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Description

This invention relates to a sealed double glazed stained glass unit.

It has not proved possible to produce a sealed double glazed stained glass unit with a conventional leaded stained glass panel as one boundary wall of the sealed unit. It has been proposed (GB-A-1426551, 1147030 and 2137680) to locate a conventional leaded stained glass panel in the cavity between the clear glass boundary sheets of a conventional sealed double glazed unit but this arrangement is optically unsatisfactory under certain lighting conditions.

It has also been proposed (in GB-A-1491696) to make a double glazed leaded light by securing raised strip members to both sides of one of the clear glass boundary walls of a conventional double glazed unit and optionally to apply transparent coloured lacquer to give a stained glass effect.

DE-A-3029613 discloses a thermally insulated decorative glazing unit with strips of metal, wood or plastics foil framing decorative elements etched in or applied to one pane of the unit.

EP-A-0085732 discloses a simulated stained and leaded glass window constructed by sticking lead strips and coloured plastics sheets onto a glass or plastic pane. It has also been proposed to paint areas of the inside surface of one of the clear glass boundary sheets of a double glazed unit before completing the sealed unit but to even a relatively inexperienced eye plastics sheets and painted areas are seen to be substitutes for real stained glass.

According to one aspect of the invention, a double glazed stained glass unit comprises first and second facing sheets of clear transparent material, a perimeter frame spacing the facing sheets apart and hermetically sealing the cavity, formed between the facing sheets, and located within the cavity a stained glass panel comprising an array of pieces of glass arranged with edge regions thereof adjacent and a framework of lead strips overlying said edge regions, the pieces of glass being supported directly against the inside of the first of the facing sheets with a gap between edge regions of adjacent glass pieces, is characterised in that the gap contains adhesive bonding the pieces to the first facing sheet, with a first framework of lead strips secured over each gap between the pieces of glass in the panel within the cavity and in that a second framework of lead strips is secured on the outside of the first facing sheet to overlie the gaps between the pieces of glass disposed within the cavity.

Normally the facing sheets would be of clear glass but a glass-substitute material is not ruled out for either or both of these sheets. An adhesive

suitable for adhering the pieces of glass to the inside of the first facing sheet is pure silicone. If a different adhesive is used, it should be degassable to leave a non-volatile residue. The first lead framework can be made from self-adhesive or T-section lead strip and the joints between the lengths of lead-strip that make up the first framework are preferably covered with an area of blow pipe melted solder.

The perimeter frame can be constructed from conventional British Standard approved materials.

Self adhesive lead strip can be used to make the second external framework, the joints between strips again preferably being covered with areas of melted solder.

Any of the glasses used for a conventional stained glass panel can be incorporated in the cavity, thus opening the possibility of incorporating any available coloured/clear/obscured glasses into the unit.

According to a further aspect of the invention, a method of incorporating the different glasses of a leaded stained glass panel into a sealed double glazed unit comprising first and second transparent facing sheets hermetically sealed around their edges to leave a cavity between the sheets in which the panel is located, is characterised by securing edge regions of adjacent glasses of the stained glass panel together and to the first transparent facing sheet, via an adhesive-filled gap between adjacent glasses, locating a first frame of lead strips over the adjacent edge regions of the glasses so that a respective strip of the first frame overlies each gap, combining the facing sheets into a hermetically sealed double glazed unit in a manner known per se so that the stained glasses and first lead frame lie within the cavity between the facing sheets, and by adhering a second lead frame on the outer face of the first facing sheet to obscure the gaps between the edge regions of the adjacent glasses viewable through the first facing sheet.

The area of the stained glass panel may represent substantially the entire area of the sealed unit or may be located in the sealed unit with a perimeter of the facing sheets therearound.

Preferably both facing sheets are transparent and preferably are of glass. The second facing sheet can be translucent or obscured glass in some applications.

