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(54) Title: DECORATIVE PANE

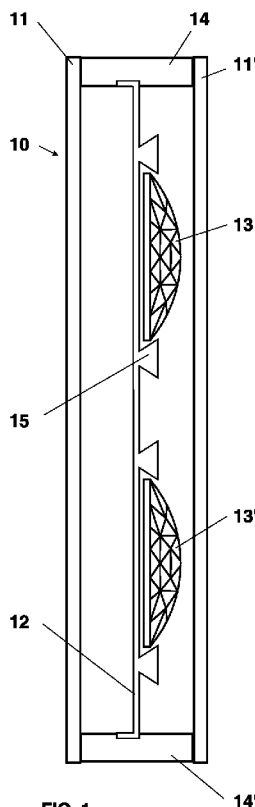


FIG. 1

(57) Abstract: A decorative pane is disclosed comprising two outer panes sandwiching a plastic supporting substrate to which at least one decorative element has been applied. Also disclosed is a decorative pane comprising a plastic supporting substrate to which at least one decorative element has been press-fit.

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DESCRIPTION

DECORATIVE PANEField of Invention

This invention relates to a decorative pane.

Background to Invention

Traditionally, decorative glass panes comprise a mosaic of coloured glass pieces, individually shaped and held together by strips of lead and supported by a rigid frame.

More recently, such panes have been created by forming decorative elements on an underlying, supporting glass substrate. This would include the direct bonding of decorative elements to the substrate as well as the bonding of bevels on the substrate and the creation of decorative elements in the cavities defined by the bevels and the supporting substrate (e.g. by curing coloured liquid resin poured in to the cavities). It is also known to bond a decorative, unitary plastic moulding to a supporting glass substrate.

Such decorative panes can be doubled glazed by sandwiching decorative elements applied to one supporting glass substrate with another glass substrate.

Summary of Invention

In accordance with a first aspect of the present invention, there is provided a decorative pane comprising two outer panes sandwiching a plastic supporting substrate to which at least one decorative element has been applied.

For the avoidance of doubt, "supporting" is intended to mean that the plastic supporting substrate has some degree of structural integrity sufficient to support the decorative elements at least to some extent independently of the outer panes. It is not intended to include, for example, a thin film that would have to be bonded to one of the outer panes to prevent distortion and / or sagging of the film under the weight of the decorative elements. Furthermore, it is not intended to exclude an arrangement where the outer panes are in contact with the supporting substrate and provide restraint in a direction perpendicular to plane of the panes.

The inventor has realised that such a decorative pane with its plastic supporting substrate has many benefits including: simplified manufacture compared to conventionally manufactured decorative panes; enabling decorative elements to be readily applied to either side of the plastic supporting substrate, facilitating a dual aspect decorative pane, i.e. where decorative elements are provided facing both outer panes; and requiring no adhesives as there is no requirement to bond the supporting substrate to either pane.

In accordance with a second aspect of the present invention, a decorative pane is provided comprising a planar, plastic supporting substrate from which moulded protrusions protrude, and in to which at least one decorative element has been press-fit, and including the possibility of at least one decorative element being press-fit in to each side of the plastic supporting substrate.

Press-fitting both simplifies manufacture and also accommodates decorative elements manufactured to loose tolerances or with irregular or uneven surfaces, which may previously have been unsuccessfully bonded to glass.

Brief Description of Drawings

The invention will now be described, by way of example only, with reference to the following figures in which:

Figure 1 shows, schematically, a section through a decorative, double glazed pane in accordance with the present invention;

Figures 2a and 2b illustrating the press-fitting of a decorative element in to the plastic supporting substrate of the pane of figure 1.

Figure 3 shows, schematically, an alternative configuration of a the plastic supporting substrate and decorative elements according to the present invention.

Figure 4 shows, schematically, a further alternative configuration of a the plastic supporting substrate according to the present invention.

Detailed Description

Referring to figure 1, a section through a decorative, double glazed pane 10 is shown composed of two outer panes of glass 11, 11' sandwiching an internal moulded plastic substrate 12 with flexible protrusions 15 for retaining decorative

elements 13, 13' using a press-fit. The plastic substrate would typically be a UV stable polyester or acrylic.

