

EUROPEAN PATENT APPLICATION

Application number: 84830131.3

Int. Cl.4: **E 06 B 3/26**

Date of filing: 26.04.84

Date of publication of application: 30.10.85
Bulletin 85/44

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Designated Contracting States: **AT BE CH DE FR GB LI LU NL SE**

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54 Production method for window and door frames wood-metal profiles, and relative profiles obtained with such a method.

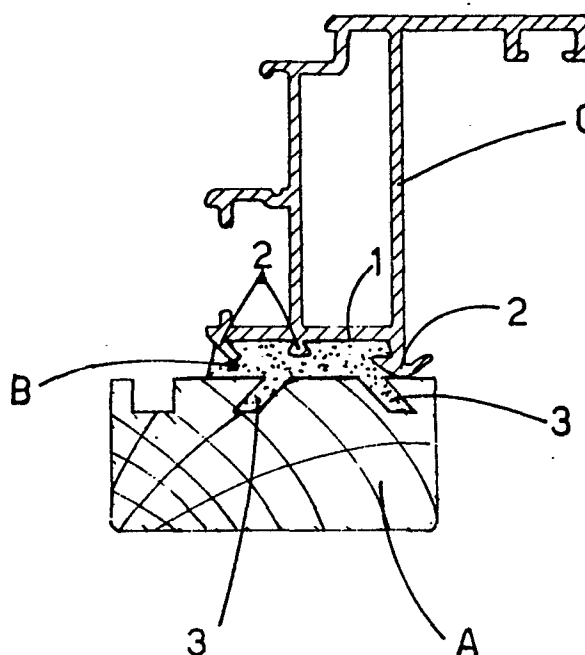
57 A method for producing wood-metal profiles or section bars for window and door frames by continuous injecting a binding material (B) into a space between said profiles or section bars (A, C), said method comprising:

- using a wood spline (A) with at least one longitudinal slanting groove-milling (3) made on the surface intended for receiving the joint binding material (B);

- using a metal profile (C) provided with longitudinal undercut slanting or thickened end tongues on the space intended for receiving said binding material (B);

- continuous injecting a binding material (B) into said space;

and wherein the contact surface between the binder (B) and the metal profile (C) is not glued for allowing longitudinal sliding and avoiding distortions; joint between profiles or section bars for forming window and door frames is also carried out by means of grooves for injecting binding material.



EP 0 159 458 A1

Production method for window and door frames wood-metal profiles,
and relative profiles obtained with such a method

5 The present invention relates to a method for producing wood-metal profiles or section bars for window and door frames and profiles or section bars obtained with such a method.

The invention is particularly suitable for use in producing window
10 and door frames in which a strong, indeformable, durable metal outside structure and a room-warmed, insulating wood inside structure is desired.

At the present state of the art, a number of wood-metal profiles
15 or section bars for window and door frames are known, in which joint between wood and metal is carried out in various ways; examples of pertinent background art documents are:

- DE - U - 1 885 669 (Schanz Metalbau) wherein said joint is provided by means of synthetic material small blocks (8) which are
20 inserted by pins (9) into the wood profile (3) and wherein each small block (8) fits, sliding longitudinal in free clearance and rabbet adhesion of the surface of one tongue of the metal profile against the wood spline, in the aluminium covering profile (4), the bearing structure of the frame being therefore in this case
25 the wood frame and not the aluminium profile which is only a covering, thus without structural bearing characteristics;

- DE - U - 7 128 609 (E. Notter) wherein said joint is provided by interposing a plastic binding-adhesive material (27/29) which
glues the wood spline (14/16) to an aluminium alloy profile
30 (10/12) by means of tongues, some of which function as rabbet

spacers with wood adhering surfaces (42,46), in this case both wood and metal materials are joined for constituting a single inseparable bearing structure in all directions;

5 - FR A1 - 2 371 - 568 (P. Chou) wherein said joint is provided with adhesion surface rabbets, between an inside bearing metal profile structure (1) and wood covering splines (11) by pre-pressing on said wood splines (11) elastic plastic material tongues (12) which fit by pressure in the bearing metal profiles or section bars having core structural function (1), while the
10 wood splines have only a covering function, not a structural bearing function;

- DE - A1 - 2 736 151 (E. Hueck) wherein said joint between different profiles or section bars is provided by means of undercut tongues with an additional spacing^{*} profile (12), with a
15 plastic binding-adhesive material (7,8) for carrying out a single bearing structure in all directions;

- AT - B - 345 529 (R. Falkner) wherein said joint between different profiles or section bars (2,3) is provided by means of tongues with thickened inserting ends (6), without contact
20 surfaces but with a preformed fitting material (5) for carrying out a single bearing structure in all directions;

- European Patent Application EP -A1 - 0 053 104 (Mataushek), Int. Class. E 06 B 3/26 published on 02.06.82 in European Bulletin 82/22 describes a joint system between aluminium alloy profile
25 (2/9) by means of longitudinal toothed edged tongues (4) and grooved (6/10) or dovetail (7,8) wood, by means of plastic binding-adhesive material (11) extruded by continuous extruding process machine (5/11).

30 The drawbacks of the currently used solutions and of the above-

mentioned prior art consist essentially in that:

- Ia. either one of the two profiles or section bars is not structurally bearing but has only a covering function (DE - U - 1 885 669 (Schanz Metalbau); FR - A1 - 2 371 568 (P. Chou));
 - 5 - IIa. or they are in a single bearing structure integral for bearing stresses in all directions (DE - U - 7 128 609 (E. Notter); DE - A1 - 2 736 151 (E. Hueck); AT - B - 345 529 (R. Falkner); EP - A1 - 0 053 104 (Mataushek)).
- 10 The invention as claimed is intended to provide a complex integral continuous bearing wood-metal profile as in solution IIa., structurally much more strong than profile of solution Ia.

Anyhow, the disadvantages of the integral profiles or section bars
15 of the above-mentioned solution IIa. consist mainly in that, being the two materials with different coefficient of expansion, sudden changes of temperature cause same to deform and warp so that window and door frames thus obtained either have sealing defects or might not close for interference.

