

12 **EUROPEAN PATENT APPLICATION**

21 Application number: **88201378.2**

51 Int. Cl.4: **E06B 3/66 , E06B 3/02**

22 Date of filing: **01.07.88**

30 Priority: **23.07.87 NL 8701747**

43 Date of publication of application:
01.02.89 Bulletin 89/05

84 Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

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54 **A pluralglass pane.**

57 A plural glass pane, comprising an assembly of at least two glass panes (1) being held at the desired distance by means of distance ledges extending along the edge portions and joining each other, holes (10) being formed in at least one of said glass panes (1) which do not communicate with the air space (2) between the glass plates, in which holes (10) fastening means for fastening fitting elements are provided, said plural glass pane being characterised in that near a hole (10) or a plurality of adjacent holes (10) for fastening means a distance piece (3) is provided, which comprises an annular closed outer rim (4) surrounding a chamber (5) filled with cement around the or each fastening means, and a distance piece for this purpose.

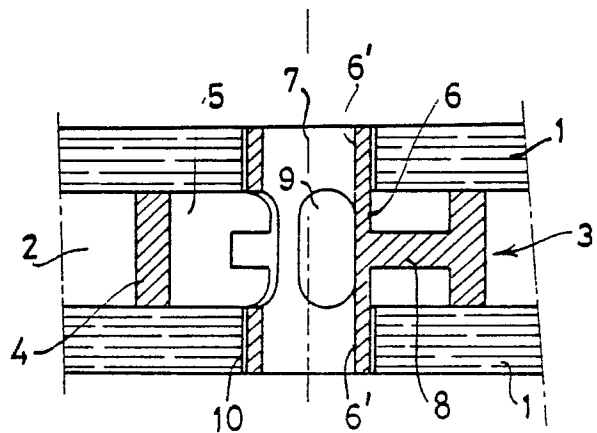


Fig. 2.

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A plural glass pane.

In NL-C 178 531 (NL-A 82 00 970) of the same applicant a plural glass pane has been described, comprising an assembly of at least two glass panes which are held at a desired distance by means of distance ledges arranged along the border portions and joining each other, and, at the outer side of said distance ledges, a cement layer is provided for preventing penetration of moisture, and in at least one of said glass panes holes are formed which do not communicate with the air space between said panes, in which holes fastening means such as nails or bolts are provided for fastening fitting elements. The holes and the nails or bolts are, then, surrounded by distance ledge portions and cement, so that the holes open in the interspace filled with cement.

Plural glass panes constructed in this manner effectively avoid that, along the fastening nails or bolts, leak passages are formed as a consequence of the substantial forces acting thereon, through which passages moisture can penetrate into the interspace between the glass panes.

According to this patent the distance ledges are provided, in the vicinity of said holes, with re-entrant portions being led, at the inner side, along said holes, thus defining a cement space enclosing the nails or bolts arranged therein, said space, when providing the circumferential cement layer, also being completely filled with cement. A consequence thereof is, however, that, on the one hand, special distance ledges are to be used, and that, on the other hand, a cement layer is present between said nails or bolts and the edge of the plural glass pane, said layer being visible through the panes, which, in particular in the vicinity of handles or similar fitting elements situated at some distance from the edge, can be objectionable. Moreover it is not possible to arrange, in this manner, fitting elements at a larger distance from the edge, and in particular in the centre of the glass pane.

The invention provides an improvement of the above-mentioned plural glass pane, allowing to avoid said objections, and being characterised in that, near a hole or several adjacent holes for the fastening means, a distance piece is provided comprising an annular closed outer rim surrounding a chamber to be filled with cement around the or each nail or bolt.

Said distance pieces can have such dimensions that they will be substantially covered by the fitting elements fastened by the nails or bolts in question, so that the cement layer is not or hardly visible, and in that, in the case of fitting elements situated near the edge of the glass pane, a cement

layer extending to the edge is no longer present. Moreover normal straight distance ledges can be used at the edge of the plural glass pane. It will, for the rest, be clear that in the case of a fitting element such as a hinge arranged near the edge and in particular in the corners, the above-mentioned known distance ledges can be used without any objection.

