, clay, China clay, clear crystal.

In general, the only chemicals to be avoided in pigments are those containing lead or copper. As a rule, pigments containing these two metals make it possible for an undesirable chemical reaction to occur with the fluorescing materials which generally contain sulphides. Thus as an example, lead sulphide or copper sulphide are both undesirable since they are not transparent to ultra-violet and hence would make it impossible for the fluorescing layer to operate in those portions of the picture where such chemicals occur. However, even such metals may be used in pigments if steps are taken to isolate migration of the pigment material into the fluorescing material such as by the use of varnish or the like or where the sign is not to have a very long life and chemical interaction is not objectionable.

In addition to the pigment materials itemized above, it is also possible to use such materials as barium either in a metallic form or as a sulphate, asbestine, silica, ultramarine blue, violet, green, colloidal sulfur in fused silicate base, terre verte, iron silicate earch, chromium oxide, chromium hydroxide, barium yellow, barium chromate, cadmium yellow, cadmium sulfide or sulfoselenides, cadmium red, cadmium selenide, alizarine crimson, high strength madder lake, mercury vermillion, mercury sulfide, graphite.

The sign may be disposed in a suitable frame or other support and is preferably located so as to be under the influence of light 20 generating ultra-violet and light 21 generating normal visible light. Lamp 20 may be of any suitable type and preferably is of the type available on the market consisting of a mercury arc lamp coated with

black light absorbing material but emitting substantial ultra-violet radiation. Such so-called black light generators are well known and are used for illuminating airplane instruments and the like. Lamp 21 may be a conventional lamp or may be daylight. It is understood that the relative intensities of the two sources of light at the surface of the picture are so adjusted that the fluorescent material will have substantial visibility to an onlooker. Thus as an example, a sign measuring about one or two square feet in area may have a 15 watt fluorescent light blacked out for ultra-violet operation disposed about a foot or so away while lamp 21 may be a conventional 40 or 60 watt lamp or may be daylight without direct sunlight upon the picture. In general, direct sunlight is not desirable upon the picture since the light intensity is so great as to render it difficult for an observer to see the fluorescent layer.

It is understood that where transparency to ultra-violet and to light emitted by the fluorescent material is specified, perfect or near perfect transparency is not necessarily called for. It is sufficient if enough ultra-violet and emitted light is passed to render the picture visible under operating conditions.

What is claimed is:

1. A sign comprising a backing, a first layer of ultra-violet responsive luminescent material on said backing delineating a design, a second layer of material transparent to ultra-violet and to the light emitted from the luminescent material, said

second layer overlaying at least part of said first layer and delineating a design, said second layer material being visible under ordinary light, said first layer material being granular of between about 140 and about 325 mesh, said second material also being granular and of a finer mesh than said first layer material, said first layer design being visible under ultra-violet light and said second layer design being visible under visible light.

2. The sign according to claim 1 wherein the first layer is covered in part by an intermediate layer of material opaque to ultra-violet, said intermediate layer exposing the first layer to delineate the design.

3. The sign according to claim 1 wherein the second layer material has a fineness of about 325 mesh.

4. The sign according to claim 1 wherein the first and second layer materials are of about 200 and about 325 mesh respectively.

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