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(54) improvements in double glazing.

(57) A double glazed leaded light unit comprises first (4) and second (10) facing sheets of clear transparent material, a perimeter frame (9, 11) spacing the facing sheets apart and hermetically sealing the gap (8) formed between the facing sheets, and located within the gap, the lead strips (7, 7a) and glass pieces (1, 2) of a leaded light (3), and is characterised in that the pieces of glass (1, 2) are supported directly, against the inside of the first of the facing sheets (4), a first framework of lead strips (7, 7a) is secured over the edges of the pieces of glass (2, 1) within the gap (8) and a second framework of lead strips (7) is secured on the outside of the first facing sheet (4) to overlie the edges of the pieces of glass (2, 1) disposed within the gap (8).

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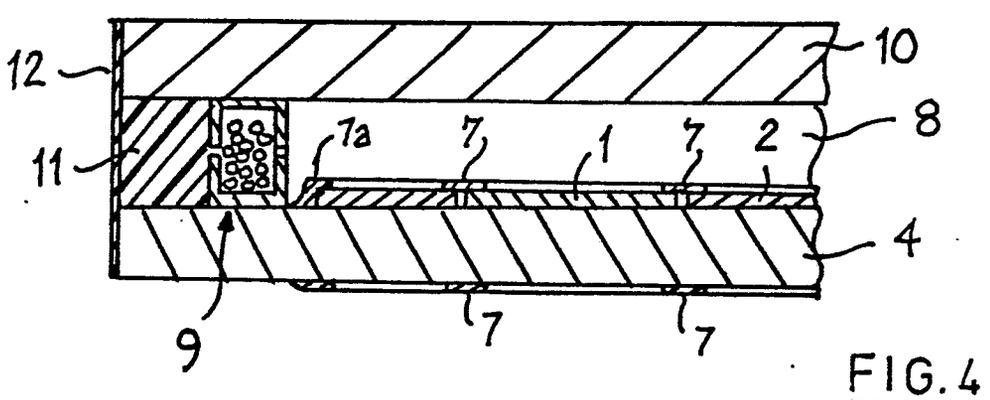

FIG. 4

Improvements in double glazing

This invention relates to a sealed double glazed leaded light unit which has particular reference to a 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 gap 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.

EP-A-0085732 discloses a substitute sealed double glazed stained glass unit constructed by sticking lead strips and coloured plastics sheets onto the inside of one of the clear glass boundary sheets. It has also been proposed to paint areas of the inside surface of one of the clear glass boundary sheets 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 leaded light unit comprises first and second facing sheets of clear transparent material, a perimeter frame spacing the facing sheets apart and hermetically sealing the gap formed between the facing sheets, and located within the gap, the lead strips and glass pieces of a leaded light, wherein the pieces of glass are adhered directly, at edge regions thereof, to the inside of the first of the facing sheets, a first framework of lead strips is secured over the edges of the pieces of glass within the gap and a second framework of lead strips is secured on the outside of the first facing sheet to overlie the edges of the pieces of glass disposed within the gap.

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 lead framework can be made from self-adhesive or T-section lead strip, the joins between the lengths of lead strip that make up the framework preferably being 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 made the second external framework, the joins 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 gap, 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 comprises adhering edge regions of adjacent glasses of the stained glass panel together and to a first trans parent facing sheet, locating a first frame of lead strips over the adjacent edge regions so that a respective strip of the frame overlies each edge region, combining the first facing sheet with a second facing sheet into a hermetically sealed double glazed unit so that the stained glasses and first lead frame lie within the gap between the facing sheets, and adhering a second lead frame on the outer face of the first facing sheet to obscure 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 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 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.

The invention will now be further described by the following examples read in conjunction with the accompany ing 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 resuling 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 gap 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 joins 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 gap 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 hemetically 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 leaded light 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 gap (8) formed between the facing sheets, and located within the gap, the lead strips (7,7a:21, 25) and glass pieces (1, 2:22) of a leaded light, characterised in that the pieces of glass (1, 2:22) are supported directly against the inside of the first of the facing sheets (4, 26), a first framework of lead strips is secured over the edges of the pieces of glass within the gap and a second framework of lead strips (7, 27) is secured on the outside of the first facing sheet (4, 26) to overlie the edges of the pieces of glass disposed within the gap.

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 characterised by securing the glasses of the stained glass panel directly to a first transparent facing sheet (4, 26), locating a first frame of lead strips (7, 7a:21, 25) over adjacent edge regions of the glasses so that a respective strip of the frame overlies each edge region, combining the first facing sheet (4:26) with a second facing sheet (10:29) into a hermetically sealed double glazed unit so that the stained glasses and first lead frame lie within the gap (8) between the facing sheets, and adhering a second lead frame (7:27) on the outer face of the first facing sheet (4, 26) to obscure the edge regions 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 (21) 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 between the adjacent glasses (22) and the first frame (20) and assembled glasses (21) are secured to one face of the first facing sheet (26) by adhesive applied to 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).

