(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 632 326 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 158(3) EPC

(43) Date of publication:
08.03.2006 Bulletin 2006/10

(21) Application number: **03732597.4**

(22) Date of filing: **06.06.2003**

(51) Int Cl.:
B28B 3/02 *(1968.09)*

(86) International application number:
PCT/ES2003/000274

(87) International publication number:
WO 2004/108375 (16.12.2004 Gazette 2004/51)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

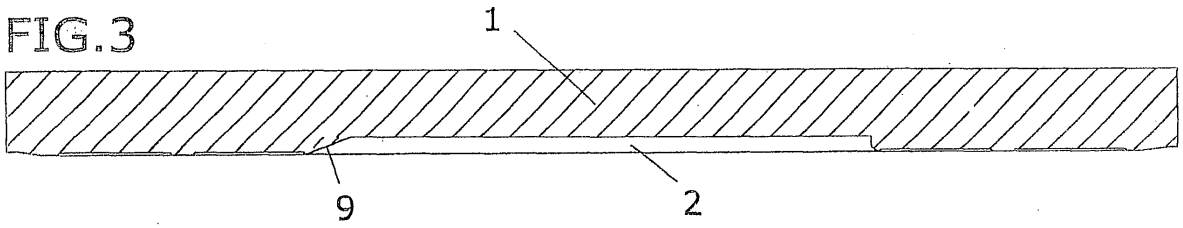
(71) Applicant: **Molcer, S.A.**
12540 Vila-Real (Castellon) (ES)

(72) Inventor: **FERNANDEZ VICENTE, Rafael**
12540 Vila-Real (ES)

(54) **PUNCH FOR SHAPING CERAMIC PIECES WITH DOVETAIL GROOVES AND CERAMIC PIECES OBTAINED WITH SAID PUNCH**

(57) The invention relates to a punch for shaping ceramic pieces with dovetail grooves, comprising a series of metal mortises on which a less dense plastic material such as polyurethane, rubber, etc, can be disposed in any size or shape and which can be placed anywhere on the punch either on the surface or embedded therein or projecting a few millimetres therefrom. The punch is totally covered by the same type of material but with a greater density. The plastic material for vulcanisation is applied by means of a template, whereby mortises are produced when the punch is applied to the ceramic pieces, said mortises having a first top section that is slightly curved with the purpose of enabling stripping, wherein said first section penetrates into the ceramic piece and then widens in the lower part in a dovetail manner. In order to prevent dovetailing in one of the edges, the opposite edges of the mortises of the template are slightly inclined so as to obtain an inclined vulcanisation on the edges of the punch.

FIG.3



EP 1 632 326 A1

Description

OBJECT OF THE INNOVATION

[0001] The object of this innovation is a punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch, which can be a isostatic or not isostatic punch, used in a penetrating mould, which acts from the upper part, or in a mirror or double frame mould, which acts from the lower part.

[0002] The punch makes some cavities in the ceramic pieces, in order to make easier the fixation and holding of the tile.

[0003] This innovation is characterised by the special formation and design of the punches, the kind of materials used and the vulcanisation of these punches, thus the above-mentioned punches provide to the back side of the tiles the dovetail grooves.

[0004] So the invention belongs to the scope of the punches hydraulic or non-hydraulic used to shape the back side of the tiles.

BACKGROUNDS

[0005] The punches used until now to shape forms or dovetail grooves have some drawbacks, like the non regular dovetail shape formed by pressing. In other words, the depth, length and width of the dovetail are not identical in all the tiles. There are some variations, deformations that make difficult to adapt the fixation pieces to the back side of the tiles.

[0006] The cavities obtained with said punches have the drawback of an insufficient structural strength, since the wider part of the dovetail groove begins just in the surface of the tile, so the groove does not have the necessary strength and depth to provide a suitable and secure fixation by means of special pieces to a ventilated façade.

[0007] Moreover the rubber and other materials used in the punches have an average density which shapes dovetail grooves wider just in the surface of the tile. For this reason, to achieve a dovetail groove wider inside the ceramic piece it is necessary to use a plastic material that covers the entire punch surface.

[0008] Besides that, there are some punches with little prismatic or cylindrical pieces installed on them, which cannot provide dovetail grooves strong and regular enough in a serial production.

[0009] Therefore the purpose of this innovation is to go beyond the former punches overcoming the mentioned drawbacks by developing a punch with a plastic material cover of a suitable density. This cover will be installed in such a way that the dovetail groove obtained in the ceramic piece the appropriate structural strength, width and regularity, with the wider part starting in a considerable depth inside the tile. For this reason the external side of the cavity will have a higher strength and a totally regular form.

DESCRIPTION OF THE INNOVATION

[0010] The proposed innovation of punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch, can be an isostatic or not isostatic punch, used in a penetrating mould, which acts from the upper part, or in a mirror or double frame mould, which acts from the lower part, is characterised because it has mortises where it is placed a kind of material (which can be polyurethane, rubber, or any other material of the same characteristics) less dense than the one used to vulcanise all the surface of the punch. So when the punch presses on the clay, all the less dense rubber perimeter sides will expand themselves just some millimetres from the metallic wall limit. By this way the groove shaped in the tile will have a dovetail form, with a totally regular shape in the first penetrating part inside the tile, because of the structural strength which gives the metallic internal case.

[0011] The above-described punch will have a rubber coating more dense than the rubber placed in the mortises made with this purpose. The vulcanisation rubber will cover the whole punch surface.

[0012] The less dense rubber pieces which shape the dovetail grooves in the tiles, might have any form or size and be situated anywhere on the punch levelled or standing out some millimetres from its surface.

[0013] In order to vulcanise the punches are used some metallic matrices, which have the negative form of the punches, and can have a special formation if it is not wanted or needed to shape dovetail grooves in some part of the tiles.