20 Furthermore, the above-mentioned prior art metal profiles or section bars:

- Ib. either are provided with wide contact surfaces of the wood spline (DE - U - 1 885 669 (Schanz Metalbau); DE - U - 7 128 609 (E. Notter); FR - A1 - 2 371 568 (P. Chou));
- 25 - IIb. or are provided with minimum contact surfaces but with additional spacers (DE - A1 - 2 736 151 (E. Hueck);
- IIIb. or are not in contact (AT - B - 345 529 (R. Falkner); EP - A1 - 0 053 104 (Mataushek)), in such case thermal passage is avoided improving insulating effectiveness, but keeping a
30 constant spacing at acceptable tolerance between the two profiles

or section bars is difficult, as it is well known to those skilled in the art that in the case of continuous extrusion of binding material (for example when using foamed polyurethane) said material is subjected to shrinkages and variations which finally
5 change thickness.

Further disadvantages result from the difficulty of edge joining in rational manner the 45° cut profiles or section bars for manufacturing the respective frames, therefore said methods still use conventional joint squares.

10 Further drawbacks consist in the difficulty of carrying out a set of few profiles or section bars suitable for permitting realization of both single and double window and door frames as well as frames provided with window shades.

15 A first object of the present invention is to avoid profile distortions assuring at the same time a structural integral bearing resistance of the window and door frame with respect to both materials which constitute said profile, i.e. both wood and metal.

20 A second object of the invention is to obtain a constant section profile without spacing changes between the two integral wood-metal splines, reducing thermal passage to a minimum and without necessity of intermediate spacers.

A third object of the present invention is to permit 45° cut
25 corner head joint in more effective structural manner.

A fourth object of the invention is to carry out a set of standard profiles or section bars which allow manufacture of both single and double frames as well as frames capable of receiving curtain in the middle thereof.

30 The whole with the maximum effectiveness of structural strength,

solidity of 45° joints included, and maximum insulation effectiveness.

The invention as claimed is intended to remedy the above-mentioned
5 disadvantages. It solves the problem producing wood-metal profiles
or section bars according to the characteristics as claimed in the
appended claims.

The advantages offered by this invention are mainly that the
10 profiles or section bars will no longer undergo distortions due to
sudden changes of temperature, they will be of constant section,
of highest structural strength and with thermal passage reduced to
a minimum, therefore with high degree of insulation; the 45°
joints will be strong and easy to made and the standard shaped
15 profiles or section bars will allow carrying out of both single
and double frames with possibility of inserting also window shades
in the middle thereof.

One way of carrying out the invention is described in detail below
20 with reference to drawings which illustrate some preferred
embodiments, in which:

Figure 1 is a schematic view with enlarged effect of the
distorsion (warping) undergone by the currently-used wood-metal
25 profiles or section bars rigidly welded between them by a
binding-glueing agent, because of sudden changes of temperature;
Figure 2 is the same view of the distorsion effect due to sudden
change of temperature in the wood-metal profile joined with
binding not glueing material according to the present invention;
30 Figures 3, 4, 5, and 6 are sectional views of a set of standard

profiles or section bars for carrying out window and door frames according to the present invention; Figure 7 shows an example of window single frame; Figures 8 and 9 are the transversal sectional views with respect to planes A-A and B-B respectively, of Figure 7; Figure 10 is a perspective view of the 45° cut head of a profile with prearranged groove for 90° head joint with other elements for forming window and door frames; Figure 11 is a front view of a joint corner of two profiles or section bars as per Figure 10 with section on plane D-D of Figure 13; Figure 12 is a view taken on the opposite side with section on plane C-C; Figure 13 is a view taken on the outer side with partial section X-X and Y-Y respectively of the two preceding figures; Figure 14 is a sectional partial view on the vertical plane A-A and B-B of a double window frame with possibility of inserting in the middle thereof also a window shade.

According to the above figures the invention provides complex profiles or section bars consisting of a wood spline (A) joined by means of a binding material (B) to an aluminium alloy profile (C), wherein said aluminium profile is provided with bent tongues with thickened ends for forming undercuts (2), one of said tongues being arrow-head-shaped for making rabbet of constant spacing but with minimum contact surface in order to reduce thermal passage (2'), and wherein the joining surface of the wood spline (A) has longitudinal slanting opposed dovetail notches-millings (3).

According to the invention, joint is made in continuous:

- pretreating the contact surface (1) of the metal profile (C) with a release agent, for example by coating with buffer or by spraying grease or silicone or other lubricating or anti-glueing materials or using metal profiles or section bars surface treated

against glueing of binding material;

- injecting insulating binding material such as foamed polyurethane (B) into the space between the two joined profiles or section bars kept in contact by means of pressure rollers and guides during continuous advancing of filiform battering (2').

The result is that in the differences of thermal expansion between the wood (A) and metal (C) materials, the latter will slide on the not-glued surface (1) of the binder (B) without therefore warping the profile that otherwise would lose linearity.

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The profiles or section bars have the shapes as shown in the figures and permit to carry out the illustrated window and door frames. For 45° head joint, a deep 45° "V" notch (4) is made in the wood, said notch extending still 45° "V" shaped but less deep also into the binding material (B) and into the metal profile (C), so that by a head joint a kind of hole (4') is obtained leading to an inner larger pocket in the wood (4) and wherein when heads mate, an injection of quick setting binding material such as binding polyurethane resin (B') is effected.

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Of course, changes and modifications can be made without departing from the spirit or scope of the invention as defined in the appended claims.

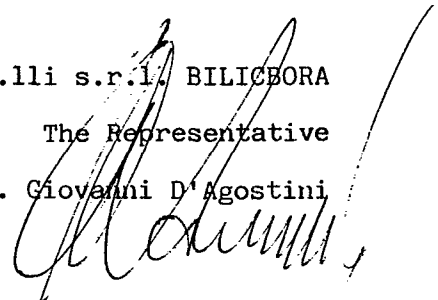
Udine, June 20, 1984.

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The Representative

Dr. Giovanni D'Agostini



Claims:

1. Method for producing wood-metal profiles or section bars for window and door frames by means of continuous injecting a binding material (B) into a space between said profiles or section bars, characterised in that it comprises:
- using a wood spline (A) with at least one longitudinal slanting notch-milling (3) made on the surface intended for receiving the joint binding material (B);
 - using a metal profile (C) provided with longitudinal undercut slanting or thickened end tongues on the space intended for receiving said binding material (B);
 - continuous injecting a binding material (B) in said space;
- and characterised in that said metal profile (C) is provided with a surface (1) on said binding space with said binding material (B) and/or said binding material (B) is of such a composition as to adhere by glueing on the contact surface of the wood spline (A) but not to adhere on said contact surface (1) of the metal profile (C) and this in such a way so that longitudinal sliding between the two respective surfaces results sufficiently free even though in narrow and forced manner but such that, when elongation differences occur under sudden change of temperature, longitudinal sliding of one profile with respect to the other is possible without causing straightness distortions.
2. A method as claimed in claim 1, characterised in that said metal profile (C), before being subjected to binding treatment with binding material (B), is treated on said joining surface (1) with a release agent.

