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(54) Manufacture of simulated lead lights.

(57) The invention relates to the manufacture of simulated lead lights, stained glass windows and other decorative panels and involves building up successive layers of an opaque paint and layers of transparent or translucent particulate material on the surface of a carrier such as a transparent, translucent or opaque surface.

The opaque paint is preferably based on a two-pack epoxy resin which includes micaceous iron oxide pigment together with at least one metallic pigment or opacifying material such as aluminium, for example.

The method provides a range of white and colour versions as well as metal or precious metal surface finish versions. It also allows for the use of relatively inexpensive and generally more readily available particulate material.

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IMPROVEMENTS IN AND RELATING TO MANUFACTURE OF SIMULATED LEAD LIGHTS

The present invention primarily concerns a method of manufacturing simulated lead lights and stained glass windows of the kind, for example, referred to in European Patent Specification No. 0 038 681.

The present invention provides a method of manufacturing a simulated lead light in which simulated opaque lead canes are built up on the surface of a transparent or translucent carrier, comprising the following steps:

(1) applying lines of an opaque paint to the carrier surface, the lines corresponding to the positions of the desired lead canes;

(2) while the paint is still wet, applying transparent or translucent particulate material so that it adheres to the wet paint;

(3) removing surplus unadhered material; and

(4) drying the paint and the adhered particulate material;

By repeating the above steps, the method allows for the build up, in a sandwich-like manner, of one or more layers comprising opaque paint and transparent or translucent particulate material. It is a preferred feature that in applying subsequent layers, a finer grade of particulate material is applied so as to optimally fill any voids in the covering.

Inclusion of transparent or translucent particulate material makes for ease of production of many coloured versions in particular, white, pale grey and pastel colour versions of simulated lead lights.

The method ideally includes a final application of opaque paint prior to final drying and curing.

In an alternative embodiment for use in applications where such high durability is not required, the present invention further provides a method of manufacturing a simulated lead light in which simulated opaque lead canes are built up on the surface of a transparent or translucent carrier, comprising applying lines of an opaque paint to the carrier surface, the lines corresponding to the positions of the desired lead canes.

A number of applications of opaque paint may be employed in order to achieve a desired thickness, the minimum thickness typically being approximately 200 microns (dry film thickness).

In both embodiments, the opaque paint may be based on, for example, two-pack Epoxy resin and preferably includes micaceous iron oxide (MIO) pigment or tinted versions thereof. The preferred MIO epoxy paint gives enhanced durability, opacity and resistance to chemicals and ultra violet radiation.

The opaque paint may include in its composition, at least one metallic pigment and/or other opacifying material such as aluminium, for example, in powdered form, or copper, zinc, stainless steel, lead or chromium. The inclusion of aluminium, for instance, provides a tinting colour. Furthermore, the addition of aluminium in the MIO-containing opaque paint results in enhanced durability.

Therefore, different tinted colour versions of the preferred MIO Epoxy coating may be employed, whilst retaining the aesthetic and durability benefits of the high MIO pigment content of the paint. White or pastel colour versions may also be produced by the method according to the invention.

The opaque paint may be any colour and "Gold leaf" or simulated "Gold leaf", chromium or stainless steel, may optionally be applied over the final layer of opaque paint so as to enhance the decorative effect in addition to providing increased durability.

The above methods may include the use of natural end/or forced drying or curing techniques partially or wholly to dry the paint and particulate material when applied.

The invention will now be described in more detail with reference to the following specific examples:

Example 1.

(1) An opaque paint, preferably based on micaceous-iron oxide (MIO) pigment dispersed into two-pack epoxy media is applied to the surface of the transparent or translucent carrier by screen printing;

(2) dry transparent or translucent inorganic or organic particulate material, such as for example crushed glass or washed sea sand or powdered plastic of similar particle size (e.g. in the range 120-180 grit size), is applied to, and adheres to, the wet paint;

(3) unadhered particulate material is removed by brushing or compressed air-hose blowing, for example;

(4) the paint and the particulate material adhered thereto are allowed to dry. If desired, the drying process can be speeded up by force drying methods such as stoving, but in that case, only partial curing is effected;

(5) Step (1) above is repeated to overcoat the partially constructed canes, thus providing an overall sandwich effect, the thickness of the overcoat being adjusted as required;

(6) while the paint is still wet, a finer grate (e.g. in the range 320-600 grit size) of particulate material is applied in order to fill voids in the covering applied by step (2) and to enhance the effect and durability of the coating;

(7) step (3) is repeated;
(8) Step (4) is repeated;
(9) Step (5) is repeated:
(10) The canes are then fully dried, preferably using a hard cure method such as staving in order to achieve the desired toughness parameters.

