

(19)



(11)

EP 2 303 048 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
14.03.2012 Bulletin 2012/11

(51) Int Cl.:
A43B 7/12 (2006.01) **A43B 23/02** (2006.01)
A43B 23/06 (2006.01)

(21) Application number: **09736497.0**

(86) International application number:
PCT/SI2009/000029

(22) Date of filing: **17.07.2009**

(87) International publication number:
WO 2010/008352 (21.01.2010 Gazette 2010/03)

(54) PERFORATED WATER-REPELLENT COATING FOR FOOTWEAR PROTECTION

PERFORIERTE WASSERABWEISENDE BESCHICHTUNG ZUM FUSSBEKLEIDUNGSSCHUTZ

REVÊTEMENT HYDROFUGE PERFORÉ POUR LA PROTECTION D ARTICLES CHAUSSANTS

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK SM TR**

(30) Priority: **18.07.2008 SI 200800181**
16.07.2009 SI 200900199

(43) Date of publication of application:
06.04.2011 Bulletin 2011/14

(73) Proprietor: **Alpina, Tovarna Obutve, D.D., Ziri
4226 Ziri (SI)**

(72) Inventors:
• **ZUPAN, Igor**
4290 Trzic (SI)
• **NOVAK, Janez**
4226 Ziri (SI)

(74) Representative: **Pipan, Marjan**
Kotnikova 5
1000 Ljubljana (SI)

(56) References cited:
WO-A-98/14081 FR-A- 2 116 790
US-A1- 2001 000 272

EP 2 303 048 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The subject of the invention is a perforated water-resistant coating for footwear protection that provides protection against penetration of water into the interior of footwear by a water-repellent layer, which layer is mechanically or otherwise treated in a way that the water-repellent layer is perforated with a series of tiny pores. The invention belongs to class A43B23/06 of the international patent classification.

[0002] A technical problem solved by the invention is protection against penetration of water in the interior of footwear and simultaneously transport of water vapour from the interior of footwear into the ambient.

[0003] It is a known fact that a human body needs to be protected against too low temperatures and especially against the influences of atmospherilia like rain and snow. A foot therefore needs protection by footwear that is impervious to water. A disadvantage of such known solution lies in that it prevents a foot from breathing and therefore causes an uneasy feeling and excess sweating. There are various solutions to the described problem that include a variety of semi-permeable membranes that prevent water from penetrating into footwear interior and provide for a limited flow of air and water vapour. A drawback of these solutions lies in the fact that an external protective layer is needed for protection against mechanical damage, and this layer is not impermeable and usually in the form of fabric or leather. Both fabric and leather absorb water thus increasing in mass, which requires more effort in the use of footwear and contributes to impaired heat insulation. Due to the rough surface of fabric the quotient of friction between fabric and snow is higher than that exerted between snow and entirely smooth surface, like that of a water-repellent material for instance. When walking in nature in any time of the year, we are often exposed to the influence of water or snow that covers a large surface of a shoe. A smooth surface provides for a quicker sliding of snow or water off a shoe and a shoe material is thus exposed to water for a shorter time period. A shorter time period during which a shoe is covered with water or snow means less possibility of penetration of water into footwear and more time for footwear to breathe.

[0004] US 2001/0000272 A discloses a perforated water repellent coating for footwear protection.

[0005] The invention will now be described in more detail based on an embodiment and figures representing in:

Figure 1 footwear with a part manufactured from a perforated material;

Figure 2 footwear with a part only partially manufactured from a perforated material;

Figure 3 a perforated material in cross-section with schematically represented pores and an external water-repellent layer and internal reinforcing layer;

Figure 4 schematic representation of a perforated

material in cross-section and distribution of perforation pores;

Figure 5 ski running footwear having the entire upper part manufactured from a perforated material;

Figure 6 ski running footwear having only part of the upper part manufactured from a perforated material and the remaining part from a water impermeable material;

Figure 7 cross-section of a material used to manufacture an upper part which does not form part of the invention, wherein the outermost layer is water impermeable, water repellent, smooth and perforated, the next laminate layer is a membrane that breathes and onto which a protective fabric or a carrying mesh is laminated.