The use of T-shaped lead for the first frame enables an even more realistic double glazed stained glass window to be produced since the framework of T-shaped lead can be built up by cutting and soldering as the pattern of included glasses is assembled on a support in a manner very similar to that used for a conventional stained glass window. When the framework is complete, it

and its included glasses can be inverted and adhesive applied to regions of the frame and glass (e.g. to corner regions in the gaps where lead strips meet) so that one facing sheet of the eventual double glazed unit can be pressed down onto the inverted stained glass unit to adhere it to the facing sheet. The hermetically sealed double glazed unit can then be assembled exactly as described before.

A still further aspect of the invention relates to a first facing sheet which carries a stained glass unit and first framework this being set out in the following claim 8.

The invention will now be further described by the following examples read in conjunction with the accompanying drawings in which

Figures 1 to 4 show in perspective and cross-section various stages in the production of a sealed stained glass unit by a first method according to this invention, and

Figures 5 and 6 show in perspective and cross-section a modified construction resulting from a second method according to this invention.

Figure 1 of the drawing shows two pieces of glass 1 and 2 which constitute part of a stained glass panel 3 resting on a rectangular sheet 4 of float glass. An air-drying silicone adhesive is "gunned" into the gap 5 between the pieces 1 and 2 and the pieces are slid together on the sheet 4 to close the gap 5. This operation ensures that adhesive 6 fills the gap 5 and forms an upstand 6a overlying the gap on the upper surface of each piece 1 and 2 (Figure 2).

The other pieces of glass, preferably all of similar thickness, required to complete the stained glass panel 3 are applied to the facing sheet 4 in a similar way until the pattern is completed.

When all the pieces of glass are in place, the upstands 6a overlying each gap are sliced off flush with the upper surfaces of the glass pieces (e.g. using a razor blade) and narrow strips 7 of self-adhesive lead strip (e.g. 9.0 mm wide and 1.0 mm thick) are cut and stuck over each adhesive-filled gap. (Figure 3)

The joints between the strips 7 are then soldered (e.g. in the same way in which the lead spacer bars of a conventional stained glass panel 3 would be soldered) and the perimeter of the panel 3 is completed with edge strips 7a of lead which may be bent down to contact the sheet 4.

The panel 3 is now located in the cavity 8 of a conventionally produced double-glazed sealed unit using a dessicant-filled perimeter frame 9 spacing the sheet 4 from a further glass facing sheet 10. A conventional edge-sealing mastic 11 and edge strip 12 completes the sealing of the unit.

To finish the sealed unit, more pieces of self-adhesive lead strip 7 are applied to the exposed

face of the sheet 4 in positions to mask the underlying gaps 5 and the joints between these strips are soldered as before. In practice this means that two substantially similar but (opposite handed) lead frameworks have been used - one located inside the cavity 8 and one outside (Figure 4).

A unit manufactured as described above has been tested by Bostik laboratories for initial dew point and humidity cycling and was tested to below -60°C without failure. The test to BS 5713 was satisfactorily completed. Two years after manufacture the humidity seal appears to be perfect.

Visually, in no lighting condition, does the sealed unit appear to be other than genuine.

The mastic 11 may be Bostic 3180 and the adhesive 6, Dow Corning 781.

Figure 6 shows, in cross-section part of a double glazed unit made by a modified method in which a framework 20 of T-shaped lead strips 21 (see Figure 5) is built up around pieces 22 of glass. The upright of the T is as long as the glass pieces 22 are thick and is located in the gap between adjacent pieces 22. The horizontal bar of the T overlies the edge regions of the pieces 22 and the lengths of lead strip 21 are blow-pipe soldered at 23 as the assembly proceeds on a flat supporting base 24 until the pattern is complete. L-shaped edge pieces 25 of lead can be used to mark the outer boundary of the pattern of stained glass.

The base 24 and its supported pattern of glass pieces and lead framework is now inverted and a silicone adhesive (e.g. Dow Corning 781) is "gunned" onto the joints between the lead strips 21 and all around the outer boundary of the pattern.