The panes 11, 11' and the plastic substrate 12 are joined at their respective peripheries by spacers 14, 14' whereby the panes and the plastic substrate are spaced apart.

Figures 2a and 2b illustrate the press-fitting of a decorative element 13 in to the plastic supporting substrate 12. In particular, moulded protrusions 15 are shown deforming when receiving the decorative element.

Figure 3 shows, schematically, an alternative plastic supporting substrate 12' whereby decorative elements 13, 13' are press-fit in to opposing sides of the supporting substrate, thereby facilitating a dual aspect decorative pane (not shown) incorporating the same.

Figure 4 shows, schematically, a feature of an alternative plastic supporting substrate 12'' according to the present invention with a decorative element in the form of a concave recess. It would be inherently difficult to provide such a feature in a conventional film for bonding to a pane, however, with the structural integrity associated with plastic supporting substrates of the present invention, such a decorative element can be readily sandwiched between outer panes.

The supporting plastic substrate can be manufactured by conventional techniques including vacuum forming. One would expect a suitable thickness of plastic to be in the order of 2 to 4mm so as to have sufficient rigidity to support decorative elements, but also sufficient flexibility to enable decorative elements to be press-fit in to place.

A preferred method of manufacturing is as follows. Step 1: to machine a mould for the supporting substrate from say an acrylic, i.e. a material generally unsuited to heat applied during vacuum forming but one which may be readily machined. Step 2: to form a negative mould (i.e. corresponding to the shape of the supporting substrate) using rubber. And step 3: to form a positive mould from a specialist casting compound, e.g. to create a silastic mould. This enables fine textures and detail to be rendered because of the workability of acrylic compared to say aluminium which might conventionally be used to make a first mould of a product for which manufacture by vacuum forming is intended.

Alternatively, one might initially make a silastic mould and final tool from an original glass master. This is significant as it allows the replication of an existing glass styles. In particular, fused, kiln formed and slumped decorative glass could be replicated with great accuracy.

The decorative elements can be made from a range of materials that are currently not commonly used as decorative elements for such panes including plastic, onyx or marble. Colour can be added by floating liquid plastic dyes into cavities created during moulding of the plastic substrate. The plastic substrate may also have embossed textures formed as part of the moulding process where, for example, some obscuration of a pane is required.

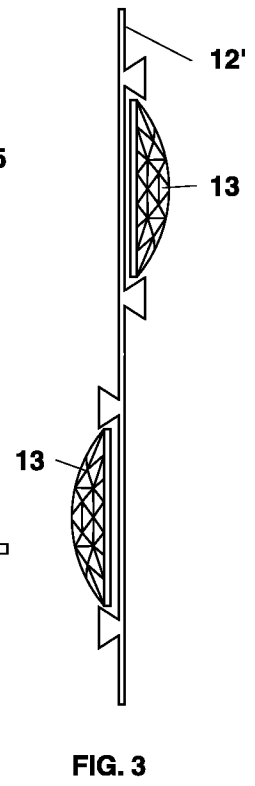
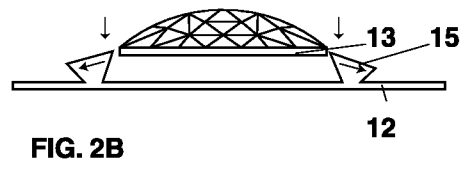
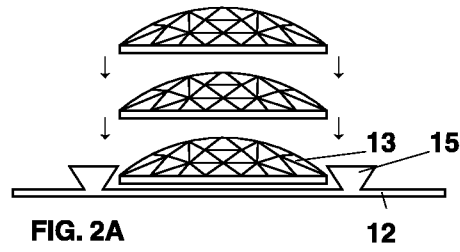
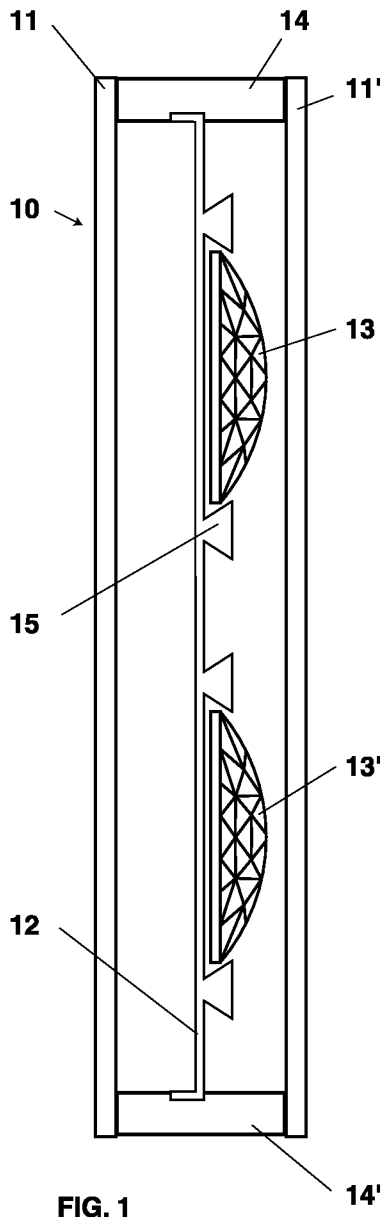
The rigidity of the supporting substrate may be enhanced with deep grooves which may also have an aesthetic quality.

