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(71) Applicant: **BIESSE S.p.A.**  
**61100 Pesaro (IT)**

(72) Inventor: **Bernardi, Paolo**  
**47841, Cattolica (IT)**

(74) Representative: **Jorio, Paolo et al**  
**Studio Torta S.r.l.**  
**Via Viotti, 9**  
**10121 Torino (IT)**

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### (54) Panel of wood or similar, and relative production method and machine

(57) A panel of wood or similar is defined by two parallel sheets of wood (4) fixed to each other with the interposition of a filling structure (6), has a lateral contour

(7a, 7b, 7c, 7d), and has at least one contoured edge (13) fixed along at least part of the lateral contour (7a, 7b, 7c, 7d) and having at least one tooth (16) shaped to extend at least between the two sheets (4).

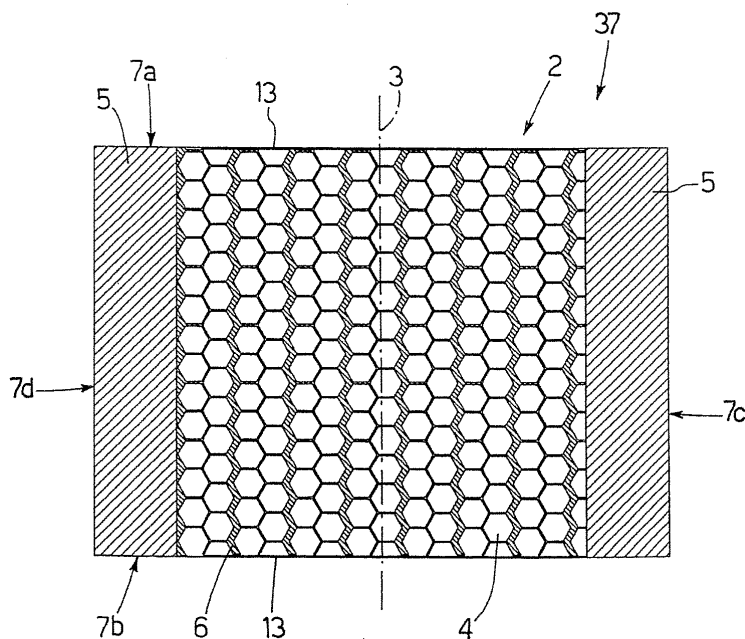
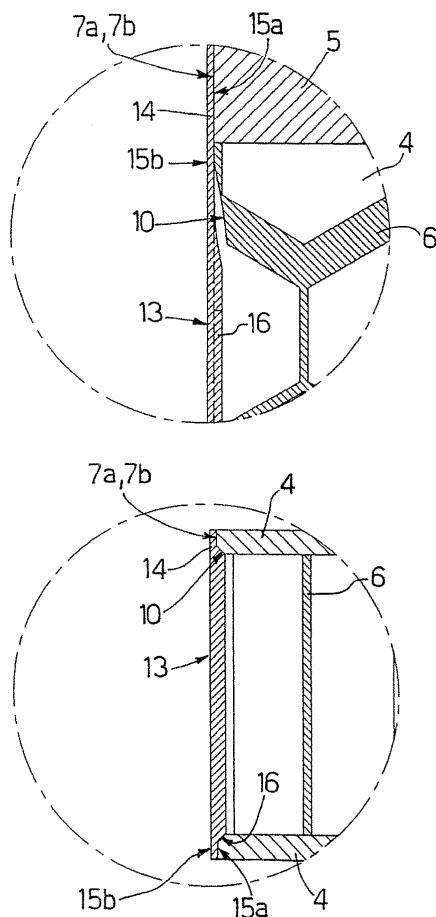


Fig.1

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## Description

**[0001]** The present invention relates to a panel of wood or similar.

**[0002]** In wood panel manufacturing, a panel is known comprising two parallel sheets of wood or similar, which are substantially the same shape and fixed to each other with the interposition of at least two parallel strips of wood or similar.

**[0003]** The strips are located on opposite sides of a longitudinal axis of the panel, and, together with the sheets of wood, define a cavity which opens axially outwards at two substantially flat end faces of the panel perpendicular to the axis, and houses a filling structure normally defined by a honeycomb paper structure.

**[0004]** Known panels of the type described above have several drawbacks, mainly due to the honeycomb paper structure failing to correctly support the end portions of the sheets of wood, thus resulting in failure of the end portions of the panel.

**[0005]** The above drawback has been partly solved by a production method, in which each free end of the cavity is first closed axially by a reinforcing member inserted between the sheets of wood and the strips, and a substantially flat finish edge is then applied to each end face of the panel.

**[0006]** The above known production method obviously involves considerable time, and calls for relatively complex machinery to insert the reinforcing members and then apply the finish edges.

**[0007]** It is an object of the present invention to provide a panel of wood or similar, designed to eliminate the aforementioned drawbacks.

**[0008]** According to the present invention, there is provided a panel of wood or similar, as claimed in Claims 1 to 5.

**[0009]** The present invention also relates to a method of producing a panel of wood or similar.

**[0010]** According to the present invention, there is provided a method of producing a panel of wood or similar, as claimed in Claims 6 to 13.

**[0011]** The present invention also relates to a machine for producing a panel of wood or similar.

**[0012]** According to the present invention, there is provided a machine for producing a panel of wood or similar, as claimed in Claims 14 to 20.

