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(71) Applicant: **Cosmo S.p.A.**
67039 Sulmona (AQ) (IT)

(72) Inventors:
- **Gianni, Luigi**
62039 Sulmona (AQ) (IT)
- **Tavazza, Giuseppe**
20100 Milano (IT)
- **Piersante, Pasquale**
65010 Spoltore (PE) (IT)

(74) Representative: **Petruzziello, Aldo et al**
Racheli & C. S.p.A
Viale San Michele del Carso, 4
20144 Milano (IT)

Remarks:
Amended claims in accordance with Rule 86 (2) EPC.

(54) Panel, in particular for wood floors

(57) A panel (1) for a panel joining system, wherein the panel (1) comprises a male part on at least one side and a female part on at least one other side. The male part comprises a protrusion with a thickness smaller than the thickness of the panel (1). The male protrusion has a cut (20) so as to define two tongues (21,22), flexible in a transverse direction, wherein at least one tongue (21,22) has a tooth at one end. The female part comprises a groove (30) formed in the thickness of the respective side of the panel. The groove is able to receive the protruding male part of another panel and has an entry narrowing adapted to be passed over by the tooth of the protruding male part.

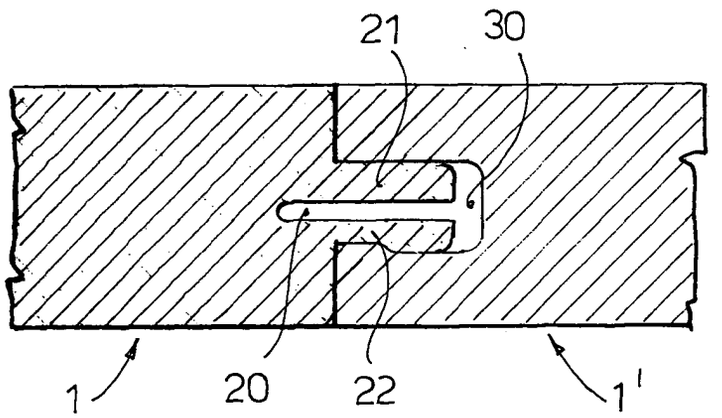

FIG. 6

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Description

[0001] The present invention refers to a system for joining panels or boards used in particular for prefinished wood floors.

[0002] Even if specific reference will be made herein to wood panels, the invention also extends to panels of other woody materials such as laminates, plywood, multilayer wood, MDF and the like, provided they have adequate elasticity. Furthermore, even if specific reference is made herein to wood or parquet floors, and the terms horizontal and vertical refer to this situation, the invention also extends to wood coverings for vertical or slanting walls.

[0003] Panel joining systems are currently known to the art based on coupling of a male element and a female element.

[0004] The male part generally has a profile with parallel edges and the female part has a matching slot. Consequently the male part of a panel can engage by tonguing inside the female part of another panel.

[0005] To ensure a good tightness of the joint minimal interference is necessary between the male part and the female part. As a result installation of a wood floor using this joining system requires a certain effort on the part of the operator who is forced to tap the panel to be mounted with a suitable instrument, for example a parquet hammer, to force the female part of said panel onto the male of the panel already laid.

[0006] Said joining system presents drawbacks since it requires a certain skill on the part of the operator to ensure that the join is perfect along its entire length.

[0007] The object of the present invention is to overcome the drawbacks of the prior art by providing a panel joining system adapted to simplify assembly operations and reduce effort by the operator during said operation.

[0008] Another object of the present invention is to provide such a panel joining system that is able to ensure a good tightness of the joint.

[0009] These objects are achieved in accordance with the invention with the characteristics listed in appended independent claim 1.

[0010] Advantageous embodiments of the invention are apparent from the dependent claims.

[0011] The panel joining system according to the invention provides for the use of a panel comprising a male part provided on at least one side of the panel and a female part provided on at least one other side of the panel.