[0006] The structural solution of the invention provides a possibility to manufacture footwear having a water-repellent coating 3 from a perforated material in the shape of tiny pores arranged over the surface of the material, said pores having a considerably smaller diameter than the total material thickness. The upper part 1 is manufactured from a perforated material consisting of two layers, the external one being a water-repellent layer 5 and smooth on its surface and the internal being a reinforcing layer 6 manufactured from a woven or unwoven fabric and the two layers are inseparably joined and treated in a way that tiny pores 4 are manufactured through both materials prior to use, said pores having a smaller diameter than the thickness of the external layer and are small enough to resist water penetration due to capillary pressure and yet large enough for the footwear to breathe therethrough. In special cases only a part 7 of said upper part 1 may be manufactured from a water-repellent material 7.

[0007] Said perforated material 3 consists of at least two layers and is composed of the external smooth and water-repellent layer 5 and the internal reinforcing layer 6, which is either woven or unwoven, wherein said layers are joined in a way that the external layer 5 remains smooth on its external side. The perforation 3 is effected by tiny pores, the diameter of which does not exceed the thickness of the material of the external smooth layer, the diameter preferably being less than 0.1 mm and the pores are arranged mutually close enough to provide for a sufficient breathing of the material, preferably more than 10 pores per cm².

[0008] The structural solution of footwear manufacturing described above is hereinafter extended to footwear for ski running, wherein the topmost material is functionally or rather technologically manufactured in a way to prevent water and moisture from entering from the external side of the shoe into shoe interior on the one hand and on the other diverts moisture from foot sweating from the shoe interior towards the exterior, i.e. away from the foot.

[0009] The upper shoe material here disclosed does not form part of the invention. It consists of several layers. The outermost layer 1' is perforated, i.e. has pores of an optional diameter over its surface that are optionally arranged.

[0010] The outermost layer 1' may be manufactured in the shape of a mesh, so that it consists of, is composed of or is woven of filaments of an adequate thickness of an optional synthetic material, said filaments being mutually interwoven in an optional way and form the perforated surface of the material. The outermost layer 1' may also be made of a synthetic material, like PVC, PU, etc. by the use of technology »casting onto carrier material, where the surface of the material is mechanically perforated. Among others, the upper layer is water impermeable, smooth on its external surface and water repellent.

[0011] A next layer 2' immediately following the external upper layer is of a material that breathes, i.e. a breathable membrane. The membrane is a material, the fundamental functional capability of is determined by two features. The first is resistance of the membrane to the penetration of water and moisture from the external side towards the interior, i.e. the pressure that the membrane can take when water and moisture enter from the external side.

[0012] The second important feature is the capability of the membrane to transport water vapour from the interior of the shoe outwards (membrane permeability / permeability quotient in milligrams per square centimetre per hour), which is indicative of a certain quantity of water vapour that the membrane is capable of permeating within a certain time period.

[0013] A layer 3' laid onto the upper two layers is a protective fabric / carrying mesh (i.e. tricot), the function of which is protection of the membrane against mechanical influences or damages.

[0014] The structure of the material or laminate as described hereinbefore consists of three basic layers. Said laminate may, however, also consist of more than three basic layers, if need may be from a functional point of view. Further layers apart from the three basic ones may be added to the basic laminate in order to improve the load capacity of same, in order to improve thermo-insulation of the laminate or to improve distribution of moisture within a shoe with the purpose of getting the largest surface possible, through which moisture would evaporate through the permeable membrane from the shoe interior outwards.

Claims

1. Perforated water-repellent coating for footwear protection
characterised in that
its upper part (1) is manufactured from a micro-perforated material consisting of two layers, of which an external layer (5) is water repellent and smooth on

its external surface, and an internal reinforcing layer (6) consists of a woven or unwoven fabric, the two layers being inseparably joined and treated in a way that tiny pores (4) are manufactured through both materials prior to use, said pores having a smaller diameter than the thickness of the external layer.

2. Perforated water-repellent coating for footwear protection as claimed in Claim 1
characterised in that
a part (7) of said upper part (1) is manufactured from a water-repellent material in those parts, which are most exposed to mechanical loads, and the remaining parts are from a microperforated material.
3. Perforated water-repellent coating for footwear protection
characterised in that
its upper part (1') is manufactured of a material consisting of three layers, of which an outermost layer is perforated, smooth, water impermeable and water repellent and laminated in a next layer with a breathable membrane, which is, as a third layer, further reinforced and mechanically protected by a carrying fabric, wherein pores (4') are manufactured through said upper layer (1') and optionally arranged over its surface.
4. Perforated water-repellent coating for footwear protection as claimed in Claim 3,
characterised in that
a part (3') of said upper part (1') is manufactured from a material impervious to water on those areas of footwear, which are exposed to greatest mechanical loads.