**[0013]** A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic longitudinal section, with parts enlarged for clarity, of a preferred embodiment of the wood panel according to the present invention; Figure 2 shows a schematic view in perspective of a wood component from which the Figure 1 panel is produced;

Figure 3 shows a schematic plan view, with parts removed for clarity, of a machine for producing the

Figure 1 panel;

Figure 4 shows a schematic plan view of a detail of the Figure 3 machine;

Figure 5 shows a schematic view in perspective of a first detail of Figure 4;

Figure 6 shows a schematic view in perspective of a second detail of Figure 4; and

Figure 7 shows a schematic view in perspective of a variation of the Figure 1 panel.

**[0014]** With reference to Figures 3 and 4, number 1 indicates as a whole an edging machine for edging components 2 of wood or similar (Figure 2), each of which has a given longitudinal axis 3, and comprises two parallel sheets 4 of wood or similar, which, in the example shown, are substantially rectangular and substantially identical, and are made, in the example shown, from materials derived from wood, such as so-called MDF (Medium Density Fibre) or HDF (High Density Fibre) materials.

**[0015]** Sheets 4 are joined with the interposition of two strips 5 of wood or similar, which are substantially parallelepiped-shaped with a substantially rectangular cross section, are parallel to each other and to axis 3, are located on opposite sides of axis 3, and, in the example shown, are substantially the same length as each sheet 4 measured parallel to axis 3.

**[0016]** Component 2 also comprises a filling structure 6 located between sheets 4 and strips 5 (in the example shown, a honeycomb filling structure made, for example, of cardboard and glued to sheets 4), is bounded axially by two parallel flat faces 7a, 7b (only one shown in Figure 2) perpendicular to axis 3, and is bounded by two flat faces 7c, 7d perpendicular to faces 7a, 7b.

**[0017]** Edging machine 1 comprises a known conveying device (not shown) for feeding components 2 successively in a given direction 8 and along a given path P. Each component 2 is first conveyed with its axis 3 crosswise to direction 8 through a cutting station 9 comprising a machining unit (not shown), which is positioned facing face 7a and mills the corresponding end of structure 6 and the free portions of the corresponding ends of sheets 4 to form a seat 10 (Figure 1) opening outwards at face 7a.

**[0018]** As shown in Figure 3, component 2 is then fed through an edging station 11 comprising a known edging unit 12 for applying to face 7a a contoured edge 13 (Figure 1) comprising a substantially flat fastening portion 14, which is of substantially the same area as face 7a and is bounded axially by two faces 15a, 15b perpendicular to axis 3. Face 15a faces face 7a, and comprises a central reinforcing tooth 16 projecting axially from face 15a, formed in one piece with portion 14, of approximately the same length as but no longer than the distance between strips 5, and shaped to engage seat 10 and fit between strips 5 and in contact with sheets 4.

**[0019]** Edging machine 1 also comprises a feed unit 17 for step-feeding a tape 18 to edging station 11, where edging unit 12 engages and forms from tape 18 a suc-

cession of edges 13 for application to faces 7a of respective components 2.

**[0020]** With reference to Figure 4, unit 17 comprises a number of pairs of counter-rotating rollers 19 arranged in succession in the feed direction 20 of tape 18. The rollers 19 in each pair of rollers 19 are mounted for rotation about respective substantially vertical axes 21 of rotation, are located on opposite sides of tape 18, and comprise an idle pressure roller and a powered roller.

**[0021]** As shown in Figure 5, tape 18 is bounded, in the example shown, by two contoured longitudinal edges 22 parallel to direction 20, has a central portion 23 defined between edges 22, and is fed by rollers 19 through a cutting station 24 comprising a cutting unit 25 - in the example shown, a milling unit - which engages tape 18 to form a succession of teeth 16 on tape 18.

**[0022]** Cutting unit 25 comprises a straight guide 26 extending in direction 8 and fitted to a fixed frame 27 of unit 17; and a slide 28 mounted to slide along guide 26 and connected by a screw-nut screw coupling to a screw 29 of a respective actuating device 30, a motor 31 of which rotates screw 29 to move slide 28 along guide 26 in direction 8.

**[0023]** Slide 28 supports a known electric spindle 32 having a vertical longitudinal axis 33 and fitted to slide 28 to slide, with respect to slide 28 and linearly in a horizontal direction 34 crosswise to direction 8, between a work position, in which a tool (not shown) fitted to electric spindle 32 engages central portion 23 of tape 18 to form teeth 16, and a rest position disengaging tape 18.

**[0024]** Station 24 also comprises a cutting device 35 located between two pairs of rollers 19 in direction 20, and which cooperates with a diverting device 36, located downstream from the pairs of rollers 19 in direction 20, to cut off and dispose of an initial portion (not shown) of tape 18 not worked on by cutting unit 25.

**[0025]** In actual use, and with electric spindle 32 in the rest position, tape 18 is fed in steps by rollers 19 in direction 20 through cutting station 24.

**[0026]** At each stop of tape 18, electric spindle 32 is first moved in direction 34 into the work position to engage central portion 23 of tape 18, is then moved by slide 28 in direction 20 to remove part of portion 23 to form a tooth 16, and is then moved back into the rest position in direction 34. Each tooth 16 is thus formed by combining the movements of electric spindle 32 in directions 20 and 34.

**[0027]** Obviously, in variations not shown:

electric spindle 32 may be fitted to frame 27 to slide linearly in direction 34, with respect to frame 27, between the work and rest positions, so that each tooth 16 is formed by combining the movements of tape 18 in direction 20 with the movements of electric spindle 32 in direction 34;

tape 18 may have a substantially rectangular cross section, and cutting station 24 may comprise two further cutting devices located upstream from electric

spindle 32 in direction 20 and on opposite sides of tape 18 to form longitudinal edges 22;

cutting unit 25 may be eliminated, and tape 18 fed directly to edging unit 12, so that each tooth 16 is the same length as relative edge 13, and is inserted inside a seat 10 formed at both filling structure 6 and strips 5; and

feed unit 17 may be eliminated and replaced by a store containing a number of edges 13 withdrawn successively by edging unit 12.