[0012] The male part comprises a protrusion or rib, with a slightly smaller thickness compared with the thickness of the panel, protruding outwardly from the respective side edge of the panel along a plane substantially parallel to the plane of the panel. This male protrusion has an incision along a plane substantially parallel to the plane of the panel, so as to define two substantially flexible tongues in a transverse direction. At least one of these tongues has at its end a tooth or thickening.

[0013] The female part comprises a groove formed in the thickness of the respective side of the panel, along a plane substantially parallel to the plane of the panel. This groove is able to receive the male protruding part of another panel and has an entry narrowing able to be passed by said at least one tooth of the protruding male part.

[0014] Further characteristics of the invention will be made clearer by the detailed description that follows, referring to a purely exemplary and therefore non limiting embodiment thereof, illustrated in the appended drawings, in which:

Figure 1 is a perspective view of a panel according to the invention;
Figure 2 is a perspective view of the panel of Figure 1 turned 180°;
Figure 3 is a plan view of the panel of Figure 1;
Figure 4 is cross sectional or longitudinal sectional view, partially broken off, taken along the plane of section A-A or B-B of Figure 3;
Figure 5 is a sectional view like Figure 4, illustrating a second embodiment of the panel according to the invention;
Figure 6 is a sectional view, partially broken off, illustrating joining of two panels according to the second embodiment of the invention.

[0015] A system for joining panels according to the invention is described with the aid of the figures.

[0016] In Figures 1, 2 and 3 a wood panel according to the invention, denoted as a whole with reference numeral 1, is illustrated. The panel 1, by way of example, is substantially rectangular in shape, but can be of another shape, such as square, triangular and the like.

[0017] As shown better in Figure 4, a protruding male part 2 and a recessed female part 3 are formed on the two opposite major sides (section A-A of Fig. 3) of the panel 1; a protruding male part 2 and a recessed female part 3 are also formed on the opposite minor sides (section B-B of Fig. 3) of panel 1.

[0018] The male part 2 is shaped as a protrusion or rib with a linear profile that protrudes outwardly from the respective side edge of the panel 1, along a horizontal plane parallel to the plane of the panel. The female part 3 is shaped as a groove formed, along a horizontal plane, in the respective side edge of the panel 1.

[0019] Returning to Figures 1-3, since the panel 1 is rectangular, the male part 2 is substantially L-shaped and extends for a good part of the length of the two adjacent sides of the panel 1, leaving free two end portions 11 (Fig. 3) of said adjacent sides of the panel 1. The female part 3 also is substantially L-shaped and extends for the entire length of the other two adjacent sides of the panel 1.

[0020] Returning to Figure 4, the male protrusion 2 has a smaller thickness than the total thickness of the panel 1 and is disposed approximately on the midline

with respect to the horizontal axis of the thickness of the panel 1.

[0021] A cut 20 is formed in the male protrusion 2 along a horizontal plane, approximately along the midline axis of the thickness of the male protrusion 2. The cut 20 extends for the entire protrusion 2 and also involves part of the thickness of the panel 1. The cut 20 can extend into the thickness of the panel 1 even for a portion equal to roughly the width of the protrusion 2.

[0022] The cut 20 divides the male protrusion 2 into two tongues 21, 22 having a suitably reduced thickness so as to be elastically flexible so as to be able to bend elastically in a vertical direction. In particular, if the cut 20 is made slightly below the midline of the thickness of the male protrusion 2, the lower tongue 22 can have a smaller thickness than the upper tongue 21 and thus greater elasticity.

[0023] At the end of each tongue 21, 22 there is provided a respective thickening or outwardly protruding tooth 23, 24 which extends for the entire length of the tongue. The teeth 23, 24 protrude upwards and downwards, respectively, from the respective upper and lower tongues 21, 22 so as to give rise to respective abutment surfaces 25, 26 which can be step-shaped or in the form of inclined planes. The ends 27, 28 of the teeth 23, 24 are suitably chamfered or rounded.

