

DECORATIVE FITTING AND METHOD OF MAKING SAME

This invention relates to largely transparent decorative fittings having a narrow color layer formed therein, and to methods for producing such fittings. It appears to be especially well suited for use in the plumbing field (e.g. to provide valve control handles).

It is known in the art to make valve handles from acrylic so that they are largely transparent. For heightened decorative effect, there have also been attempts to insert color walls inside the acrylic so as to provide a slight tint to the handle when the handle is viewed from a direction perpendicular to the color wall. Prior art color walls were provided in valve handles by layering a thin sheet of colored plastic over a preformed acrylic sheet, and then placing a second acrylic sheet over the top side of the color wall. This "sandwich" technique was also utilized to fabricate other decorative objects such as paperweights. However, because of the thickness of conventional plastic sheets, one could readily see that a plastic color sheet had been inserted into the acrylic, and much of the decorative value was therefore lost. Also, once the thinness of the conventional color wall sheets got below .165 cm. (.065 inches), it became very difficult to handle the preformed plastic without having them break up as they were being transferred over the panels.

Thus, the applicant has not found anywhere in the prior art an acrylic decorative fitting in which a color layer having a thickness .101 cm. (.040 inches) has been inserted. As will become clear from the des-

scription which follows, such extreme narrowness is highly desirable because it can provide the illusion of the color wall being almost invisible when the layer is looked at in one direction, without showing a clear layering effect when the handle is viewed from the side. Thus, similar to the curiosity and wonderment aroused by the illusion of placing ships in a narrow neck bottle, the present invention makes the consumer wonder how the wall of color has been inserted.

10 The object of the present invention is therefore to provide decorative fittings with extremely narrow color walls and methods for making them.

 The present invention provides a method of forming a decorative fitting so that it has an internal color layer, characterized by forming a frame on a first substantially transparent panel such that the frame projects out from a side surface of the first panel; abutting a second substantially transparent panel against the frame so as to form a color-insert cavity, said cavity being defined by the edges of the frame and the space between adjacent walls of the transparent panels; placing a flowable color material and adhesive in the cavity and permitting the color material and adhesive to harden in the cavity and bind to the panels so as to form a sandwich structure; and cutting the sandwich structure into at least two fitting components, both of which comprise a sandwich of a portion of both of the panels with a segment of the color layer in between

30 The present invention also provides a decorative fitting having at least one internal color layer formed therein, comprising a first substantially transparent panel; at least a second substantially transparent panel; characterized by said color layer being a thin layer of colored material positioned between said panels and having a thickness no greater than .10 cm. (.04 inches), said color layer being constructed and

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arranged so as to be visible at one position, yet substantially invisible when viewed 90° therefrom.

(B)

In an especially preferred form, the frame can be formed with a gap in it so as to permit air from the cavity to easily escape when the color material and adhesive are placed in the cavity, and the color/ adhesive can be injected into the cavity through a transverse hole formed in one of the transparent panels. It is preferred that the frame projects out from the first panel less than .101 cm. (.04 inches) in the direction of the second panel. The preferred adhesive is an acrylic adhesive and it is preferred to clamp the panels together while the color material and adhesive are hardening.

If two color layers are desired, a frame can be formed on both sides of the first panel surface and color walls can be formed on both sides of the first panel surface through the use of two transparent panels clamped to the two sides of the first panel.

It should be appreciated that one aspect of the present invention is the realization that extremely thin frames (e.g. made out of rigid metal and/or formed integrally with the first panel) can be provided so as to permit the creation of a color layer of the requisite thickness. Another aspect of the invention is the realization that a series of handle components can be cut out of the sandwich portion which is inside the frame. This creates a highly efficient production process, and only minimal waste of materials.

A better understanding of the invention will be had with reference to the accompanying drawings:

Figure 1 is an exploded assembly view in perspective illustrating the orientation of three panel members and two frames prior to the forming of color walls;

Figure 2 is a view in vertical section taken along line 2-2 in Figure 1, after the panel wall members have been clamped together;



Figure 3 is a side elevational view illustrating the cutting of handle knob components from the sandwich panel members after the adhesive material has solidified;

Figure 4 is an end view of the finished handle after it has been placed on an insert member; and Figure 5 is another end view of the handle illustrated in Figure 4, with the handle turned 90° showing the largely invisible appearance of the color walls.

10 A handle formed in accordance with the present invention, generally 10, is shown in its finished form in Figures 4 and 5 of the attached drawings. To make this handle, one can follow the process depicted in Figures 1-3 and described below.

