July 26, 1960 R. F. MALINOWSKI ET AL 2,946,911

COATED ELECTRIC LAMP

Filed Nov. 1, 1957

Fig. 1.

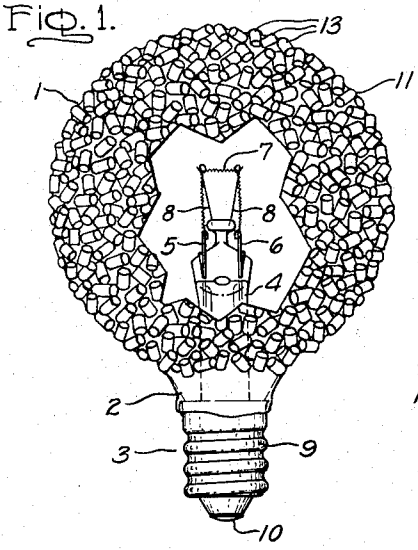


Fig. 2.

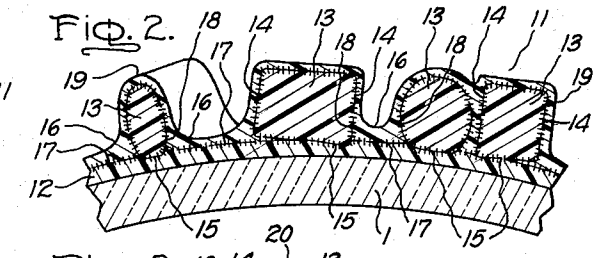


Fig. 3.

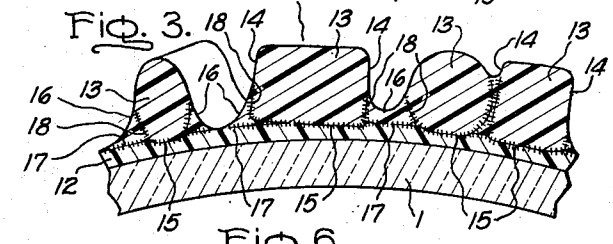


Fig. 6.

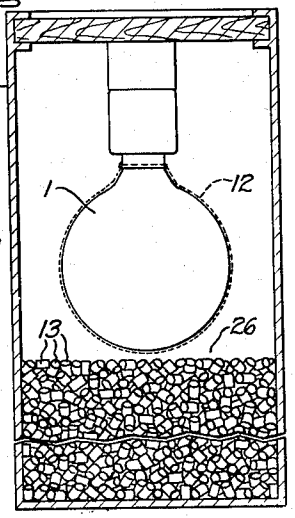


Fig. 4.

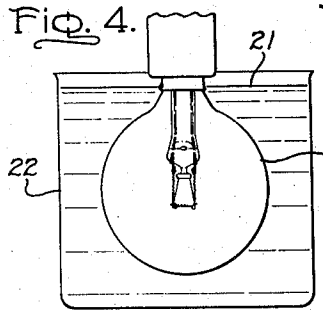


Fig. 5.

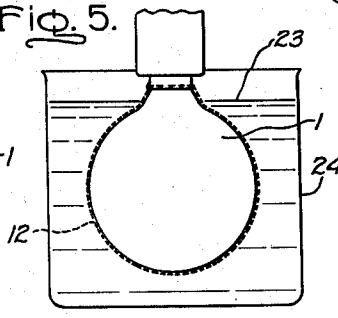


Fig. 7.