Pressing a sheet of plane transparent glass (26 - see Figure 6) onto the inverted pattern of glass and lead, secures the components together and provided the amount of adhesive applied at each location 23 and around the outer edges is not enough to spread beyond the limits of the horizontal bar of the T-shaped lead strips 21 or the L-shaped edge pieces 25, the adhesive will not be visible when the pattern of glass and lead is viewed through the sheet 26, in the hermetically sealed double glazed unit. The sheet 26 is combined with a second sheet of glass 29, edge mastic 30 and dessicant filled framing strip 31 to form a hermetically sealed unit. A second framework 27 of self-adhesive lead strips 28 is then applied on the exposed face of the sheet 26 to overlie the strips 21 and edge pieces 25 of the inner framework 20 to complete the double glazed unit.

Claims

1. A double glazed stained glass unit comprising first (4:26) and second (10:29) facing sheets of clear transparent material, a perimeter frame

(9, 11:30, 31) spacing the facing sheets apart and hermetically sealing the cavity (8) formed between the facing sheets, and located within the cavity, a stained glass panel comprising an array of pieces of glass (1, 2:22) arranged with edge regions thereof adjacent and a framework of lead strips overlying said edge regions, the pieces of glass (1, 2:22) being supported directly against the inside of the first of the facing sheets (4, 26), with a gap (5) between edge regions of adjacent glass pieces (1, 2:22), characterised in that the gap (5) contains adhesive bonding the pieces to the first facing sheet (4:26), with a first framework of lead strips (7:21) secured over each gap (5) between the pieces of glass in the panel within the cavity (8) and in that a second framework of lead strips (7:27) is secured on the outside of the first facing sheet (4:26) to overlie the gaps (5) between the pieces of glass disposed within the cavity (8).

2. A double glazed unit as claimed in claim 1, characterised in that the facing sheets (4, 10:26, 29) are of clear glass.

3. A double glazed unit as claimed in claim 1 or claim 2, characterised in that the pieces of glass (1, 2) are adhered around their edges to the inside of the first facing sheet (4) and in that each lead framework is made from self-adhesive lead strip (7), the joins between the lengths of lead strip (7) that make up each framework being covered with an area of melted solder.

4. A method of incorporating the different glasses (1, 2:22) of a leaded stained glass panel into a sealed double glazed unit comprising first (4, 26) and second (10, 29) transparent facing sheets hermetically sealed around their edges to leave a cavity (8) between the sheets in which the panel is located, characterised by securing edge regions of adjacent glasses of the stained glass panel together and to the first transparent facing sheet (4, 26), via an adhesive-filled gap (5) between adjacent glasses, locating a first frame of lead strips (7, 7a:21, 25) over the adjacent edge regions of the glasses so that a respective strip of the first frame overlies each gap (5), combining the facing sheets into a hermetically sealed double glazed unit in a manner known per se so that the stained glasses and first lead frame lie within the cavity (8) between the facing sheets, and by adhering a second lead frame (7:27) on the outer face of the first facing sheet (4:26) to obscure the gaps (5) between the edge re-

gions of the adjacent glasses viewable through the first facing sheet.

5. A method as claimed in claim 4, characterised in that both facing sheets (4, 10:26, 29) are transparent glass sheets,

6. A method as claimed in claim 4 or 5, characterised in that the adjacent glasses (22) of the stained glass panel are assembled together with a first frame (20) of T-shaped lead strips (21) whose end regions are soldered together and the uprights of the T-shaped lead strips lie in the gap between the adjacent glasses (22) and the first frame (20) and assembled glasses (22) are secured to one face of the first facing sheet (26) by adhesive applied to the gaps between edge regions of the glasses (22) and to the uprights of the lead strips (21).

7. A method as claimed in claim 6, characterised in that edge regions of the first frame (20) employ L-shaped lead strips (25).

8. The first facing sheet (4:26) of a double glazed stained glass unit comprising first and second frameworks of lead strips (7, 7a:20, 27) located on opposite sides of the sheet (4:26) and with means colouring the area between the lead strips on one side of the facing sheet, characterised in that the separate glasses (1, 2:22) of the stained glass unit are secured to said one side with an adhesive-filled gap (5) between edge regions of each of the glasses and in that the first framework (7a:20) overlies the gaps (5) on the one side and the second framework (7:27) overlies the gaps (5) viewable through the other side of the facing sheet (4:26)

9. A first facing sheet as claimed in claim 8, characterised in that the first framework (20) comprises "T"-shaped strips of lead (21), the upright of each "T" being located in one of said gaps (5).