**[0028]** In connection with the above, it should be pointed out that edging machine 1 is only shown partly and only relative to the edging of face 7a (Figure 3), whereas edging machine 1 normally has a longitudinal axis of symmetry parallel to direction 8, comprises two cutting stations 9, two edging stations 11, and two feed units 17 located on opposite sides of path P, and is therefore able to edge both faces 7a, 7b simultaneously and form a panel 37 (Figure 1) comprising relative component 2 and relative edges 13.

**[0029]** By virtue of the design of edges 13, therefore, manufacture of panels 37 :

involves only one edging operation comprising both insertion of reinforcing tooth 16 between sheets 4, and edging of faces 7a, 7b;

is relatively fast; and

is performed on relatively straightforward, low-cost edging machines 1.

**[0030]** The Figure 7 variation differs from what is shown in Figures 1 and 2 by simply eliminating strips 5, and by edging machine 1 being used to edge a component 2 defined solely by sheets 4 and filling structure 6. Each face 7a, 7b, 7c, 7d is edged with a respective edge 13, the portion 14 of which is fixed to sheets 4, and the tooth 16 of which engages relative seat 10 so as to be positioned contacting sheets 4, and is substantially the same length as relative face 7a, 7b, 7c, 7d.

## Claims

1. A panel of wood or similar, comprising a component (2) of wood or similar, which in turn comprises two parallel sheets (4) of wood or similar, and a filling structure (6) between the sheets (4), and has a lateral contour (7a, 7b, 7c, 7d); and at least one edge (13) fixed along at least part of said lateral contour (7a, 7b, 7c, 7d); and **characterized in that** the edge (13) is a contoured edge (13) comprising at least one tooth (16) projecting inside the component (2) and between said sheets (4).
2. A panel as claimed in Claim 1, wherein said sheets (4) are positioned contacting the tooth (16).

3. A panel as claimed in Claim 1 or 2, and also comprising, for each tooth (16), a relative seat (10) formed in the filling structure (6) to house the tooth (16).
4. A panel as claimed in any one of the foregoing Claims, wherein the filling structure (6) is a honeycomb structure.
5. A panel as claimed in any one of the foregoing Claims, wherein the component (2) also comprises at least two strips (5) of wood or similar, located between and fixed to said sheets (4); the filling structure (6) being located between said strips (5); and the tooth (16) being of a length approximately equal to, but no longer than, a distance between the strips (5), so as to project inside the component (2) and between the strips (5).
6. A method of producing a panel of wood or similar from a respective component (2) of wood or similar, which comprises two parallel sheets (4) of wood or similar, and a filling structure (6) between the sheets (4), and has a lateral contour (7a, 7b, 7c, 7d); the method comprising the step of:
- edging at least part of the lateral contour (7a, 7b, 7c, 7d) with at least one edge (13); and being **characterized by** also comprising the steps of:
- forming on the edge (13) at least one tooth (16) projecting from the edge (13); and inserting the tooth (16) at least between said sheets (4) when edging the lateral contour (7a, 7b, 7c, 7d) .
7. A method as claimed in Claim 6, and also comprising the step of:
- forming on said lateral contour (7a, 7b, 7c, 7d) a seat (10) for receiving the tooth (16).
8. A method as claimed in Claim 7, and also comprising the step of:
- forming the seat (10) at said filling structure (6).
9. A method as claimed in any one of Claims 6 to 8, and also comprising the step of:
- detaching each edge (13) from a continuous tape (18) comprising two contoured longitudinal edges (22), and a central portion (23) defined between said contoured longitudinal edges (22).
10. A method as claimed in Claim 9, and also comprising the step of:
- forming each tooth (16) by detaching the relative edge (13) from said tape (18).
11. A method as claimed in Claim 9, and also comprising the step of:
- forming each tooth (16) by means of a relative first machining operation of said central portion (23).
12. A method as claimed in any one of Claims 9 to 11, and also comprising the step of:
- forming each contoured longitudinal edge (22) by means of a second machining operation of said tape (18).
13. A method as claimed in any one of Claims 6 to 12, wherein the component (2) also comprises at least two strips (5) of wood or similar, located between and fixed to said sheets (4) to contain the filling structure (6); the method also comprising the step of:
- inserting the tooth (16) between said strips (5) when edging said lateral contour (7a, 7b, 7c, 7d).
14. A machine for producing a panel of wood or similar, the machine comprising at least one edging station (11); first feed means for supplying the edging station (11) with at least one component (2) of wood or similar, which comprises two parallel sheets (4) of wood or similar, and a filling structure (6) between the sheets (4), and has a lateral contour (7a, 7b, 7c, 7d); second feed means (17) for supplying said edging station (11) with at least one edge (13); and edging means (12) for applying the edge (13) along at least part of said lateral contour (7a, 7b, 7c, 7d); and being **characterized in that** the edge (13) comprises at least one tooth (16) shaped to fit, in use, between said sheets (4).
15. A machine as claimed in Claim 14, and also comprising a store for a number of said edges (13).
16. A machine as claimed in Claim 14, and also comprising cutting means (12) for cutting a succession of edges (13) off a continuous tape (18) comprising two parallel contoured longitudinal edges (22), and a central portion (23) defined between said contoured longitudinal edges (22).
17. A machine as claimed in Claim 16, wherein said cutting means (12) define each tooth (16) by cutting the relative edge (13) off said tape (18).
18. A machine as claimed in Claim 16, and also comprising a first cutting unit (25) for forming each tooth (16) by means of a relative first machining operation

of said central portion (23).