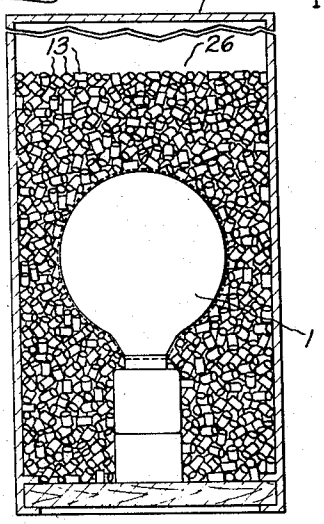
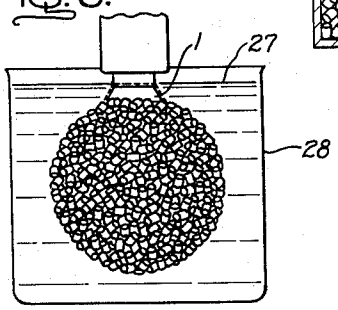


Fig. 8.



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2,946,911

COATED ELECTRIC LAMP

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Filed Nov. 1, 1957, Ser. No. 694,041

9 Claims. (Cl. 313—116)

This invention relates in general to electric lamps, especially of the incandescent type, and more particularly to light-diffusing and refracting coatings for electric lamp bulbs and to methods of producing such coatings.

It has been proposed heretofore to provide electric lamp bulbs or envelopes with light-modifying coatings composed of small glass beads of various shapes as of round, square or prismatic form, suitably fastened to the surface of the glass bulb as by means of a varnish or other binding medium. This provided a lamp having a distinctive appearance and produces a very appealing decorative lighting effect eminently suitable for various lighting purposes such as Christmas tree and display lighting, luminous signs, and the like. Such prior type glass bead coatings, however, have not possessed adequate adherence strength against dislodgement of the glass beads from the glass bulb during ordinary handling, shipment and use of the lamps. Moreover, because of the sharp edges and corners which are normally characteristic of glass beads formed with one or more flat faces or facets, as where they are in the form of prisms, pyramids, cylinders and the like, a lamp bulb having an external coating comprised of such sharp-edged beads would be highly objectionable from a safety standpoint. This is due to the danger of persons handling the lamp becoming cut or scratched by the sharp exposed edges and points of the coating.

It is an object of our invention, therefore, to provide an electric lamp having a firmly adherent and mechanically strong external light-refracting coating on the lamp envelope which will withstand all normal handling and usage of the lamp without becoming dislodged therefrom.

Another object of our invention is to provide an electric lamp having an external light-refracting coating on the lamp envelope which is of relatively light weight and is completely devoid of any sharp edges and points such as would otherwise render the lamp dangerous to handle.

Still another object of our invention to to provide an electric incandescent lamp having a firmly adherent light-modifying coating on the lamp envelope of a character such as to create a sparkling or glittering effect to the light emitted by the lamp during operation.

A further object of our invention is to provide a novel type of coating for glass lamp bulbs and similar illuminating ware which will act to at least in part refract the light passing therethrough and which is firmly adherent to the glass bulb and highly resistant to dislodgment therefrom.

A still further object of our invention is to provide a light-refracting coating on a glass lamp bulb or similar article of a character such as to present a snow-like or ice-like appearance.

Briefly stated, in accordance with one aspect of the invention, a glass lamp envelope or similar illuminating ware is provided with an external coating consisting of a thin base coat of a transparent organic plastic having a multiplicity of integral faceted protuberances of a transparent organic plastic projecting in random oriented

manner from the base coat. According to a further aspect of the invention, the base coat may be constituted either by a clear or a colored transparent lacquer, and the protuberances constituted by faceted particles or granules of a clear or a colored transparent organic plastic, such as polystyrene, acrylics, or cellulose acetate for example. The plastic granules are adherent to and additionally secured to the base coat by small fillets or webs of the said organic plastic integral with the plastic granules and diffused into the base coat at their surface layer of contact therewith. Alternatively, a clear or colored transparent lacquer top coat may be used into which the plastic granules are diffused and which itself is diffused into and tightly bonded to the base coat where the top coat is in surface contact with the base coat at the bottoms of the interstitial spaces between the plastic granules.

