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(54) A method and a device for mounting a glass pane in a window frame

(57) In a method for mounting a glass pane in a window frame the glass pane (10) is positioned with its edge portion in a fillister (14) in the window frame (2), the fillister having a side surface (16) and a bottom surface (18). One side surface (26) of the edge portion of the glass pane is positioned and sealed in relation to the side surface (16) of the fillister (14) and at the other side surface (34) of the edge portion of the glass pane there is positioned a fastening strip (12) which by means of fastening means (44) is fixed to the bottom surface (18) of the fillister. The fastening strip (12) is fixed to the bottom surface (18) of the fillister (14) by attaching the fastening means (44) to the fastening strip (14). The other side surface (34) of the edge portion of the glass pane is sealed in relation to the window frame by means of a sealing strip (50) consisting of elastic material, the sealing strip being forced into the groove (38). The sealing strip (50) covers the fastening means (44) completely. The invention relates also to a device for mounting a glass pane in a window frame.

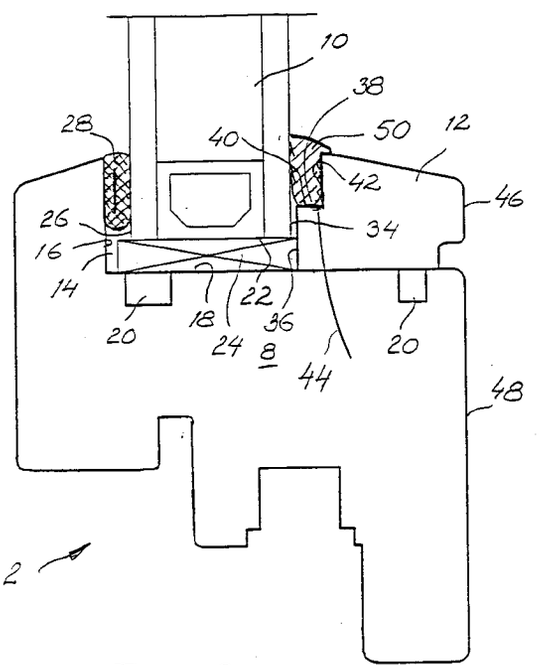

Fig. 2a

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Description

The present invention relates to a method and a device for mounting a glass pane in a window frame, especially to a frame made of wood or a frame of a material which may be fixed by means of nails or staples.

In a prior art method and a prior art device for mounting a glass pane in a window frame the glass pane which for example can consist of two panes connected with each other for forming a sealed glazing unit is with its edge portion positioned in a fillister in the window pane. The fillister is formed by a side surface and a bottom surface and the glass pane is positioned in the fillister by positioning and sealing one side surface of the edge portion of the glass pane against the side surface of the fillister and by fixing a fastening strip by means of fastening elements to the bottom surface of the fillister. Thereby, a side surface of the fastening strip faces the other side surface of the edge portion of the glass pane and this side surface of the fastening strip is sealed in relation to said side surface of the edge portion of the glass pane. The fasting strip as well as the window frame consist of wood and the fastening strip is fixed to the bottom surface of the fillister of the frame by means of nails or staples which from the upper surface of the fastening strips are forced through the fastening strip into the window frame. Thus, the prior art method and the prior art device for mounting a glass pane in a window frame requires subsequent treatment by for example filling or flatting for hiding the parts of the nails or the staples positioned at the surface of the fastening strip or at least for making these portions less visible.

A method for mounting a glass pane in a window frame made of wood according to the introductory part of claim 1 is known from EU 0 015 842, however, the nails used for fixing the fastening strip are hit in a manner so that the heads of the nails are visible. Moreover, the hitting procedure is made while the fastening strip has to be pressed against the pane in order to compress the sealing, which does not lead to a reliable sealing.

The object of the invention is to provide a method and a device for mounting a glass pane in a window frame obviating the disadvantages mentioned above.

In order to comply with this object the method for mounting a glass pane in a window frame is in accordance with the invention characterized in that the fastening strip is fastened to the bottom surface of the fillister by positioning the fastening means in a groove formed in the fastening strip at the other side surface of the edge portion of the glass pane and open towards the other side surface of the edge portion of the glass pane and that the other side surface of the edge portion of the glass pane is sealed in relation to the window frame by means of a sealing strip, consisting of elastic material, the sealing strip being forced into the groove under compression between the other side surface of the edge portion of the glass pane and an opposite side surface of the groove while covering the portions of the fastening means positioned at the surface of the groove.

Thus, when using the method for mounting a glass pane in a window frame in accordance with the invention there is provided a fixing of the fastening strip to frame by means of completely hidden nails or staples. The costly and time consuming subsequent treatment is thereby completely avoided.

