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(54) Junction device for connecting two coplanar panels

(57) A junction device (1) for connecting two coplanar panels (2, 3) comprising a tenon (4) developing for at least a part of the lenght of at least one side (2a) of a first (2) panel and at least one mortise (5) developing for at least a part of the lenght of at least one side (3a) of a second (3) panel, suitable for receiving the insertion of said tenon (4). It comprises first shaped surfaces (22; 30; 40; 50) jointing each external surface (6, 7) of the first panel (2) with the lateral surface (10, 11) of the tenon (4) immediately adjacent and of second shaped surfaces (23; 31; 41; 51) jointing each external surface (8, 9) of the second panel (3) with the lateral surface (16, 17) of the mortise (5) immediately adjacent. At least one of the shaped surfaces (22, 23; 30, 31; 40, 41; 50, 51) defining at least one undercut area (24) with respect to the external surface (6, 7; 8, 9) of the panel (2, 3) which belongs to, housing the correspondent shaped surface (23, 22; 31, 30; 41, 40; 51, 50) of the other panel (3, 2).

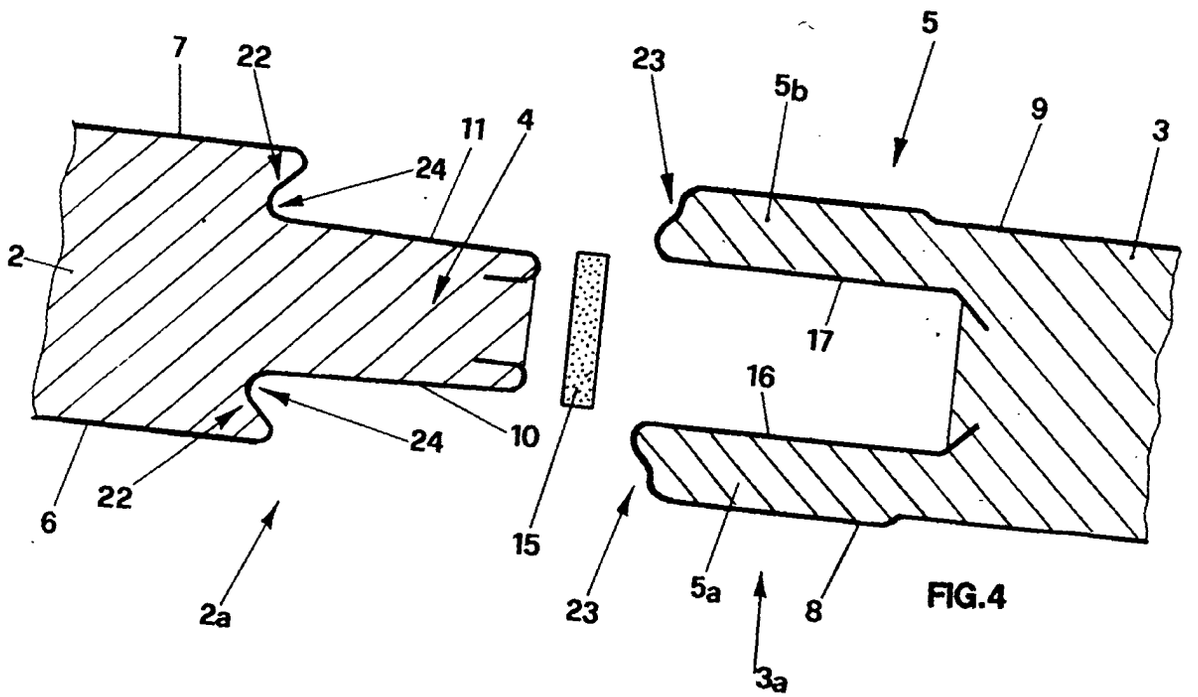

FIG.4

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Description

[0001] The invention relates to a junction device for connecting two coplanar panels, particularly suitable for being used in the realization of walls of industrial, commercial buildings and compartmenting in general.

[0002] Construction technical notes of industrial, commercial or other buildings are known, using metallic self-supporting panels, realized with metallic material, for example with profiled sheet. They are realized with an insulating interposition giving the structural resistance needed for their positioning as a wall or covering.