The coatings according to the invention not only possess great strength against dislodgment of the plastic granules from the surface of the glass envelope, but the granules are also free of exposed sharp edges or points such as would otherwise render the lamp envelope dangerous to handle. Besides presenting a very attractive appearance under both lighted and unlighted conditions of the lamp, the coatings according to the invention act to refract the light rays passing therethrough and thereby create a distinctive and appealing sparkling or scintillating effect.

Further objects and advantages of our invention will appear from the following detailed description of species thereof and from the accompanying drawing.

In the drawing,

Fig. 1 is an elevation of an electric incandescent lamp having an envelope provided with a light-modifying coating according to the invention, the envelope being shown partly broken away in order to illustrate the interior parts of the lamp.

Fig. 2 is a fragmentary sectional view, on a greatly enlarged scale, of a portion of the wall of a glass lamp envelope or other glass illuminating ware provided with a coating comprising our invention.

Fig. 3 is a sectional view similar to Fig. 2 showing a modified form of coating comprising our invention, and

Figs. 4 to 8 are views illustrating the successive steps which may be employed to apply to the envelope of an electric lamp an external light-modifying coating according to the invention.

Referring to Fig. 1, the invention is there shown as applied to an electric incandescent lamp comprising a hermetically sealed transparent glass envelope or bulb **1** provided with a neck portion **2** to which a conventional type lamp base **3** is suitably secured, as by conventional basing cement for instance. The bulb **1** may be of spherical shape as shown, or of any other suitable shape, and it is provided with a reentrant stem **4** which extends into the bulb from the neck **2** thereof and through which are sealed a pair of leading-in wires **5, 6**. Interiorly of the bulb, the leading-in wires **5, 6** are electrically connected to the opposite ends of a suitable incandescible filament or light source **7** which may be constituted by a length of tungsten wire of straight, coiled or coiled-coil form and suitably supported in place within the bulb, for example, by means of supplementary filament support wires **8** supported on the glass stem **4**. Exteriorly of the bulb **1**, the leading-in wires **5, 6** are electrically connected to the side shell and end eyelet contacts **9** and **10**, respectively, of the base **3**.

The bulb **1** is provided on its exterior surface with a light-modifying coating **11** according to the invention and comprising, in general, a thin layer or base coat **12** of a transparent organic plastic having a multiplicity of small faceted particles or granules **13** of transparent organic plastic integral therewith and protruding therefrom in

random oriented manner and preferably in closely contiguous relation to one another so as to substantially cover the area of the bulb provided with the coating **11**. The light-modifying coating **11** may be applied to a portion only of the surface area of the bulb **1**, or it may be applied over substantially the entire exposed surface area of the bulb as shown in Fig. 1. The base layer or coat **12** may consist of a suitable transparent lacquer or varnish, for instance, a cellulosic lacquer such as cellulose acetate or butyrate, and it may be either clear or of any desired transparent color. A solution of cellulose acetate in acetone has been found entirely satisfactory as the material for the base coat **12** which may be applied to the bulb **1** in any suitable manner, as by dipping or spraying.

The plastic particles or granules **13** may be made of any suitable transparent organic plastic which is capable of being dissolved in a solvent. Cellulose acetate, and various synthetic resins such as polystyrene and acrylics are examples of suitable organic plastics which have been found to be eminently satisfactory as materials for the granules **13**. Of these materials, however, polystyrene is preferred because of its relatively low cost, among other things. For the purposes of the invention, the plastic granules **13** in the final coating may be of any shape having one or more facets or flat faces **14** for refracting the light rays passing therethrough. Thus, as representative examples, the plastic granules **13** in the coating may be in the form of regular or truncated cylinders, prisms, pyramids, or cones, or in the form of more or less round beads with one or more flat sides or facets. In the particular case illustrated, the plastic granules **13** are in the form of small truncated cylinders such as are commonly used in the plastic molding industry. Such shaped plastic granules are a standard commercially available product and therefore are relatively inexpensive. The plastic granules **13** may be of a clear plastic or of any transparent colored plastic, as desired. To produce the best lighting effect in conventional size decorative lamps such as Christmas lamps, for instance, the plastic granules **13** should have a size, i.e., maximum and minimum width dimensions, within the range of from approximately $\frac{1}{16}$ to $\frac{1}{8}$ inch.

