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ORNAMENTAL ELECTRIC LIGHT BULB AND METHOD OF MANUFACTURE THEREOF

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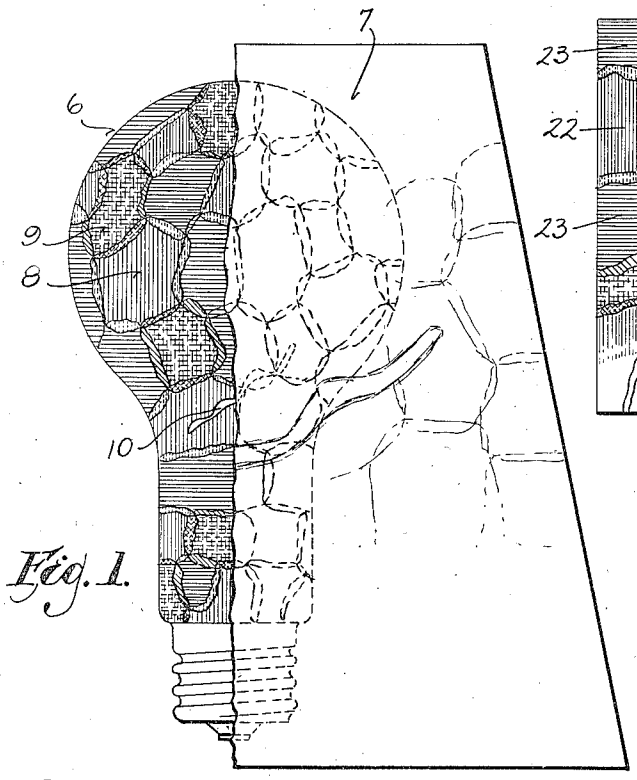


Fig. 1.

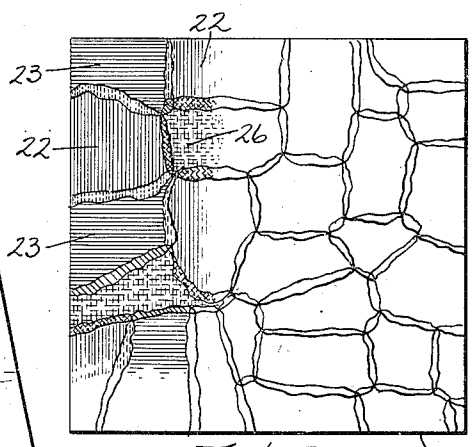


Fig. 3.

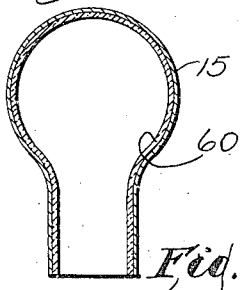


Fig. 4.

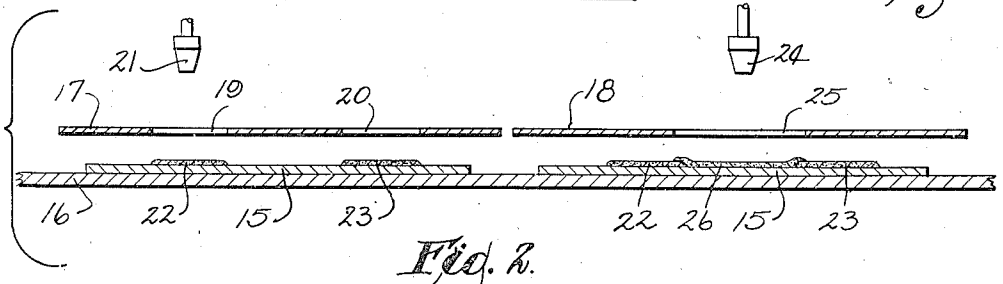


Fig. 2.

