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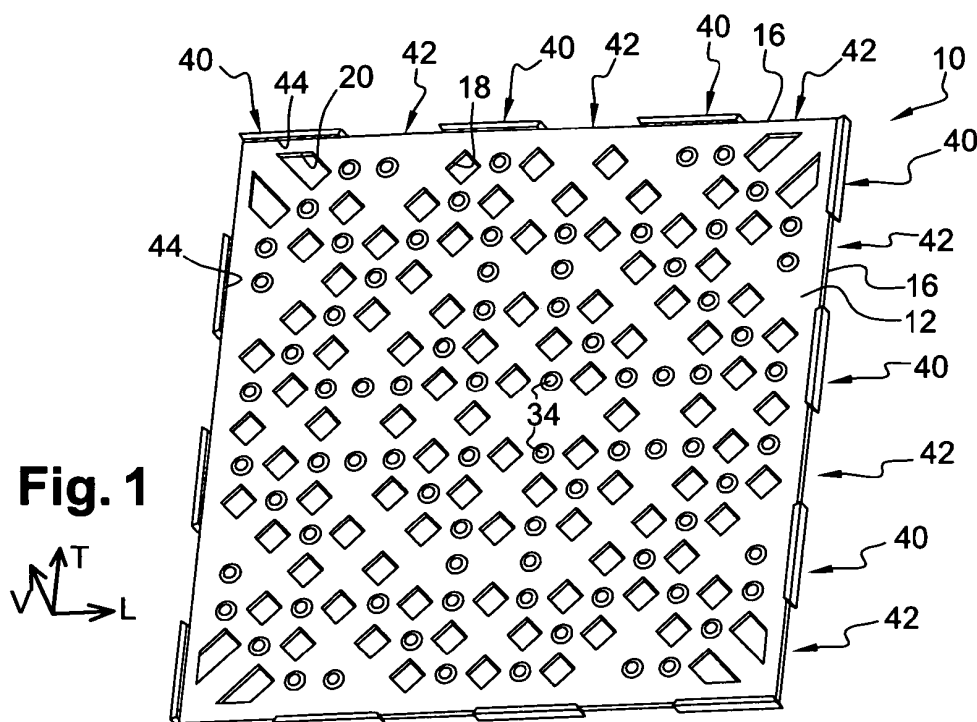
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(54) **Modular holding structure for ground surfacing**

(57) Modular holding structure (100) for ground surfacing (102), such as a floor, a stone surfacing or a pavement, said structure comprising a plurality of unitary modules (10) connected together in order to design a flat holding able to be placed vertically between the ground and the surfacing, in which structure each module (10) is a plate having a polygonal periphery which is bounded by

a horizontal superior planar face (12) and by several vertical side faces (16), each side face (16) being provided with consecutive and complementary tenons (40) and mortises (42) designed in order to allow the connection of two adjacent unitary modules (10) through fitting along the vertical direction (V) wherein at least some tenons (40) protrude vertically (44) above the surface of said superior horizontal face (12) of the plate.



Description

TECHNICAL BACKGROUND

[0001] The present invention pertains to a universal holding structure for different ground surfacing such as floors, stones surfacing, pavements made of wood, reinforced wood, stone or tiles, etc...

[0002] The present invention is directed to such a holding structure designed to be a holding plane able to be placed vertically between the ground and the surfacing.

[0003] Such a holding structure should thus authorize to assemble and locate several surfacings, with different fastening or connecting means.

[0004] The structure should be appropriate outdoors and as a consequence should allow to solve notably the rainwater drainage problems.

[0005] Besides, such a holding structure should be of reasonable unitary dimensions, being moreover of an easy packaging type in order to be easily put into the market and reduced to practice.

[0006] It is known from WO-A-99/36638 a support for paving or decking which discloses a modular holding structure (100) for ground surfacing (102), such as a floor, a stone surfacing or a pavement, said structure comprising a plurality of unitary modules (10) connected together in order to design a flat holding able to be placed vertically between the ground and the surfacing, in which structure each module (10) is a plate having a polygonal periphery which is bounded by a horizontal superior planar face (12) and by several vertical side faces (16), each side face (16) being provided with consequential and complementary tenons (40) and mortises (42) designed in order to allow the arrangement of two adjacent unitary modules (10) through fitting along the vertical direction (V).