Such a distance piece can be filled with cement through a hole in one of the glass panes, before the nail or bolt in question is provided therein or has been completely inserted.

In particular the distance piece according to the invention has a circular outer edge, so that, when being put in place, it is not necessary to pay attention to the orientation thereof, and a rotation caused by, for instance, tensioning forces, is not objectionable.

In order to obtain a good location, the distance piece of the invention is preferably provided with one or more central sleeves each being connected by spokes with the rim, and being provided with a central bore for accommodating a nail or bolt, passages communicating with the cement receiving chamber being provided for allowing the cement chamber to be filled with cement.

Preferably said sleeves are extended at both ends beyond the end faces of the outer rim by end portions fitting into the holes of the glass panes.

The invention will be elucidated below by reference to a drawing, showing in:

Fig. 1 a partial section through a plural glass pane according to the invention; and

Fig. 2 a representation in perspective with partially removed portions of a distance piece for such a glass pane.

In Fig. 1 a part of a plural glass pane according to the invention is shown. It comprises two glass panes 1 being held at a given distance in the edge portions by means of profile ledges in the manner described in NL-C 178 531, the internal air space 2 providing the desired insulation. These circumferential profile edges are sealed against moisture by means of an uninterrupted external cement layer.

For fastening fitting elements, according to the invention use is made of a distance piece 3 separately shown in Fig. 2. It comprises an outer ring 4 surrounding an inner space 5, and in the centre thereof a central sleeve 6 with a bore 7 is provided which is connected with said ring 4 by means of spokes 8. One or more openings 9 in the sleeve 6 provide a connection between the bore 7 and the cement chamber 5. The sleeve 6 has at both sides end portions 6' extending beyond the respective end face of the ring 4 as clearly follows from Fig.

1. This distance piece 3 consists of a suitable plastics material, and can be produced as a unitary element.

As shown in Fig.1, the end portions 6' of the distance piece 3 are inserted into holes 10 of the glass panes 1, so that the ring 4 is kept centered in respect of said holes 10. Before inserting a fastening bolt or the like into the bore 7 of the sleeve 6, cement is injected through the bore 7 of the sleeve 6, the cement then penetrating through the opening or openings 9 into the chamber 5 and filling the latter completely. Before or during the insertion of a fastening nail or bolt, surplus cement is removed, and then the interspace between the nail or bolt and the inner wall of the bore 7 can be filled with cement.

As shown the end portions 6' of the sleeve 6 have a length which is equal to the thickness of a glass pane 1. When mounting a fitting element, a washer or filler plate can be placed against the glass pane 1 in question, said washer or plate having an opening in which the end portion 6' of the sleeve is fitting, the sleeve then remaining unstressed. It will be clear, however, that sometimes also shorter or longer end portions 6' can be used.

The advantage of a round distance piece is that, when being put in place, it is not necessary to pay attention to its orientation, and a possible rotation thereof during arranging or by other causes has no visible consequences, and also a better force distribution is obtained.

It is, of course, also possible to use distance pieces of this kind adapted to surround two or more holes in the glass panes 1 at a relatively small mutual distance, and having a single continuous cement chamber. It is, of course, also possible to omit the central sleeve 6, if a precise alignment on a hole 10 is not required.

Claims

1. A plural glass pane, comprising an assembly of at least two glass panes being held at the desired distance by means of distance ledges extending along the edge portions and joining each other, at the outer side of said distance ledges a cement layer being provided for preventing penetration of moisture, holes being formed in at least one of said glass panes which do not communicate with the air space between the glass plates, in which holes fastening means for fastening fitting elements are provided, which holes and fastening means are surrounded by distance ledge portions and cement, so that said holes open into the interspace filled with cement, characterised in that near a hole (10) or a plurality of adjacent holes for

fastening means a distance piece (3) is provided, which comprises an annular closed outer rim (4) surrounding a chamber (5) filled with cement around the or each fastening means.