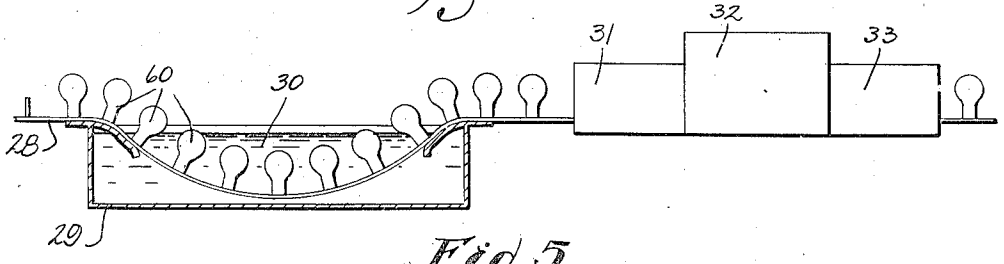


Fig. 5.

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ORNAMENTAL ELECTRIC LIGHT BULB AND METHOD OF MANUFACTURE THEREOF

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Madison, Wis.

Application September 8, 1938, Serial No. 228,880

11 Claims. (Cl. 41—33)

This invention relates to improvements in ornamental electric light bulbs and methods of manufacture thereof.

It is the primary object of the invention to provide a novel and improved ornamental bulb and to provide a means and method suitable for the manufacture of such bulbs in large quantities.

Other objects will appear in more detail from the following disclosure.

In the drawing:

Figure 1 shows a view partially in side elevation through a shade illuminated by a lamp bulb embodying this invention, the shade being broken away to expose the lamp bulb in side elevation.

Figure 2 is a diagrammatic view in section and shows the building up of a transfer film for the decoration of the bulb illustrated in Figure 1 by one method embodying this invention.

Figure 3 is a plan view of the decorative film or transfer.

Figure 4 is a view in side elevation illustrating the application of the transfer film to the glass blank to be later used in manufacturing the bulb.

Figure 5 is a diagrammatic view partially in section and partially in side elevation showing apparatus for practicing the method whereby the transfer film is dissolved from the decorative blank and the blank is baked in an oven for the fusing of the decorating color material to the blank.

Like parts are designated by the same reference characters throughout the several views.

Desirable ornamental effects cannot be projected from an ornamental bulb 6 on to the shade 7 if the color design on the face of the bulb is too regular or uniform. To get the best results, the color design should be highly irregular and the colors should preferably overlap somewhat so that in the pattern produced on the shade the different colors will blend together without destroying materially their transparency. Blending areas of color are indicated in Figure 1 at 8 and 9 although it will be understood to be almost impossible to illustrate the blending in a mechanical drawing.

Desirable results are also produced if scratches or areas of clear glass appear in irregular form and with irregular width, as shown at 10.

In the past, an effort has been made to decorate bulbs with paint or the like. Such bulbs have been used with a certain degree of success, particularly where the bulbs have low wattage. However, when high temperatures are developed in bulbs so decorated, a coating of paint is invariably destroyed. Furthermore, where different colors are overlapped in ordinary paint, it is desirable to let one color dry completely before another may be applied and even then an undesirable densification occurs which reduces unduly the transparency of the colored bulb.

Accordingly, the colors applied to the bulb are preferably vitreous. The coloring of glass by baking or burning vitreous enamel thereon is well known but it has not heretofore been used for this purpose and the effect produced by the overlapping of areas of color for the purposes of the present invention is new.

Transparent vitreous enamel is available in powdered form on the open market in a variety of different colors. It is prepared to include any desired flux, such as the well known litharge and borax flux. I prepare a solution consisting of approximately 95 per cent turpentine and 5 per cent damar varnish, the exact proportions being unimportant. Sixty parts of this liquid are then mixed with one hundred parts of enamel and the mixture is ground in a ball mill or otherwise to the desired fineness. The liquid is simply a vehicle for transferring the powdered vitreous enamel to the glass blank which is later to be made up into the bulb. The solution may be sprayed or brushed on to the blank or applied in the manner hereinafter to be described. The evaporation of the turpentine leaves the powdered vitreous enamel in a dust-like coating on the base of the blank. As above noted, the application of the different colors has preferably been irregular so that the dust-like deposits will preferably not have straight or regular outlines and will preferably overlap somewhat the different colors involved. Where it is desired to leave lines of clear glass, tracings of litharge or any other suitable repellent may be made on the glass blank before the solution is sprayed thereon.