[0007] According to this disclosed design, the support is provided with a plurality of guiding plates 38 in order to retain slats. However, such an arrangement implies a complicated mold for obtaining both plates 38 and mating components 40 and 42.

[0008] The present invention aims to provide a structure which is easy to mold.

BRIEF SUMMARY OF THE INVENTION

[0009] To this end, the present invention pertains to a modular holding structure according to the preamble of claim 1, characterized in that at least some tenons protrude vertically above the surface of said superior horizontal face of the plate.

[0010] According to other features of the present invention :

- each side face comprises an equal number of tenons and mortises, and each angle, at the intersection of two side faces, comprises successively one tenon and one mortise each one belonging respectfully to one of these two side faces ;

- tenons and mortises are of a dovetail complementary shape ;
- each side face protrudes vertically under the inferior face of the plate, and the side faces inferior edges constitute a supporting peripheral edge for the module on the ground ;
- said peripheral edge support comprises several notches, notably for the disposal of liquids towards the environment ;
- the inferior face of the plate is reinforced by means of several ribs, and the plate is perforated between the ribs ;
- the plate comprises several studs for the fastening of the surfacing which protrude vertically downwards from the inferior face of the plate, and each one of them being a vertically perforated cylinder and which is aligned with a hole in the plate in order to constitute an aperture opening able to receive a fastening means of the surfacing on the plate, such as a screw or a nail ;
- each modular element is of a regular polygonal periphery, notably squared and
- each modular element is made of a single molded plastic piece.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Other features and advantages of the present invention will appear while reading the following detailed description for the understanding of which one should report to the accompanying drawings in which :

- Figure 1 is a perspective three-quarter view from above of a unitary module for a holding modular structure according to the invention ;
- Figure 2 is a perspective three-quarter view from below of the unitary module of figure 1 ;
- Figure 3 is an example of a holding modular structure designed through connection of several unitary modules according to figure 1 and 2, which is used as holding for the production of a floor ;
- Figure 4 is a sectional enlarged view, by a vertical plane of the unitary module of figure 1, representing a fixing stud ;

[0012] In the following description, identical similar or analog elements, will be designated by the same reference numbers.

[0013] To facilitate comprehension of the description and of the claims the words vertical, horizontal, longitudinal, cross-sectional - with reference to the gravity and to the trihedral L, V, T shown in the drawings - are used in a non limiting way.

[0014] According to the present invention, each unitary module 10 which allows through connection of such modules the production of a modular holding structure, is a plate of polygonal periphery.

[0015] By way of non limiting examples, as shown in

the drawings, each unitary module in the present invention is a plate with a squared periphery.

[0016] Each plate 10 is a unitary item made in the present invention as a one-piece molded plastic item.

[0017] The plate 10, which general plane in use is horizontal, that is parallel to the ground on which it will be layed (the horizontal plane corresponding to the L and T axes of the trihedral L, V, T) is bounded by a horizontal plane superior face 12 and by an opposite horizontal flat inferior face 14.

[0018] Plate 10 is also bounded laterally by four vertical lateral faces 16 protruding in the present invention consecutively and right angled.

[0019] The superior face 12 is flat.

[0020] In order to reduce the quantity of plastics used and to facilitate the disposal of the drainage waters and of the rainwaters through the modular structure, the plate constituting unitary module 10 is perforated by several openings 18 and 20 which are distributed according to regular patterns and according to the plate diagonals.

[0021] As shown on Figure 2, each lateral face 16 protrudes vertically below the plane of the horizontal interior face 14 in order to constitute a peripheral frame 22 oversizing downwards.

[0022] When placed on the ground, it is the inferior face or horizontal inferior edge 24 of the peripheral frame 22 which is helded on the ground.

[0023] In order to facilitate the drainage through unitary module, each lateral face 10 comprises notches laterally opening 26 designed in the edge 24.

[0024] In order to reinforce the rigidity of unitary module 10, the inferior face 14 is provided with several raised ribs 28 which protrude vertically downwards, in the present case over a height smaller than that of the peripheral frame 22.

[0025] Ribs 28 protrude « between » the openings 18 and 20.