[0024] The female part 3 has a recessed seat or groove 30 formed, along a horizontal plane, in the thickness of the panel 1, approximately along the midline axis of the thickness of the panel 1, in any case positioned in such a way that when the male is housed therein, the surfaces of the adjacent panels are aligned. The female seat 30 has a width suitable to receive the thickness of the male protrusion 2 and the depth of the seat 30 is greater than the width of the male protrusion 2.

[0025] The recessed seat 30 is defined between an upper potion 31 and a lower portion 32 of the thickness of the side of the panel 1. The upper and lower portions 32, 32 have in their inside surface respective inwardly protruding edges 33, 34 which extend along the entire length of the seat 30.

[0026] The edges 33, 34 define a narrowing at the entry to the seat 30 and respective abutment surfaces 35, 36, step-shaped or in the form of inclined planes, in the upper and lower portions 31, 32 which delimit a wider part at the bottom of the seat. The inside end comers 37 and 38 of the upper and lower portions 31, 32 are suitably tapered or rounded.

[0027] Figure 5 illustrates a second embodiment of a panel 1 according to the invention, wherein like reference numerals are used to denote like or corresponding parts to those of the first embodiment. In the second embodiment the tooth of the upper tongue 21 of the male and the corresponding edge of the upper portion 31 of the female have been eliminated. Clearly the tooth and the corresponding edge may also be provided only in the upper tongue 21 of the male and in the upper part 31 of the female, respectively.

[0028] Figure 6 illustrates the joint between two panels 1, 1' according to the second embodiment. The two panels 1, 1' are positioned on a flat surface, such as a floor, so as to have the female part 3 of the panel 1' facing the male part 2 of the panel 1.

[0029] The panel 1' is moved towards the panel 1. In this manner, the rounded parts 27, 28 of the tongues 21, 22 of the male 2 come into contact with the rounded parts 37, 38 of the upper and lower portions 31, 32 of the female which act as a lead-in, so as to bring about inward bending of the tongues 21, 22 of the male.

[0030] Once the tooth 24 of the lower tongue 22 of the male has passed beyond the edge 34 of the lower part 32 of the female, passing beyond the narrowing of the seat 30 of the female, the lower tongue 22 of the male springs elastically outward, moving away from the upper tongue 21 and the tooth 24 of the tongue of the male settles into the widest part of the female seat 30.

[0031] In this situation a sufficient tightness of the joint is ensured. In fact separation of the two panels 1, 1' is prevented by the fact that the abutment surface 26 of the tooth 24 of the male lower tongue 22 abuts against the abutment surface 36 of the edge 34 of the lower part 32 of the female.

[0032] In any case, the addition of glue in the side edges of the male and female of the panels improves the tightness of the joint. It must be considered that in this case a possible excess of glue is absorbed both inside the female seat 30 and inside the cut 20 in the male part.

[0033] Numerous variations and modifications within the reach of a person skilled in the art can be made to the present embodiments of the invention without thereby departing from the scope of the invention as set forth in the appended claims.

1. A panel (1) particularly for wood floors and the like comprising a male part (2) provided on at least one side of the panel and a corresponding female part (3) provided on the opposite side of the panel characterised in that

- said male part (2) comprises a protrusion or rib, with a smaller thickness than the thickness of the panel (1) protruding outward from the respective side edge of the panel (1) along a plane substantially parallel to the plane of the panel, said male protrusion (2) having a cut (20) along a plane substantially parallel to the plane of the panel, so as to define two tongues (21, 22) substantially flexible in a transverse direction, wherein at least one of said tongues (21, 22) has at its end a tooth or thickening (24), and
- said female part (3) comprises a groove (30) formed in the thickness of the respective side of the panel, along a plane substantially parallel to the plane of the panel, said groove being able to receive the protruding male part (2) of another panel and having an entry narrowing able to

be passed over by said at least one tooth (24) of the protruding male part.