In a preferred embodiment of the method according to the invention the fastening strip is prior to the fixing to the bottom surface of the fillister given a correct position by positioning a reference surface of the fastening strip in a predetermined position in relation to a reference surface of the window frame, the position of the fastening strip being defined so that the sealing strip is subjected to the desired compression when it is forced down into the groove. It is thereby suitable that said reference surfaces are constituted by the side surface of the fastening strip turned from the glass pane and the adjacent side surface of the window frame. Preferably said side surface are positioned in the same plane.

In the method according to the invention the side surface of the edge portion of the glass pane, which is positioned against the side surface of the fillister can be sealed in relation to this side surface by means of an elastic material sealing strip or by means of a silicone bead or the like.If the sealing of said edge portion of the glass pane in relation to the side surface of the fillister is provided by means of an elastic material sealing strip a fastening position of the fastening strip at the bottom surface of the fillister is adapted so that said sealing strip as well as the sealing strip forced into the groove in the fastening strip are subjected to the desired compression.

The method according to the invention can be used when the glass pane consists of a single pane as well as when the glass pane consists of an insulating glass pane consisting of two or more panes sealingly connected with each other.

The device for mounting a glass pane in a window frame according to the invention comprises a fillister formed in the frame comprising a side surface against which one side surface of the edge portion of the glass pane is adapted to be positioned and sealed, a fastening strip which is adapted to be fixed to the bottom surface of the fillister by means of fastening means with one side surface facing the other side surface of the edge portion of the glass pane and a sealing strip for sealing the other side surface of the edge portion of the glass pane in relation to the fastening strip, the fastening strip being formed with a groove positioned adjacent the other side surface of the edge portion of the glass pane and open towards said side surface, the fastening means being positioned in the groove for fixing the fastening strip to the bottom surface of the fillister, and the device comprising an elastic material sealing strip which under compression is positioned in the groove between the other side surface of the edge portion of the glass pane and an opposite side surface of the groove, the sealing

strip covering the portions of the fastening means positioned at the surfaces of the groove.

It is preferred that the sealing strip positioned in the groove the fastening strip is at its side surfaces engaging the edge portion of the glass pane and the opposite side surface of the groove formed with sealing lips for securing an efficient sealing function and facilitating the forcing of the sealing strip into the groove.

In order to secure the drainage of water the sealing strip positioned in the groove is formed whith an outer inclined surface forming with the edge portion of the glass pane and angle exceeding 90°.

The invention shall be described in the following with reference to the accompanying drawings.

Fig. 1 is a plan view of a window frame with a glass pane mounted therein in accordance with the invention.

Fig. 2a is a section on line II-II of Fig. 1 through the bottom element of the window frame shown in Fig. 1.

Figs. 2b and 2c are sections through sealing strips included in the window frame as shown in Fig. 1 and 2a.

Fig. 3 is a section corresponding to Fig. 2a of a modified embodiment of a window frame with a glass pane mounted therein in accordance with the method of the invention.

Fig. 4 is a section similar to Fig. 2a, however, directed to an embodiment in which the fastening has no groove.

In Fig. 1 there is shown a plan view of a window frame 2 consisting of wood and comprising side elements 4, an upper element 6 and a bottom element 8. An insulating glass pane 10 is by means of a peripherally extending fastening strip 12 mounted in the window frame 2 by means of the device according to the invention. The fastening strip 12 consists of wood, foamed plastic material or any other material through which nails or staples can be driven.

The sectional design of the side elements 4, upper element 6 and bottom element 8 of the window frame 2 appears from Fig. 2a but it is realized that this sectional shape can be of any other design within the scope of the invention.

The window frame is formed with a fillister 14 which is of angular cross section by being formed with a side surface 16 and a bottom surface 18. The side surface 16 and the bottom surface 18 form a substantially right angle with each other. Grooves 20 are in a conventional way formed at the bottom surface 18.

The insulating glass pane 10 is at its edge surface 22 supported in a conventional way by means of setting blocks 24 in the fillister 14 of the frame. The edge portion of the insulating glass pane 10 has a side surface 26 which is positioned and sealed against the side surface 16 of the fillister, the sealing being provided by means of a sealing strip 28 compressed between the side surface 16 of the fillister 14 and the side surface 26 of the edge portion of the insulating glass pane 10. The cross sectional shape of the sealing strip 28 is in a non-compressed condition shown in Fig. 2b. Thus, the sealing strip 28 is constituted by a cellular rubber profile, consisting for example of EPDM with substantially rectangular cross section having a hollow space 30 and bead shaped projections 32 at the surface adapted to engage the side surface 26 of the edge portion of the insulating glass pane.

The insulating glass pane 10 is locked into the fillister 14 by means of the fastening strip 12. The fastening strip 12 has a side surface 36 facing the side surface 34 of the edge portion of the insulating glass pane and has in addition thereto a groove 38 open towards the edge portion 34 of the insulating glass pane. The groove 38 has a bottom surface 40 and a side surface 42 facing the side surface 34 of the insulating glass pane.