A typical durable simulated lead cane thickness may be built up by the above method to circa 1.5 to 3mm dry film thickness. Accelerated weathering tests showed that full adhesion and coating integrity were retained after testing for over 3000 hours. The test conditions are equivalent to exposure to approximately six years normal weathering.

EXAMPLE 2.

A typical opaque paint formulation is as follows:
All w/w ratios are given with respect to the weight of the coating.

Micaceous iron oxide	30 - 40% w/w
Metallic Powders e.g. leafing aluminium paste.	2 - 4% w/w
Organic or inorganic pigments e.g. Tio_2 or Phthalocyanoblue	5 - 10% w/w
Two-pack epoxy resin	25 -35% w/w
Solvents, for example, glycol ethers higher alcholols or/and aromatic hydrocarbons.	25 - 30% w/w
Additives	4 - 5% w/w

The preferred micaceous iron oxide (MIO) epoxy paint may also contain circa 2% to 4% of leafing aluminium paste.

The MIO epoxy paint may be reacted and cured with activators such as polyamide or suitable polyamine types or adducts as desired to suit production curing schedules.

EXAMPLE 3

Example of white version of the opaque paint

Rutile Titanium dioxide pigment	Circa 30% w/w
Two-pack Epoxy Resin	25 -35% w/w
Additives	4 - 5% w/w

The formulations given in examples 2 and 3 contain various additives including surfactants, dispersants and rheology control additives such as hydrogenated castor oil, aluminium stearate or Bentonite gellants.

The method allows for various drying or force drying procedures on plastic sheets, for instance, which may not be able to endure high temperatures.

The methods according to the invention allow the use of relatively inexpensive, readily available materials such as the transparent or translucent particulate material.

Though the invention is described above with reference to the manufacture of simulated lead lights, it will be understood that designs other than tradition Tudor type "lead lights" may also be constructed using the method outlined above. Such other designs may be constructed on glass sheets and other plastic sheeting or opaque sheet material such as decorative panels.

Claims

1. A method of manufacturing a simulated lead light in which simulated opaque lead canes are built up on the surface of a transparent or translucent carrier, comprising the following steps:
   (1) applying lines of an opaque paint to the carrier surface, the lines corresponding to the positions of the desired lead canes;
   (2) while the paint is still wet, applying transparent or translucent particulate material so that it adheres

to wet paint;
(3) removing surplus unadhered material; and
(4) drying the paint and the adhered particulate material.

2. A method according to Claim 1 wherein steps (1) to (4) are subsequently repeated using a finer grade particulate material.

3. A method according to claim 1 or claim 2 including a final application of opaque paint prior to final drying and curing.

4. A method of manufacturing a simulated lead light in which simulated opaque lead canes are built up on the surface of a transparent or translucent carrier, comprising applying lines of an opaque paint to the carrier surface, the lines corresponding to the positions of the desired lead canes.

5. A method according to any one of the preceding claims wherein the opaque paint is based on two-pack epoxy resin.

6. A method according to any one of the preceding claims wherein the opaque paint includes micaceous-iron oxide pigment or tinted versions thereof.

7. A method according to Claim 6 wherein the opaque paint includes in its composition, at least one metallic pigment and/or other opacifying material selected from the following group: aluminium, copper, zinc, stainless steel, lead and chromium.

8. A method according to any one of the preceding claims wherein "gold leaf", simulated "gold leaf", chromium or stainless steel is applied over the final layer of oqaque paint.

9. A simulated lead light manufactured according to any one of the preceding claims.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 1245

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,X	EP-A-0 038 681 (D.F. QUADLING) * Page 2, line 25 - page 5, line 28; page 7, lines 1-29; claims 1,8,9 *	1-3,9	B 44 F 1/06
D,Y		6,7	
X	GB-A-2 165 800 (G. SAGGERS) * Entire document *	1-3,9	
X	US-A-4 103 052 (J.J. SUMMERS et al.) * Column 1, lines 38-59; column 2, lines 37-46 *	4	
Y	WO-A-8 602 599 (A. BERLY) * Page 1, line 1 - page 2, line 20; claims 1,4,5,9 *	6,7	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 44 F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07-05-1991	DOOLAN G.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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