**19.** A machine as claimed in any one of Claims 16 to 18, and also comprising a second cutting unit for forming said contoured longitudinal edges (22) by means of a second machining operation of said tape (18). 5

**20.** A machine as claimed in any one of the foregoing Claims, wherein the component (2) also comprises at least two strips (5) of wood or similar, located between and fixed to said sheets (4); the filling structure (6) being located between said strips (5); and the tooth (16) being of a length approximately equal to, but no longer than, a distance between the strips (5), so as to project inside the component (2) and between the strips (5). 10 15

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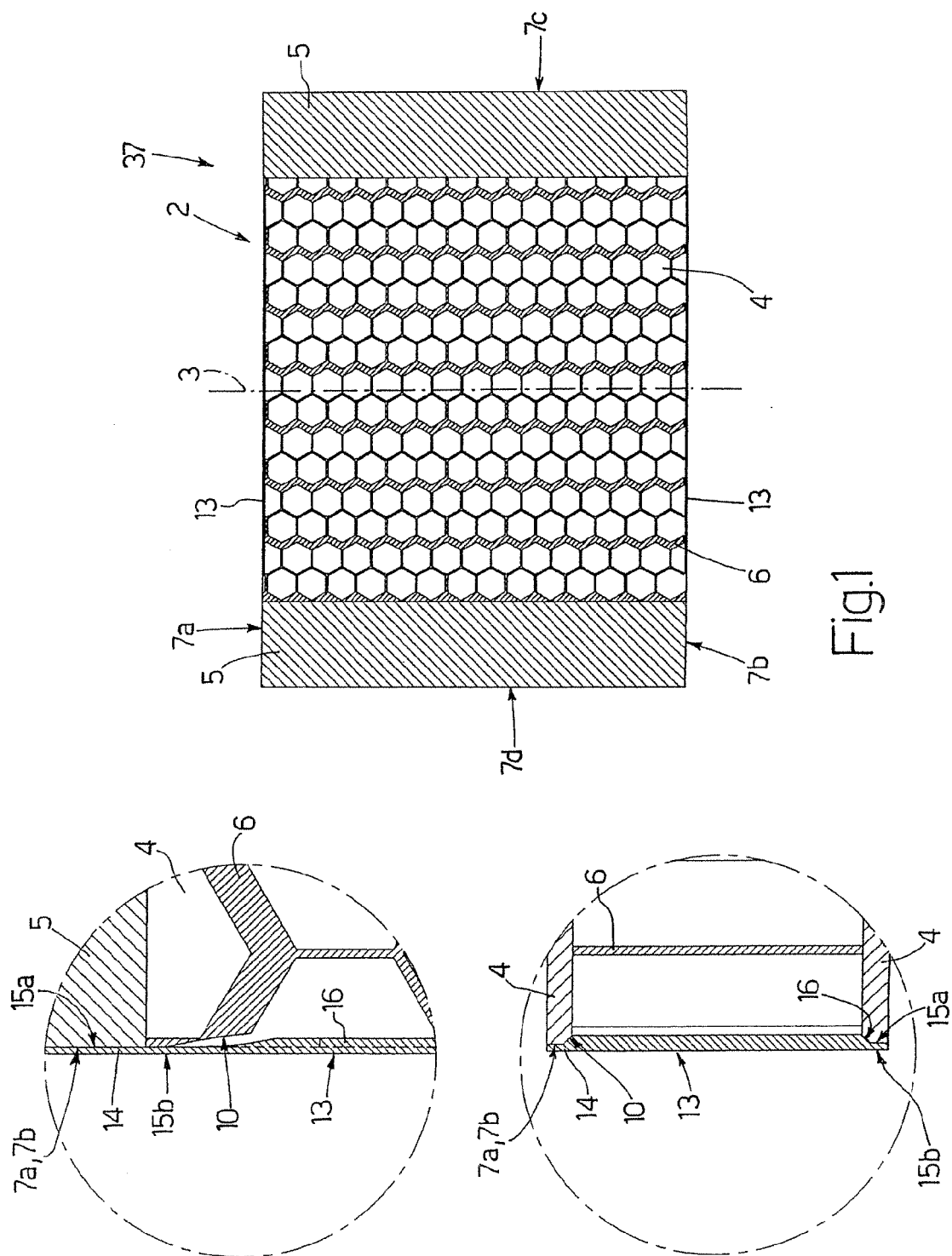
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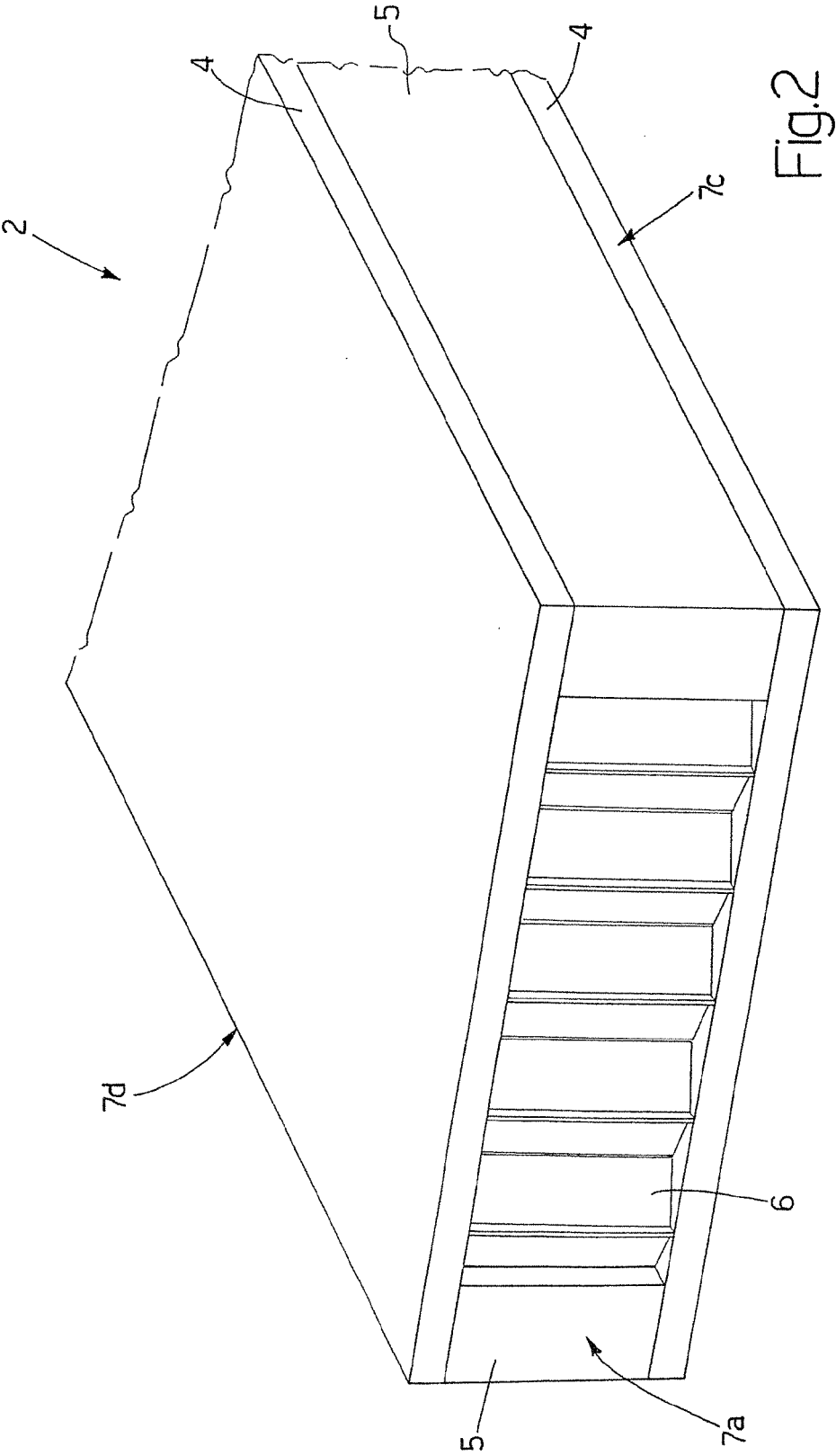