[0003] The use of polyurethane as an insulator, permits, in particular, the use of such panels at low temperatures to build freezers for alimentary conservation reasons. It is clear that, in different applications, the insulator could be substituted by another material, for example polystyrene, fiberglass or other materials, each one with mechanical resistance, thermal and acoustic insulation characteristics.

[0004] In order to realize the mounting, the panels are fixed to a supporting structure made, for example, by an iron frame through suitable fixing means, such a through screw.

[0005] The known technique foresees that the abovementioned panels are mounted one beside another, side by side along the lateral edges. Here male-female junction elements, allowing their joint fixing, are present.

[0006] Such a junction device type is represented in fig. 1 and foresees that the lateral edge of a first P1 of said panels, commonly named female or mortise M, has a U-profile suitable for housing the conjugate profile T of the lateral adjacent edge P2, called male or tenon.

[0007] This allows the panel modular junction and their mechanical and also esthetical continuity next to the junctions.

[0008] Between the mortise M and the tenon T a gasket G, realizing the continuity of the insulator C1, C2 of the two panels P1, P2 in order to assure thermal and acoustic insulation, in normally interposed.

[0009] A disadvantage of such a technique is that the ends M1, M2 of the mortise becomes larger towards the outside when the time goes on, defining along the junction a protruding edge from the panel external surfaces.

[0010] Such a phenomenon is due to the deformations which the materials making the panel are subjugated to. The deformations are caused particularly by the temperature gap existing between the external and internal surface of the panel itself.

[0011] Such a situation frequently happens at low temperatures, as in the cited case of the freezers. In this case the difference between the internal and the external environment can vary from 40°C, during the winter, to 100°C during the summer, with the external walls exposed to the sun.

[0012] The edge deformation creates slots next to the junctions, determining the decrease of the mechanical seal and of the thermal insulation.

[0013] Internally to the slots water or dust can also enter, deteriorating the sanitary conditions inwardly and the esthetical aspect outwardly.

[0014] A known technique solving the cited disadvantage is represented in fig. 2, where the junction between the adjacent panels P1, P2 is obtained by an elastic junction device, realized by a couple of elastic protuberances A1, A2.

[0015] The protuberances are overhanging with respect to the edge of a first panel P1, U-shaped in order to house the suitably shaped edge S of the adjacent panel P2.

[0016] During the mounting the two panels are placed one beside another and are fixed one with another through a mutual pressure movement.

[0017] A first disadvantage of such a technique is that the overhanging protuberances are obtained by turning round, in practice 360°, the sheet end.

[0018] In such a way the bending is substantially made by two edges very close, between which the insulator penetration, during the panel realization, is difficult.

[0019] This determines a decrease of the insulating characteristics of the junction.

[0020] Another disadvantage is that the fixing mounting of such panels is difficult, particularly when the heights reach values higher than three meters. This is due to the great deformation power requested in order to telescope the panels one with another.

[0021] In this case the adjacent panels remain spaced, not allowing the perfect adherence of the junction and determining the decrease of the junction insulating characteristics.

[0022] The present invention is intended to eliminate the cited disadvantages.

[0023] It is a first aim of the invention the realization of a junction device for connecting two coplanar panels and allows the maintenance, when the time goes on, of the planar characteristics in the external surfaces.

[0024] It is another aim that the junction device of the invention allows the simplification of the panel mounting steps with respect to the equivalent solutions of the known type.

[0025] These and other aims are reached through the realization of a junction device for connecting two coplanar panels which, according to the main claim subject, is made by:

- at least one tenon developing for at least one length line of at least a side of the first of said panels;
- at least one mortise developing for at least one length line of at least a side of the second of said panels and suitable for receiving the insertion of said tenon;

and is characterized in that it comprises first shaped surfaces joining together each external surface of said first panel with the lateral surface of the immediately adja-

cent tenon. It also comprises second shaped surfaces joining together each external surface of said second panel with the lateral surface of the immediately adjacent mortise, at least one of said shaped surfaces defining at least an undercut area with respect to the belonging panel receiving the correspondent shaped surface of the other panel.

[0026] According to a preferred embodiment, the junction is composed by a unique tenon, belonging to the first panel, and by a unique mortise belonging to the second panel. The first and second shaped surfaces are made by connectable curved surfaces characterizing a substantially S-profile.