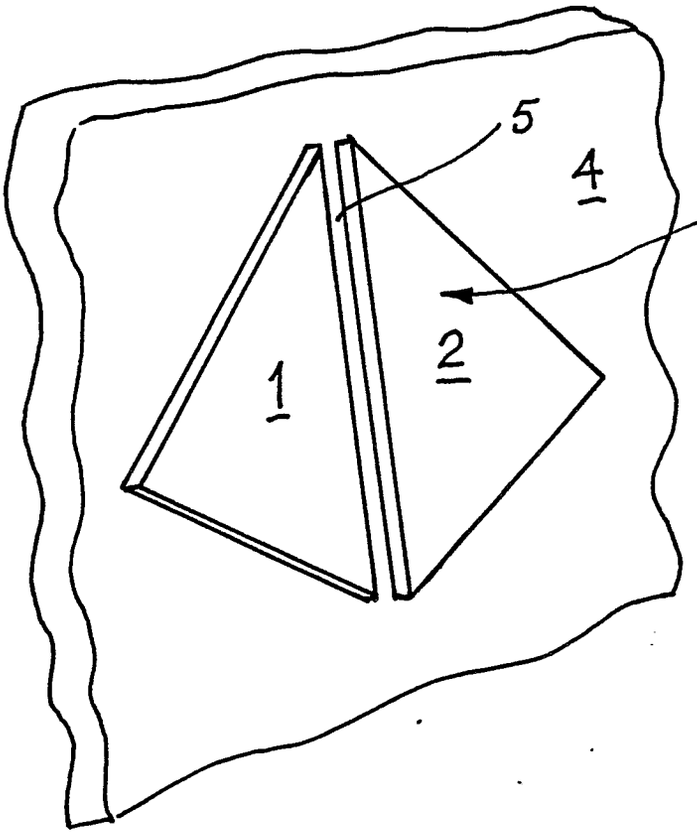

FIG.1

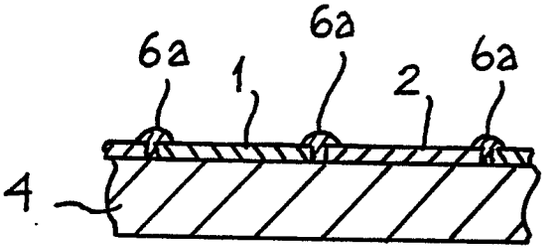

FIG.2

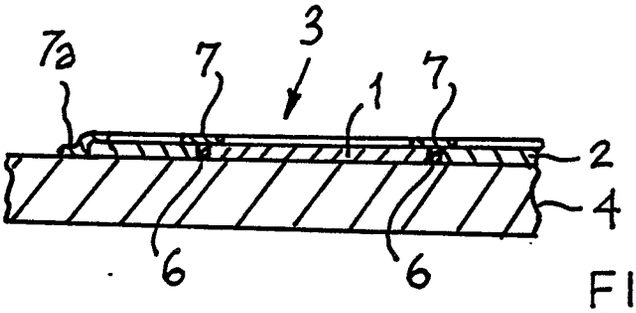

FIG.3