15 The method of fabricating the handle involves the use of a "first" panel member 11 and two outer panels 12 and 13 (the "second" and "third") panels, these panels are 61 cm. by 61 cm. (24 inches by 24 inches) cast acrylic and substantially transparent. Preferably, panels 12 and 13 are 1.27 cm. (one-half inch) thick, and panel 11 is 2.54 cm. (one-inch thick).

20 Six pieces of metal shim stock having a thickness of .063 cm. (.025 inches) are cut into 1.27 cm. by 60.9 cm. (1/2 inch by 24 inches) strips. And two pieces are cut into 1.27 cm. by 30.4 cm. (1/2 inch by 12 inches) strips. Double-stick tape is secured on one side of the shims, and they are placed on both sides of the panel 11 in the fashion shown in Figure 1 to form the border strips 14, 15, 16 and 17 on one side of the panel and 14A, 15A, 16A and 17A on the opposite side of the panel. Note the air release gaps 27 and 27A in the frame.

Apertures 18 and 18A are drilled through the lower base portions of panels 12 and 13 to provide an inlet diameter of .421 cm. (.166 inches) for injection of the color material. The surfaces of the panels 12

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and 13 are then wiped with a lint-free cloth (treated with denatured alcohol to remove dirt and static charge). Then, the three panels 11, 12 and 13 are positioned adjacent to each other with their edge portions aligned as shown in Figure 2. They are then clamped together using gluing clamp 20.

An acrylic adhesive sold under the trade name PS-30 (by T.F.E. Industries) is utilized. It should be pointed out that the PS-30 acrylic adhesive is a two-component system. 950 grams of Component A is combined initially with the desired quantity of an Orasol (R.T.M.) black dye obtained from the Ciba-Geigy Corporation. It will also be combined with a dispersing agent for the dye which is sold under the trade name Degament 1011 which is available from Degussa Corporation. The amount of the dispersing agent will be of a quantity to give the desired intensity of color. The dye and dispersing agent are mixed with the Component A acrylic for one hour on a suitable jar roller. After this time, 50 grams of PS-30 Component B is added to the dyed PS-30 Component A mixture, and mixed thoroughly for two to three minutes. The resulting mixed materials will then be placed in a suitable pressure tank. Other color/adhesive systems may also prove useful.

When the panel members 11-13 have been assembled in the manner shown in Figure 2 and clamped, the colored adhesive can be injected through the apertures 18 and 18A by suitable nozzles 23 at a preferred pressure of 2.81 kg/cm^2 (40 psig). The colored adhesive material indicated at 24 and 25 in Figure 2 will then flow between the panels and into the dye cavities 21 and 22. It will be appreciated that these cavities are defined by the inner edges of the frames 14-17 and 14A-17A, and the spacing between the panels 11-13.

The adhesive material 24 and 25 will flow into the cavities 21 and 22 until it reaches the top portions

of the panel. During this period, any trapped air will be released through the gaps 27.

The flow of the material through the nozzles 23 can then be stopped and the feed lines removed. Suitable tapered pins can then be placed in the holes 18 and 18A. After the adhesive has been allowed to solidify, the tapered pins can be removed. Panel members can then be cut into 5.08 cm. by 5.08 cm. (two-inch by two-inch) squares as indicated by the intersecting lines shown in Figure 3. A band saw is represented by the saw blade 28. It can be used to cut through the panels 11-13.

One can then machine the handles with decorative chamfers by a milling machine or other cutting device and then polish the surfaces. Any machining marks can be removed by lightly sanding in a circular motion with a wet or dry sandpaper, and the facets of the acrylic handles can then be power-buffed using a clean buffing wheel and buffing compound. A handle insert 37 with a neck portion 38 can be placed into the handle if desired. This is effectuated by supporting the handle 10 into a two-jaw chuck, and boring a suitable hole into one of the surfaces. Heat can then be supplied by a suitable heat gun in the hole, and the insert can then be jammed into the fixture when the bore is suitably heated. The temperature of the heat gun is usually about 149° - 177° C (300° - 350° F) and it is usually used for about three minutes. The resulting handle will be substantially in the form shown in Figures 4 and 5.

It will be appreciated that for purposes of illustration the color wall panels 33 and 34, are shown as visible when viewed as shown in Figure 4. In fact, while the walls can be seen from this angle they are so thin that one cannot discern any gap between the transparent segments when one carefully examines the handle. As the handle is rotated 90° to the Figure 5 position

the color wall appears to disappear and all that appears is a slight smoky coloration. If one were to place one's finger at the opposite side of the handle 10 from that shown in Figure 5 the finger would be clearly visible 5 through the handle. This is an especially interesting phenomena when one considers that two of such color walls have been provided in the handle.