[0027] Advantageously, the undercut areas, defined by panel shaped surfaces which they belong to, allow the constraining of the adjacent panel shaped profiles preventing the retraction.

[0028] Said aims and advantages will be better underlined during the description of preferred embodiments of the invention, given as an indicative but not limitative title, referring to the accompanying drawings where:

- figs. 1 and 2 represent different executive variations of the known art;
- fig. 3 represents a sectional view of the junction device of the invention;
- fig. 3a represents an enlarged particular of fig. 3;
- fig. 4 represents an exploded view of fig. 1;
- figs. 5-7 represent executive variations of the particular of fig. 3a.

[0029] The junction device of the invention is represented in fig. 3, indicated as a whole by 1.

[0030] It comprises a first panel 2 on the side 2a, from which a tenon 4 develops. The tenon is inserted on the mortise 5, machined on the side 3a of a second panel 3 which is coplanar with the first panel 2.

[0031] The two lateral surfaces 6, 7 in the first panel 2 and the lateral surfaces 8, 9 of the second panel 3 are substantially made by a couple of profiled parallel sheets, between which the insulator C is interposed.

[0032] The insulator C is made preferably, but not necessarily, by thermal insulating material, for example polyurethane.

[0033] Referring to the tenon 4, it is made by a rib protruding from the side 2a of the first panel 2 and is delimited by lateral surfaces 10, 11 substantially parallel.

[0034] Referring to the mortise 5, it is made by a substantially U-shaped notch, delimited by lateral surfaces 16, 17.

[0035] Both the tenon 4 and the mortise 5 develop according to the direction defined by the longitudinal wall axis, which is realized when the panels 2, 3 are coupled.

[0036] Further, the ends defining each panel and bent to define the tenon 4 and the mortise 5 remain spaced, in order to prevent the thermal bridge in correspondence with the head end 12 of the tenon 4 and of the bottom 13 of the mortise 5.

[0037] Between the head end 12 of the tenon 4 and the bottom 13 of the mortise 5 a seal gasket 15, placed during the junction operations of the first panel 2 to the second panel 3.

[0038] According to the invention and as it can be seen in the particular of fig. 3a, the external lateral surface 6, 7 of the first panel 2 joins together with the respective lateral surfaces 10, 11 of the tenon 4 through first shaped surfaces, indicated as a whole by 22.

[0039] In the same way the external lateral surfaces 8, 9 of the second panel 3 join together with the lateral surfaces 16, 17 of the mortise 5 through second shaped surfaces, indicated as a whole by 23.

[0040] In particular, the first shaped surfaces 22 and the second shaped surfaces 23 have a connectable S-shaped profile. As it can be seen in fig. 4, the first shaped surfaces 22 define an undercut area 24 with respect to the lateral surfaces 6, 7 of the first panel 2.

[0041] When the first panel 2 is joined with the second panel 3, the tenon 4 is housed with a light interference from the mortise 5, in order to guarantee a good mechanical seal.

[0042] In order to help the coupling, the tenon 4 has a tagging in the final part, as it can be seen in fig. 3.

[0043] The second shaped surface 23 of the second panel 3 is housed in the undercut area 24 of the first panel 2, so operating the locking of the lateral wall 5a, 5b of the mortise 5, which are so prevented from deformation, due to thermal expansion, towards the outside.

[0044] In such a way we have reached the first aim of the invention.

[0045] In fig. 5 a first executive variation of the shaped surfaces, indicated as a whole by 30, 31, is represented. Each shaped surface is made by a plane inclined with respect to the external lateral surface 6, 8 of the respective panel 2, 3.

[0046] Fig. 6 represents another executive variation of the shaped surfaces, indicated as a whole by 40, 41, each one being made by convergent planes individualizing a conjugate, substantially V-shaped profile.

[0047] Fig. 7 represents a further executive variation of the shaped surfaces, indicated as a whole by 50, 51. They become different from the previous ones because, in spite of being insertable one in another, they have different profiles.

[0048] Referring to the panels, which the junction device is realized on, they could foresee, for example, on one side a tenon and on the opposite side a mortise.

[0049] They could be used for realizing walls through their horizontal alignment.

[0050] In a different embodiment the panels could foresee only tenons or mortises on all the sides. Therefore, during the mounting step, such panels must be placed alternated and aligned along the horizontal or vertical direction.