2. A panel according to claim 1, characterised in that said groove (30) of the female part (3) is defined between an upper portion (31) and a lower portion (32) of the panel and said narrowing of the groove is obtained by means of at least one edge (33, 34) formed on the inner surface of the upper (31) and/or lower portion (32).

3. A panel according to any one of claims 1 or 2, characterised in that said at least one edge (33, 34) gives rise to an abutment surface shaped as a step or inclined plane (35, 36) in the respective upper/lower part (31, 32) of the female part (3) and said at least one tooth (23, 24) gives rise to an abutment surface shaped as a step or inclined plane (25, 26) in the respective upper/lower tongue (21, 22) of the male part (2).

4. A panel according to any one of the preceding claims, characterised in that said cut (20) in the protrusion of the male part (2) is formed along a plane coinciding with the midline plane of the thickness of the male part (2) so as to obtain two tongues (21, 22) having the same thickness.

5. A panel according to any one of claims 1 to 4, characterised in that said cut (20) in the protrusion of the male part (2) is formed along a plane above or below the midline plane of the thickness of the male part (2) so as to obtain two tongues (21, 22) having different thicknesses and elasticity.

6. A panel according to any one of the preceding claims, characterised in that the depth of said cut (20) is greater that the protrusion of said male protruding part (2).

7. A panel according to claim 6, characterised in that the depth of said cut (20) is equal to about double the protrusion of the protruding male part (2).

8. A panel according to any one of the preceding claims, characterised in that it is used for joining flooring elements.

9. A panel according to any one of the preceding claims, characterised in that it is made of wood.

10. A panel according to any one of the preceding claims, characterised in that it is made of multiply wood.

11. A panel joining system, characterised in that it employs panels (1, 1') according to any one of the preceding claims.

Claims

1. A panel (1) particularly for wood floors and the like comprising a male part (2) provided on at least one side of the panel and a corresponding female part (3) provided on the opposite side of the panel,

- said male part (2) comprises a protrusion or rib, with a smaller thickness than the thickness of the panel (1) protruding outward from the respective side edge of the panel (1) along a plane substantially parallel to the plane of the panel, said male protrusion (2) having a cut (20) along a plane substantially parallel to the plane of the panel, so as to define two tongues (21, 22) substantially flexible in a transverse direction, wherein at least one of said tongues (21, 22) has at its end a tooth or thickening (24), and
- said female part (3) comprises a groove (30) formed in the thickness of the respective side of the panel, along a plane substantially parallel to the plane of the panel, said groove being able to receive the protruding male part (2) of another panel and having an entry narrowing able to be passed over by said at least one tooth (24) of the protruding male part,