As shown in Figs. 2 and 3, the plastic particles or granules **13** are disposed on the base coat **12** in random oriented manner so as to create an irregular pattern or arrangement of the faceted particles on the lamp bulb and produce a varied light-dispersing effect on the light rays passing through the coating **11**. In addition, the plastic granules **13** are preferably disposed closely contiguous to one another so as to substantially cover the surface area of the bulb provided with the light-modifying coating.

In accordance with the invention, the plastic particles or granules **13** are preferably embedded to a slight degree in the base coat **12** and are at least slightly diffused thereinto at their surface layers of contact therewith, as indicated at **15**, so as to in effect constitute an integral part of the base coat **12**. This result may be effected by applying and pressing the plastic granules **13** onto the base coat **12** while the surface layer only of the latter is in a softened and tacky state such as results from the brief contacting and superficial redissolving of the previously dried base coat **12** with a solvent therefor, as by the dipping of the lacquer base coated lamp bulb **1** in solvent for both the base coat **12** and the organic plastic granules **13** to be applied onto the bulb. When the plastic granules **13** are then pressed against such a reactivated tacky surface layer of the base coat **12**, the solvent present in the softened surface layer of the base coat **12** eventually acts to penetrate and dissolve the surface layer of the plastic granules **13** in contact with the base coat **12**, thereby causing the plastic granules to diffuse into the base coat at their interfaces, as shown at **15**, so as to in effect constitute an integral part of the base coat. The solvent-penetrated surface layer portions of the plastic granules **13** thus form continuous plastic links **15** between the base coat **12** and the portions of the plastic granules **13** which are not penetrated by the solvent from the base coat. Particularly where a colored type of base coat **12** is employed, it is preferable that the plastic granules **13** not be embedded all the way through the thickness of the base coat since such a condition would produce clear, i.e. uncolored areas, under the plastic granules such as ordinarily would be undesirable.

The plastic particles or granules **13** of the light-modifying coating **11** according to the invention are additionally secured in place on the lamp bulb **1** at their bottom regions, within the interstitial spaces therebetween, by means of fillets or webs **16** of an organic plastic which are diffused into the base coat **12** as indicated at **17** and into which the plastic granules **13** themselves are diffused or bonded, as indicated at **18**. As shown in Fig. 2, the fillets or webs **16** may constitute portions of a thin continuous film or top coat **19** of a suitable transparent lacquer or varnish (such as cellulose acetate for example) which, when applied over the plastic granule coated area of the bulb **1**, is in the form of a solution containing solvent for both the base coat **12** and the plastic granules **13**. The solvent in the top coat **19** then acts to penetrate and dissolve the surface layers of the base coat **12** and the plastic granules **13** in contact with the top coat solution, thereby causing the top coat **19** to diffuse into and form a solid solution with the base coat **12** as indicated at **17**, and the plastic granules **13** to diffuse into and become an integral part of the top coat **19** as indicated at **18**, at the respective surfaces of contact therebetween. The solvent-penetrated surface layer portions of the plastic granules **13** and of the base coat **12** thus form continuous plastic links **17** and **18** between the top coat **19** and the portions of the base coat and the plastic granules which are not penetrated by the solvent from the top coat. The top coat **19** may be essentially the same as the base coat **12**, that is, a cellulosic lacquer such as cellulose acetate or butyrate. It is preferred, however, that the top coat **19** be of clear character in all cases, irrespective of whether a clear or colored base coat **12** is employed. By virtue of the diffusion of the continuous film or top coat **19** into the base coat **12** at the regions between the plastic granules **13** and the diffusion of the plastic granules **13** into the top coat **19**, the plastic granules and the top coat virtually become an integral part of the base coat **12** and thus contribute greatly to the mechanical strength of the final coating **11**. As a result, an exceedingly firm attachment of the plastic granules **13** to the bulb **1** against dislodgment therefrom is produced.