Fig. 2

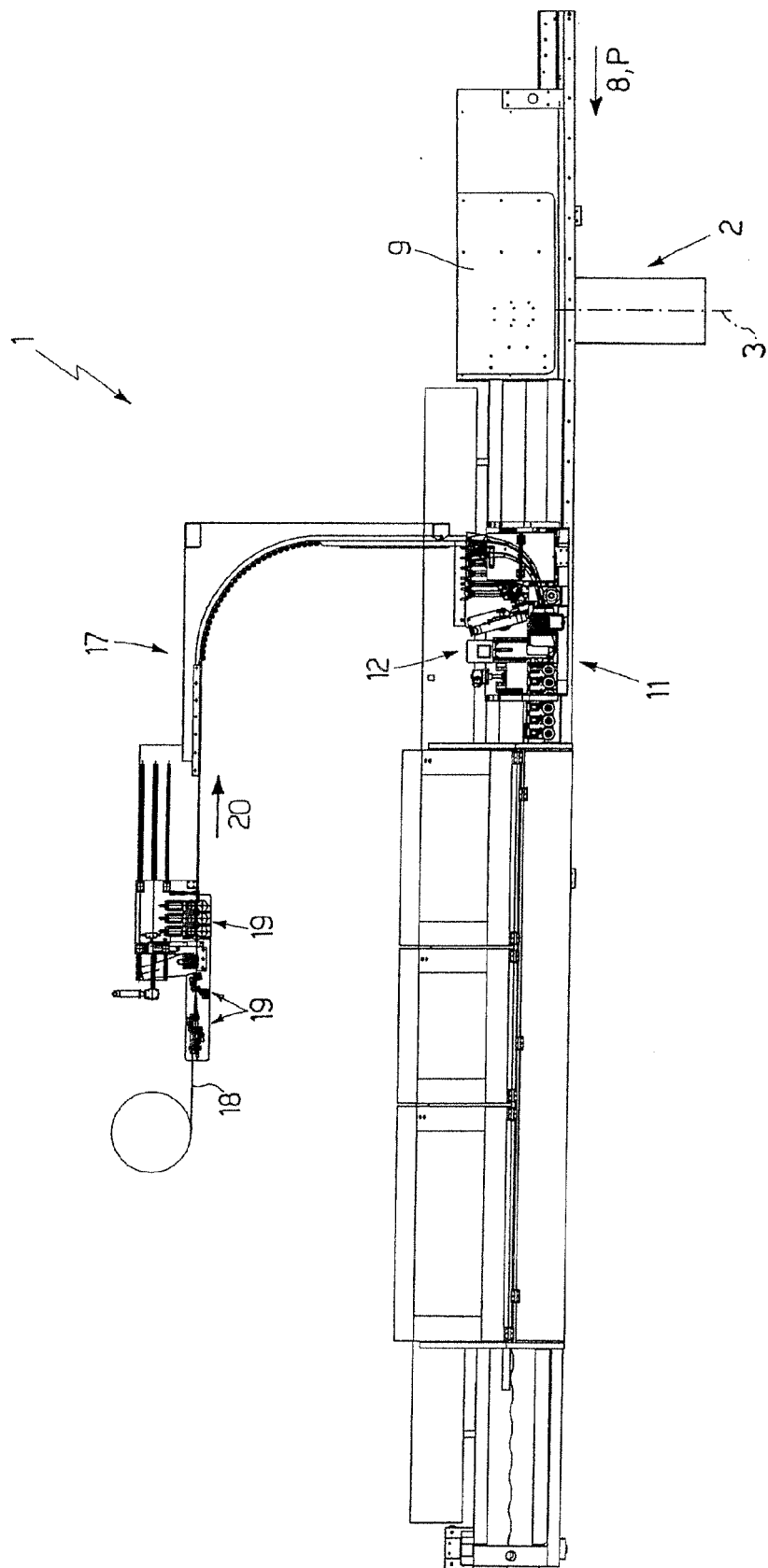


Fig.3

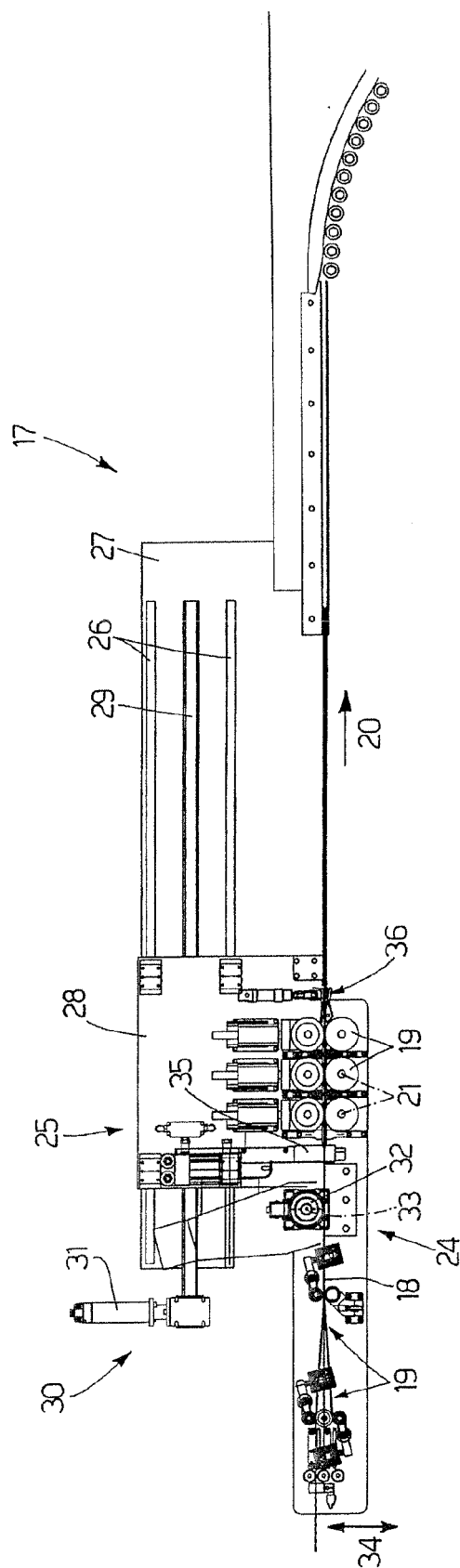


Fig.4

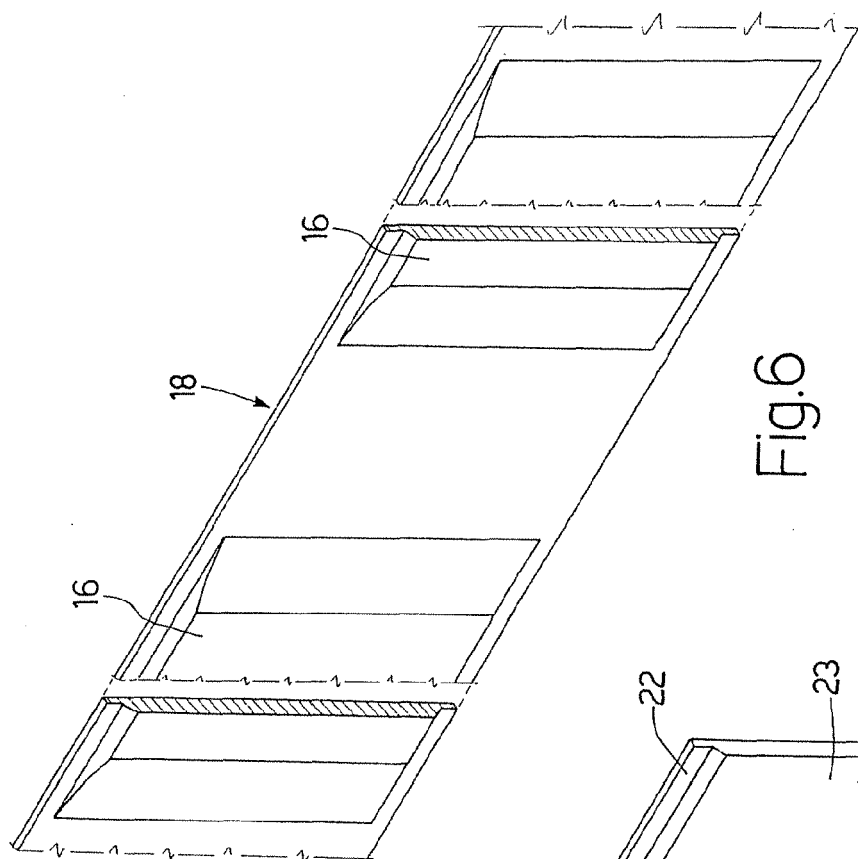


Fig. 6

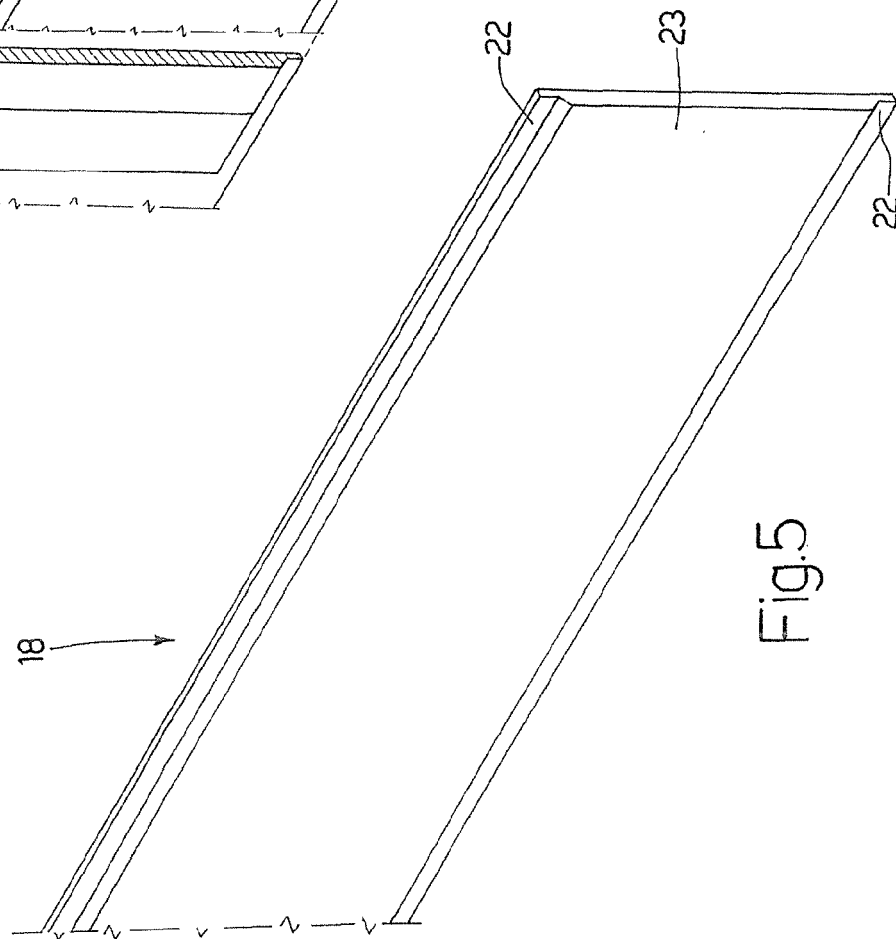


Fig. 5

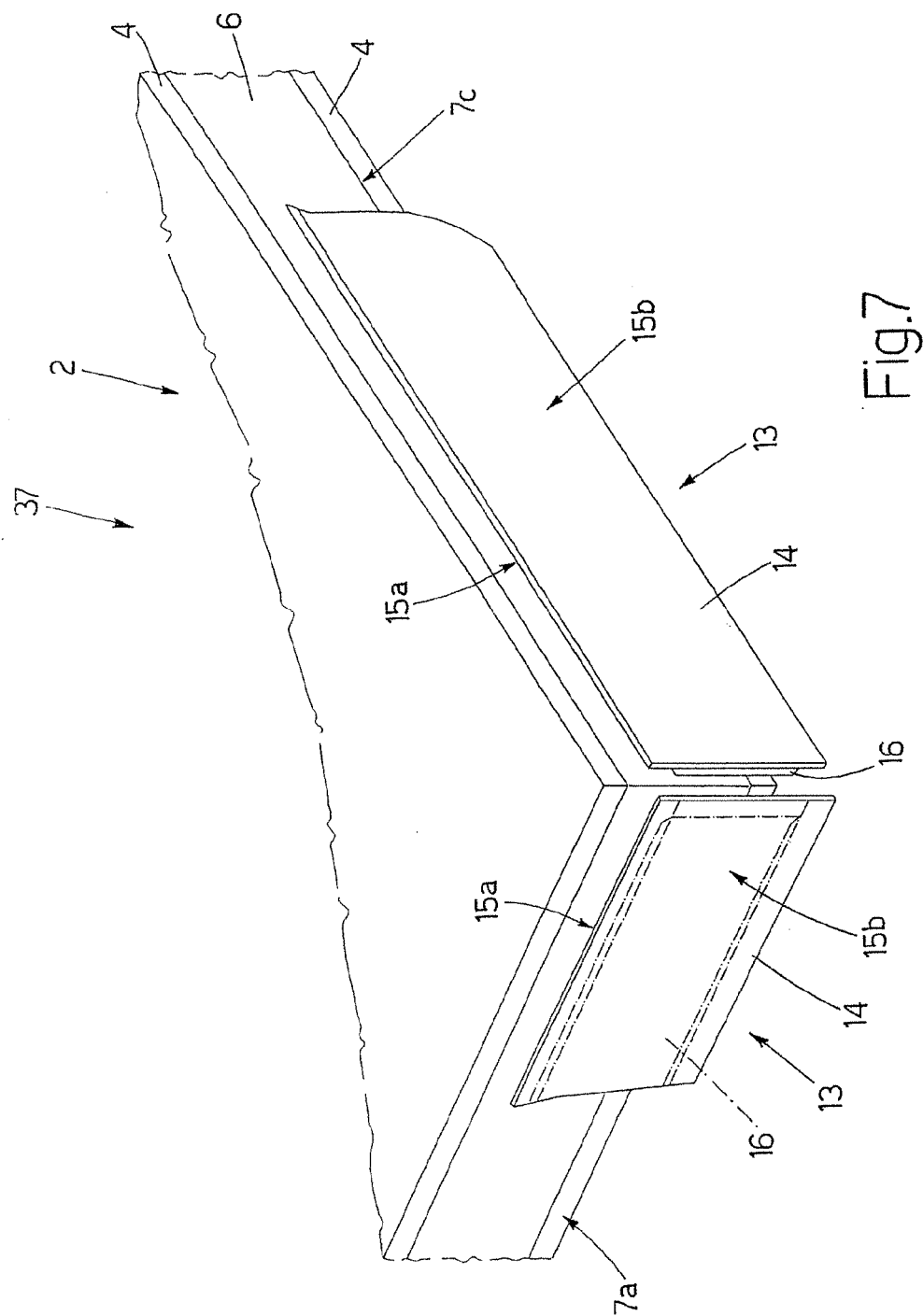


Fig. 7



| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                     |                                                                               |                                                                                                                                                                                                                                                                                       |                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Category                                                                                                                                                                                                                | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim                                                                                                                                                                                                                                                                     | CLASSIFICATION OF THE APPLICATION (IPC)  |
| X                                                                                                                                                                                                                       | DE 18 43 810 U (H. ROEMMLER G.M.B.H)<br>21 December 1961 (1961-12-21)         | 1-9                                                                                                                                                                                                                                                                                   | INV.<br>B21D5/00<br>B27D5/00<br>B27M1/08 |
| A                                                                                                                                                                                                                       | * figure 1 *                                                                  | 10                                                                                                                                                                                                                                                                                    |                                          |
|                                                                                                                                                                                                                         | -----                                                                         |                                                                                                                                                                                                                                                                                       |                                          |
| X                                                                                                                                                                                                                       | US 3 947 012 A (COBB WESTRAY S)<br>30 March 1976 (1976-03-30)                 | 1,3,5-9                                                                                                                                                                                                                                                                               |                                          |