[0026] As it will be explained later, and notably to allow fixation of certain surfacing elements such as a floor by means of screws and/or nails, the plate constituting the unitary module 10 comprises several fastening studs.

[0027] As shown on Figure 2, each fastening stud 30 protrudes vertically downwards from the inferior face 14 of plate 10.

[0028] Studs are preferably, but not in a limiting way, designed at the crossings of ribs 28.

[0029] Each stud 30 is in the form of a molded cylinder which can extends above the full height available, i.e. from the plane of the inferior face 14 up to the plane of the peripheral holding edge 24.

[0030] Each stud 30 is perforated, by molding, centrally and vertically, in the present case by a hole of the type 32, produced in one piece by molding and terminating vertically upwards and downwards.

[0031] Each hole 32 is aligned with a corresponding hole 34 of the plate, produced in one piece by molding and terminating in superior face 12 and vertically downwards in alignment with hole 32.

[0032] By means of a non limiting example, each hole 34 can have a tapered profile analog to a "milling".

[0033] Alternatively, each hole 34 can be cylindrical in the form of a "countersink".

5 **[0034]** According to the present invention, in order to connect different unitary modules 10 one to another to constitute a flat modular holding structure having large dimensions, each unitary module 10 comprises connecting means, in the vertical direction, of the tenons and mortises type.

10 **[0035]** For this purpose, each lateral face 16 comprises, protruding and embossing, several tenons 40 successively aligned along each face 16 defining between them consecutive mortises 42 complementary to tenons 40.

15 **[0036]** Each lateral face comprises an equal number of tenons and mortises, being in the present embodiment three.

20 **[0037]** In order to allow the connection to one another of two unitary modules, i.e. indistinctly of adjacent lateral faces to be connected with each other by vertical interlocking, each lateral face 16 comprises an equal number of tenons and mortises and, at each angle at the crossing of two lateral faces 16, there is successively one mortise 42 belonging to one of the lateral faces and, on the consecutive lateral face, a tenon 40.

25 **[0038]** Tenons 40 and mortises 42 have a dovetail profile, in order to allow an arrangement in the vertical direction and as a consequence allow the production of a very accurate and rigid fastening of two unitary modules arranged laterally side by side.

30 **[0039]** According to another aspect of the present invention, each tenon 40 protrudes embossed upwards above the plane of superior face 12 of the plate 10 forming a protruding extension 44.

35 **[0040]** Thickness of each embossed tenon from the lateral face 16 and above the plane of superior face 12 is sufficient to permit a solid and accurate arrangement, but is sufficiently reduced so that, as will be explained later, the part vertically protruding 44 of each tenon 40 can be easily removed by cutting, for example using a cutter, to remove these protruding portions 44 between two adjacent plates 10.

40 **[0041]** Indeed, as shown in Figure 3 by way of a non limiting example, after the connection of several unitary modules 10 to produce a modular structure 100, tenons 40 distributed along the periphery of modular structure 100 retain their protruding parts 44 which constitute the same number of peripheral lateral wedges allowing the positioning and the retaining of the surfacing elements arranged on the superior face 12.

45 **[0042]** By contrast, « inside » of this peripheral contour of modular structure 100, if one has removed by cutting the protruding parts 44, it is provided a continuous horizontal plane without asperity corresponding to coplanar faces 12 of adjacent connected plates 10.

50 **[0043]** In the exemplified embodiment shown in Figure 3, a board 102 is illustrated placed on the modular struc-

ture 100, to produce a floor for example.

[0044] The fixing of board 102 on modular structure 100 can be obtained through different means such, for example, bonding and/or screwing grace of a number of fixing studs 30 of each unitary module 10, and thus of modular structure 100.

[0045] By way of example, each unitary module can be a square plate of 300 mm side produced by molding in polyethylene or in polypropylene.

[0046] When the surfacing is made of slabs or wooden boards, all fixing studs constitute all screwing points providing a great variety of dimensional options for slabs or boards as well as for the distribution of screwing points.

[0047] When slabs or boards are made of reinforced wood, the « milled » form 34 favors the arrangement by screwing grace of the sawdust disposal.

[0048] When the surfacing is made of natural stone slabs, the importance of superior face 12 provides an extremely large bonding area and protruding portions 44 allow an accurate fit of the slabs on the modular holding structure 100.