The fastening strip 12 is fixed to the bottom surface 18 of the window frame fillister 14 by means of nails 44 which from the bottom surface 40 of the groove 38 extend through the fastening strip 12 into the wood material of the frame. The fastening strip 12 is fixed to the frame in such a position that the outer side surface 46 of the fastening strip is positioned in the same plane as the adjacent side surface 48 of the window frame. A sealing strip 50 is forced into the groove 38 in the fastening strip 12 and is thus compressed between the side surface 34 of the edge portion of the insulating glass pane and the opposite side surface 42 of the groove 38 in the fastening strip 12. The sectional shape of the sealing strip 50 in a non-compressed condition appears from Fig. 2c. The sealing strip 50 is provided with sealing lips 52 and 54, thus engaging the side surface 34 of the edge portion of the insulating glass pane and the side surface 42 of the groove 38. The sealing strip 50 has an upper bevelled surface 56 forming an angle with the side surface 34 of the edge portion of the insulating glass pane exceeding 90° and thereby providing a satisfying drainage of water from the window pane. The sealing strip 50 completely hides the portions of the nails 44 visible at the bottom 40 of the groove 38, and in accordance with the invention there is provided a completely hidden fixing of the fastening strip 12 to the window frame without any requirement for subsequent treatment of the window frame.

The dimensioning of the fastening strip 12 in relation to the fillister 14 and in relation to the insulating glass pane and the sealing strips 28 and 50 is such that the sealing strips 28 and 50 have the compression necessary for providing the desired sealing function when the side surface 46 of the fastening strip 12 is positioned in the same plane as the side surface 48 of the window frame.

The embodiment of the invention shown in Fig. 3 differs from the embodiment shown in Fig. 2 in the respect that the side surface 26a of the edge portion of the insulating glass pane 10a is sealed towards the side surface 16a of the fillister 14a by means of a bead 60 of silicone positioned in a groove 58 in the window frame instead of by means of the sealing strip 28. For the rest the embodiment according to Fig. 3 is in all essentials

formed in agreement with the embodiment according to Fig. 2a.

The mounting of the insulating glass pane 10 in the window frame 2 is conducted substantially in the following way: Initially the sealing strip 28 is applied to the side surface 16 of the fillister 14. It is preferred that the sealing strip 28 is at its surface intended to be connected with the side surface 16 of the fillister 14 provided with an adhesive covered by a removable tape. Thus, after the tape has been removed the sealing strip 28 can in a simple way be fastened to the side surface 16 of the fillister 14. Thereupon, the insulating glass pane 10 is positioned in the fillister, the frame 2 thereby taking a horizontal position which means that the sealing strip 28 which thereby will take up the weight of the insulating glass pane is subjected to a certain precompression. The position of the insulating glass pane 10 in the fillister is thereupon adjusted by means of the setting blocks 24. The fastening strip 12 is nailed in the fillister 14 against the bottom surface 18 of the fillister, the side surface 46 of the fastening strip 12 being positioned in the same plane as the side surface 48 of the frame. Thus, the surfaces 46 and 48 constitute reference surfaces for defining the correct position of the fastening strip 12 in the frame 2. The fastening strip 12 is fastened in the frame by means of nails or staples which are positioned in the fixing strip 12 starting from the bottom 40 of the groove 38.

After the fastening strip 12 has been fixed to the frame the sealing strip 50 is positioned in the groove 38 by being forced into the groove to the position as shown in Fig. 2a. Thereby, the dimensions of the included elements, i.e. the fastening strip 12, the sealing strips 28 and 50 and the insulating glass pane, as well as the groove 38 in the fastening strip 12 and the position of the fastening strip 12 are related so to each other that the sealing strips 28 and 50 are automatically provided with the correct compression when the sealing strip 50 is forced into the groove 38.

In the embodiment according to Fig. 3 the side surface 26a and 34a of the edge portion of the insulating glass pane directly contact the side surface 16a of the fillister and the side surface 36a of the fastening strip 12a, respectively, which means that the positioning of the including elements can be conducted in such a way that the sealing strip 50a is subjected to the desired compression when it is forced into the groove 38a.

The silicone bead 60 is supplied to the groove 58 subsequently to the finalizing of the mounting of the insulating glass pane in the fillister.

The invention can be modified within the scope of the following claims. For example, the sealing strip 28 can be formed with an upper bevelled surface for improving the drainage of water from the glass pane in the case that the window frame is turned so that the sealing strip 28 is positioned at the outside of the frame.

Also for the rest the invention can be modified within the scope of the following claims.

Fig. 4 is showing another embodiment of the present invention, in which the fastening strip 12 has no groove. Accordingly the nail 44 is hammered into the fastening strip 12 at the edge adjacent the pane 10.