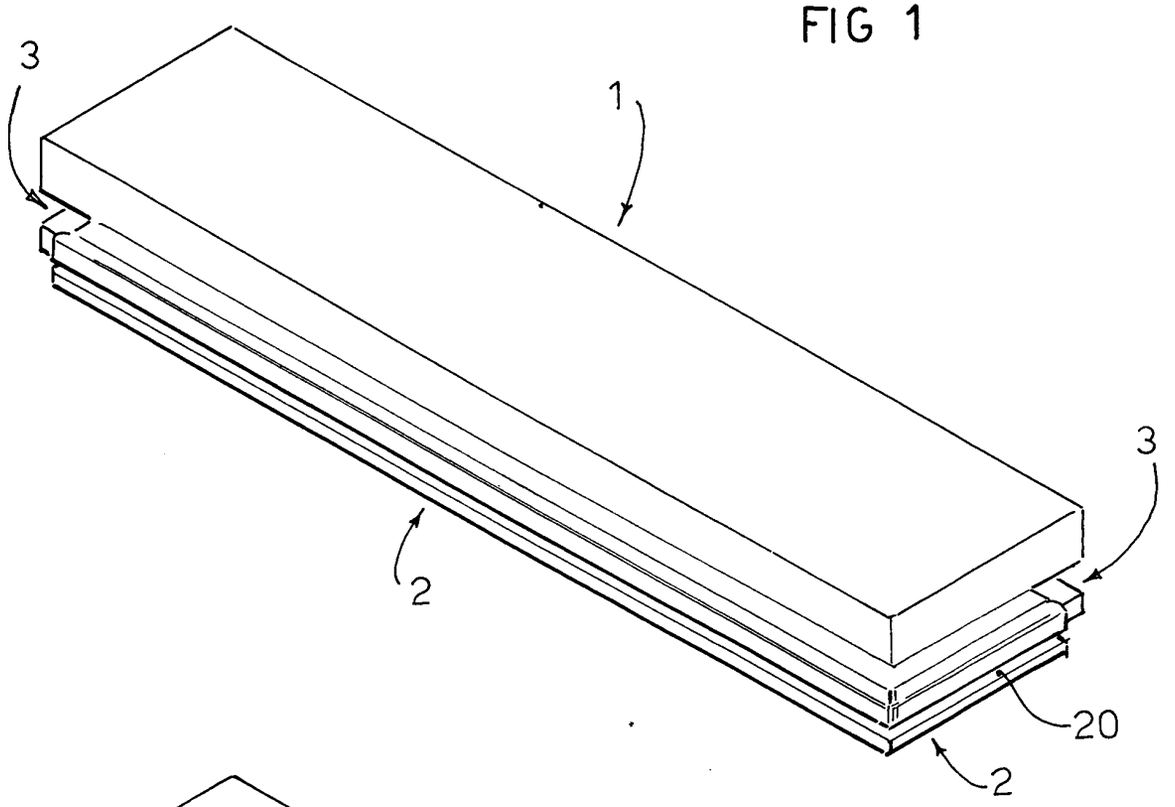
wherein

- said male part (2) and said female part (3) are integrally formed in one piece with the panel (1), and wherein
- said cut (20) of the male part is free after the coupling of the male and female parts.

2. A panel according to claim 1, **characterised in that** said groove (30) of the female part (3) is defined between an upper portion (31) and a lower portion (32) of the panel and said narrowing of the groove is obtained by means of at least one edge (33, 34) formed on the inner surface of the upper (31) and/or lower portion (32).

3. A panel according to any one of claim 2, **characterised in that** said at least one edge (33, 34) gives rise to an abutment surface shaped as a step or inclined plane (35, 36) in the respective upper/lower part (31, 32) of the female part (3) and said at least one tooth (23, 24) gives rise to an abutment surface shaped as a step or inclined plane (25, 26) in the respective upper/lower tongue (21, 22) of the male part (2).