When the applications of enamel have dried upon the glass, they are baked at temperatures sufficient to fuse them to the glass. The fusing temperatures are ordinarily at 1050 degrees to 1200 degrees Fahrenheit according to the flux which is incorporated in the powdered enamel. About 35 minutes' exposure to these temperatures is usually required but the total time of treatment, including pre-heating, baking and annealing, may be approximately two and one half hours. Upon completion of the treatment, the colored enamels are fused to the glass according to the patterns in which they have been deposited thereon. Where litharge or other repellent is used, the glass will be clear and uncolored. The resulting colors on the glass are more highly transparent and brilliant

than it is possible to obtain in paints and they will withstand any temperatures at which electric lamps are ordinarily operated. Consequently, the coloring is permanent and neither washing nor any other treatment will affect it.

The coloring operations thus far described are necessarily quite largely hand work. Stencils may be used where desired to apply the different layers of color and the different colors may be applied consecutively without waiting for a previously applied color to become dry. There is no commingling or fusing of the colors until the fusing operation occurs and at that time the fused color distributes itself at substantially uniform thickness over the face of the blank so that there is no building up of thickness such as reduces light transmission through the blank when ordinary paint is used in the same manner.

To adapt the blank coloring operation to production methods of manufacture, I prefer to color the blanks as shown in Figures 2 to 5, inclusive. I make highly soluble transfer films 15 of gelatine or the like and place these on a conveyor 16 travelling beneath any desired number of relatively fixed stencils 17 and 18. Through the openings 19 and 20 in stencil 17, a spray-head 21 delivers a spray containing transparent vitreous enamel in an appropriate vehicle. The conveyor 16 may operate intermittently with sufficient dwell to enable suitable deposits 22 and 23 to be built up on the face of film 15 by the material passing through the openings 19 and 20 of the stencil.

In the next step of the advance of conveyor 16, the gelatine film 15 dwells beneath stencil 18 and the spray from nozzle 24 passing through the opening 25 in this stencil will build up a deposit 26 overlapping the previous deposits 22 and 23 to blend the differing colors of the vitreous material carried by the respective sprays. As aforesaid, this operation may be repeated as many times as desired by simply multiplying the number of stencils and the number of spray nozzles.

The result is the production of a colored water soluble transfer film 15 as shown in Figure 3. This film is now wrapped about the glass blank 60 as indicated in Figure 4. It is not at all necessary for the purposes of the present invention that the transfer film should fit the contours of the glass blank. On the contrary, the greater the irregularity the more pleasing will be the result when the finished electric bulb is placed in use to project on to a shade or other screen 7 the pattern of its colored surface. The pressing of the transfer film to the blank may be done manually or by dies shaped to the contours of the blank.

The blank will preferably be first sprayed with some solution similar to a light varnish so that the powdered virteous enamel on the transfer film will adhere to the glass of the blank.

The glass blank is now placed on the conveyor 28, preferably right side up, and is carried through a tank 29 containing to a suitable depth some solution capable of dissolving the film 15. Such film need not necessarily be water solvent but, assuming that it is made of gelatine or the like, the liquid 30 in tank 29 may be water.

The immersion and removal of the blank from the water is preferably very gradual. This applies particularly to the removal so that after the protecting film has been dissolved, there will be no errosion from the blank of the deposit of powder-like vitreous enamel which has been made by the transfer operation. After the conveyor leaves the trough or tank 29, it passes into the pre-heating chamber 31 leading to the oven 32 and thence passes from the oven through the annealing chamber 33 to emerge as a completed blank on which vitreous colors integrally appear. The blank is then made up into an electric light bulb in accordance with the conventional methods.