Patentansprüche

1. Perforierte wasserabweisende Beschichtung zum Fußbekleidungsschutz
dadurch gekennzeichnet, dass
ihr Oberteil (1) aus einem mikro-perforierten zweischichtigen Material hergestellt ist, wobei die Außenschicht (5) wasserabweisend und an der Außenoberfläche glatt ist und die innere Verstärkungsschicht (6) aus gewebtem und ungewebtem Gewebe zusammengesetzt ist, wobei die beiden Schichten miteinander untrennbar verbunden und derart behandelt sind, dass vor dem Gebrauch sehr kleine Poren (4) durch die beiden Materiale angefertigt sind, wobei die Poren einen kleineren Durchmesser als die Dicke der Außenschicht aufweisen.
2. Perforierte wasserabweisende Beschichtung zum Fußbekleidungsschutz nach Anspruch 1
dadurch gekennzeichnet, dass
ein Teil (7) des Oberteils (1) aus einem wasserab-

weisenden Material in jenen Teilen hergestellt ist, die mechanischen Belastungen am meisten ausgesetzt sind und die übrigen Teile aus einem mikroperforierten Material hergestellt sind.

3. Perforierte wasserabweisende Beschichtung zum Fußbekleidungsschutz

dadurch gekennzeichnet, dass

ihr Oberteil (1') aus einem dreischichtigen Material hergestellt ist, wobei die äußerste Schicht perforiert, glatt, wasserdicht, wasserabweisend und in der nächsten Schicht mit einer atmenden Membrane laminiert ist, die als die dritte Schicht durch ein Tragewebe weiter verstärkt und mechanisch geschützt ist, wobei die Poren (4') durch die genannte Ober-schicht (1') hergestellt und gegebenenfalls über ihre Oberfläche angeordnet sind.

4. Perforierte wasserabweisende Beschichtung zum Fußbekleidungsschutz nach Anspruch 3,

dadurch gekennzeichnet, dass

ein Teil (3') des genannten Oberteils (1') aus einem wasserdichten Material an jenen Stellen der Fußbe-kleidung hergestellt ist, die am meisten den mecha-nischen Belastungen ausgesetzt sind.