[0049] The modular structure according to the invention displays a very high draining capacity of the drainage and of rainwater and allows a very good ventilation of underlying soils which avoids rotting and occurrence of molds.

[0050] The accurate connection of unitary modules one to another, as well as the whole modular structure rigidity, allow the production of subsets consisting of several modules after having the oversized parts 44 cut in the center of these subsets.

[0051] Notches 26, besides their drainage or rainwater disposal capacity, allow also to perfectly recess unitary modules head to tail one over the other in order to facilitate notably the carrying and the storage thus reducing the floor space by two.

[0052] The present invention is of course not limited to the embodiment described here above.

[0053] The present invention is notably not limited to a square periphery, each unitary module could display another kind of regular polygonal periphery profile and for example, could be of equilateral triangular contour.

Claims

1. Modular holding structure (100) for ground surfacing (102), such as a floor, a stone surfacing or a pavement, said structure comprising a plurality of unitary modules (10) connected together in order to design a flat holding able to be placed vertically between the ground and the surfacing, in which structure each module (10) is a plate having a polygonal periphery which is bounded by a horizontal superior planar face (12) and by several vertical side faces (16), each side face (16) being provided with consequential and complementary tenons (40) and mortises (42) designed in order to allow the arrangement of two ad-

jacent unitary modules (10) through fitting along the vertical direction (V), **characterized in that** at least some tenons (40) protrude vertically (44) above the surface of said superior horizontal face (12) of the plate.

2. Modular structure according to Claim 1, **characterized in that** each side face (16) comprises an equal number of tenons (40) and mortises (42), and each angle, at the intersection of two side faces (16), comprises successively one tenon (40) and one mortise (42) each one belonging respectfully to one of these two side faces.

3. Modular structure according to anyone of preceding claims **characterized in that** tenons (40) and mortises (42) are of a dovetail complementary shape.

4. Modular structure according to anyone of preceding claims **characterized in that** each side face (16) protrudes vertically under the inferior face (14) of the plate, and the side faces inferior edges constitute a supporting peripheral edge (24) for the module on the ground.