DESCRIPTION OF THE DRAWINGS

[0014] To complete the description, and to reach a better understanding of the invention features, it is enclosed a set of drawings, showing in detail the most important features of the invention, in a descriptive and non-restrictive way.

[0015] The drawing number 1 represents the matrices used to vulcanise the punches.

[0016] The drawing number 2 represents the punch, which is the goal of the innovation, and some sections of itself.

[0017] The drawing number 3 represents the isostatic punch with the less dense rubber inside a mortise, and also the matrix used to vulcanise the punch.

[0018] The drawing number 4 represents the same figure of drawing number 3, but the punch has already been vulcanised. It is also shown the vulcanisation done in a part of the worn punch surface where dovetail grooves will not be formed.

[0019] The drawing number 5 represents a non-isostatic punch where are shown the mortises that includes the less dense rubber.

[0020] The drawing number 6 represents a non-isostatic punch and its own matrix before the vulcanisation

process.

[0021] The drawing number 7 represents the previous figure after the vulcanisation process.

[0022] The drawing number 8 represents the action of the punch on the ceramic piece.

[0023] The drawing number 9 represents the shape of the dovetail groove formed in the ceramic piece.

[0024] The drawings number 10 and 11 show the matrix and the punch used to shape a round dovetail groove.

[0025] The drawings number 12 and 13 show the matrix and the punch used to shape a triangular dovetail groove.

PREFERRED WAY TO CARRY OUT THE INVENTION

[0026] Paying attention to the above-mentioned drawings, we are going to describe the preferred way to carry out the invention, and a description of the drawings.

[0027] In the drawing number 1 it is represented the matrix (1) used to vulcanise the punch (5). On this matrix there are several back prints (3), which make the backside drawing of the ceramic pieces. The matrix has also some cavities (2) or rectangular moulds with rounded sides (4) that make wider the groove in order to facilitate the tile ejection after the pressing and to avoid stripping.

[0028] In the drawing number 2 it is represented a punch (5) with some mortises (8), which include less dense rubber pieces (6). During the pressing of the tile the mortises push the less dense material, which expands inside the clay from the metallic wall limit. In addition it is shown an entrance of isostatic fluid (7) for the hydraulic punches.

[0029] In the drawing number 3 it is represented an isostatic punch (5) and its own matrix (1) for the vulcanisation. It is shown again the mortise (8) where the less dense material (6) is placed. The cavity (2) of the vulcanisation matrix (1) has an inclined side (9), which avoid the formation of a dovetail groove.

[0030] The drawing number 4 shows the same punch (5) of drawing number 3 after vulcanisation, where you can see the vulcanisation rubber (10) covering the entire punch surface. In one of the less dense material (6) there is an inclined part (11) of the vulcanisation rubber (10) in order to avoid the dovetail groove formation in part of the ceramic piece.

[0031] The drawing number 5 shows a punch (5), a non-hydraulic punch in this case, with some less dense rubber pieces (6). The aim of the invention is not changed whether the punch is hydraulic or non-hydraulic.

[0032] The less dense material (6) on the punch can have any form or position on the punch (5), it can also lay directly on the punch metallic surface or slightly sunk, standing out only a part of it.

[0033] In the drawings number 6 and 7 it is represented the situation of a non-hydraulic punch (5) before and after the vulcanisation. In the figure number 7, after the vulcanisation of the punch (5), the plastic material (10) of a greater density than the pieces (6) located inside the mortise (8) covers the entire punch surface. In the joining line between the less dense polyurethane, rubber, etc piece (6) and the punch surface there is a reduction (11) in the vulcanisation (10), which allows the expansion of the less dens rubber (6) when it is pressed against the tile surface.

[0034] The figure number 8 shows the action of the punch (5), hydraulic or non-hydraulic, against the ceramic piece (12), forming a dovetail groove (13) inside the tile (12). The groove has a first slightly curved or inclined section (13.1) that makes easier the tile ejection. So the first inclined section (13.1) goes through the tile and forms the characteristic expansion (13.2) of the dovetail. This structure gives to the ceramic piece more strength.

[0035] The figure number 9 is a representation of the dovetail groove (13) in the tile.

[0036] The drawing number 10 shows a matrix (1) with some projections or back prints (3) and some round moulds or cavities (14). As the other cavities of the former drawings, they have a rounded side in order to facilitate the tile ejection. In the figure number 11, the rounded mortises (15) of the punch (5), fitted with a lower density material (6) and vulcanised with a greater density material by means of the matrix (1) with cavities (14), forms in the ceramic pieces dovetail grooves roundly shaped.

[0037] Finally in the drawings number 12 and 13 are shown the same figures of the previous drawings 10 and 11, but the matrix (1) cavities (16) and the mortises (8), where the less dense pieces (6) are fitted, have a triangular form. Therefore the dovetail grooves in the tiles will be triangularly shaped.

[0038] We do not consider necessary to go further in the description of the invention, in order to explain the scope and the advantages of the invention to an expert in this matter.

[0039] The materials, the shape, the size and the position of the invention elements can be changed, whether the innovation do not suffer any essential alteration.

[0040] The terms used in the description must ever been understood in a wide and non-restrictive way.

Claims

1. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch **comprising** a punch that has on its surface some mortises in any position or form, which avoid every deformation of the dovetail grooves that will be formed in the ceramic piece. In these mortises it is fitted a material (6) less dens than the vulcanisation material (10), which covers the entire punch surface by means of a matrix.

2. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 1 **wherein** the punch is hydraulic.

3. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 1 **wherein** the punch is non-hydraulic.

4. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 2 **wherein** the punch acts from above in a penetrating mould.

5. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 2 **wherein** the punch acts form down in a double frame or mirror mould.

6. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 3 **wherein** the punch acts from above in a penetrating mould.

7. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 3 **wherein** the punch acts form down in a double frame or mirror mould.

8. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with all the former claims **wherein** the vulcanisation matrix has some cavities (2) or rectangular moulds and some back prints (6).

9. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 8 **wherein** the cavities (2) or rectangular moulds have a rounded side (4), which facilitates the tile ejection and avoids stripping during the punch action.

10. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 9 **wherein** the matrix (1) has an inclination (11) in the front sides that avoid the shaping of a dovetail grove in some tile parts.

11. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 1 **wherein** the less dense piece (6) has any form or size and is situated anywhere on the punch, laying directly on the punch metallic surface or slightly sunk, standing out only a few millimetres.

12. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 11 **wherein** the less dense piece (6) on the punch is roundly shaped, so it forms in the ceramic piece a round dovetail groove.

13. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 11 **wherein** the less dense piece (6) on the punch is triangularly shaped, so it forms in the ceramic piece a triangular dovetail groove

14. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 1 **wherein** the dovetail groove has a slightly curved or inclined side (13.1) that goes through the tile and forms the characteristic expansion (13.2) of the dovetail.

15. Punch for shaping ceramic pieces with dovetail grooves and pieces obtained with said punch according with the claim number 1 to 14 **wherein** the vulcanisation, in the joining line between the less dense material (6) and the punch surface, has a reduction (11), which allows the expansion of the lower density material sides (6) when it is pressed against the tile surface.

16. Ceramic piece obtained by means of the former claimed punch **comprising** some dovetail grooves with a first slightly curved section, which penetrates inside the tile in order to make easier the tile ejection, and with another section expanded in the tile giving to it more structural strength.

17. Ceramic piece obtained by means of the former claimed punch according with the claim number 13 **wherein** some part of one or more groove sides formed in the tile do not has a dovetail groove, because of the matrix cavity shape, which gives in the vulcanisation a more inclined form.