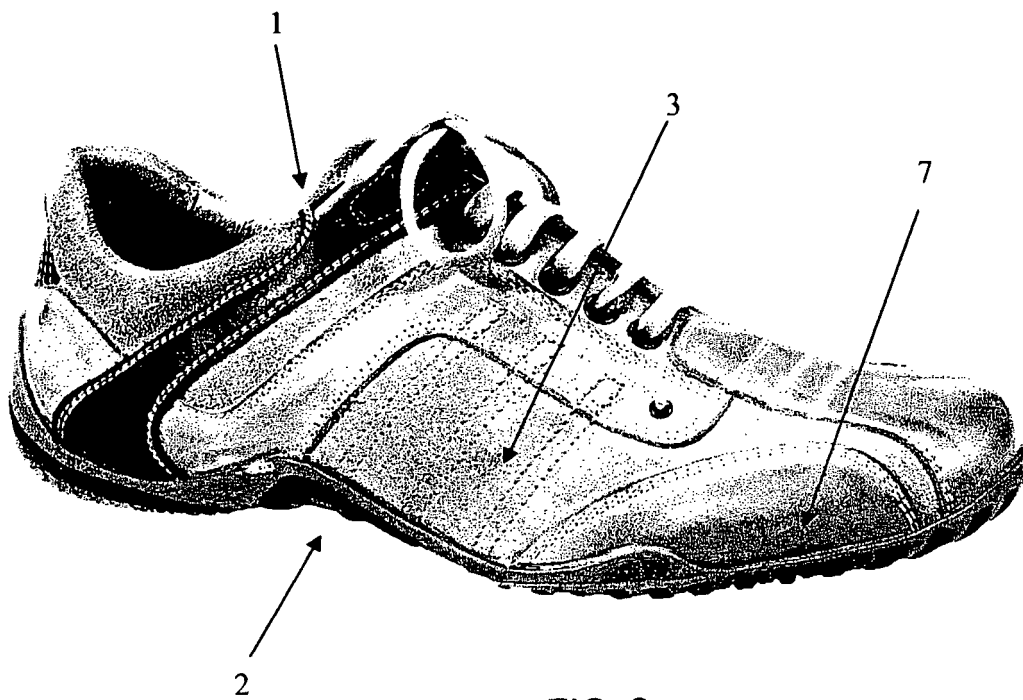
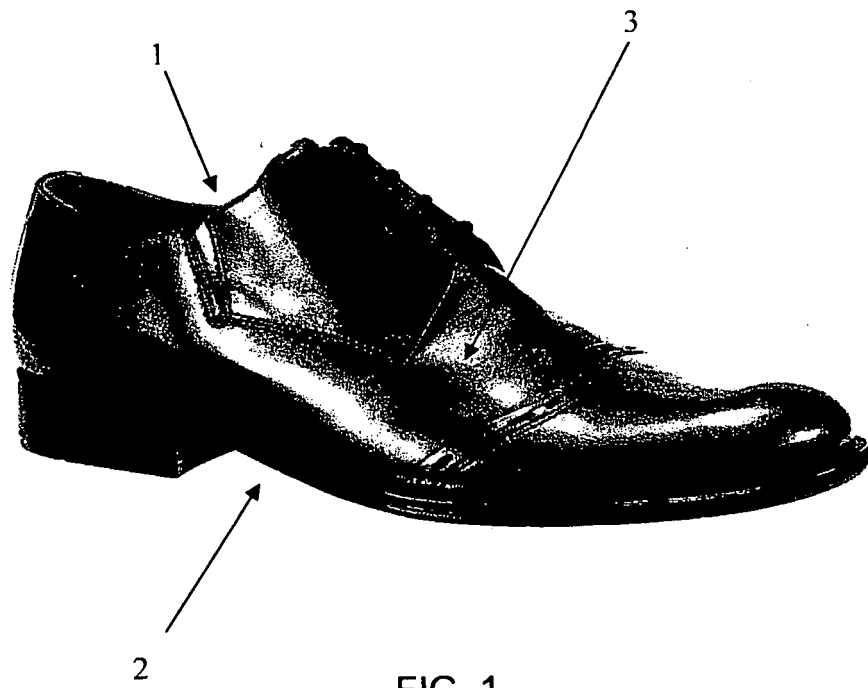
laminée dans la couche suivante avec une membra-ne respirable, qui est comme la troisième couche renforcée par un tissu porteur et mécaniquement protégé, les pores (4') étant fabriquées à travers la couche (1') supérieure mentionnée et facultative-ment disposées sur sa surface.

4. Un revêtement perforé, résistant à l'eau pour la pro-tection d'articles chaussants selon revendication 3, **caractérisé en ce que**

une partie (3') de la partie supérieure (1') mentionnée est fabriquée d'un matériau imperméable en telles parties des chaussures, qui sont le plus exposées aux charges mécaniques.

Revendications

1. Un revêtement perforé, résistant à l'eau pour la pro-tection d'articles chaussants
caractérisé en ce que
sa partie supérieure (1) est produite d'un matériau micro-perforé de deux couches, la couche extérieure (5) étant résistante à l'eau et lisse sur la surface ex-térieure et la couche intérieure renforçante (6) étant composée d'un tissu tissé et non-tissé, les deux cou-ches étant inséparablement jointes entre elles et trait-ées d'une telle façon, qu'avant l'usage des pores (4) minuscules sont fabriquées à travers les deux matériaux, les pores ayant un diamètre plus petit que l'épaisseur de la couche extérieure.
2. Un revêtement perforé, résistant à l'eau pour la pro-tection d'articles chaussants selon revendication 1
caractérisé en ce que
une partie (7) de la partie supérieure (1) est produite d'un matériau résistant à l'eau en telles parties, qui sont le plus exposées aux charges mécaniques et les autres parties sont fabriquées d'un matériau mi-croperforé.
3. Un revêtement perforé, résistant à l'eau pour la pro-tection d'articles chaussants
caractérisé en ce que
sa partie supérieure (1) est produite d'un matériau de trois couches, la couche la plus extérieure étant perforée, lisse, imperméable, résistante à l'eau et