Claims

1. A method for mounting a glass pane in a window frame, wherein the glass pane (10) is positioned with its edge portion in a fillister (14) in the frame (12), the fillister having a side surface (16) and a bottom surface (18), by positioning and sealing one side surface (26) of the edge portion of the glass pane against the side surface (16) of the fillister (14) and by fixing a fastening strip (12) by means of fastening means (44) to the bottom surface (18) of the fillister with a side surface (36) facing the other side surface (34) of the edge portion of the glass pane and sealing the fastening strip in relation to the edge portion of the glass pane, **characterized** in that the fastening strip (12) is fixed to the bottom surface (18) of the fillister (14) by applying the fastening means (44) at the edge of the fastening strip (12, Fig. 4) or in a groove (38) formed in the fastening strip (12, Fig. 2a) adjacent the other side surface (34) of the edge portion of the glass pane and open towards the other side surface(34) of the edge surface of the glass pane and that the other side surface (34) of the edge surface of the glass pane is sealed in relation to the window frame by means of a sealing strip (50) consisting of elastic material, which under compression is forced into the region between the other side surface (34) of the edge portion of the glass pane and the fastening strip (12).

2. A method as claimed in claim 1, **characterized** in that the fastening strip (12) is defined with regard to its position before being fastened to the bottom surface (18) of the fillister (14) by positioning a reference surface (46) of the fastening strip (12) in a predetermined position in relation to a reference surface (48) of the window frame and that the fastening strip (12) is defined with regard to its position so that the sealing strip (50) is subjected to a desired compression when being forced into its final position.

3. A method as claimed in claim 2, **characterized** in that the side surface (46) of the fastening strip (12) opposite to the side surface (36) facing the other side surface (34) of the edge portion of the glass pane is positioned in the same plane as the adjacent side surface (48) of the window frame before the fastening strip (12) is fastened to the bottom surface (18) of the fillister (14).

4. A method as claimed in any of the preceding claims, **characterized** in that one side surface (26) of the

edge portion of the glass pane is sealed in relation to the side surface (16) of the fillister (14) by means of a sealing strip (28) consisting of elastic material and being positoned and compressed between said side surface (16, 26).

5. A method as claimed in claim 4, **characterized** in that the fastening strip (12) is defined with regard to its position before being fixed to the bottom surface (18) of the fillister (14) so that the sealing strip (28) positioned between one side surface (26) of the edge portion of the glass pane and the side surface (16) of the fillister, as well as the sealing strip (50) positioned between the other side surface (34) of the edge portion of the glass pane and an opposite side surface (42) of the groove (38) in the fastening strip (12) are subjected to the desired compression.

6. A method as claimed in claims 4 and 5,**characterized** in that the sealing strip (28) consisting of elastic material and positioned between the side surface (16) of the fillister and one side surface (26) of the edge portion of the glass pane is pre-compressed between said side surface (16,26) before the fastening strip (12) is defined with regard to its position and is fixed to the bottom surface (18) of the fillister (14).

7. A method as claimed in claim 6, **characterized** in that the sealing strip (28) consisting of elastic material and positioned between the side surface (16) of the fillister and one side surface (26) of the edge portion of the glass pane is pre-compressed by forcing said one surface (26) of the edge portion of the glass pane towards the sealing strip (28), for example by the influence of gravity.

8. A method as claimed in any of the preceding claims **characterized** in that the glass pane which is mounted in the window frame (2) consists of an insulating glass pane (10) comprising two or more panes.

9. A method as claimed in any of the preceding claims, **characterized** in that the fastening strip (12) is fixed to the bottom surface (18) of the fillister (14) by means of nails (44) or staples.

10. A device for mounting a glass pane in a window frame by means of the method according to claim 1, comprising a fillister (14) arranged in the frame (2) and comprising a bottom surface (18) and a side surface (16) against which one side surface (26) of the edge portion of the glass pane is adapted to be positioned and sealed, a fastening strip (12) which is adapted to be fixed to the bottom surface (18) of the fillister by means of fastening means (44) with a side surface (36) facing the other side surface (34) of the edge portion of the glass pane and a sealing strip (50) for sealing the other side surface (34) of the edge portion of the glass pane in relation to the fastening strip (12), **characterized** in that the fastening strip (12, Fig. 2a) is formed with a groove (38) positioned adjacent the other side surface (34) of the edge portion of the glass pane and open towards said side surface, the fastening means (44) being positioned in said groove for fixing the fastening strip (12) to the bottom surface (18) of the fillister (14) and that the device comprises a sealing strip (50) of elastic material positioned in the groove (38) under compression between the other side surface (34) of the edge portion of the glass pane and an opposite side surface (42) of the groove, the sealing strip covering the fastening means (44) positoned at the surfaces of the groove.

11. A device for mounting a glass pane in a window frame by means of the method according to claim 1, comprising a fillister (14) arranged in the frame (2) and comprising a bottom surface (18) and a side surface (16) against which one side surface (26) of the edge portion of the glass pane is adapted to be positoned and sealed, a fastening strip (12) which is adapted to be fixed to the bottom surface (18) of the fillister by means of fastening means (44) with a side surface (36) facing the other side surface (34) of the edge portion of the glass pane and a sealing strip (50) for sealing the other side surface (34) of the edge portion of the glass pane in relation to the fastening strip (12), **characterized** in that the fastening means (44) being positioned at the edge of the fastening strip (12, Fig. 4) adjacent to the bottom surface (18) of the fillister (14) and that the device comprises a sealing strip (50) of elastic material positioned under compression between the other side surface (34) of the edge portion of the glass pane and an opposite side surface of the fastening strip (12), the sealing strip covering the fastening means (44).