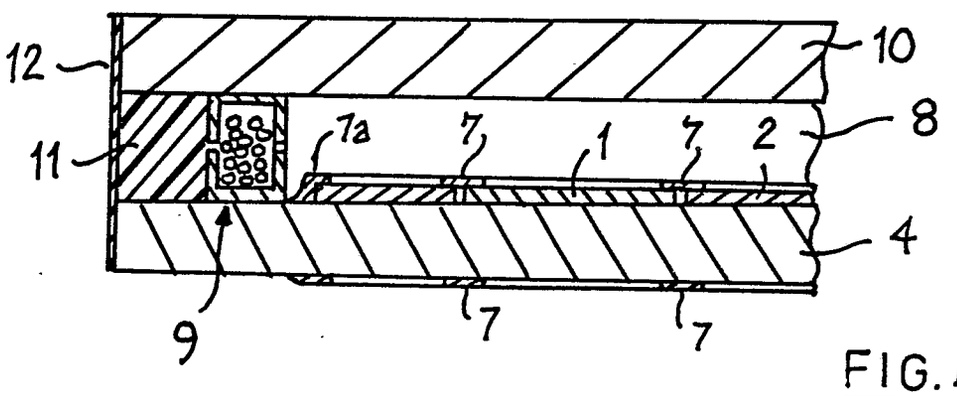

FIG.4

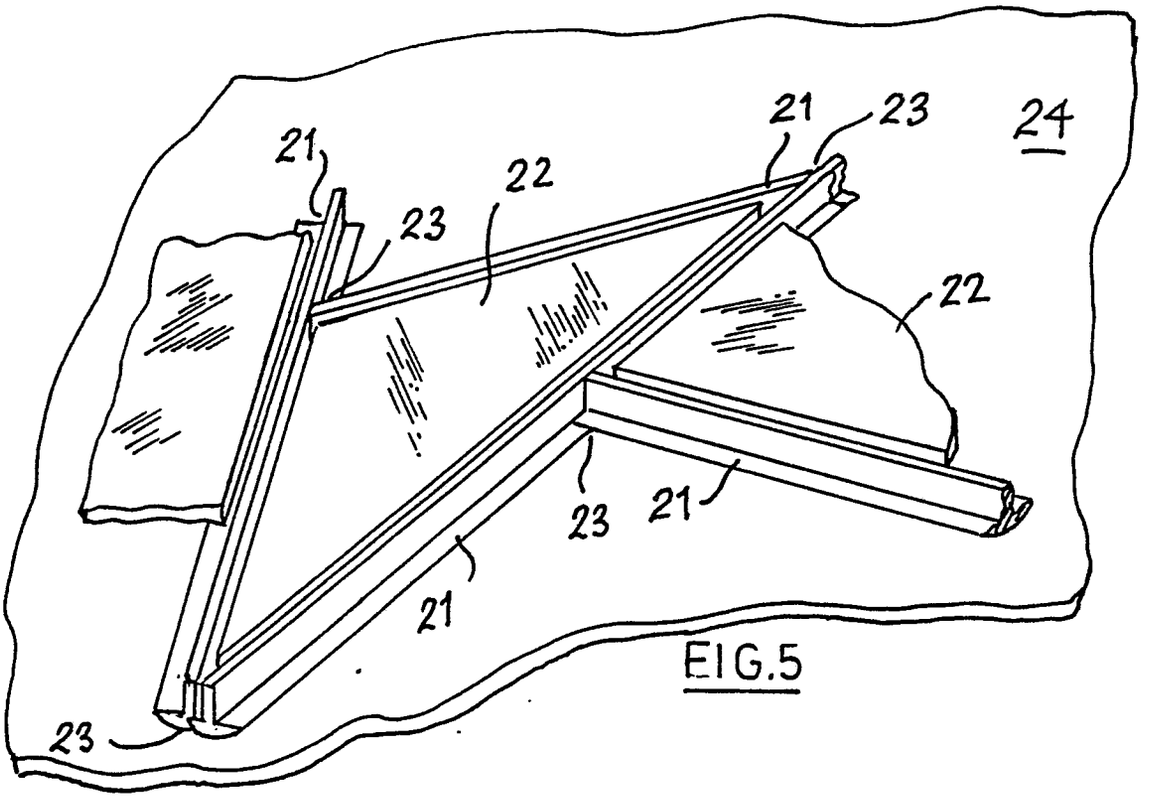

FIG.5

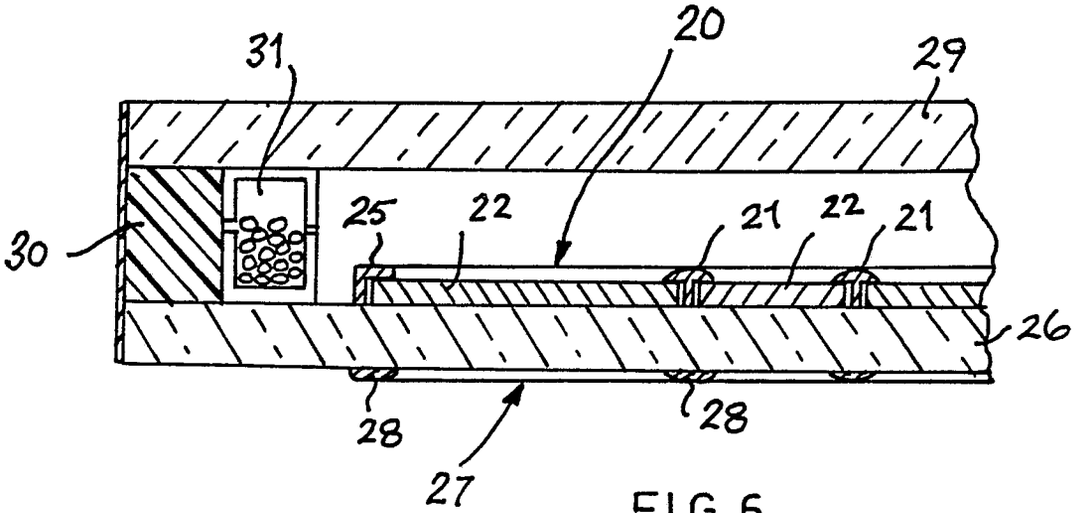

FIG.6