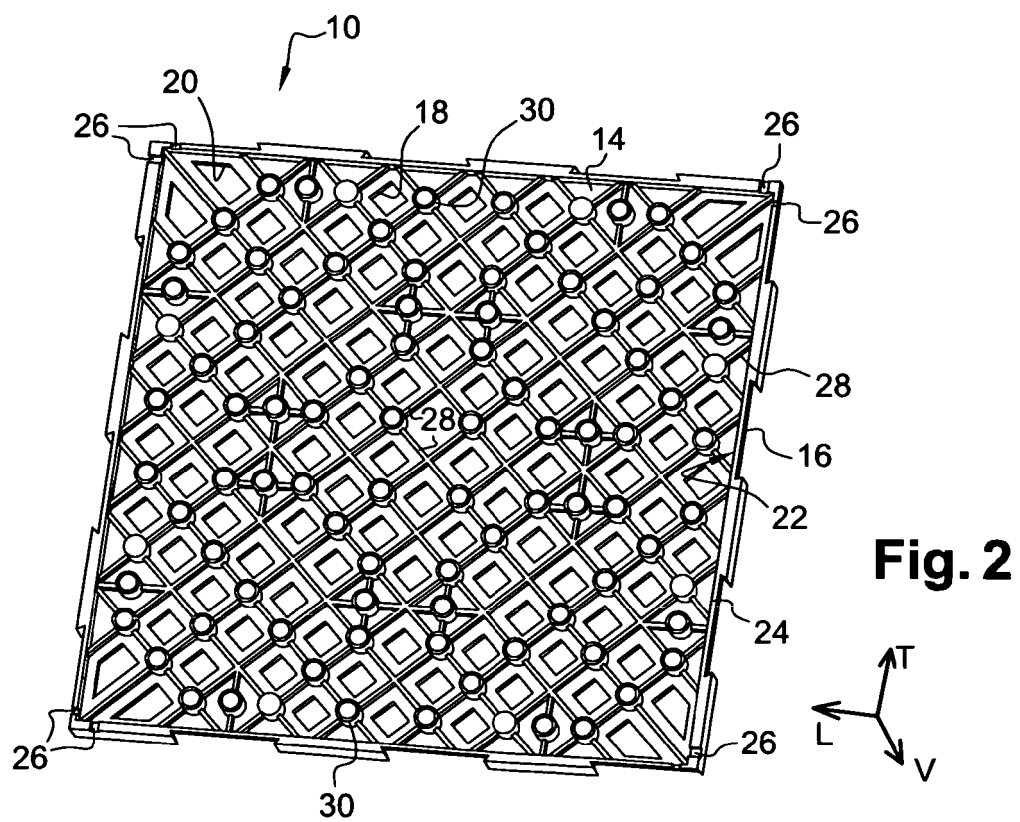
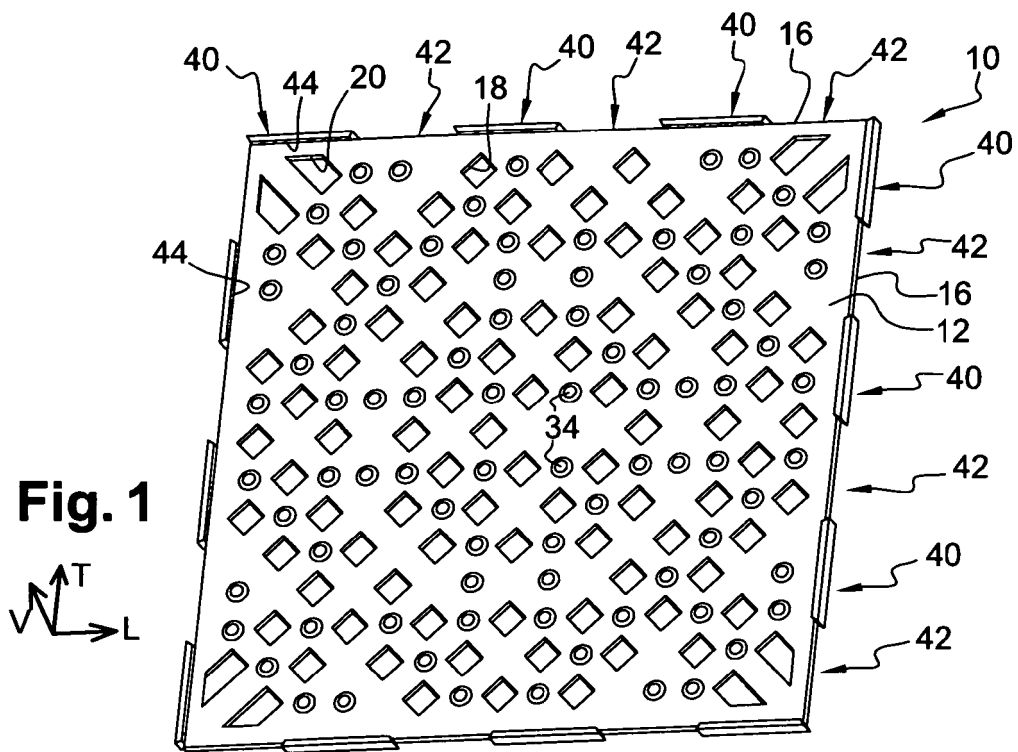
5. Modular structure according to the preceding claim, **characterized in that** said peripheral edge support (24) comprises several notches (26), notably for the disposal of liquids towards the environment.

6. Modular structure according to anyone of preceding claims **characterized in that** the inferior face (14) of the plate (10) is reinforced by means of several ribs (28), and the plate (10) is perforated (18, 20) between the ribs (28).

7. Modular structure according to anyone of claims 4 to 5, **characterized in that** plate (10) comprises several studs (30) for the fastening of the surfacing (102) which protrudes vertically downwards from the inferior face (14) of the plate, and each one of them being a vertically perforated cylinder and which is aligned with a hole (34) in the plate (10) in order to constitute an orifice opening able to receive a fastening means of the surfacing (102) on the plate (10), such as a screw or a nail.

8. Modular structure according to anyone of preceding claims, **characterized in that** each modular element (10) is of a regular polygonal periphery, notably squared.

9. Modular structure according to anyone of preceding claims, **characterized in that** each modular element (10) is made of a single molded plastic piece.