[0051] In case, also different mortise and tenon combinations could be foreseen on the panels.

[0052] It is clear that, according to what has been said,

the invention junction reaches the expected aims in all the embodiments described.

[0053] During the execution of the invention junction, shaped variations could be made to the first and second shaped surfaces or to the tenons and mortises.

[0054] Further, each junction device could be provided with more tenons and with correspondent mortises for each panel.

[0055] The cited and other not cited variations, if they take part in the following claims, are thought to be protected by the present patent.

Claims

1. A junction device (1) for connecting two coplanar panels (2, 3) composed by:

   - at least a tenon (4) developing for at least a part of the lenght of at least one side (2a) of the first (2) of said panels (2, 3);
   - at least one mortise (5) developing for at least a part of the lenght of at least one side (3a) of the second (3) of said panels (2, 3) and suitable for receiving the insertion of said tenon (4),

   characterized in that it comprises first shaped surfaces (22; 30; 40; 50) jointing each external surface (6, 7) of said first panel (2) with the lateral surface (10, 11) of the tenon (4) immediately adjacent and second shaped surfaces (23; 31; 41; 51) jointing each external surface (8, 9) of said second panel (3) with the lateral surface (16, 17) of the mortise (5) immediately adjacent, at least one of said shaped surfaces (22, 23; 30, 31; 40, 41; 50, 51) defining at least one undercut area (24) with respect to the external surface (6, 7; 8, 9) of the panel (2, 3) which belongs to, housing the correspondent shaped surface (23, 22; 31, 30; 41, 40; 51, 50) of the other panel (3, 2).

2. The junction device (1) according to claim 1), **characterized in that** at least one of said shaped surfaces (30) is made by an inclined plane with respect to the external surface (6, 7) of the panel (2) which they belong to.

3. The junction device (1) according to claim 1), **characterized in that** at least one of said shaped surfaces (40) is made by two converging planes **characterizing** a V-profile.

4. The junction device (1) according to claim 1), **characterized in that** at least one of said first shaped surfaces (22) is made by a curved surface.

5. The junction device (1) according to claim 4), **characterized in that** said curved surface characterizes a substantially S-profile.

6. The junction device (1) according to claim 4), **characterized in that** said curved surface characterizes a substantially U-profile.

7. The junction device (1) according to claim 1), **characterized in that** at least one of said second shaped surfaces (31) is made by an inclined plane with respect to the external surface (8, 9) of the panel (3) which they belong to.

8. The junction device (1) according to claim 1), **characterized in that** at least one of said second shaped surfaces (41) is made by two converging planes which characterize a V-profile.

9. The junction device (1) according to claim 1), **characterized in that** at least one of said second shaped surfaces (23) is made by a curved surface.

10. The junction device (1) according to claim 9), **characterized in that** said curved surface characterize a substantially S-profile.

11. The junction device (1) according to claim 9), **characterized in that** said curved surface characterizes a substantially U-profile.

12. The junction device (1) according to any of the preceding claims, **characterized in that** it is made by a unique tenon (4) and by a unique mortise (5).

13. A panel (2, 3) using the junction device (1) according to claim 1), **characterized in that** it has in at least one side (2a, 3a) said at least one tenon (4).

14. The panel (2, 3) using the junction device (1) according to claim 1) or 13), **characterized in that** it has in at least one side (2a, 3a) said at least one mortise (5).

15. The panel (2) using the junction device (1) according to claim 1), **characterized in that** of having in each side said at least one tenon (4).

16. The panel (3) using the junction device (1) according to claim 1), **characterized in that** it has in each side said at least one mortise (5).

17. The panel (2; 3) using the junction device (1) according to claim 1), **characterized in that** it is made by two sheets (6, 7; 8, 9) not in touch with another, substantially parallel and spaced through the interposition of thermal insulating material (C).

18. The panel (2; 3) using the junction device (1) according to claim 17), **characterized in that** said

thermal insulating material (C) is made by polyurethane.