FIG 1



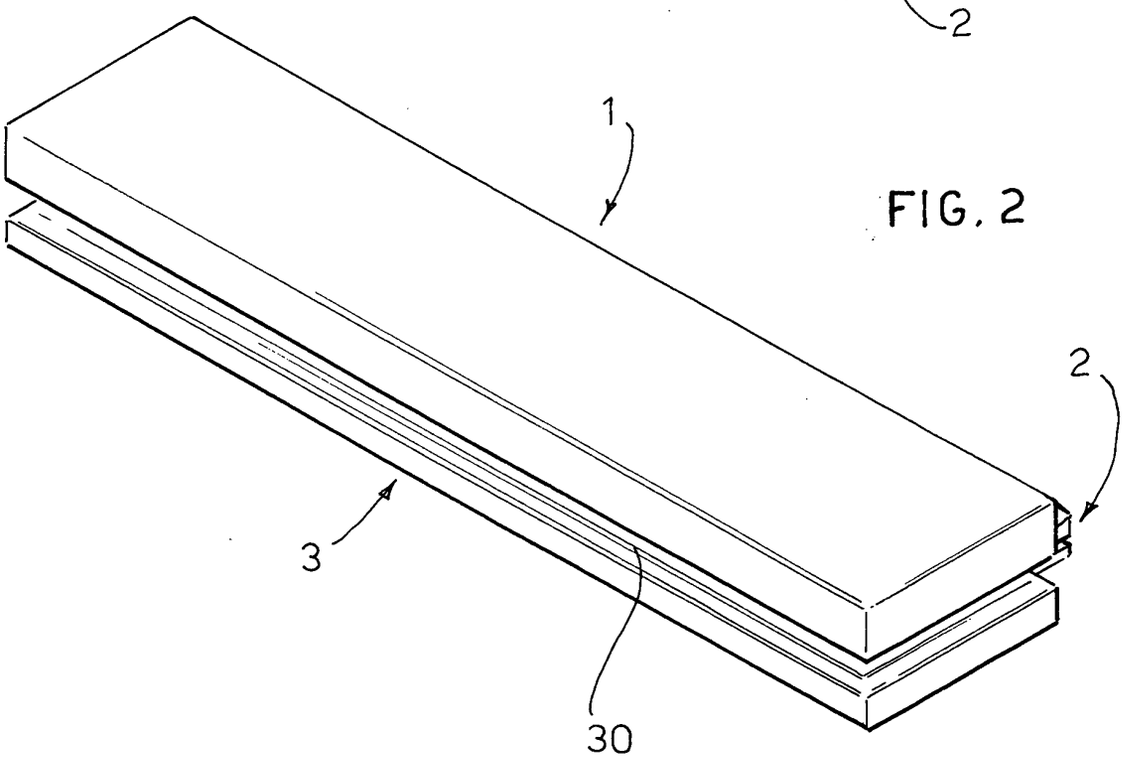
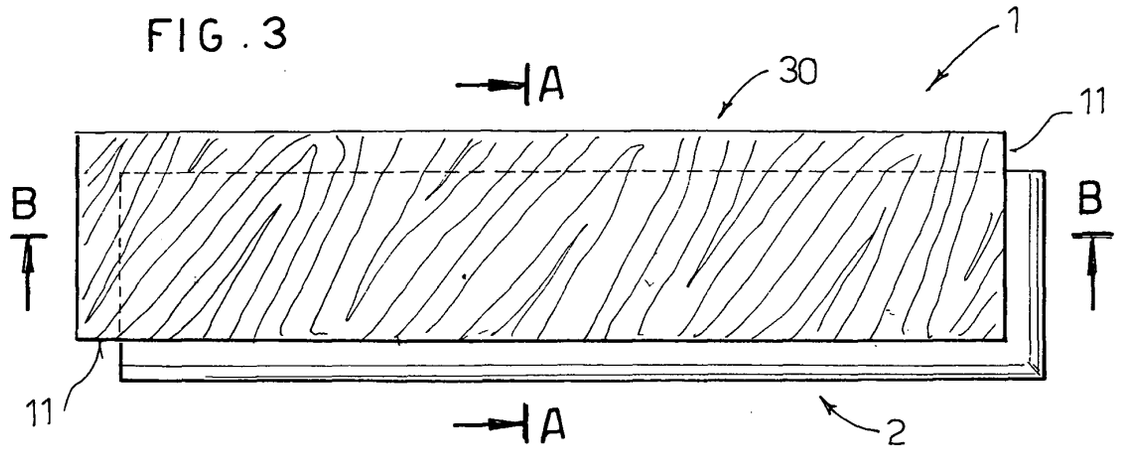