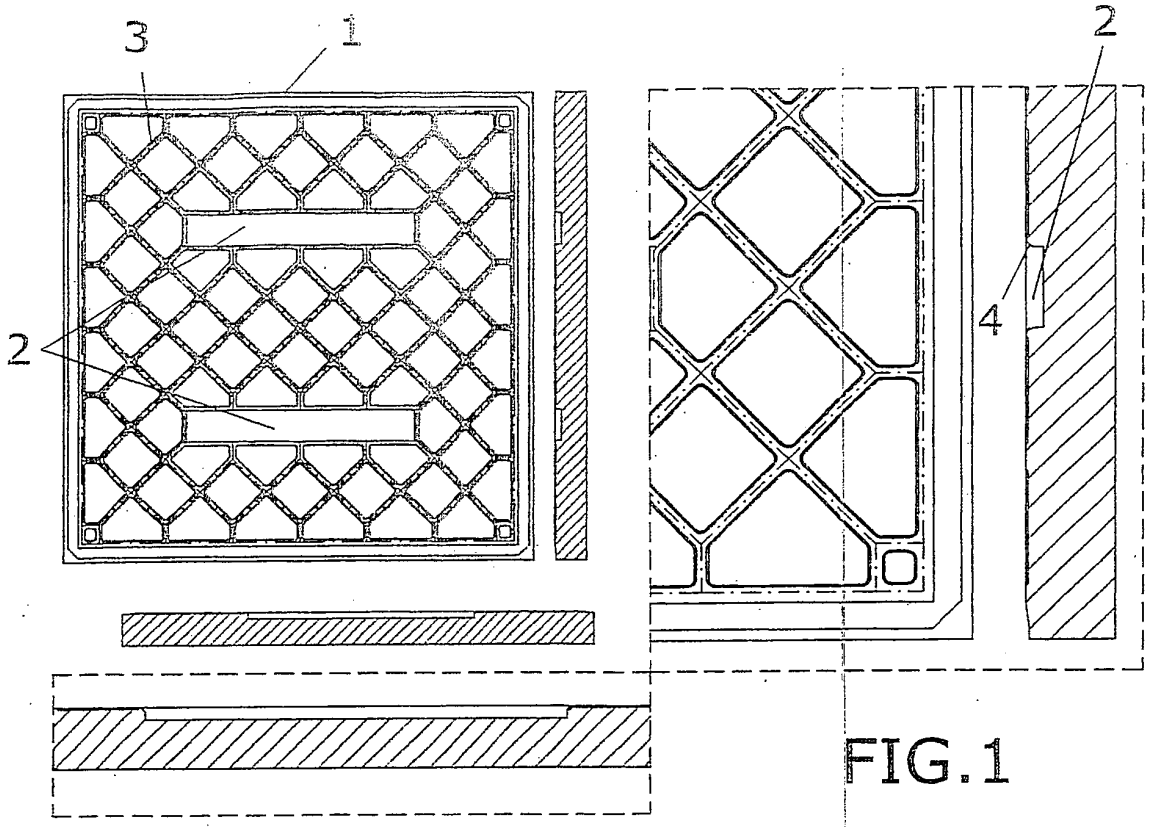


FIG.1

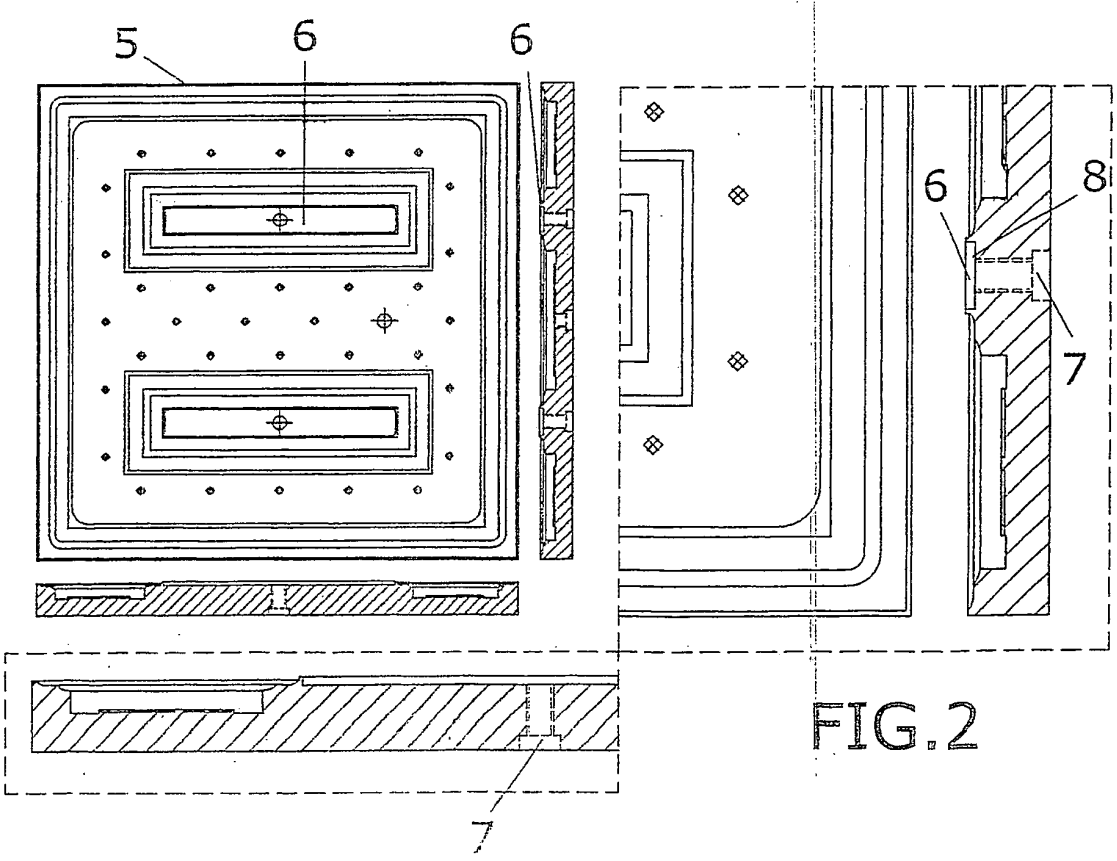


FIG.2