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3. A method as claimed in claims 1 and 2, characterised in that said release agent is a lubricant.

4. A method as claimed in the preceding claims, characterised in that said release agent is a silicon product.

5. A method as claimed in the preceding claims, comprising continuous injection of binding material (B) on the profiles or section bars to be joined when advancing on the horizontal plane oriented on the longitudinal opening from the bottom upward, characterised in that the respective metal profile is provided, in the joining area with said binding material (B), underneath, with a tongue extending longitudinally and for such a depth as to rabbet against the surface of the wood spline to which it has to be joined (A), so that said longitudinal spacing tongue (2') acts as containing bottom realizing a containing groove within which said injection of binding material (B) from above is carried out.

6. A method as claimed in the preceding claims, characterised in that for head joining said complex profiles or section bars thus obtained in order to form frames, after 45° cut, an opposed groove is carried out comprising a deeper recess (4) extending with a less deep recess (4') toward the outside surface at one side of the frame for subjecting joint to a successive filling injection of the recess thus obtained with a binding material (B').

7. A method as claimed in the preceding claims, characterised in that said injection opening (4') extends toward the side of the metal profile (C).

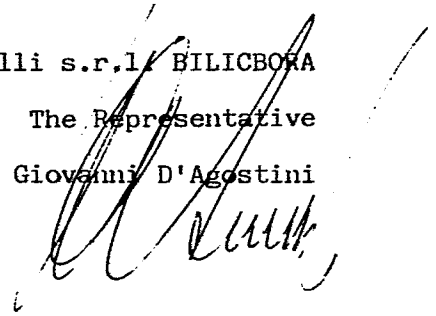
8. Wood-metal profile for window and door frames obtained with the method according to the preceding claims, characterised in that the respective metal profile is provided, in the joint area with said binding material (B), with a tongue extending longitudinally
5 and for such a depth as to rabbet against the surface of the wood spline to which it has to be joined (A) being the respective contact end shaped like a head-arrow? (2').

9. Window or door frame consisting of a plurality of profiles or
10 section bars in accordance with the preceding claims.

10. Set of profiles or section bars having the shape as shown in the figures of the description drawings and window and door frames obtained with said profiles or section bars.

15 Udine, June 20, 1984.

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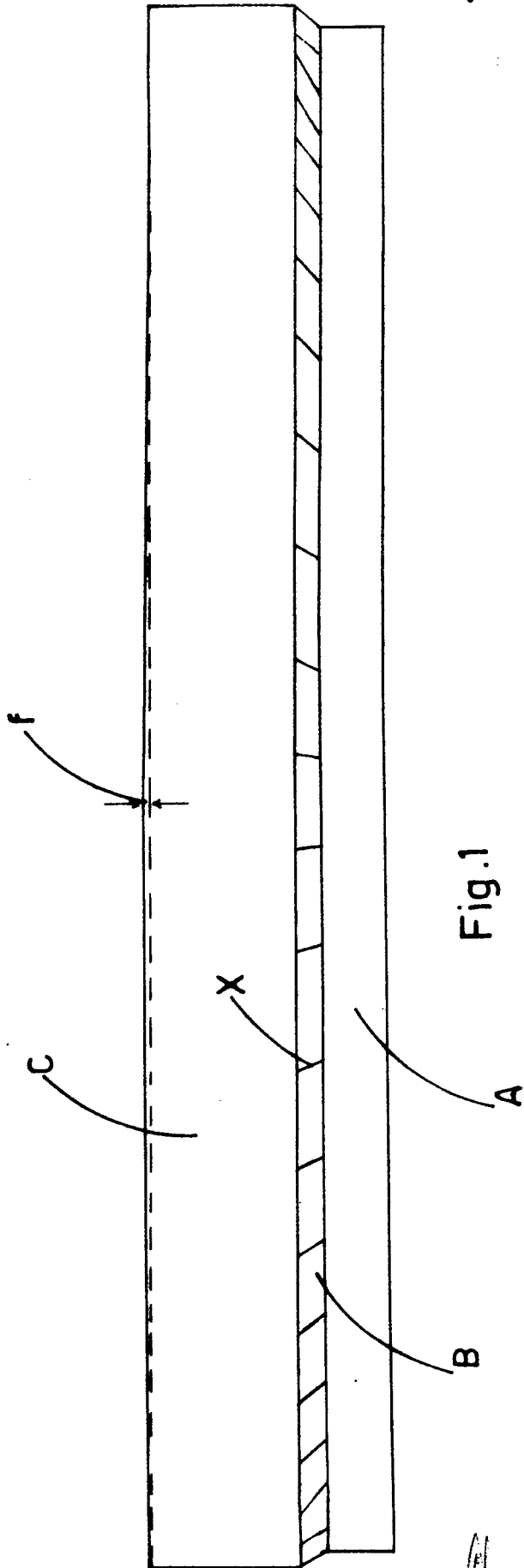