The resulting bulb will have a substantially smooth surface which, notwithstanding the blending of the colors produced by the original overlap of deposits of enamel thereon, will be of substantially uniform thickness on the completed article. The colors will be highly transparent and the source of light within the completed bulb will project the colors in a beautifully blended pattern on to the shade 7 or any other screen. By using a perfectly plain shade or screen, the decorative effect of the lighting fixture may be varied at will by simply using bulbs of different color designs.

We claim:

1. As a new article of manufacture a lamp bulb having a transparent vitreous enamel coating of various colors irregularly distributed and respectively fused to its surface.

2. As a new article of manufacture a lamp bulb having transparent vitreous enamel in various colors fused to its surface in overlapping areas whereby the colors are blended.

3. As a new article of manufacture a lamp bulb comprising a bulbous glass blank having transparent vitreous enamel in various colors fused to its surface, said enamel being of substantially uniform thickness and said colors being nevertheless blended.

4. A method of decorating a lamp bulb blank which consists in applying differing colors of transparent vitreous enamel in powdered form and in a suitable vehicle to the surface of the blank in overlapping areas and subjecting the enamel and blank to such temperatures as to fuse the enamel to the glass blank and to distribute the enamel to substantially uniform depth on the blank notwithstanding the original overlap of said areas.

5. The method of decorating a lamp bulb blank which consists in treating certain parts of the blank with a repellent, subsequently applying to the blank a vehicle carrying a powdered transparent vitreous enamel and thereafter subjecting the blank and enamel to temperatures to fuse the enamel to the blank except where the blank is protected by said repellent.

6. As a new article of manufacture a decorated glass bulb having selected clear portions of irregular outline and elsewhere coated with a highly transparent layer of vitreous enamel fused to its surface.

7. A method of decorating which involves the patterned application of powdered transparent vitreous enamel in a suitable vehicle to a soluble transfer sheet, rendering tacky a glass surface to be decorated, pressing said sheet to said surface to transfer the powdered enamel thereto in accordance with the pattern on the sheet, dissolving said sheet from the patterned enamel deposited on the glass and subsequently heating the glass and enamel at a temperature to fuse the enamel thereto.

8. The method of decorating a glass bulb which comprises the application of powdered transparent vitreous enamel in a predetermined pattern on a soluble sheet, wrapping the sheet about the surface of the glass bulb to be decorated

whereby to transfer powdered enamel to the bulb in accordance with the predetermined pattern on the sheet, rendering said enamel adherent to the bulb, immersing the bulb and sheet in a liquid in which the sheet is soluble and the enamel and its carrier are not, and subsequently fusing the enamel to the bulb.

9. A method of decorating a glass bulb which comprises the application of differing colors of powdered transparent vitreous enamel in overlapping patterns upon a flexible and soluble transfer sheet, wrapping said sheet about the bulb to be decorated for the transfer of the enamel to the bulb in accordance with the pattern on the sheet, the enamel being rendered adherent to the bulb, immersing the bulb and sheet in a bath in which the sheet is soluble, said bulb and enamel being immune to the action of said bath, and subsequently exposing the bulb and enamel to temperatures sufficient for the fusing of the enamel to the bulb in areas of blended color.

10. The method of decorating a glass bulb which comprises the spraying of powdered transparent vitreous enamel in a suitable vehicle upon predetermined areas of a transfer sheet while shielding the selected portions of the sheet from the spray, the spraying of a differing color of enamel in a suitable vehicle upon the same sheet in areas including said selected portions and overlapping the areas of deposit of the enamel first mentioned, the application of the transfer sheet to the glass bulb to be decorated while causing the adherence of the enamel to the bulb, the removal of the sheet from the enamel deposited on the bulb, and the fusing of the enamel to the bulb in blended color areas.

11. A method of decorating which involves the patterned application of powdered transparent vitreous enamel in a suitable vehicle to a transfer sheet, rendering tacky a glass surface to be decorated, pressing said sheet to said surface to transfer the powdered enamel thereto in accordance with the pattern on the sheet, and subsequently heating the glass and enamel at a temperature to fuse the enamel thereto.

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