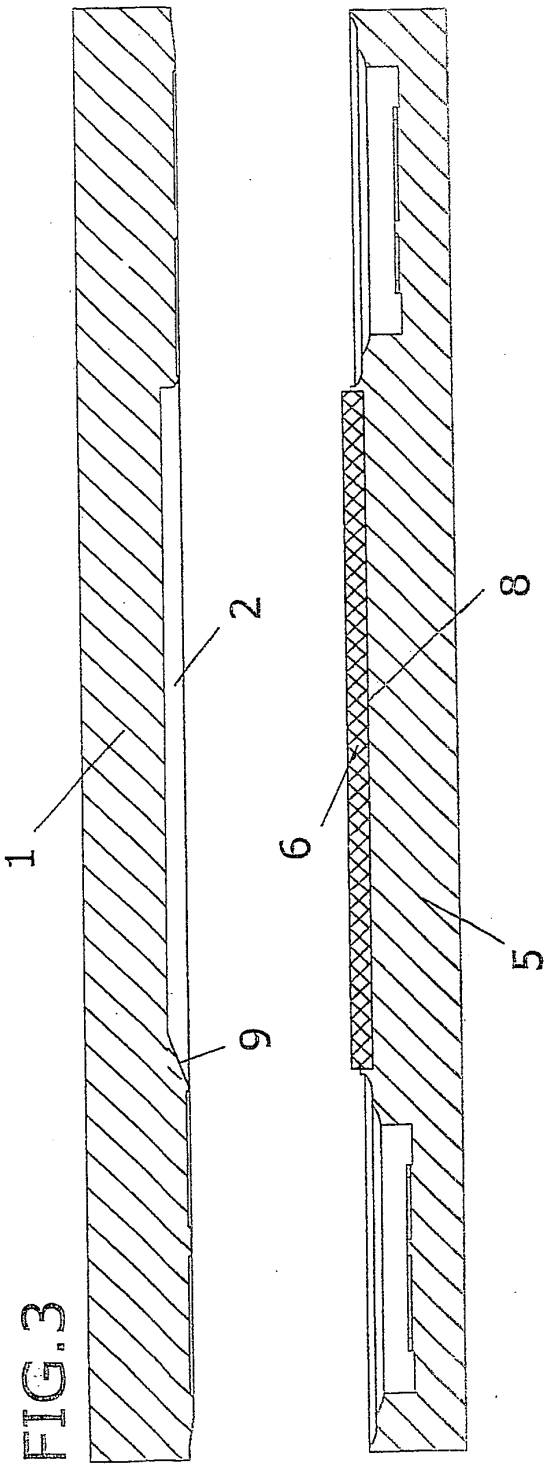


FIG.3

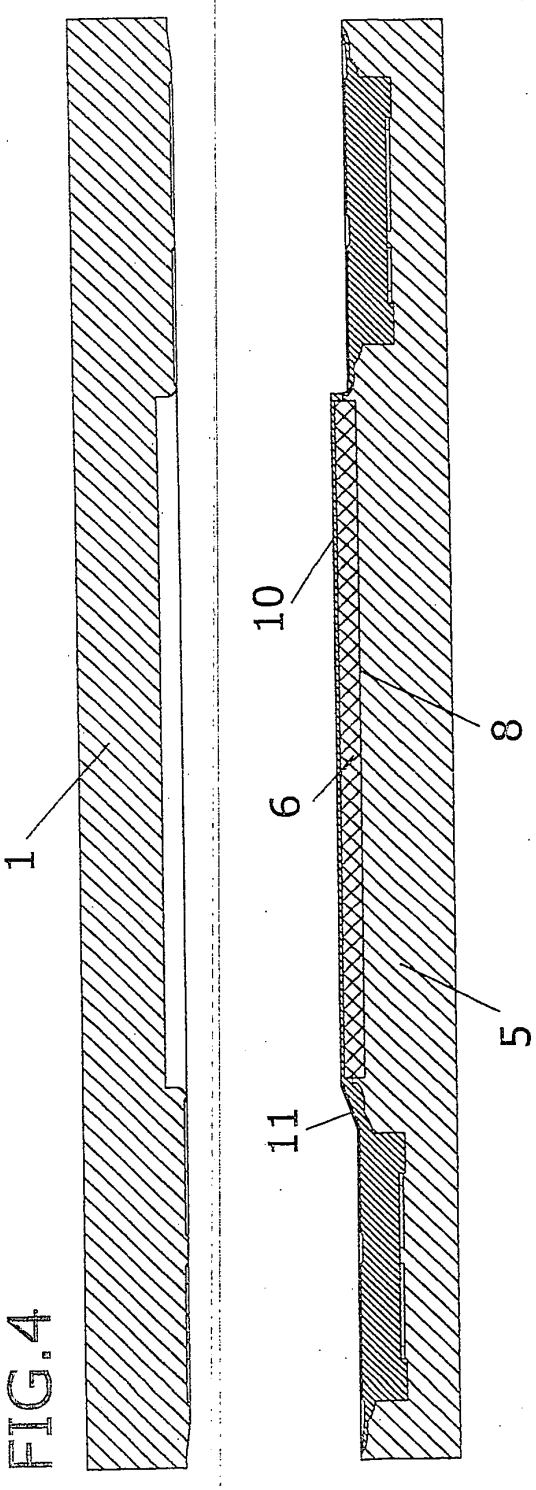