Fig.1

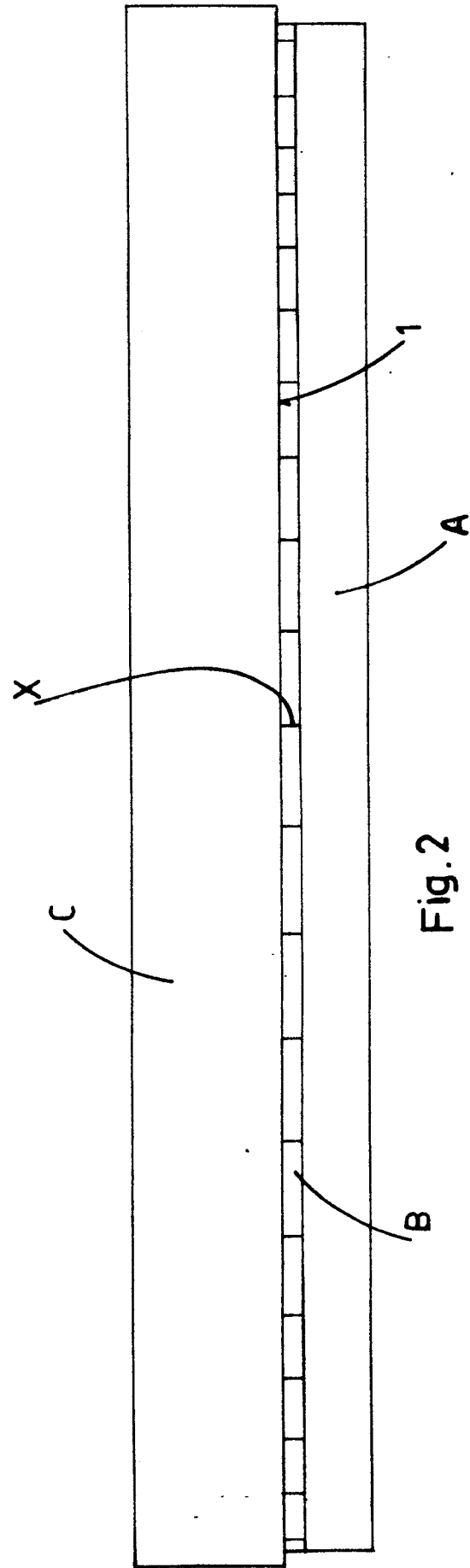


Fig.2

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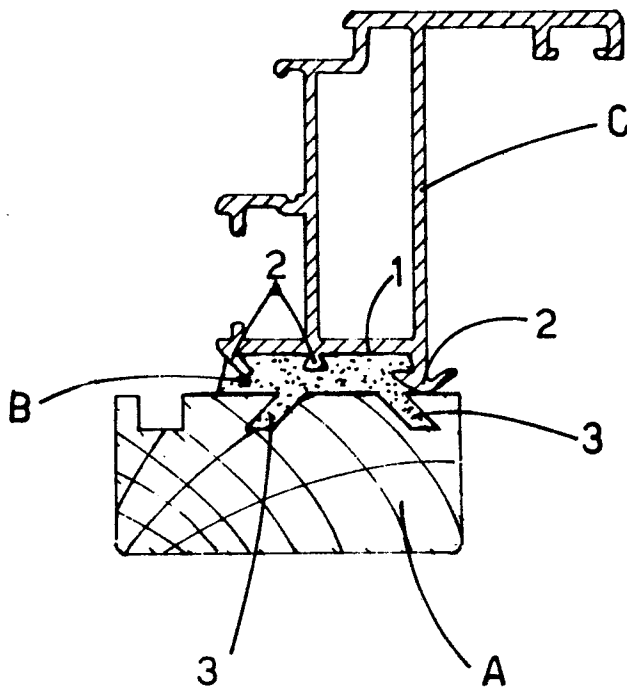


Fig.3

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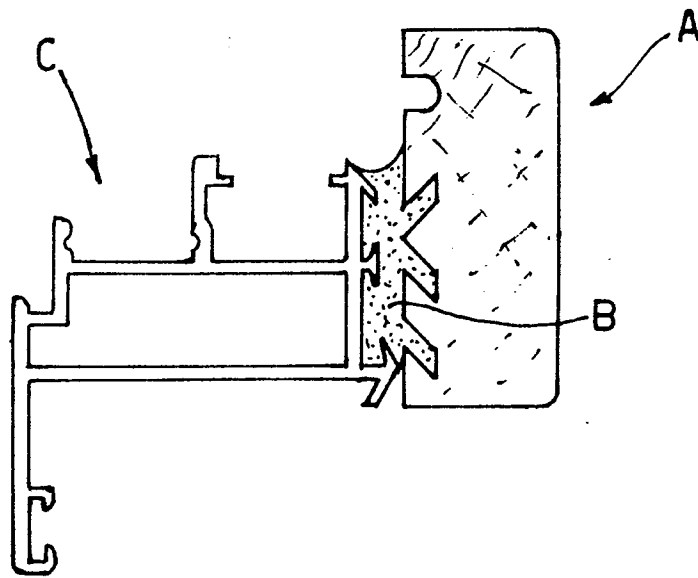