12. A device as claimed in claims 10 or 11, characterized in that the fastening strip (12) includes a reference surface (46) positioned in a predetermined position in relation to a reference surface (48) of the window frame for defining the position of the fastening strip (12) in such a way that the sealing strip (50) is subjected to a desired compression.

13. A device as claimed in claim 12, **characterized** in that the reference surface (46) of the fastening strip (12) is constituted by the side surface (46) of the fastening strip (12) comprising two or more panes.

14. A device as claimed in any of the claims 10 - 13, **characterized** that said first side surface (26) of the edge portion of the glass pane is sealed in relation

to the side surface (16) of the fillister by means of a sealing strip (28) consisting of elastic material.

15. A device as claimed in claim 14, **characterized** in that the fastening strip (12) is fixed to the bottom surface (18) of the fillister (14) in a position in which the sealing strips (28; 50) are to a desired degree compressed between the side surface (16) of the fillister and said one side surface (26) of the edge portion of the glass pane and between a side surface (42) of the groove (38) in the fastening strip (12) and the other side surface (34) of the edge portion of the glass pane.

16. A device as claimed in any of claims 10 - 15, **characterized** in that the sealing strip (50) positioned in the groove (38) is formed with sealing lips (52, 54) at its side surfaces engaging the other side surface (34) of the edge portion of the glass pane and the opposite side surface (42) of the grooves (38).

17. A device as claimed in any of claims 10-16, **characterized** in that the sealing strip (50) positioned in the groove (38) is formed with an outer bevelled surface (56) forming with the other side surface (34) of the edge portion of the window pane an angle exceeding 90°.

18. A device as claimed in any of claims 10-17, **characterized** in that the fastening strip (12) is fixed to the bottom surface (18) of the fillister by means of nails (44) or staples.