FIG.4

FIG.5

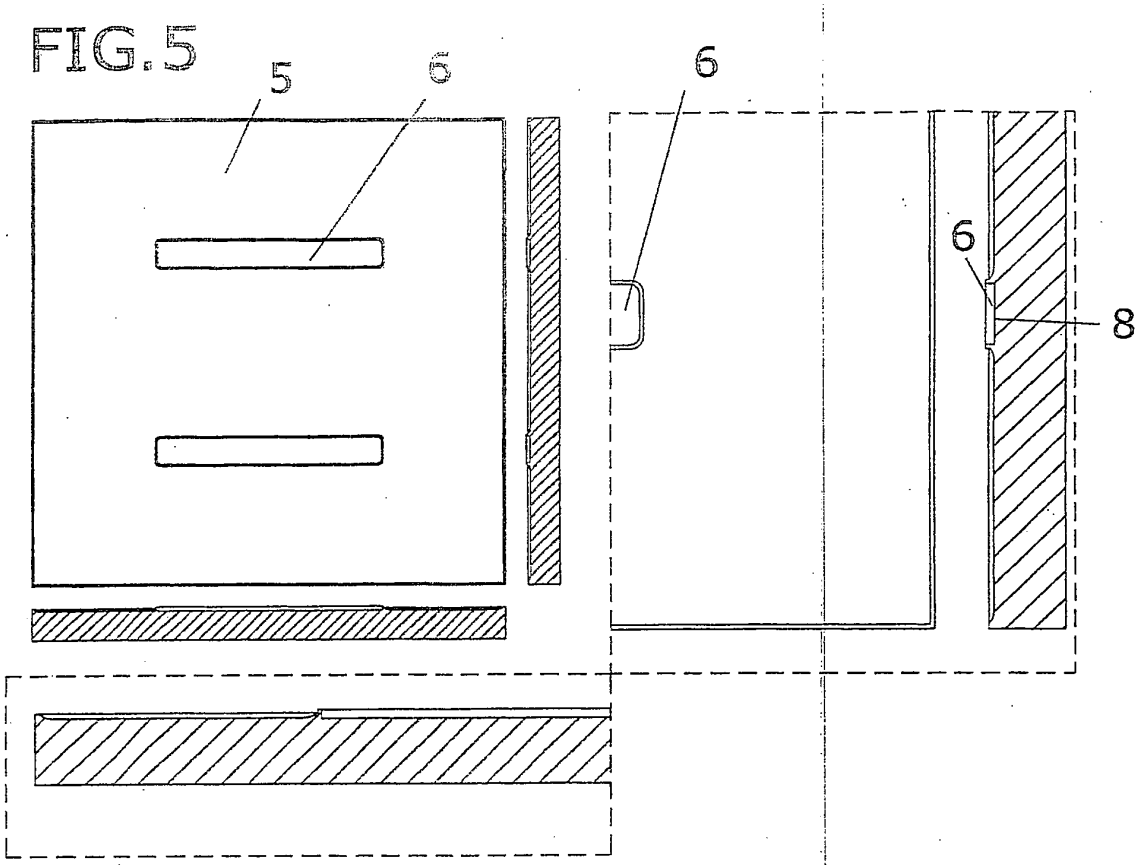
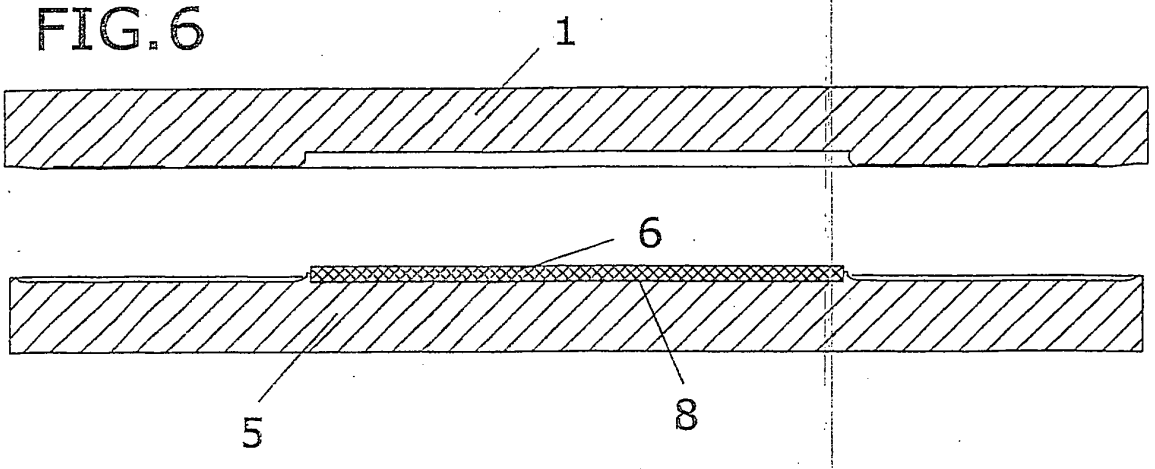