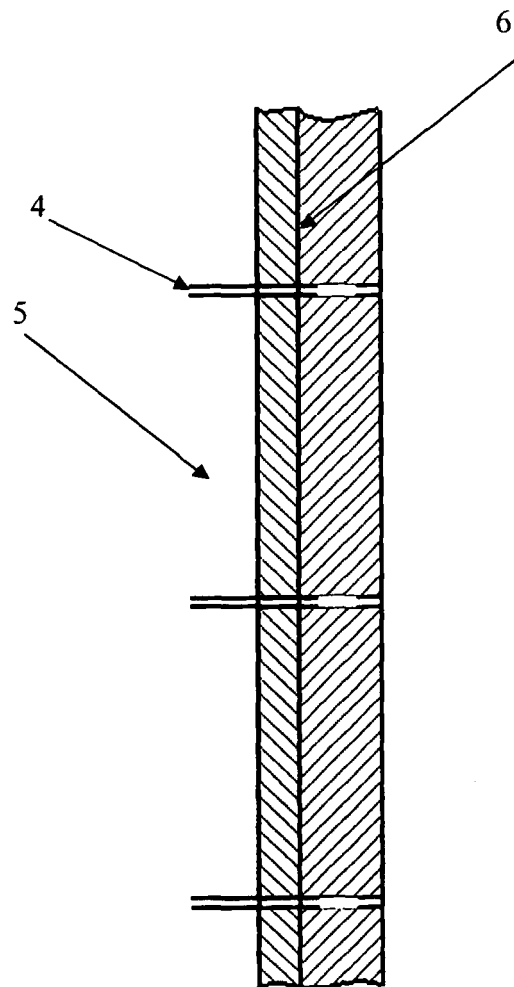


FIG. 3

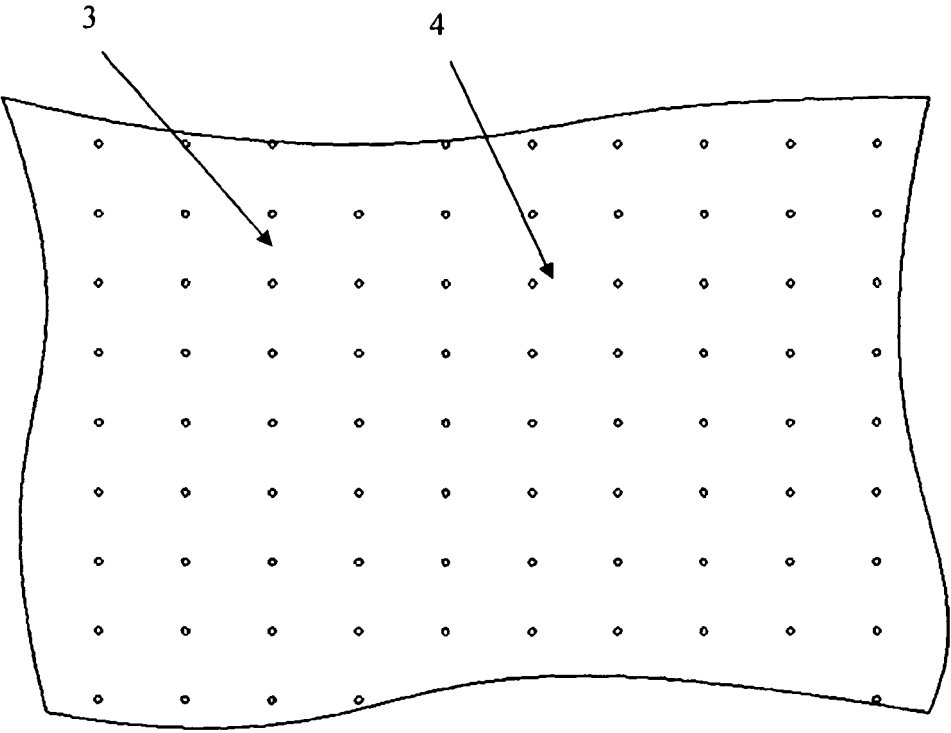


FIG. 4

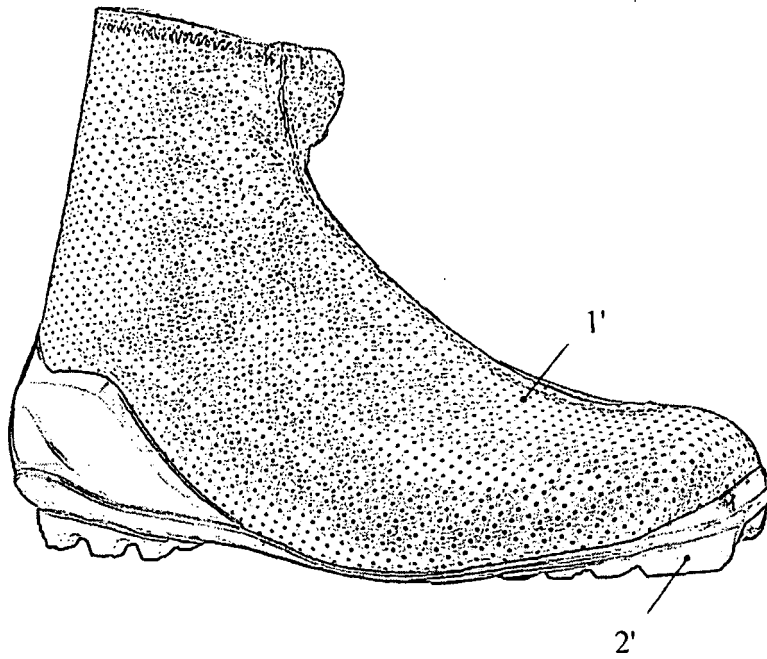


FIG. 5