10. A double glazed stained glass unit formed by combining a first facing sheet (4:26) as claimed in claim 8 or claim 9 with a second facing sheet (10:29) to form a hermetically sealed cavity (8) therebetween, the cavity containing the first framework and separate glasses (1, 2:22) of the stained glass unit.

Patentansprüche

1. Doppelverglaste Buntglaseinheit bestehend aus ersten (4:26) und zweiten (10:29) Außenscheiben aus klarem durchsichtigen Material,

- einem die Außenscheiben auseinanderhalten-
den und den dazwischen gebildeten Hohlraum
(8) hermetisch abdichtenden Umfangsrahmen
(9, 11:30, 31) sowie einer innerhalb des Hohl-
raums befindlichen Buntglastafel, die aus einer
Anordnung von mit ihren Kantenbereichen ne-
beneinanderliegenden Glasstücken (1, 2:22)
und einem diese Kantenbereiche überdecken-
den Bleistreifengitter besteht, wobei sich die
Glasstücke (1, 2:22), mit einer Lücke (5) zw-
ischen den Kantenbereichen nebeneinanderlie-
gender Glasstücke (1, 2:22), direkt auf der
Innenseite der ersten der Außenscheiben (4,
26) abstützen, dadurch gekennzeichnet, daß
die Lücke (5) einen Klebstoff enthält, der die
Stücke mit der ersten Außenscheibe (4:26) ver-
bindet, wobei ein erstes Bleistreifengitter (7:21)
jeweils über den Lücken (5) zwischen den
Glasstücken in der Tafel innerhalb des Hohl-
raums (8) befestigt ist, und daß ein zweites
Bleistreifengitter (7:27) auf der Außenseite der
ersten Außenscheibe (4:26) über den Lücken
(5) zwischen den im Hohlraum (8) angeordne-
ten Glasstücken befestigt ist.
2. Doppelverglasungseinheit nach Anspruch 1,
dadurch gekennzeichnet, daß die Außenschei-
ben (4, 10:26, 29) aus Klarglas bestehen.
3. Doppelverglasungseinheit nach Anspruch 1
oder 2, dadurch gekennzeichnet, daß die Glas-
stücke (1, 2) um ihre Kanten herum an der
Innenseite der ersten Außenscheibe (4) ange-
klebt sind und daß die Bleigitter jeweils aus
selbstklebendem Bleistreifen (7) hergestellt
sind, wobei die Fugen zwischen den die Gitter
aufbauenden Bleistreifenlängen (7) jeweils mit
einem Feld geschmolzenen Lötmetalls abge-
deckt sind.
4. Verfahren zum Einbau der verschiedenen Glä-
ser (1, 2:22) einer Bleibuntglastafel in eine
abgedichtete Doppelverglasungseinheit, die
aus ersten, (4, 26) und zweiten (10, 29) durch-
sichtigen Außenscheiben besteht, die um ihre
Kanten herum unter Belassung eines Hohl-
raums (8) zwischen den Scheiben, worin sich
die Tafel befindet, hermetisch abgedichtet
sind, gekennzeichnet durch Befestigung der
Kantenbereiche nebeneinanderliegender Glä-
ser der Buntglastafel aneinander und an der
ersten durchsichtigen Außenscheibe (4, 26)
über eine mit Klebstoff gefüllte Lücke (5) zw-
ischen nebeneinanderliegenden Gläsern, Fest-
legung eines ersten Bleistreifengitters (7,
7a:21, 25) über den nebeneinanderliegenden
Kantenbereichen der Gläser, so daß ein ent-
sprechender Streifen des ersten Gitters über
jeder Lücke (5) liegt, Zusammenfügen der Au-
ßenscheiben zu einer hermetisch abgedichte-
ten Doppelverglasungseinheit in an sich be-
kannter Art und Weise, sodaß die Buntgläser
und das erste Bleigitter in dem Hohlraum (8)
zwischen den Außenscheiben liegen, und An-
kleben eines zweiten Bleigitters (7:27) an die
Außenfläche der ersten Außenscheibe (4:26),
um die durch diese hindurch sichtbaren Lük-
ken (5) zwischen den Kantenbereichen der ne-
beneinanderliegenden Gläser unsichtbar zu
machen.
5. Verfahren nach Anspruch 4, dadurch gekenn-
zeichnet, daß beide Außenscheiben (4, 10:26,
29) durchsichtige Glasscheiben sind.
6. Verfahren nach Anspruch 4 oder 5, dadurch
gekennzeichnet, daß die nebeneinanderliegen-
den Gläser (22) der Buntglastafel mit einem
ersten Gitter (20) aus T-förmigen Bleistreifen
(21) zusammengebaut werden, deren Endbe-
reiche verlötet sind und deren Ständer sich in
der Lücke zwischen den nebeneinanderliegen-
den Gläsern (22) befinden, und das erste Git-
ter (20) und die zusammengebauten Gläser
(22) mittels auf die Lücken zwischen den Kan-
tenbereichen der Gläser (22) und den Stän-
dern der Bleistreifen (21) aufgetragenen Kleb-
stoffs an einer Fläche der ersten Außenscheibe
(26) befestigt sind.
7. Verfahren nach Anspruch 6, dadurch gekenn-
zeichnet, daß man für die Kantenbereiche des
ersten Gitters (20) L-förmige Bleistreifen (25)
verwendet.
8. Erste Außenscheibe (4:26) einer doppelver-
glasten Buntglaseinheit mit auf gegenüberlie-
genden Seiten der Scheibe (4:26) angeordne-
ten, ersten und zweiten Bleistreifengittern (7,
7a:20, 27) und mit Mitteln zum Färben der
Fläche zwischen den Bleistreifen und einer
Seite der Außenscheibe, dadurch gekennzeich-
net, daß die separaten Gläser (1, 2:22) der
Buntglaseinheit mit jeweils einer klebstoffge-
füllten Lücke (5) zwischen den Gläsern an be-
sagter einen Seite befestigt werden und daß
das erste Gitter (7a:20) über den Lücken (5)
auf der einen Seite und das zweite Gitter (7:27)
über den durch die andere Seite der Außen-
scheibe (4:26) sichtbaren Lücken (5) liegt.
9. Erste Außenscheibe nach Anspruch 8, dadurch
gekennzeichnet, daß das erste Gitter (20) aus
T-förmigen Bleistreifen (21) besteht, wobei der
Ständer des "T" jeweils in einer der besagten
Lücken (5) liegt.