In the modified form of coating **20** shown in Fig. 3, the fillets or webs **16** of organic plastic, which join or unite the plastic granules **13** to the base coat **12**, as well as to each other in the case of those granules which are more closely contiguous to one another, are constituted by the material of the plastic granules **13** themselves. This form of coating **20** is produced by suitably applying over the plastic granule coated area of the bulb **1**, as by dipping, a volatilizable solution having no solids content and comprising solvent for the plastic granules **13**. The solvent in the coating solution then acts to dissolve and render semi-fluid the exposed surfaces of the plastic granules **13**, as a result of which the softened plastic of the plastic granules **13** flows down and, in effect, migrates into the fillets or webs of the coating solution which either bridges the gaps between adjacent plastic granules or else fills the corner spaces between the granules and the base coat **12**. Upon subsequent volatilization of the fillets or webs of coating soltuion in the gaps between the adjacent plastic granules, the material of the plastic granules which has dissolved and migrated into such fillets or webs is left in situ, thereby forming plastic fillets or webs **16** integral with and of the same material as the plastic granules **13**. Moreover, by applying the final solvent coat

to the bulb before the complete volatilization of the solvent remaining in the surface layer of the base coat **12** from the previous reactivating step, the material of the plastic granules which eventually forms the plastic fillets or webs **16** then also diffuses into the base coat **12** so as to become an integral part thereof. The net result, therefore, is a coating **20** comprising a substantially continuous film of an organic plastic material over the surface of the bulb composed of the faceted protuberances or granules **13** and the adjoining fillets or webs **16**. A tough and high strength coating **20**, exceedingly resistant to dislodgment of the light-refracting granules **13** from the surface of the bulb **1**, is thereby obtained.

Referring now to Figs. 4 to 8 illustrating a suitable procedure which may be employed to apply a light-modifying coating **11** or **20** according to the invention onto a lamp bulb, the surface area of the bulb **1** which is to be provided with the coating **11** or **20** (substantially the entire surface area of the bulb in the particular case illustrated) is first coated with a layer of the lacquer or varnish which is to constitute the base coat **12**. As shown in Fig. 4, this lacquer base coat **12** may be applied to the lamp bulb **1** by dipping it in a reservoir **21** of the lacquer coating material contained in a tank **22** or other container. The lacquer coating material **21** may consist of a viscous solution (e.g., around 27 seconds viscosity measured with a No. 20 Du Pont cup at 70° F.) of cellulose acetate in a solvent such as acetone. Following the removal of the lacquer coated lamp bulb **1** from the lacquer base coat dipping tank **22**, the lacquer film **12** on the lamp bulb is allowed to dry or set, after which the portion of the surface layer of the dried base coat **12** which is to be covered with plastic granules **13** is then reactivated or softened by applying thereover a suitable reactivator solvent for the lacquer of the base coat **12**, such as acetone for example. As shown in Fig. 5, this reactivation of the surface of the lacquer base coat **12** may be accomplished by immersing or dipping the lamp bulb **1** to a predetermined level in a reservoir **23** of acetone or other solvent contained in a tank or other container **24**. The lacquer base coated lamp bulb **1** is maintained in contact with, i.e., kept immersed in the acetone or other reactivator solvent, for a period of time (for example from ten to twenty seconds or thereabouts at room temperature) sufficient to superficially dissolve and soften the surface of the base coat **12** to a predetermined depth.