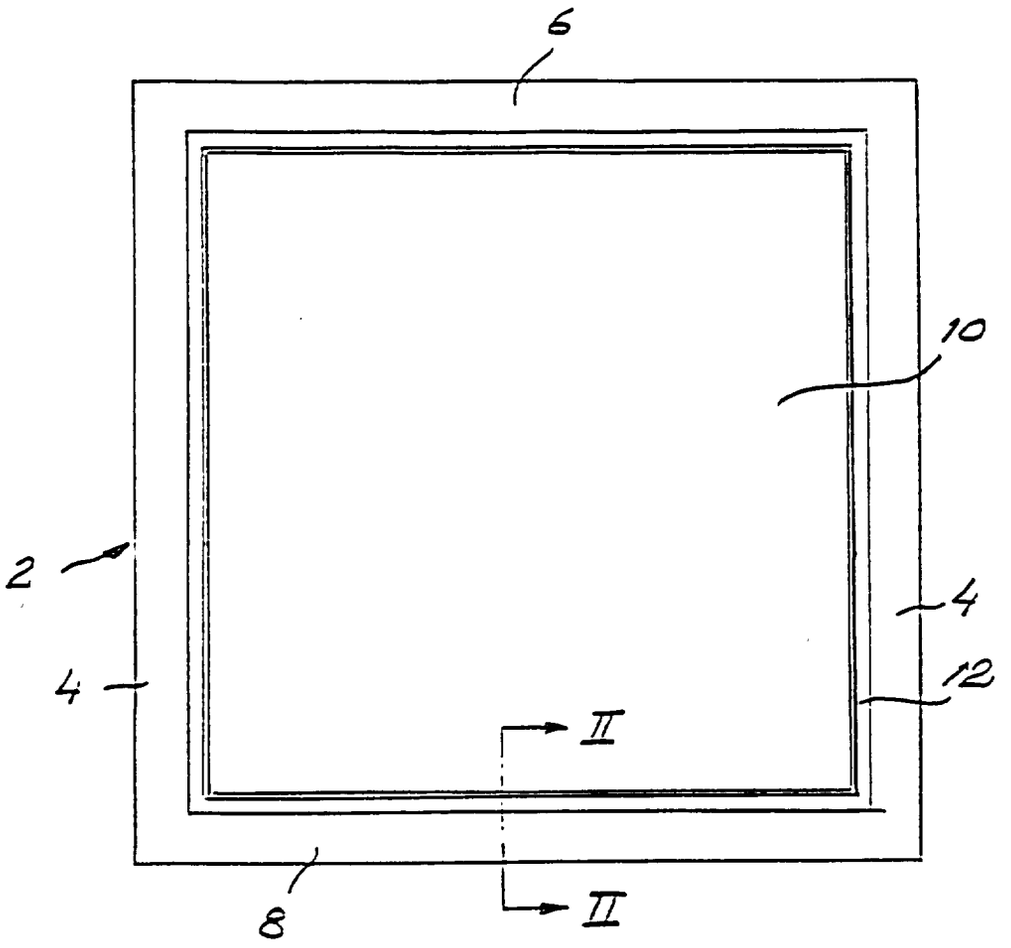

Fig. 1

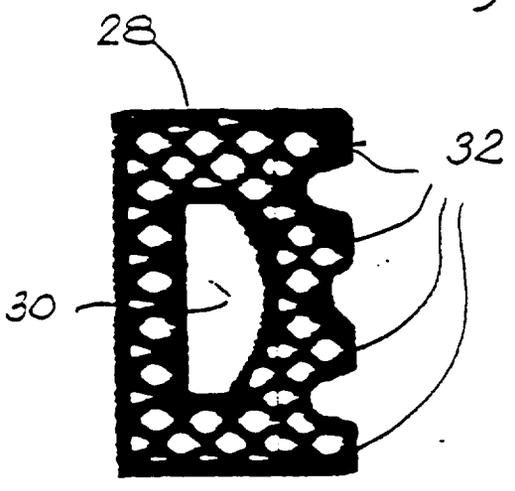

Fig. 2b

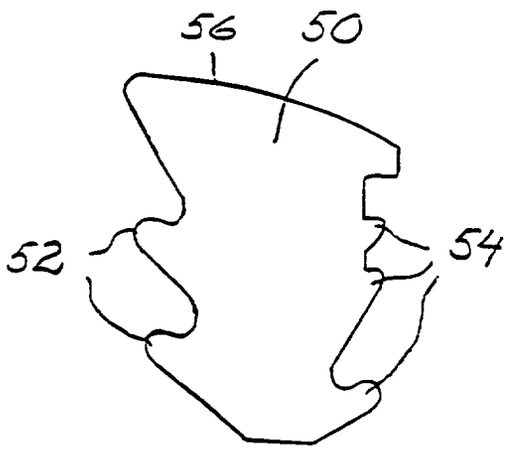

Fig 2c

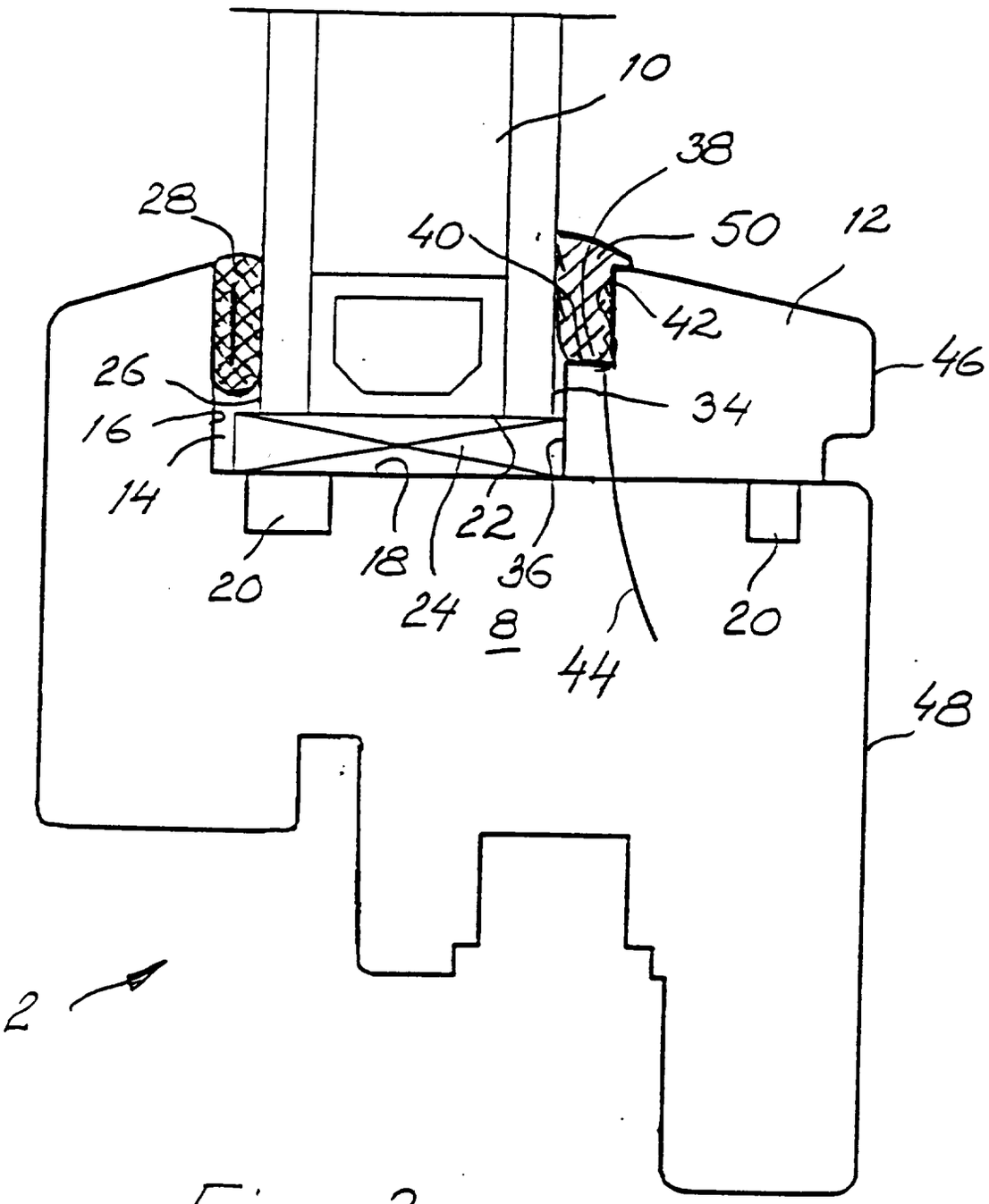

Fig. 2a

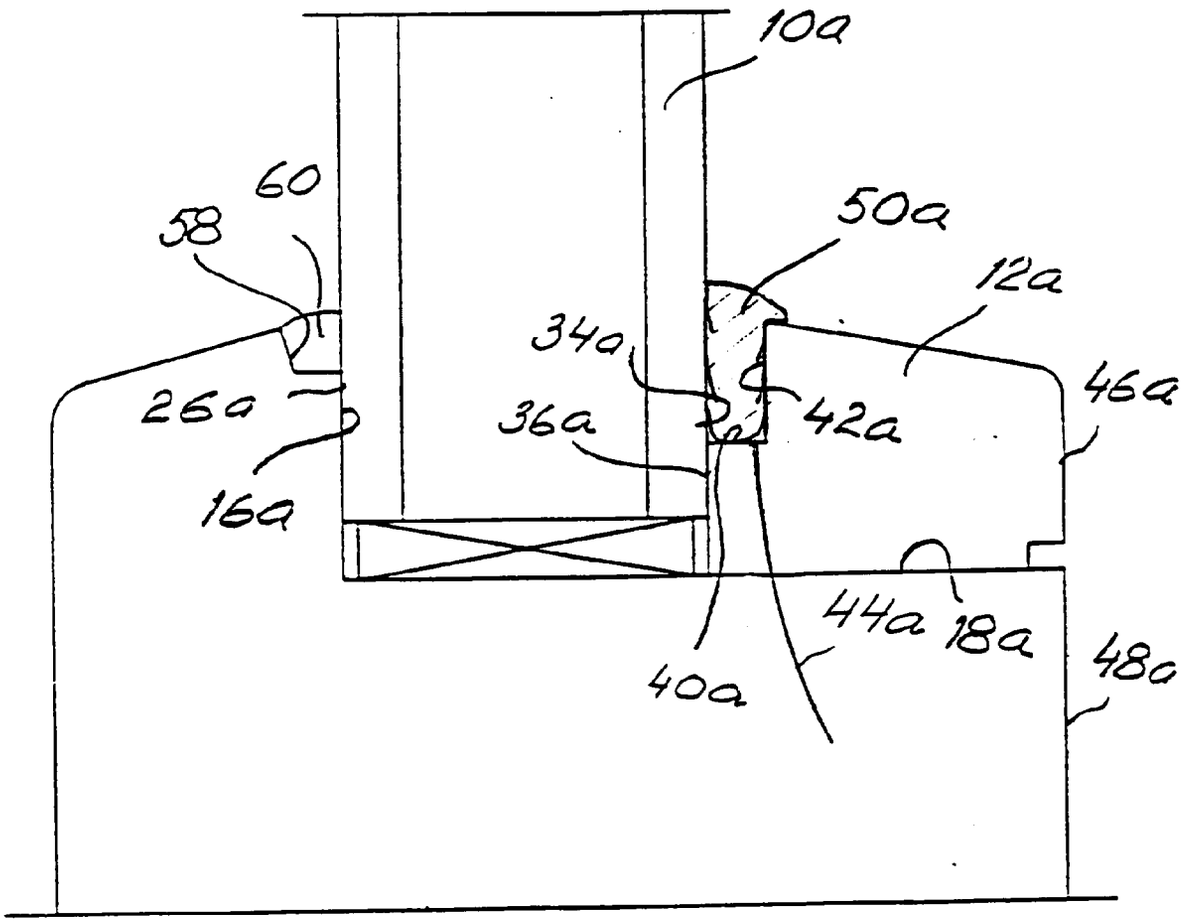

Fig. 3

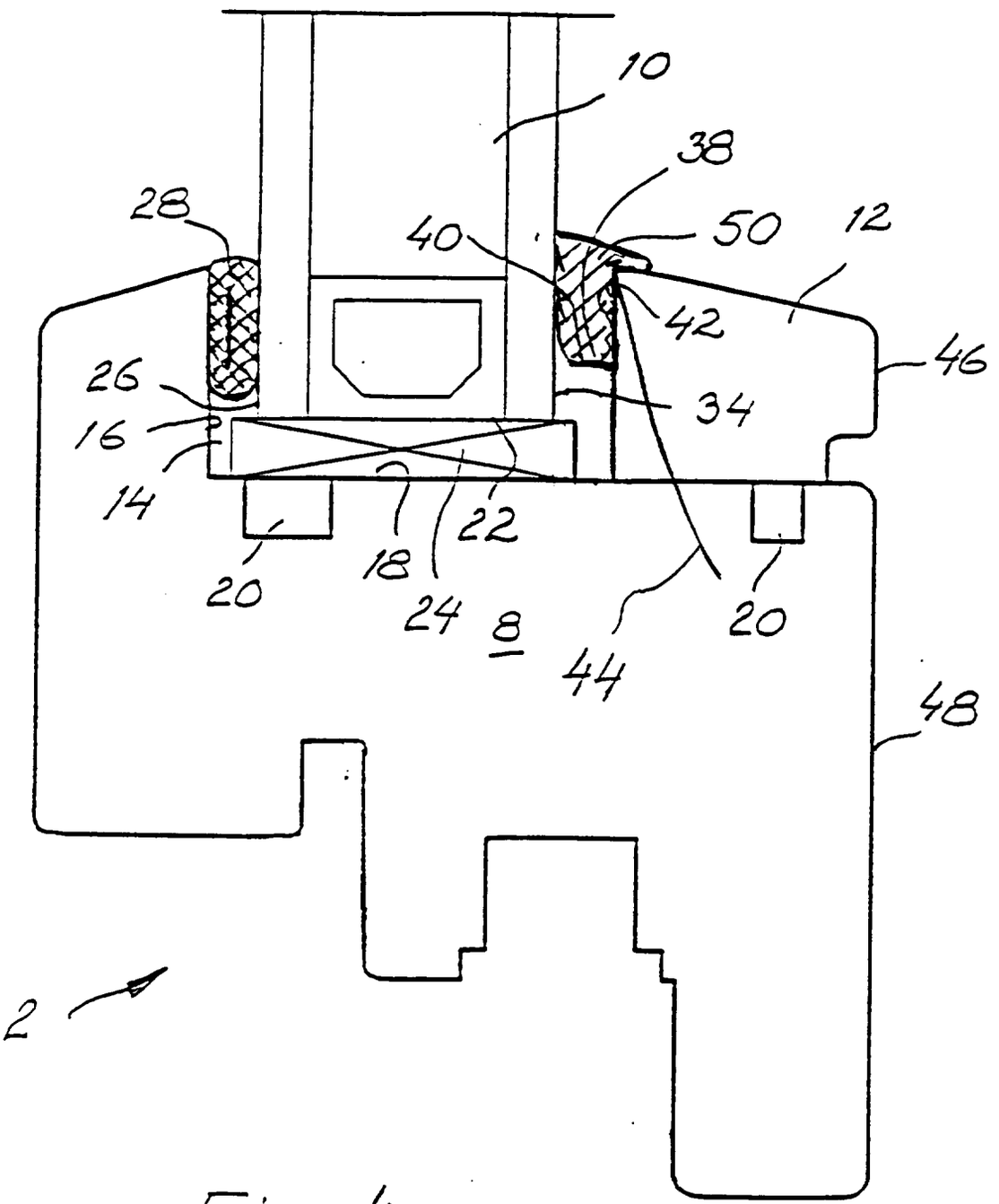

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 11 9773

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.6)
X Y	AT-B-391 520 (HRACHOWINA BAUELEMENTE) * the whole document *	1,2,4,5, 8-12,14, 15,17,18 3,6,7, 13,16	E06B3/62 E06B3/58
Y A	CH-A-684 494 (LANDER TRADING) * column 1, line 46 - column 3, line 27; figures *	3,6,7,13 1-5,8,9, 11-15,18	
Y A	CH-A-672 162 (DEVENTER PROFILE) * page 4, right column, line 54 - page 6, right column, line 33; figures *	16 1-5,8, 10,12-15	
A	EP-A-0 015 842 (TREMCO) * page 4, line 13 - page 6, line 6; figures *	1-5,8-18	
A	DE-U-94 10 630 (PREBENA) * the whole document *	1-3, 8-10,12, 13,18	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E06B E04F
A	DE-U-94 05 039 (BÜHNEN) * page 6, paragraph 3 - page 8, paragraph 2; figures *	1,2,8,9, 11-13,18	
A	DE-U-88 04 460 (POLZER) * the whole document *	3,13	
A	GB-A-2 204 084 (V KANN RASMUSSEN) * the whole document *	4-8,14	
A	BE-A-656 767 (SAINT-GOBAIN & HUTCHINSON)		
A	NL-A-7 504 807 (BOTECO)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 March 1996	Depoorter, F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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