The present invention may be particularly useful for decorative mirrors as the supporting substrate need not be bonded to a mirrored surface .

From reading the present disclosure, other modifications will be apparent to persons skilled in the art. Such modifications may involve other features which are already known in the design and manufacture of plastic mouldings and decorative panes, and component parts thereof and which may be used instead of or in addition to features already described herein

CLAIMS

1. A decorative pane comprising two outer panes sandwiching an plastic supporting substrate to which at least one decorative element has been applied.
2. A decorative pane as claimed in claim 1 wherein at least one decorative element has been applied to each side of the plastic supporting substrate.
3. A decorative pane as claimed in any of the preceding claims further comprising a spacer for joining the outer panes and the plastic supporting substrate at their respective peripheries.
4. A decorative pane as claimed in any of the preceding claims wherein at least one decorative element has been press-fit in to the plastic supporting substrate.
5. A decorative pane as claimed in claim 4 wherein the plastic supporting substrate is a planar substrate from which moulded protrusions protrude, and in to which at least one decorative element has been press-fit.
6. A decorative pane as claimed in claim 4 wherein at least one decorative element has been press-fit in to each side of the plastic supporting substrate.
7. A decorative pane comprising a planar, plastic supporting substrate from which moulded protrusions protrude, and in to which at least one decorative element has been press-fit.



INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/050921

A. CLASSIFICATION OF SUBJECT MATTER
 INV. B44F1/06 E06B3/66
 ADD. A44C17/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 B44F A44C E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 138 433 A (RIDGE JIMMY D [US]) 31 October 2000 (2000-10-31) column 6, line 47 - line 65; figures 1,2,5	1,3
X	DE 30 29 613 A1 (PLATZ KARL OTTO) 18 March 1982 (1982-03-18) page 2, line 13 - page 3, line 5 page 4, line 20 - line 26; figures 3,4	1,3
A	US 4 975 307 A (SOLLOGOUB NICOLAS [CA]) 4 December 1990 (1990-12-04) column 2, line 19 - line 57; figures 3,4	1-7
A	US 2005/028461 A1 (CZAPKA LINDA [AT]) 10 February 2005 (2005-02-10) claims; figures	1-7
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

28 January 2009

Date of mailing of the international search report

05/02/2009

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/050921

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 137 761 A (ALTMAYER ANDREAS [AT]) 11 August 1992 (1992-08-11) column 1, line 59 - column 2, line 7; claims; figure 2 -----	1-7
A	US 5 056 656 A (POELL MARTIN [AT]) 15 October 1991 (1991-10-15) column 4, line 5 - column 5, line 54; figures 3-5,8 -----	4-7
A	GB 966 339 A (ROBERT FREY; WILHELM SWAROVSKI; DANIEL SWAROVSKI; MANFRED SWAROVSKI) 12 August 1964 (1964-08-12) column 3, line 13 - line 19; claims; figures -----	4-7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2008/050921

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-6

decorative pane comprising two outer panes sandwiching a plastic supporting substrate to which at least one decorative element has been applied

2. claim: 7

decorative pane comprising a planar, plastic supporting substrate from which moulded protrusions protrude, and into which at least one decorative element has been press-fit

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2008/050921

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