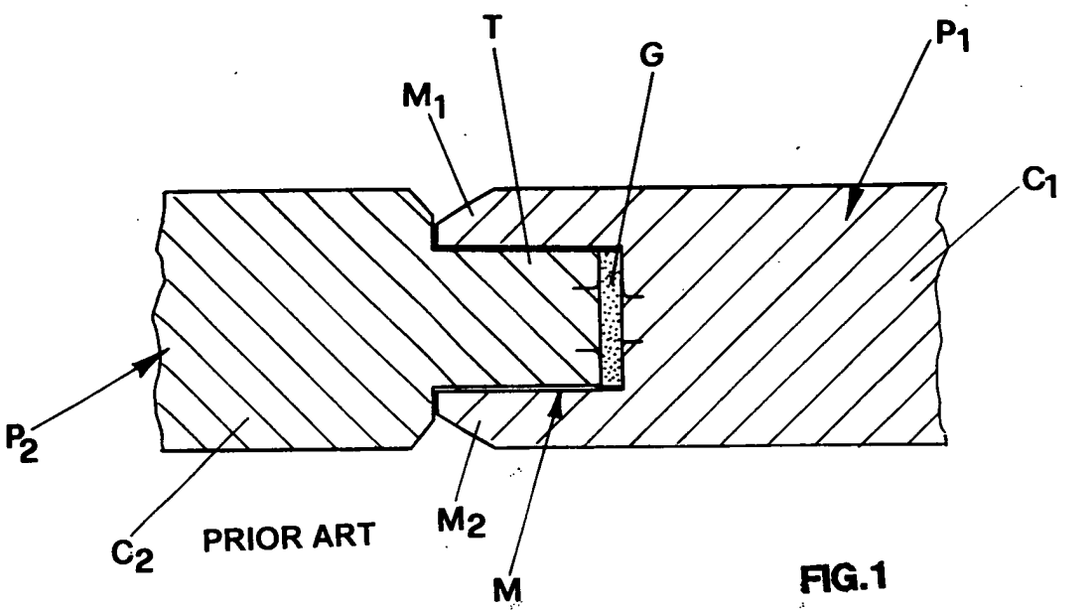

FIG.1

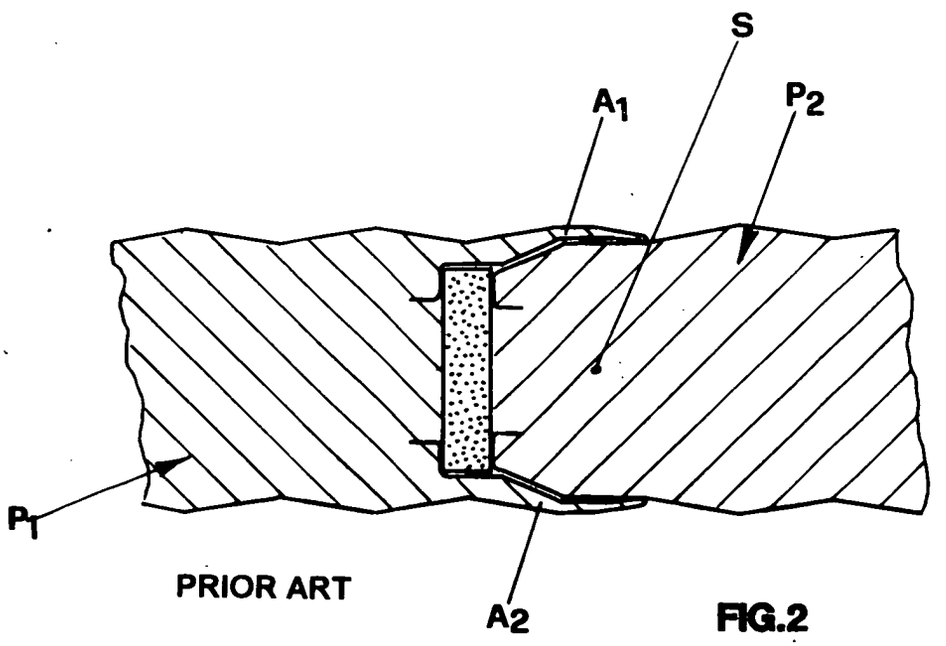

FIG.2

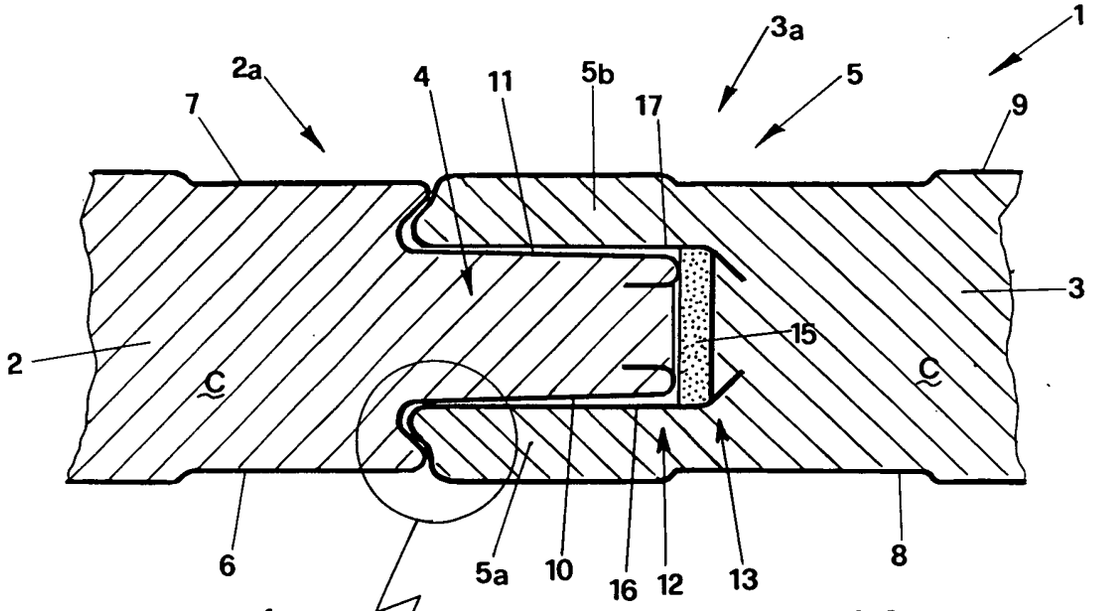

FIG.3

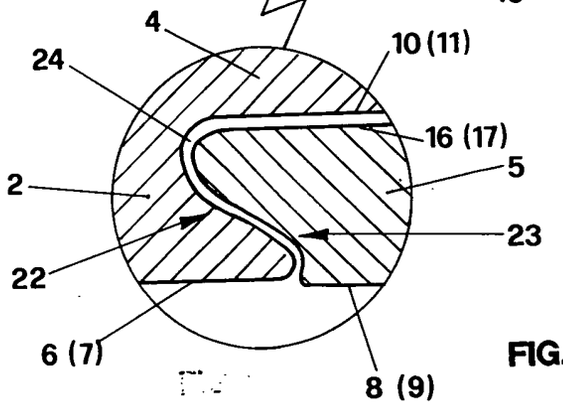

FIG.3a

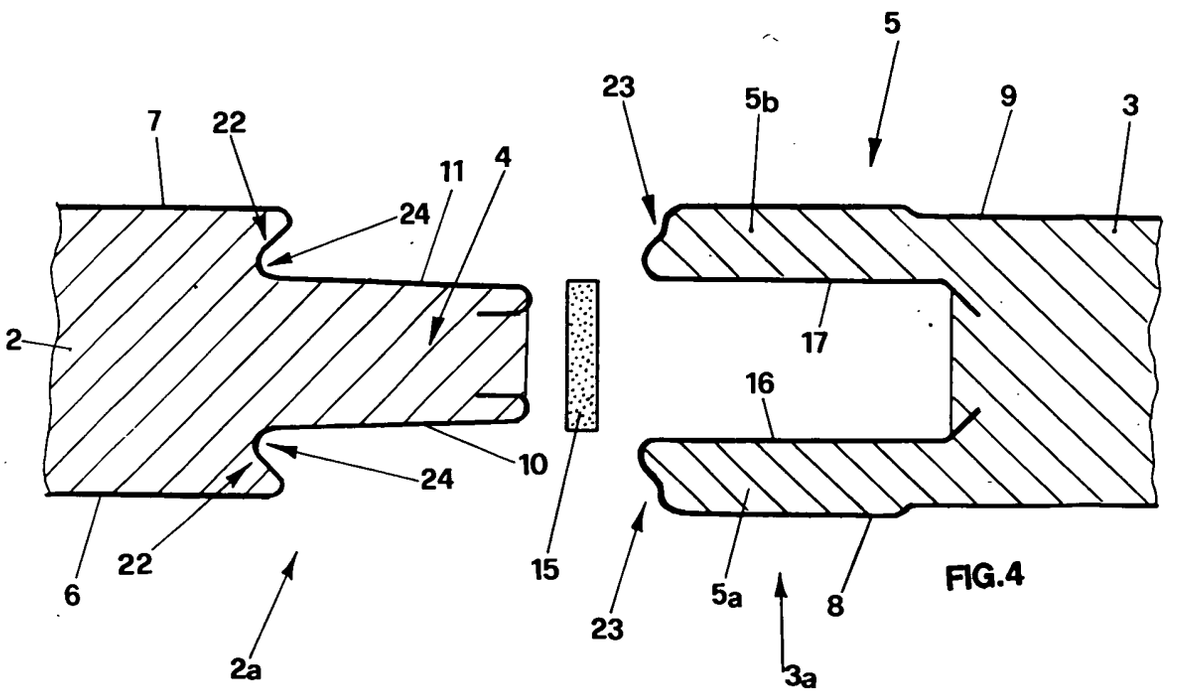

FIG.4

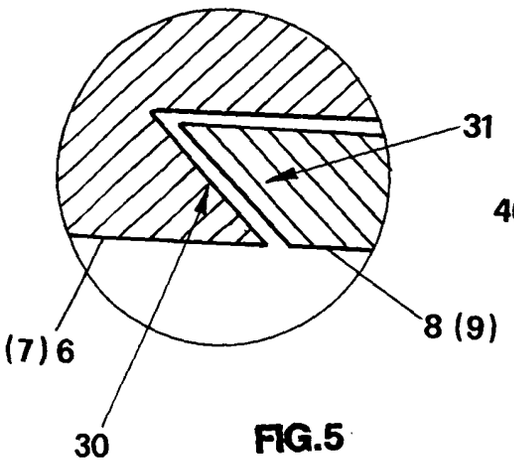

FIG.5

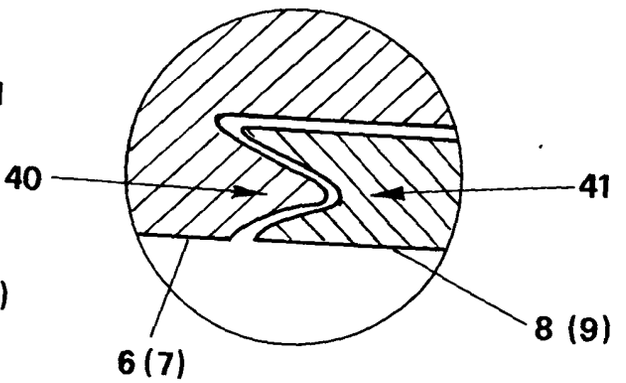