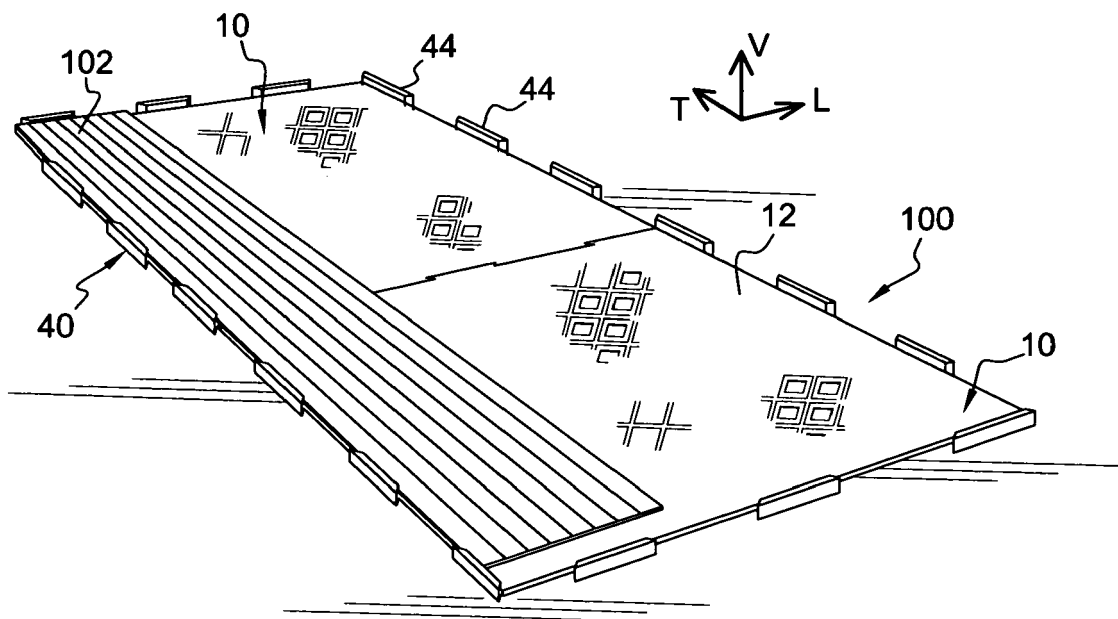


Fig. 3

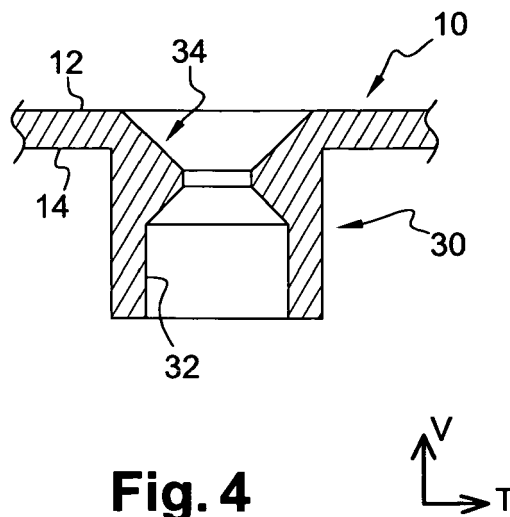


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 11 00 0525

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 2 093 348 A2 (S MA P FIL SRL [IT]) 26 August 2009 (2009-08-26) * paragraph [0009]; figures 1-4 * -----	1-9	INV. E04F15/10
Y	WO 99/36638 A1 (EZYDECK PTY LTD [AU]; BERTOLINI GEOFFREY MICHAEL [AU]) 22 July 1999 (1999-07-22) * page 6, lines 14, 15; figures 1-4 * -----	1-9	
A	DE 297 02 991 U1 (KLINGE GUENTER [DE]; GUENTHER WOLFGANG [DE]) 24 April 1997 (1997-04-24) * figures 1,2 * -----	3	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) E04F E01C
Place of search Munich		Date of completion of the search 4 May 2011	Examiner Fournier, Thomas
CATEGORY OF CITED DOCUMENTS 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		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	

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EPO FORM 1503 03.82 (P04C01)

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

EP 11 00 0525

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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04-05-2011

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