10. Doppelverglaste Buntglaseinheit, gebildet durch Kombinieren einer ersten Außenscheibe (4;26) nach Anspruch 8 oder 9 mit einer zweiten Außenscheibe (10;29) zur Bildung eines hermetisch abgedichteten Hohlraums (8) dazwischen, wobei der Hohlraum das erste Gitter und separate Gläser (1, 2;22) der Buntglaseinheit enthält.

Revendications

1. Unité de double vitrage teintée comprend une première (4; 26) et une seconde (10; 29) feuilles faciales en matière transparente claire, un cadre périphérique (9, 11; 30, 31) écartant l'une de l'autre les feuilles faciales et scellant hermétiquement la cavité (8) formée entre les feuilles faciales et, placé à l'intérieur de la cavité, un panneau de verre teinté comprenant un ensemble de morceaux de verre (1, 2; 22) arrangés avec leurs régions de bord voisines et une résille de bandes de plomb recouvrant lesdites régions de bord, les morceaux de verre (1, 2; 22) étant posés directement contre la surface intérieure de la première (4; 26) des feuilles faciales avec un interstice (5) entre les régions de bord de morceaux de verre (1, 2; 22) voisins, caractérisée en ce que l'interstice (5) contient un adhésif collant les morceaux à la première feuille faciale (4; 26), avec une première résille de bandes de plomb (7; 21) fixée par dessus chaque interstice (5) entre les morceaux de verre dans le panneau à l'intérieur de la cavité (8) et en ce qu'une seconde résille de bandes de plomb (7; 27) est fixée sur la surface extérieure de la première feuille faciale (4; 26) pour recouvrir les interstices (5) entre les morceaux de verre disposés à l'intérieur de la cavité (8).
2. Unité de double vitrage suivant la revendication 1, caractérisée en ce que les feuilles faciales (4, 10; 26, 29) sont en verre clair.
3. Unité de double vitrage suivant la revendication 1 ou la revendication 2, caractérisée en ce que les morceaux de verre (1, 2) sont collés le long de leurs bords sur la surface intérieure de la première feuille faciale (4) et en ce que chaque résille de plomb est constituée de bandes de plomb autocollantes (7), les raccords entre les longueurs de bande de plomb (7) qui constituent chaque résille étant masqués par une zone de brasure fondue.
4. Procédé pour incorporer les différents verres (1, 2; 22) d'un panneau de vitrail teinté dans une unité de double vitrage scellée comprenant