FIG.6

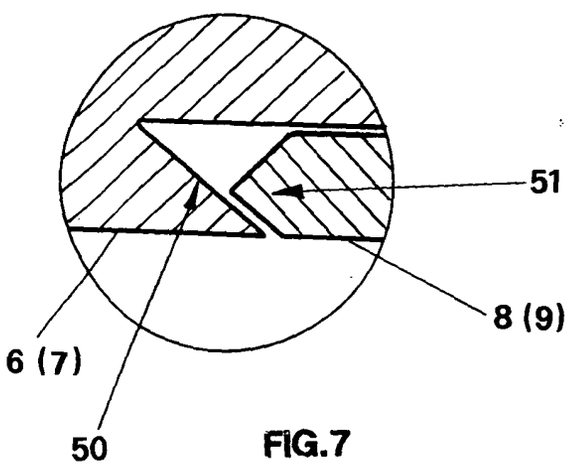

FIG.7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 02 5395

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.7)
X Y	GB 2 343 654 A (KINGSPAN RESEARCH AND DEVELOPMENTS LIMITED) 17 May 2000 (2000-05-17) * page 5, line 1 - line 10; figure 2 *	1,2,7, 12-14,17 4-6, 9-11,18	E04C2/292
Y	GB 2 259 887 A (MODULAR ERECTORS LIMITED) 31 March 1993 (1993-03-31) * figures 1,2 *	4-6,9-11	
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7) E04C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 January 2003	Mysliwetz, W

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