Fig. 4

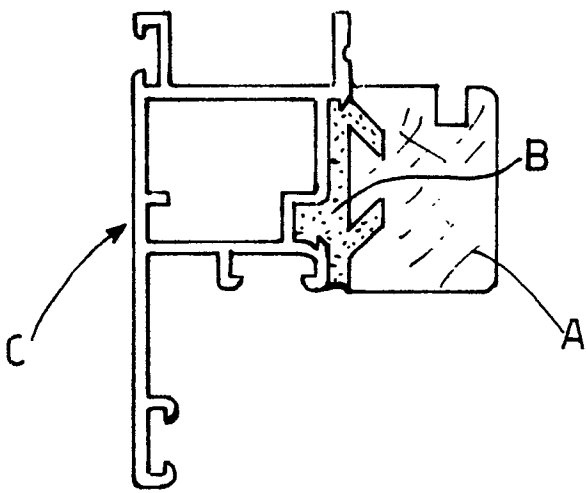


Fig. 5

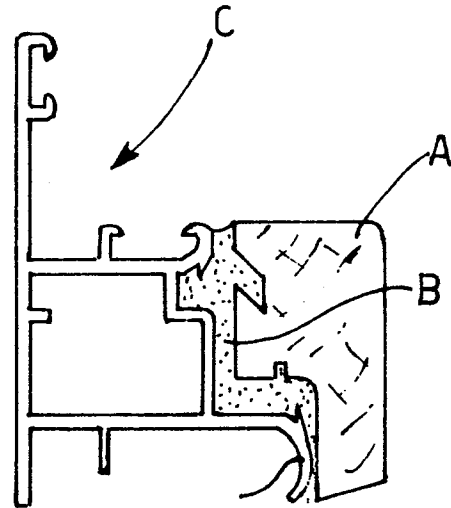


Fig. 6

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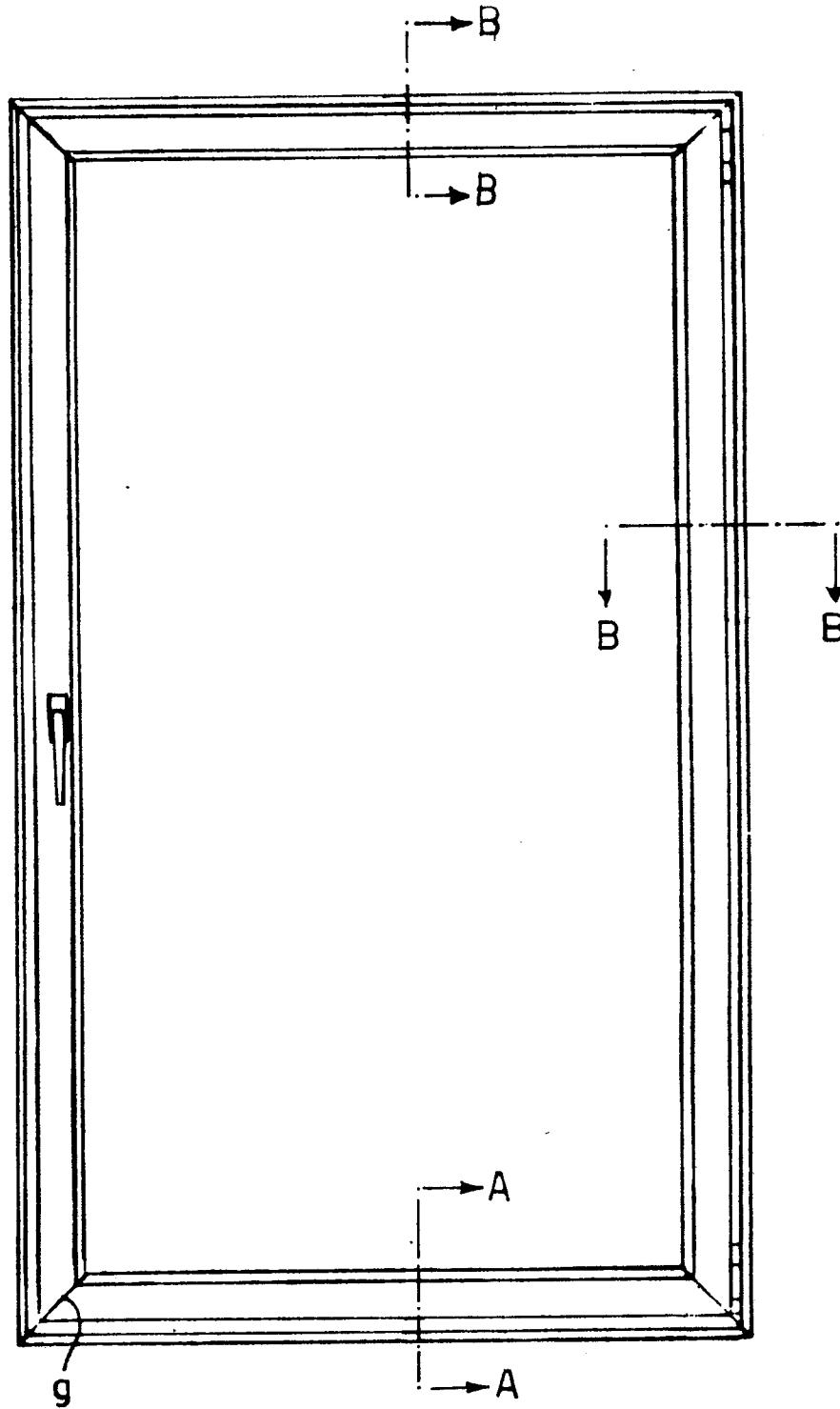