Within a very short time, i.e., a minute or so, after the reactivation or softening of the surface layer of the lacquer base coat **12** on the lamp bulb **1**, and while the said surface layer is still in a tacky condition, a layer of the plastic particles or granules **13**, for example, polystyrene plastic granules, is applied to and pressed against the softened and tacky surface of the base coat **12** on the lamp bulb **1**. This may be conveniently accomplished by supporting the bulb **1** in a closed container **25** in a position above a bed or loose filling **26** of the plastic granules **13** contained therein (Fig. 6) and then inverting the container **25** and the bulb **1** supported therein so as to cause the filling **26** of plastic granules **13** in the container to completely envelop or submerge the bulb **1**, as shown in Fig. 7. To assure the uniform coverage of the lamp bulb **1** with plastic granules **13** so as to avoid the occurrence of undesired open areas in the applied layer of granules, the filling **26** of plastic granules **13** in the container **25** is preferably sufficient to completely submerge the bulb **1** to a depth of at least about ½ inch or so above the top of the bulb. In this manner, the weight of that portion of the plastic granule filling **26** lying above the top of the bulb then exerts the necessary pressure on the rest of the granules **13** in the container **25** to not only insure the pressing of plastic granules into engagement with and more or less uniformly over the entire tacky surface area of the bulb, but to also effect the pressing of the granules against the bulb with sufficient pressure to cause them to partially embed themselves in the base coat. This assures adequate adherence of the plastic granules to the bulb, for a limited time following the granule application step, such as to prevent the granules from falling off the bulb when the latter is removed from the bed **26** of plastic granules in the container **25**.

Shortly after the application of the plastic granules **13** to the tacky base coat **12**, and before complete volatilization of the reactivator solvent remaining in the surface layer of the base coat **12** from the previous base coat reactivation step, a transparent liquid medium comprising solvent for the organic plastic granules **13** is applied completely over the plastic granule coated area of the bulb. The solvent-containing film thus applied to the bulb acts to trap and so temporarily prevents the volatilization of the reactivator solvent remaining in the surface layer of the base coat **12** between as well as underneath the plastic granules **13**. The reactivator solvent thus trapped in the base coat **12** underneath the plastic granules **13** then eventually dissolves the undersides of the plastic granules, thereby causing the latter to slightly diffuse into the base coat and, in effect, become integral therewith. The particular transparent liquid medium employed for the final coating step will depend on the type of finished coating **11** or **20** desired. Thus, to produce the form of coating **11** shown in Fig. 2, the lamp bulb **1**, following the application of the layer of plastic granules **13** thereto, is coated with a relatively low viscosity (e.g., from approximately 9 to 11 seconds viscosity measured with a No. 20 Du Pont cup at 70° F.) transparent lacquer, for example a solution of cellulose acetate in acetone, to thereby produce the final top coat **19**. The application of this top coat **19** to the lamp bulb may be conveniently accomplished by dipping the lamp bulb in a bath **27** of the cellulose acetate solution within a container **28**, as shown in Fig. 8. Following the removal of the coated bulb **1** from the dipping bath **27**, the top coating **19** is then dried in a suitable manner to complete the manufacture of the coated lamp bulb **1**. The final coating **11** produced in this manner presents a distinctive snow-like appearance, both in the lighted and unlighted condition of the lamp, which is very attractive and decorative.

To produce the coating **20** of Fig. 3, the plastic granule coated lamp bulb **1**, instead of being dipped in a bath **27** of transparent lacquer to form a top coat **19** over the plastic granules **13**, is dipped in a bath **27** of a volatilizale liquid medium comprising solvent for the plastic of which the granules **13** are composed. For example, where the granules **13** are composed of polystyrene, the volatizable solvent-containing medium employed for the bath **27** may comprise a mixture of xylene and turpentine in the proportions, for example, of approximately 150 parts of xylene to 50 parts of turpentine. The bulb is allowed to remain in the volatilizable solvent-containing bath **27** for about 15 to 30 seconds, after which it is then suitably dried, for example, by placing the lamp in a heated atmosphere having a temperature of, for example, from 50 to 60° C. The final coating **20** produced in this manner presents an ice-like appearance which, like the coating **11**, is also very attractive and decorative.