2. The glass pane of claim 1, characterised in that the distance piece (3) has a circular outer rim (4).

3. The glass pane of claim 1 or 2, characterised in that the distance piece (3) comprises one or more central sleeves (6) connected by means of spokes (8) with the rim (4), and being provided with a central bore (7) for accommodating a fastening means, passages (9) communicating with the cement receiving chamber (5) being provided for allowing the cement chamber (5) to be filled with cement.

4. The glass pane of claim 3, characterised in that the or each sleeve (6) is extended at both ends beyond the end faces of the outer rim by means of end portions (6') fitting into corresponding holes (10) of the glass panes (1).

5. A distance piece adapted to be used in a plural glass pane of any one of claims 1..4.

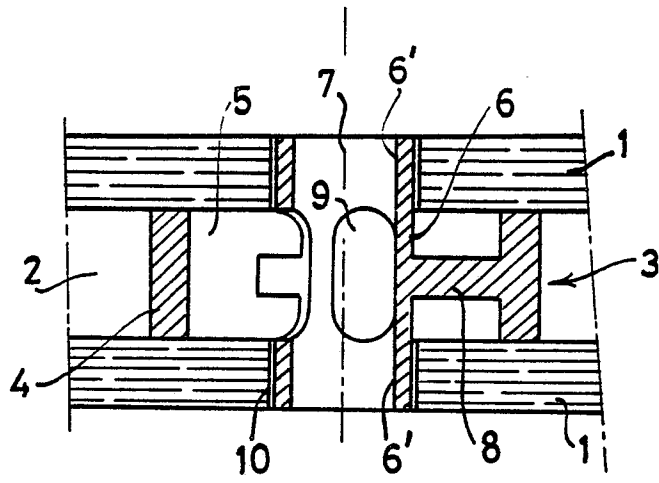


FIG. 1.

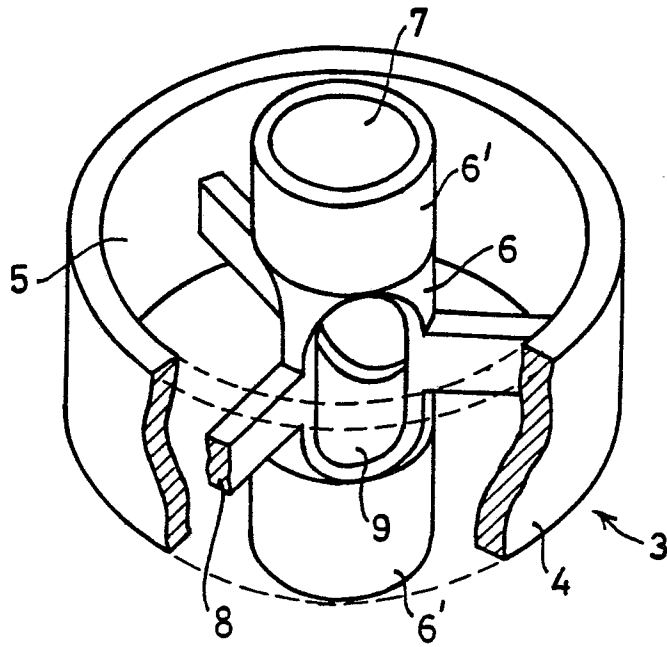


FIG. 2.



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. 4)
Y	DE-A-3 442 911 (SEITZ) * Page 8, line 12 - page 11, line 3; figures 1-11 *	1,2	E 06 B 3/66 E 06 B 3/02
A	---	3,4	
Y	NL-A-7 802 883 (STENMAN) * Page 8, line 19 - page 9, line 7; figure 10 *	1,2	
A	US-A-2 936 050 (McLAUGHLIN) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			E 06 B E 05 D
Place of search		Date of completion of the search	Examiner
THE HAGUE		21-10-1988	DEPOORTER F.
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X : particularly relevant if taken alone		T : theory or principle underlying the invention	
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