Fig. 7

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sez. A-A

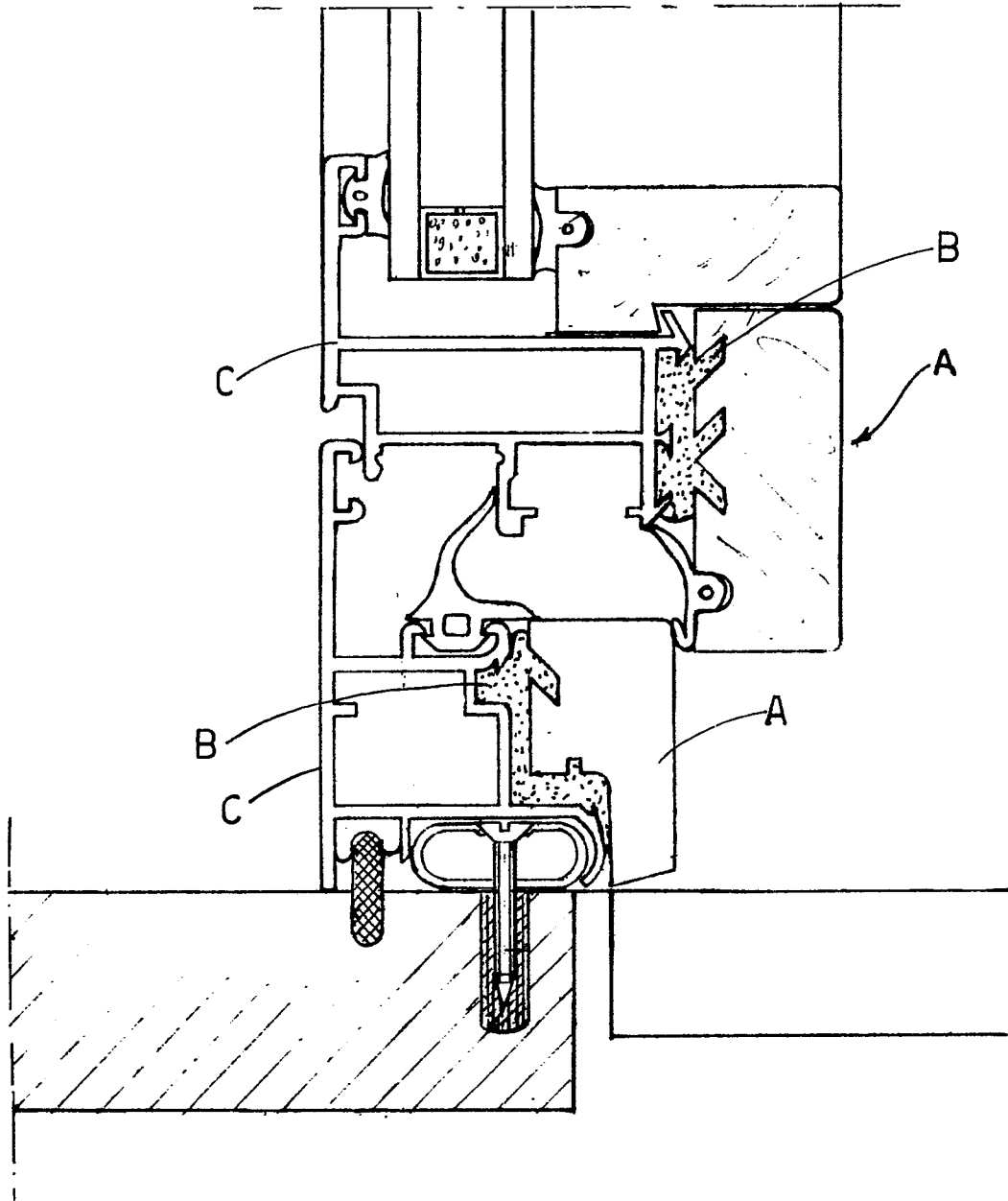
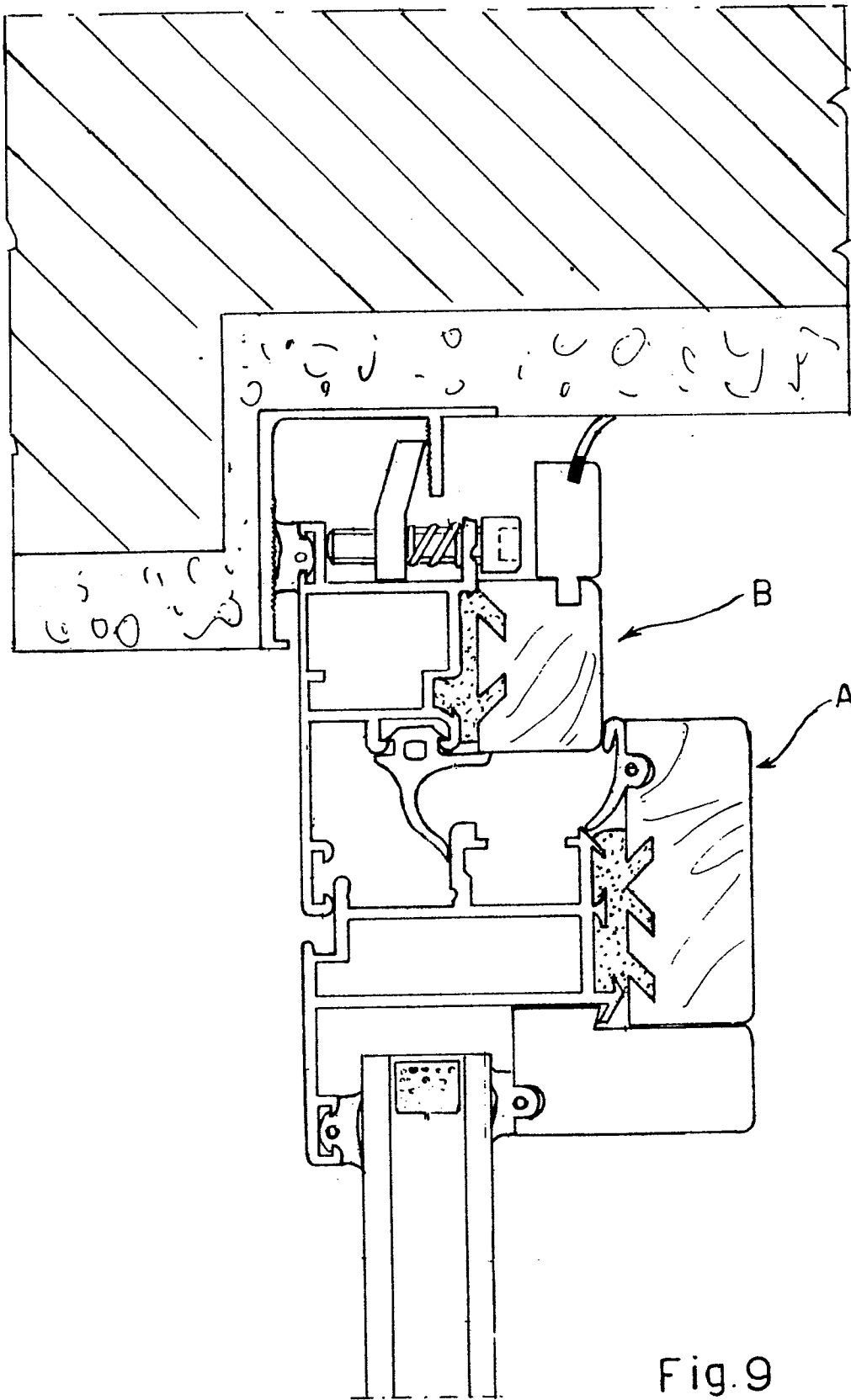


Fig.8

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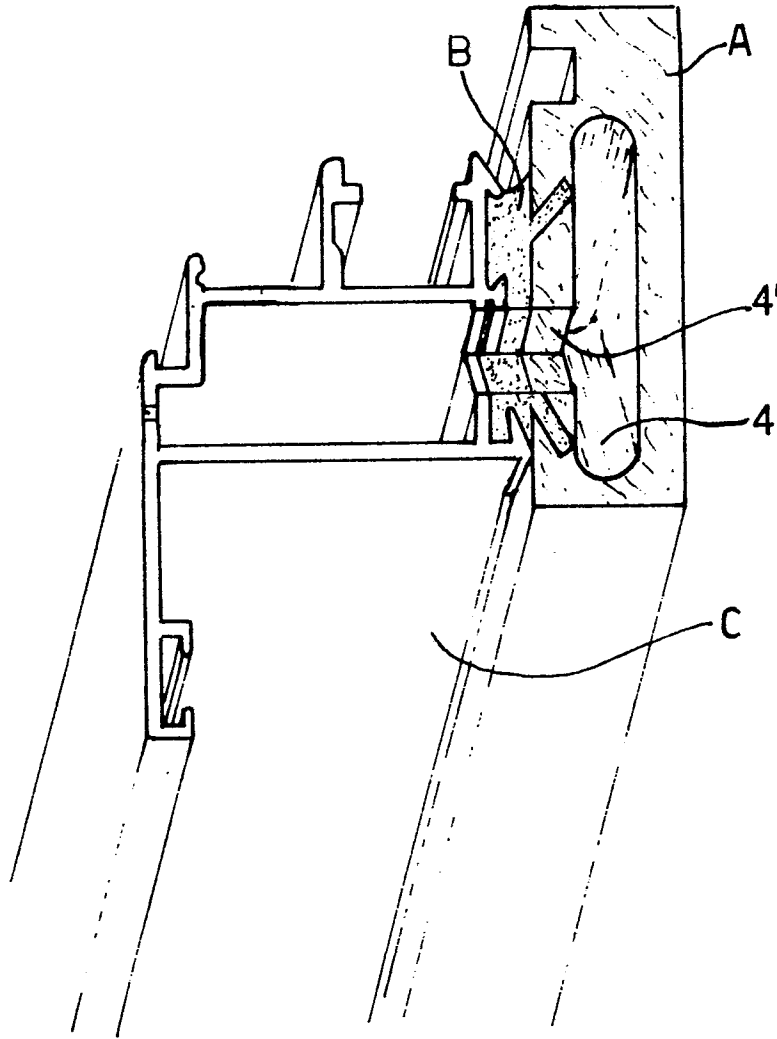