FIG. 2

FIG. 3



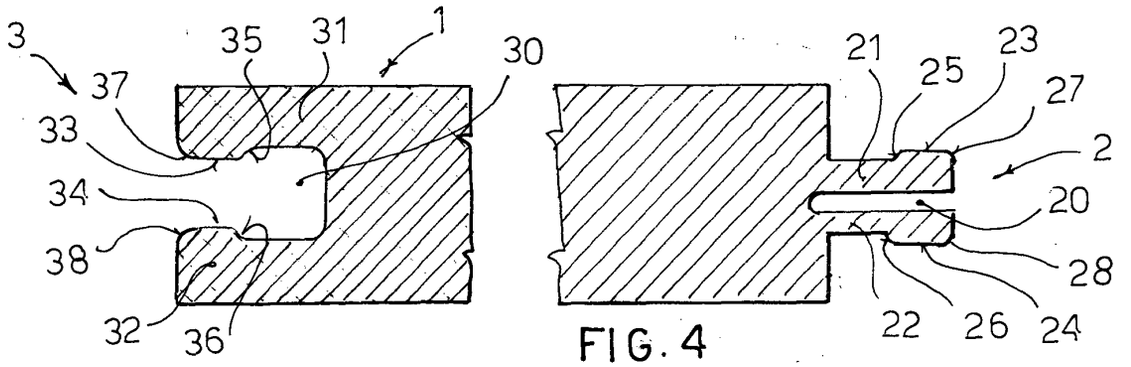


FIG. 4

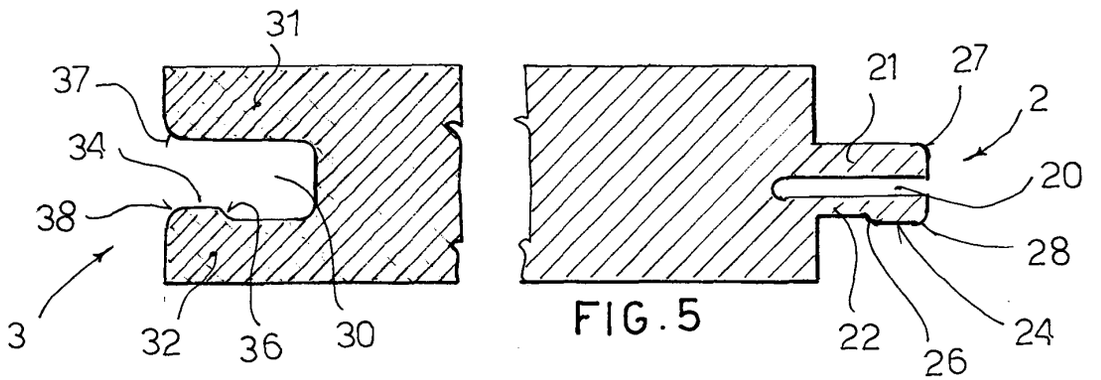


FIG. 5

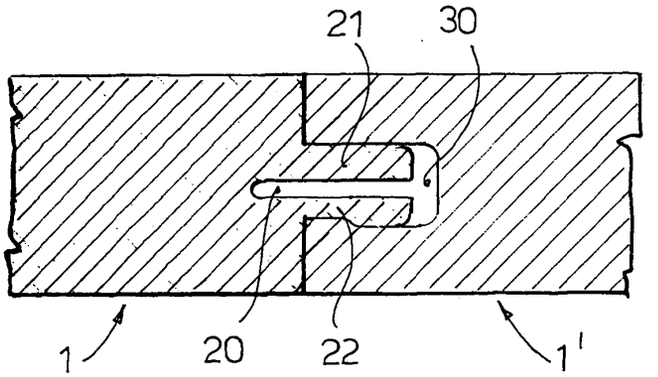


FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5604

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)
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X	DE 298 22 341 U (SCHROEDER HANS J) 2 March 2000 (2000-03-02) * page 1; figures * ---	1-11	
X	EP 1 128 000 A (KRONOTEC AG) 29 August 2001 (2001-08-29) * paragraphs [0006],[0007],[0014],[0015]; figures 1,2 * ---	1-11	
X	WO 94 01628 A (NIKKEN SEATTLE INC) 20 January 1994 (1994-01-20) * page 3, line 22 - page 4, line 27; figures 2,5 * ---	1-5,8-11	
X	DE 202 03 977 U (SCHULTE JOHANNES) 6 June 2002 (2002-06-06) * page 8, paragraph 5 - page 10, paragraph 1; figures * -----	1-3,8,9, 11	TECHNICAL FIELDS SEARCHED (Int.Cl.7) E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	20 January 2004	Bouyssy, V

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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