nant une première (4, 26) et une seconde (10, 29) feuilles faciales transparentes hermétiquement scellées le long de leurs bords pour laisser entre les feuilles une cavité (8) dans laquelle le panneau est placé, caractérisé en ce que l'on fixe les régions de bord de verres voisins dans le panneau de verre teinté l'une à l'autre et à la première feuille faciale transparente (4, 26) par l'intermédiaire d'un interstice (5) rempli d'adhésif entre les verres voisins, en ce que l'on place une première résille de bandes de plomb (7, 7a; 21, 25) par dessus les régions de bord voisines des verres de manière telle qu'une bande respective de la première résille recouvre chaque interstice (5), en ce que l'on combine les feuilles faciales en une unité de double vitrage hermétiquement scellée d'une manière connue en soi de telle sorte que les verres teintés et la première résille de plomb se trouvent dans la cavité (8) comprise entre les feuilles faciales, et en ce que l'on colle une seconde résille de plomb (7; 27) sur la surface extérieure de la première feuille faciale (4; 26) pour masquer les interstices (5) entre les régions de bord des verres voisins visibles à travers la première feuille faciale.

5. Procédé suivant la revendication 4, caractérisé en ce que les deux feuilles faciales (4, 10; 26, 29) sont des feuilles de verre transparentes.
6. Procédé suivant la revendication 4 ou 5, caractérisé en ce que les verres voisins (22) du panneau de verre teinté sont assemblés l'un à l'autre par une première résille (20) de bandes de plomb (21) en T dont les régions terminales sont brasées l'une à l'autre et dont les âmes des bandes de plomb en T se trouvent dans l'interstice entre les verres voisins (22), et en ce que la première résille (20) et les verres assemblés (22) sont fixés à une surface de la première feuille faciale (26) par un adhésif appliqué dans les interstices entre les régions de bord des verres (22) et à l'âme des bandes de plomb (21).
7. Procédé suivant la revendication 6, caractérisé en ce que les régions de bord de la première résille (20) emploient des bandes de plomb en L (25).
8. Première feuille faciale (4; 26) d'une unité de double vitrage en verre teinté comprenant une première et une seconde résilles de bandes de plomb (7, 7a; 20, 27) situées sur les surfaces opposées de la feuille (4; 26) et avec des moyens colorant les plages entre les bandes de plomb sur une seule surface de la feuille

faciale, caractérisée en ce que les verres séparés (1, 2; 22) de l'unité de verre teinté sont fixés à ladite seule surface avec un interstice (5) rempli d'adhésif entre les régions de bord de chacun des verres et en ce que la première résille (7a; 20) recouvre les interstices (5) sur ladite seule surface et la seconde résille (7; 27) recouvre les interstices (5) visibles à travers l'autre surface de la feuille faciale (4; 26).

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9. Première feuille faciale suivant la revendication 8, caractérisée en ce que la première résille (20) comprend des bandes de plomb en "T" (21), l'âme de chaque "T" étant située dans un desdits interstices (5).

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10. Unité de double vitrage en verre teinté formée en combinant une première feuille faciale (4; 24) suivant la revendication 8 ou la revendication 9 avec une seconde feuille faciale (10; 29) pour former entre elles une cavité (8) hermétiquement scellée, la cavité contenant la première résille et des verres séparés (1, 2; 22) de l'unité de verre teinté.

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