The decorative handle shown in the drawings has three acrylic panel segments and two color walls. However, 10 the principle of this invention could be applied to a handle or other decorative fitting having just one color wall and two panel members. Alternatively, three or more color walls could be fabricated by placing the frames between additional panels. In such a case, it is assumed 15 that the introduction of adhesive material would be to some extent through gaps in the frames.

Also, the terms "color", "colored" or "color material" as used herein, are meant to include any pigmentation or dying of the adhesive material. Black is 20 the preferred color material. However, other colors are within the scope of the claims.

Further, while uniformly thin color layers have been provided in the preferred embodiment, the layer could be of somewhat varying thickness or interrupted 25 design such as strips if desired. Such an effect might involve forming of some integral surface treatment on the surface of one of the panel layers adjacent the cavity.

Also, while gaps in the frame have been used to 30 permit air to escape, other types of air release gaps could be used such as additional holes cut into the panels. Thus the frame could go all the way around without gaps. Also, while a single frame between adjacent panels has been shown, one could provide multiple frames 35 between adjacent walls to extend thickness or part of a frame on one wall and the rest on the other.

Thus, while certain preferred embodiments have been described above, it should be readily apparent to those skilled that a number of other modifications and changes can be made without departing from the invention.

These modifications and changes may be made in the structure, proportions, materials, and details of the invention, as well as in the manner of its use, without departing from the spirit and scope of the invention, as defined by the appended claims. It is to be understood that the invention is not limited to the specific details shown and described herein, but is intended to cover all modifications and equivalents within the scope of the claims.

All of the above described features, elements, and details of the invention are intended to be included in the invention, as defined by the appended claims. It is to be understood that the invention is not limited to the specific details shown and described herein, but is intended to cover all modifications and equivalents within the scope of the claims.

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CLAIMS

1. A method of forming a decorative fitting so that it has an internal color layer, characterized by forming a frame on a first substantially transparent panel such that the frame projects out from a side surface on the first panel; abutting a second substantially transparent panel against the frame so as to form a color-insert cavity, said cavity being defined by the edges of the frame and the space between adjacent walls of the transparent panels; placing a flowable color material and adhesive in the cavity and permitting the color material and adhesive to harden in the cavity and bind to the panels so as to form a sandwich structure; and cutting the sandwich structure into at least two fitting components, both of which comprise a sandwich of a portion of both of the panels with a segment of the color layer in between.
2. The method of claim 1, characterized in that the frame is integrally formed with the first transparent panel.
3. The method of claim 1 or 2, characterized in that the frame is formed by adhering metal shim segments to the first transparent panel.
4. The method of claim 1, 2 or 3, characterized in that the frame has a gap in it so as to permit air from the cavity to escape when the color material and adhesive are placed in the cavity.
5. The method of any of claims 1 to 4, characterized in that the color material and adhesive are injected into the cavity under pressure through a transverse hole formed in one of the transparent panels.
6. The method of any of claims 1 to 5, characterized in that the frame projects out from the first panel side surface less than 0.10 cm. (.04 inches) in the direction of the second panel.
7. The method of any of claims 1 to 6, char-



acterized in that the adhesive is an acrylic adhesive.

8. The method of any of claims 1 to 7, characterized in that the transparent panels are clamped together while the color material and adhesive are
5 hardening.

9. The method of any of claims 1 to 8, characterized in that wherein a second frame is formed on the first panel on the surface which is opposite from the first side surface, and a third transparent panel
10 abutting against the second frame is used to form a second color layer on that side of the first panel.

10. A decorative fitting having at least one internal color layer formed therein, comprising a first substantially transparent panel; at least a second substantially transparent panel; characterized by said
15 color layer being a thin layer of colored material positioned between said panels having a thickness no greater than .10 cm. (.04 inches), said color layer being constructed and arranged so as to be visible at
20 one position, yet substantially invisible when viewed 90° therefrom.

11. The decorative fitting of claim 10, characterized by a third substantially transparent panel with an additional layer of said colored material placed
25 between said first panel and said third panel.

12. The decorative fitting of claim 10 or 11, characterized in that said color material is mixed in an adhesive.

13. The decorative fitting of claim 12, characterized in that the color material is mixed in an
30 acrylic resin.

14. A method of forming a decorative fitting so that it has an internal color layer substantially as herein described.

35 15. A decorative fitting having at least one internal color layer formed therein substantially as herein described with reference to Figures 4 and 5 of the accompanying drawings.