FIG.6



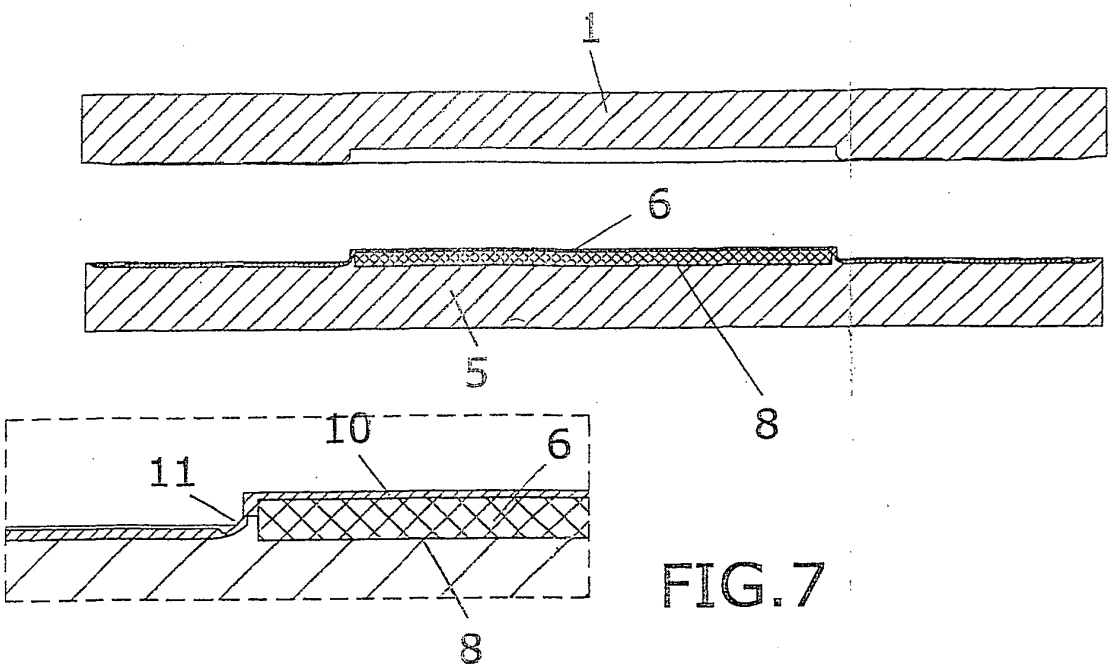


FIG.7

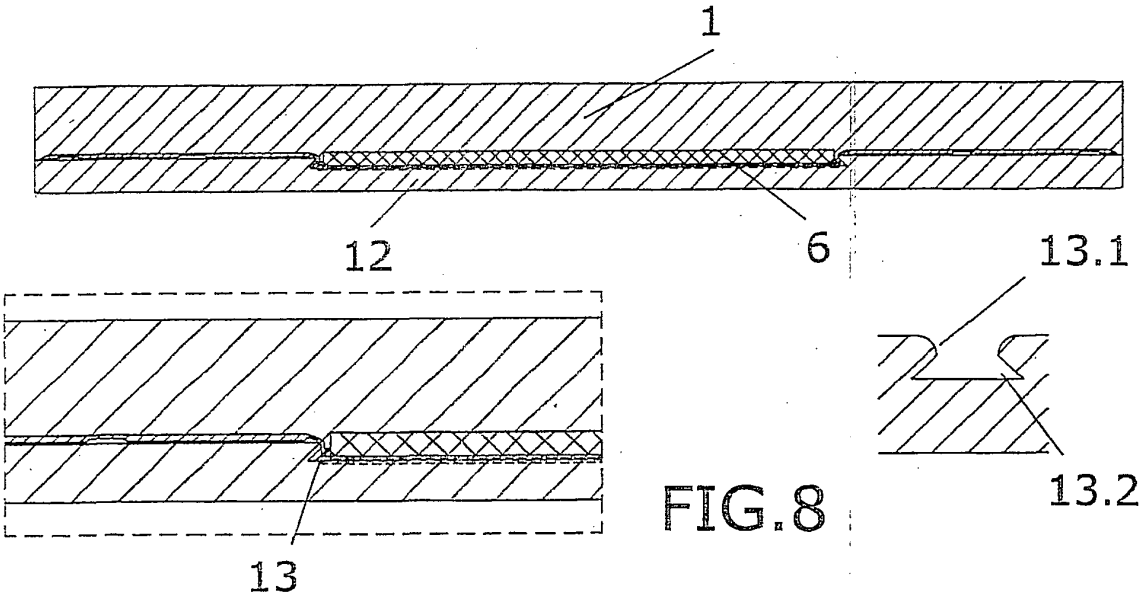


FIG.8

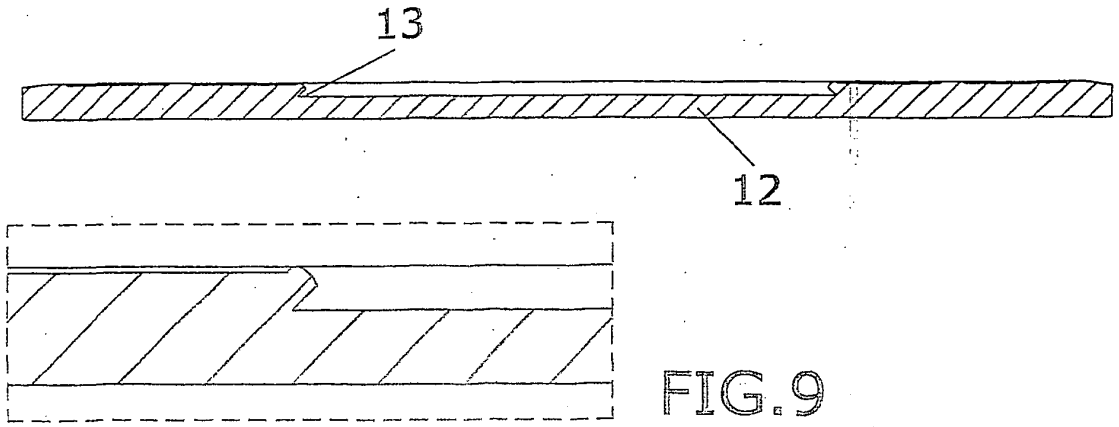


FIG.9

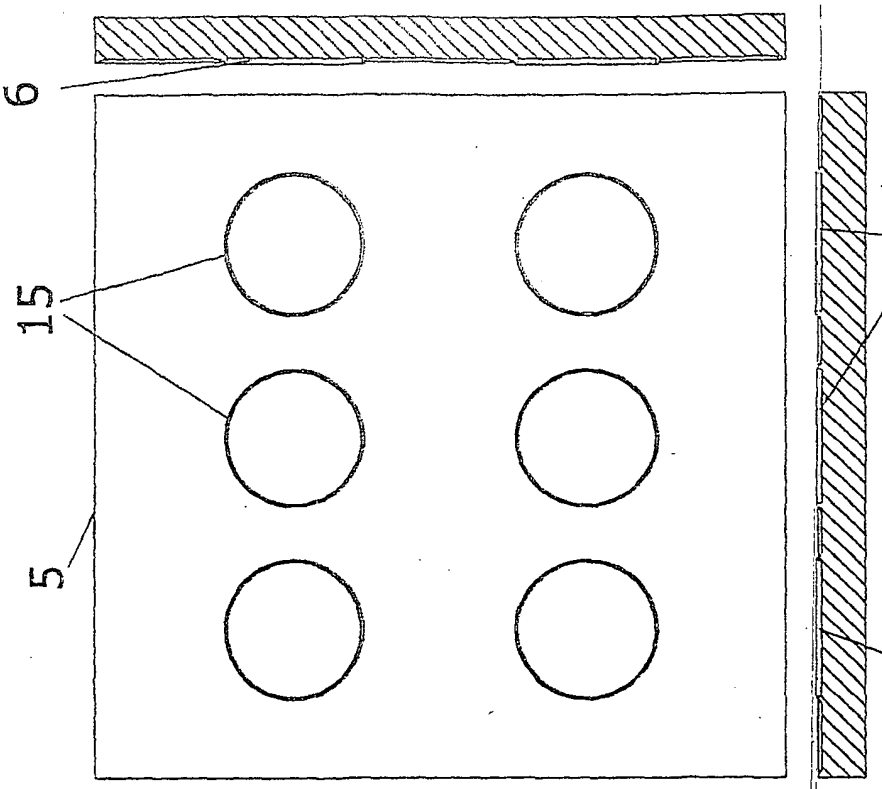


FIG.11

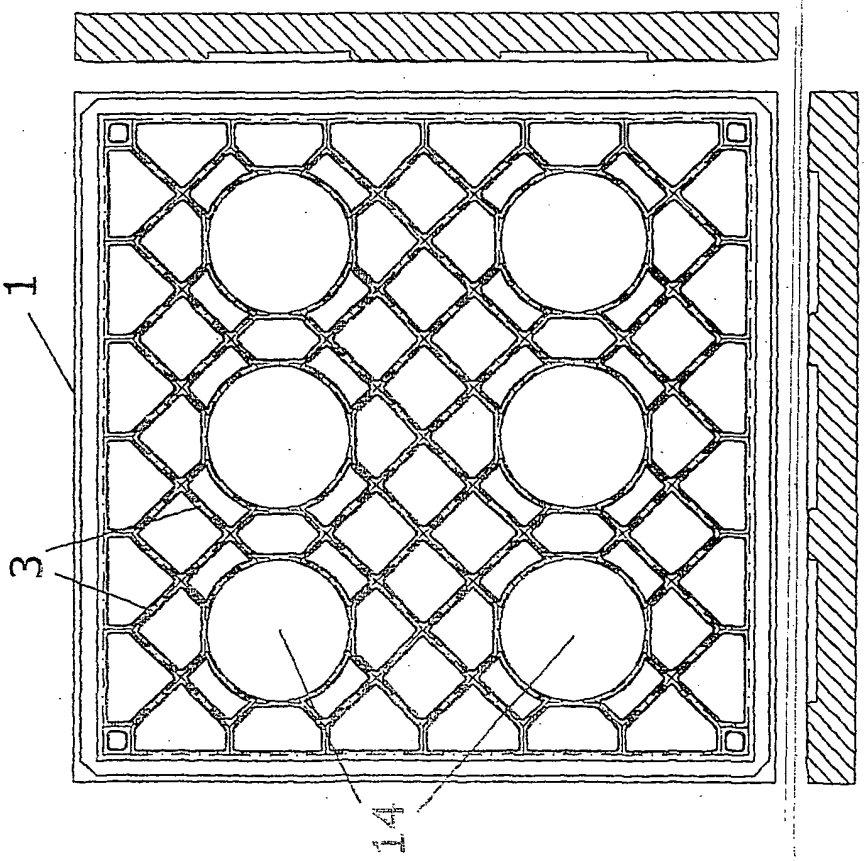


FIG.10

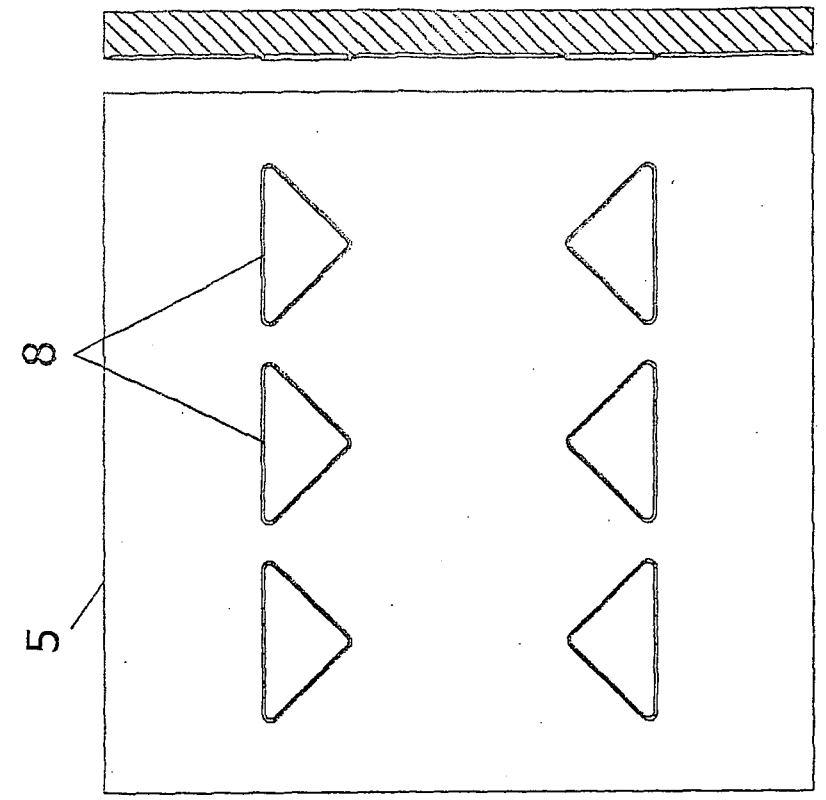


FIG.13

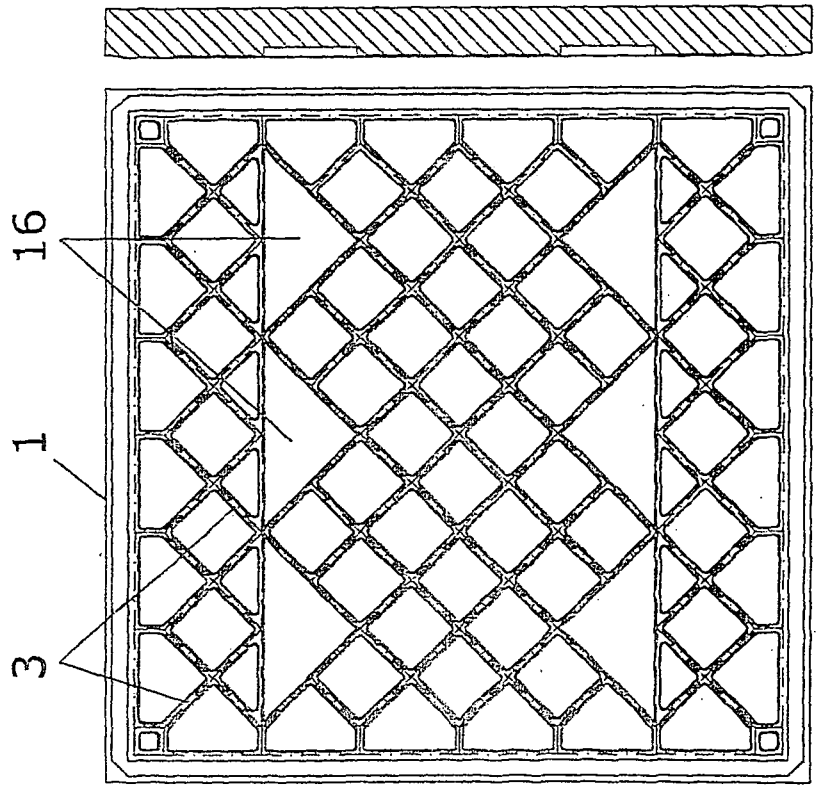


FIG.12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 03/00274

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B28B 3/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B28B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WIP, EPODOC, MISTRAL, PAJ.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ES 1037139 U (MOLCER) 01.01.1998. The whole document	1-8
A	DD 221120 A (INST. BAU Y GROBKERAMIK) 17.04.1985. abstract ; figures	1-8
A	JP 55158916 A(KANEKI) 10.12.1980. abstract ; figures	1-8
A	JP 2000320107 A (MASAHITO) 21.11.2000. abstract ; figures	1-8

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 November 2003 (26.11.03)	**04 December 2003 (04.12.03)**
Name and mailing address of the ISA/ S.P.T.O	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International Application No
PCT/ ES 03/00274

Patent document cited in search report	Publication date	Patent familiy member(s)	Publication date
ES 1037139 U	01.01.1998	NONE	
DD 221120 A	17.04.1985	NONE	
JP 55158916 A	10.12.1980	NONE	
JP 2000320107 A	21.11.2000	NONE	

Form PCT/ISA/210 (patent family annex) (July 1992)