Fig.10

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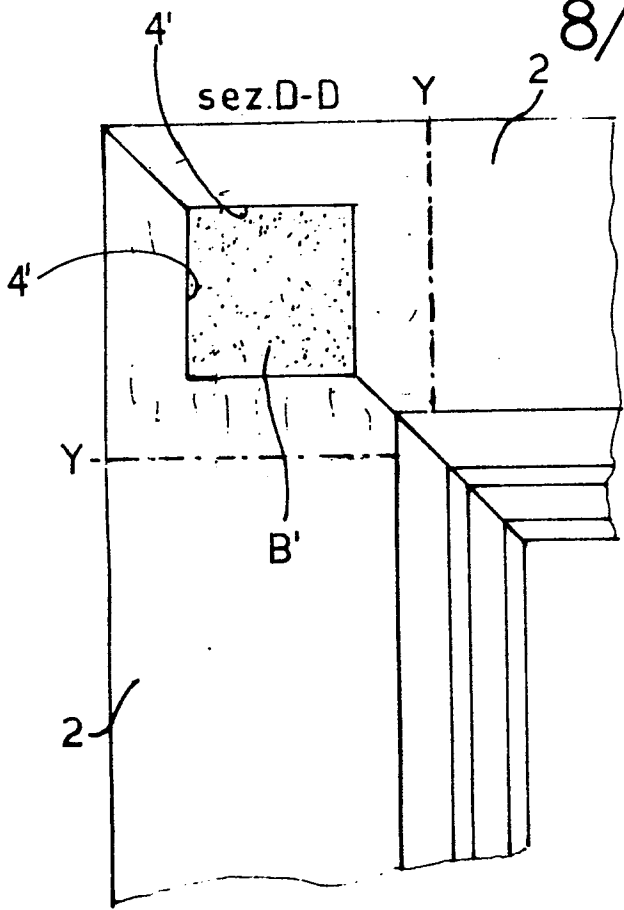