Because of the flat faces or facets **14** on the plastic granules **13**, light-dispersing coatings **11** and **20** constructed and prepared in accordance with our invention will act to refract the light rays from the filament **7** or other concentrated light source of the lamp in a manner such as to create the impression of a great many tiny light sources on the surface of the bulb. A sparkling or scintillating lighting effect is thereby produced which is highly appealing and of especial utility for decorative lighting effects such as for Christmas tree and other

decorative lighting purposes. Moreover, because the plastic particles or granules **13** constitue an integral part of light-modifying coatings **11** and **20** according to the invention, and thus add mechanical strength thereto, such light-modifying coatings therefore are extremely tough and resistant to damage by dislodgment of the plastic granules **13** from the surface of the bulb. As a result, lamps provided with coatings **11** or **20** according to the invention can be subjected to all normal handling, shipping and service conditions without fear of the coating becoming damaged.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. An electric lamp comprising a transparent glass bulb containing a light source and having a light refracting and light-transmitting coating on at least a portion of the exterior surface thereof comprising a thin layer of a transparent organic plastic having a multiplicity of integral faceted protuberances of a transparent organic plastic projecting in random oriented manner therefrom, substantially all of said protuberances having a minimum width dimension of at least several hundredths of an inch.

2. An electric lamp comprising a transparent glass bulb containing a light source and having a light-refracting and light-transmitting coating on at least a portion of the exterior surface thereof comprising a thin base coat of a transparent lacquer and a layer of faceted granules of a transparent organic plastic adherent to and protruding from the said base coat in random oriented manner, the material of the surface portions of said granules in contact with said base coat being penetrated by solvent therefor from said base coat and constituting a continuous plastic link between said base coat and the unpenetrated portions of said granules, substantially all of said granules having a minimum width dimension of at least several hundredths of an inch.

3. An electric lamp comprising a transparent glass bulb containing a light source and having a light-refracting and light-transmitting coating on at least a portion of the exterior surface thereof comprising a thin base coat of a transparent lacquer, a layer of faceted granules of a transparent organic plastic adherent to and protruding from the said base coat in random oriented manner, substantially all of said granules having a minimum width dimension of at least several hundredths of an inch, and a lacquer top coat extending completely over the said plastic granules and over the portions of the lacquer base coat exposed in the interstitial spaces therebetween, the material of the surface portions of said granules and said base coat in contact with said top coat being penetrated and acted on by solvent therefor from said top coat and constituting a continuous plastic link between said top coat and the unpenetrated portions of said granules and base coat.

4. An electric lamp comprising a transparent glass bulb containing a light source and having a light-refracting and light-transmitting coating on at least a portion of the exterior surface thereof comprising a thin base coat of a transparent lacquer and a layer of faceted granules of a transparent organic plastic attached to and projecting from the said base coat in random oriented manner, substantially all of said plastic granules having a minimum width dimension of at least several hundredths of an inch and being closely contiguous to one another and being joined to and securely braced against dislodgment from the base coat at their bottom regions by small fillets of said organic plastic, the material of the surface portions of said granules and said base coat in contact with the said fillets being penetrated and acted on by solvent therefor from said fillets and constituting a continuous plastic link between said fillets and the unpenetrated portions of said granules and base coat.

5. An electric lamp comprising a transparent glass bulb containing a light source and having a light-refracting and light-transmitting coating on at least a portion of the exterior surface thereof comprising a thin base coat of a transparent lacquer, a layer of faceted granules of a transparent organic plastic of the group consisting of polystyrene, acrylics and cellulose acetate substantially covering the said portion of the bulb and adherent to and protruding from the said base coat in random oriented manner, substantially all of said granules having a minimum width dimension of at least several hundredths of an inch, and a lacquer top coat extending completely over the said plastic granules and over the portions of the lacquer base coat exposed in the interstitial spaces therebetween, the material of the surface portions of said granules and said base coat in contact with said top coat being penetrated and acted on by solvent therefor from said top coat and constituting a continuous plastic link between said top coat and the unpenetrated portions of said granules and base coat.