| A                                                                                                                                                                                                                       | * column 4, lines 30-40; figure 5 *                                           | 10                                                                                                                                                                                                                                                                                    |                                          |
|                                                                                                                                                                                                                         | -----                                                                         |                                                                                                                                                                                                                                                                                       |                                          |
| X                                                                                                                                                                                                                       | DE 196 01 331 C1 (KEUSCH, SIEGFRIED)<br>12 December 1996 (1996-12-12)         | 14-20                                                                                                                                                                                                                                                                                 |                                          |
|                                                                                                                                                                                                                         | * claims; figure 1 *                                                          |                                                                                                                                                                                                                                                                                       |                                          |
|                                                                                                                                                                                                                         | -----                                                                         |                                                                                                                                                                                                                                                                                       |                                          |
| X                                                                                                                                                                                                                       | DE 87 15 746 U1 (HOMAG MASCHINENBAU AG)<br>10 March 1988 (1988-03-10)         | 14-20                                                                                                                                                                                                                                                                                 |                                          |
|                                                                                                                                                                                                                         | * claim 1; figure *                                                           |                                                                                                                                                                                                                                                                                       |                                          |
|                                                                                                                                                                                                                         | -----                                                                         |                                                                                                                                                                                                                                                                                       |                                          |
| A                                                                                                                                                                                                                       | US 2004/089376 A1 (ROSE MARTIN ET AL)<br>13 May 2004 (2004-05-13)             | 18,19                                                                                                                                                                                                                                                                                 |                                          |
|                                                                                                                                                                                                                         | * abstract; figures *                                                         |                                                                                                                                                                                                                                                                                       |                                          |
|                                                                                                                                                                                                                         | -----                                                                         |                                                                                                                                                                                                                                                                                       |                                          |
| The present search report has been drawn up for all claims                                                                                                                                                              |                                                                               |                                                                                                                                                                                                                                                                                       | TECHNICAL FIELDS SEARCHED (IPC)          |
|                                                                                                                                                                                                                         |                                                                               |                                                                                                                                                                                                                                                                                       | B21D<br>B27D<br>B27M                     |
| Place of search                                                                                                                                                                                                         |                                                                               | Date of completion of the search                                                                                                                                                                                                                                                      | Examiner                                 |
| Munich                                                                                                                                                                                                                  |                                                                               | 3 July 2006                                                                                                                                                                                                                                                                           | Meritano, L                              |
| CATEGORY OF CITED DOCUMENTS                                                                                                                                                                                             |                                                                               | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding document |                                          |
| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                               |                                                                                                                                                                                                                                                                                       |                                          |

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 11 2276

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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03-07-2006

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| DE 1843810                                | U  | 21-12-1961          | NONE                       |                     |
| US 3947012                                | A  | 30-03-1976          | NONE                       |                     |
| DE 19601331                               | C1 | 12-12-1996          | NONE                       |                     |
| DE 8715746                                | U1 | 10-03-1988          | NONE                       |                     |
| US 2004089376                             | A1 | 13-05-2004          | NONE                       |                     |