Fig. 11

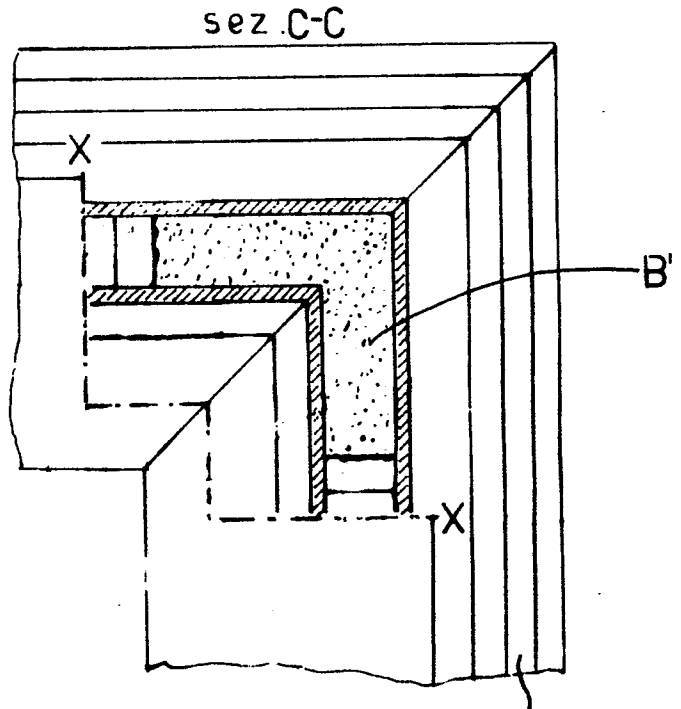


Fig. 12

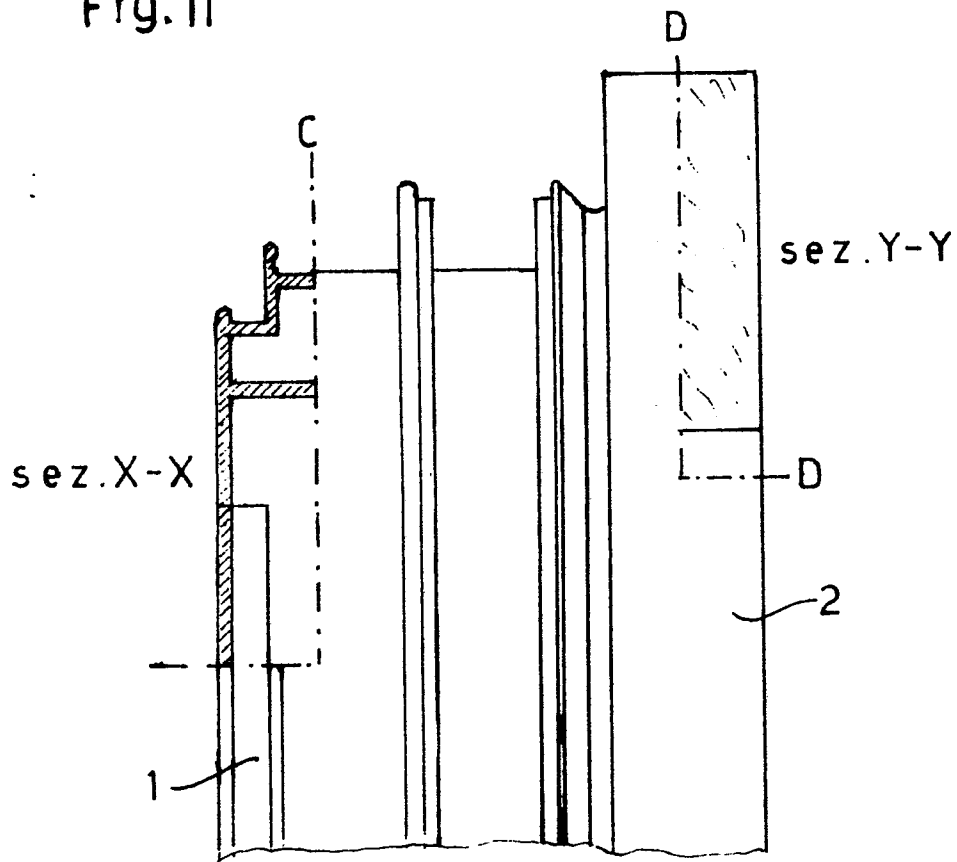


Fig. 13

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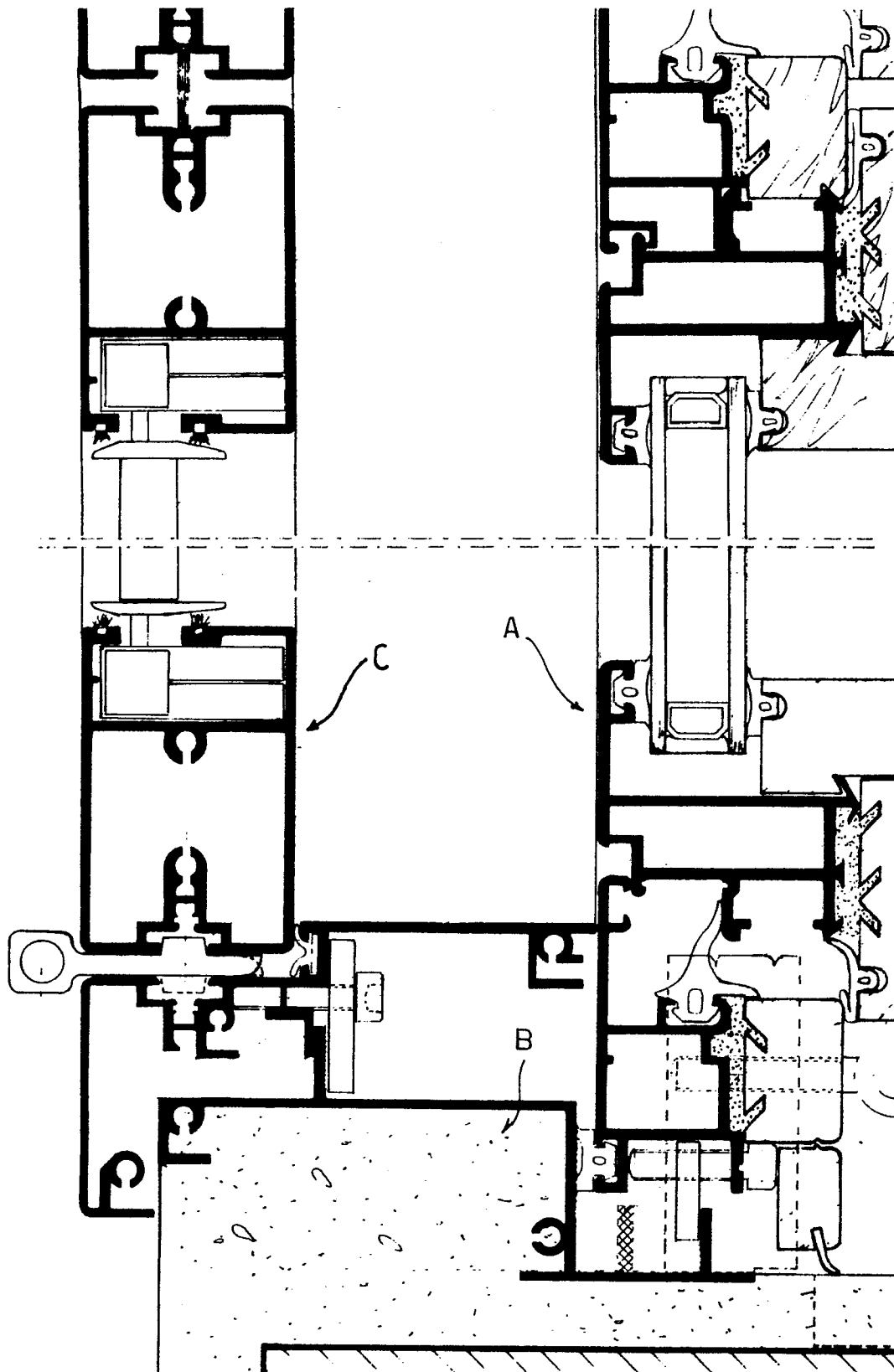


Fig.14

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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)
D,Y	EP-A-0 053 104 (MATAUSCHEK) * page 5, line 2 - page 7, line 14; figures 1,2 *	1-3,9	E 06 B 3/26
D,A		10	
D,Y	--- US-A-4 067 163 (HETMAN) * column 2, line 1 - column 3, line 43; figures 1-4 *	1-3,9	
A	--- DE-A-3 107 810 (NAHR) * page 8, line 9 - page 10, line 28; figures 1,2 *	1,9,10	
A	--- AT-B- 352 366 (INTERNORM) * page 2, line 20 - page 3, line 5; figure *	1	
A	--- DE-A-1 935 118 (FERCO) * page 4, lines 4-19; figures 1-10 *	1,9,10	
A	--- GB-A-2 057 037 (TIPPMANN) * page 2, line 65 - page 3, line 38; figures 1-4 *	1,5,8	
A	--- EP-A-0 024 520 (MÜHLE) * page 8, line 21 - page 10, line 24; figures 5-7 *	5	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-12-1984	Examiner DEPOORTER F.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			



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)
A	WO-A-8 100 588 (HEWITT) * page 19, line 21 - page 20, line 25; figures 12-14 *	6	
A	FR-A-2 521 207 (VALLOUREC) * page 6, line 2 - page 9, line 15; figures 1-6 *	6,7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-12-1984	Examiner DEPOORTER F.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			