6. An electric lamp comprising a transparent glass bulb containing a light source and having a light-refracting and light-transmitting coating on at least a portion of the exterior surface thereof comprising a thin base coat of a transparent lacquer, and a layer of faceted granules of a transparent organic plastic of the group consisting of polystyrene, acrylics and cellulose acetate substantially entirely covering the said portion of the bulb and adherent to and protruding from the said base coat in random oriented manner, substantially all of said plastic granules having a minimum width dimension of at least several hundredths of an inch and being closely contiguous to one another and joined to and securely braced against dislodgment from the base coat at their bottom regions by small fillets of said organic plastic, the material of the surface portions of said granules and said base coat in contact with the said fillets being penetrated and acted on by solvent therefor from said fillets and constituting a continuous plastic link between said fillets and the unpenetrated portions of said granules and base coat.

7. An electric incandescent lamp comprising a transparent glass bulb containing a filament and having a light-refracting and light-transmitting coating on substantially its entire exterior surface comprising a thin base coat of a transparent lacquer, a layer of faceted granules of transparent polystyrene plastic substantially entirely covering the said bulb and adherent to and protruding from the said base coat in random oriented manner, said plastic granules having minimum and maximum width dimensions within the range of from approximately $\frac{1}{16}$ to $\frac{1}{8}$ inch, and a lacquer top coat extending completely over the said plastic granules and over the portions of the lacquer base coat exposed in the interstitial spaces therebetween, the material of the surface portions of said granules and said base coat in contact with each other and with said top coat being penetrated and acted on by solvent therefor from said base coat and from said top coat and constituting continuous plastic links between said base coat and the unpenetrated portions of said granules and between said top coat and the unpenetrated portions of said granules and base coat.

8. An electric incandescent lamp comprising a transparent glass bulb containing a filament and having a light-refracting and light-transmitting coating on substantially its entire exterior surface comprising a thin base coat of transparent lacquer and a layer of faceted granules of transparent polystyrene plastic substantially entirely covering the said bulb and attached to and projecting from the said base coat in random oriented manner, said plastic granules having minimum and maximum width dimensions within the range of from approximately $\frac{1}{16}$ to $\frac{1}{8}$ inch and being closely contiguous to one another and joined to and securely braced against dislodgment from the base coat at their bottom regions by small fillets of polystyrene plastic integral with said

plastic, the material of the surface portions of said granules and said base coat in contact with each other and with the said fillets being penetrated and acted on by solvent therefor from said base coat and from said fillets and constituting continuous plastic links between said base coat and the unpenetrated portions of said granules and between said fillets and the unpenetrated portions of said granules and base coat.

9. An electric lamp comprising a transparent glass bulb containing a light source and having a light-refracting and light-transmitting coating on at least a portion of the exterior surface thereof comprising a thin base coat of a transparent colored lacquer, a layer of faceted granules of a transparent organic plastic adherent to and protruding from the said base coat in random oriented manner, said granules having a minimum width dimension of at least several hundredths of an inch, a preponderance of said granules being embedded in said colored base coat only part way through the thickness thereof whereby to leave a sufficient thickness of said colored base coat underneath the said embedded granules to effectively filter the light passing therethrough from said light source, said plastic granules being joined, to and securely braced against dislodgement from the base coat at their bottom regions by small fillets of an organic plastic, the material of the surface portions of said granules and said base coat in contact with the said fillets being penetrated and acted on by solvent therefor from said fillets and constituting a continuous plastic link between said fillets and the unpenetrated portions of said granules and base coat.

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