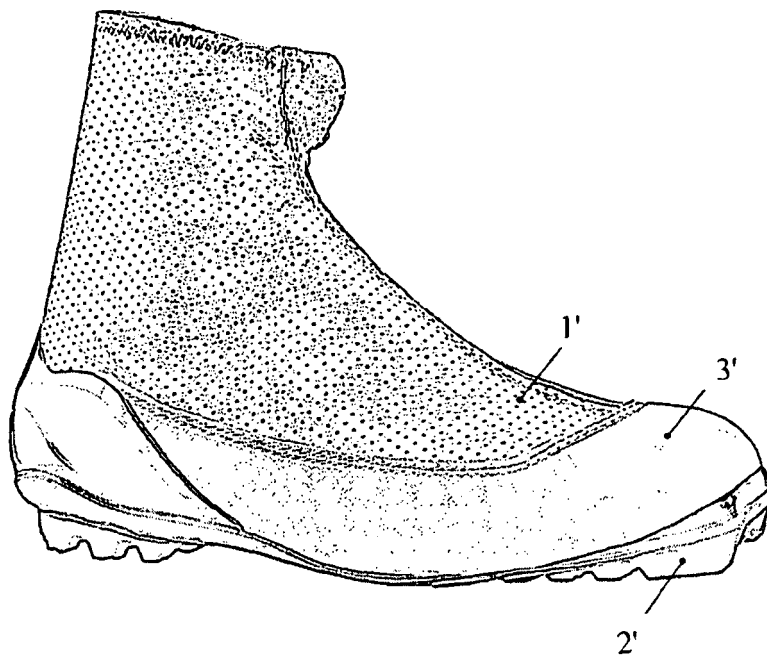


FIG. 6

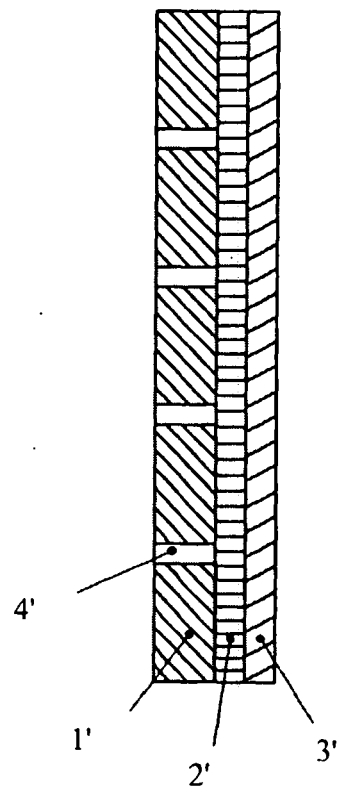


FIG. 7

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20010000272 A [0004]