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(54) Process for producing a transpiring insole and insole produced through such process

(57) A process is described for producing a transpiring insole (1) comprising the steps of: making a net-type supporting structure (2) of the insole (1) by casting elastomeric foamed material, through a die equipped with inserts adapted to make through-holes (3) in the net-type supporting structure (2), wherein the net-type supporting structure (2) is case onto a layer (5) made of natural transpiring material; and coupling a layer (7) for bearing a foot to the layer (5) made of natural transpiring material, the bearing layer (7) being coupled to the layer (5) on the opposite side of the layer (5) with respect to the side to which the net-type supporting structure (2) has been cast or glued. An insole (1) produced through such process is also described.

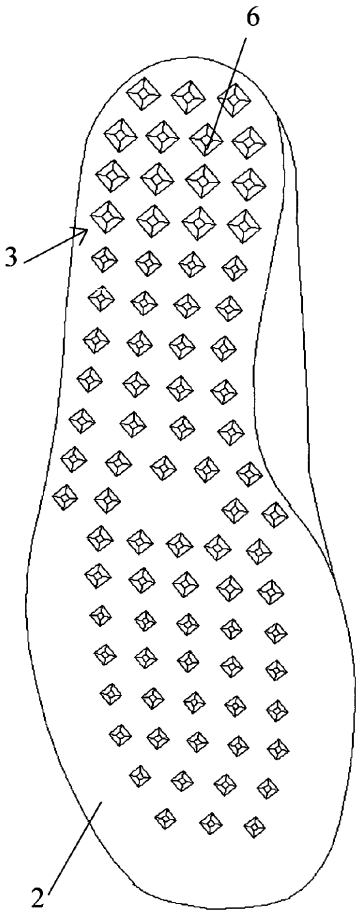

FIG. 1

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Description

[0001] The present invention refers to a process for producing a transpiring insole and to an insole produced through such process.

[0002] Insoles of various types, shapes and sizes are known in the art, and are inserted inside the shoe vamp above the sole and can be of a type that can be withdrawn or not withdrawn.

[0003] More in particular, insoles are known that are equipped with a particular anatomical shaping, suitable to favour the natural blood circulation of the foot and/or to produce a massaging effect on the foot sole. Insoles are also known that are able to favour the foot ventilation, avoiding problems deriving from excessively sweating.

[0004] With particular reference to internal foot ventilation, numerous solutions of footwear equipped with aeration devices are already known. These devices for example provide for the use of pumping means driven by the foot walking movement, in order to blow air through the insole or to expel it through suitable check valves.

[0005] It is also known to use a rubber insole, that can be sealingly inserted into a seat obtained on the sole and equipped with a plurality of alveoli, which are deformed during the normal walking movement, expelling air contained therein through holes obtained on their tops to aerate the above insole, that advantageously is also provided with holes.

[0006] Differently, shoes are known that are equipped with a drilled sole, internally covered with materials that are able to selectively allow the passage of air only but not water, to allow circulating air inside the shoe.

[0007] All these aeration systems require the use of numerous building components, such as elastically deformable elements, aeration ducts, valves, shaped soles, etc., that negatively affect the shoe manufacturing costs.

[0008] Shoe insoles are also known that are composed of a layer made of transpiring material (for example cellulose coal or cork) that has secured on its lower side an alveolar structure made of polyethylene (PE) or in ethyl-vinyl-acetate (EVA) or also or polyethylene mixed with ethyl-vinyl-acetate.

[0009] The above structure should allow, being deformed, to generate an air flow that is able to allow a beneficial effect of foot aeration.

[0010] However, in practice, the materials used for making the above alveolar structure do not show a high elastic memory and therefore, after some times in which they are compressed, do not go back to their original position. This implies that, after a short time, in practice the air pumping effect due to the variation of the volume subtended by the alveoli is substantially cancelled.

[0011] Moreover, stiffening of the insole is per se scarcely comfortable and such as to generally cause the loss of anatomical insole shape.

[0012] It must further be taken into account that normally insoles of the above described type are produced through thermoforming processes, in which often there is a closure, at least partially, of the holes that compose the alveoli.

[0013] Object of the present invention therefore is removing the above mentioned prior art inconveniences, by providing a process for producing a transpiring insole that is simple, efficient and inexpensive to perform, and that in the end allows obtaining an insole with strong transpiring capabilities inside the shoes.

[0014] Another object of the present invention is making an insole that keeps in time its anatomical shaping and its shoe aeration effect.

[0015] A further object of the present invention is providing a process for producing an alveolar insole equipped with a high elastic memory.

[0016] The above and other objects and advantages of the invention, as will appear from the following description, are obtained with a process for producing a transpiring insole as described in claim 1. Preferred embodiments and non-trivial variations of the present invention are the subject matter of the dependent claims.

[0017] It is intended that the claims are an integral part of the present specification.

[0018] It will be immediately obvious that numerous variations and modifications (for example related to shape, sizes, arrangements and parts with equivalent functionality) can me made to what is described, without departing from the scope of the invention as appears from the enclosed claims.

[0019] The present invention will be better described by some preferred embodiments thereof, provided as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 shows a top view of the lower part of a preferred embodiment of the supporting structure of the insole of the invention;
- Figure 2 shows a top view of the upper part of the supporting structure of Figure 1;
- Figure 3 shows a top view of the lower part of a preferred embodiment of the insole of the invention;
- Figure 4 shows a top view of the upper part of the insole of Figure 3;
- Figure 5 shows a side perspective view of the lower part of the supporting structure of Figure 1 coupled with a layer of cork and a layer of leather in order to make the inventive insole; and
- Figure 6 shows a side perspective view of the upper part of the insole of Figure 5.

[0020] With reference to the Figures, a preferred, but not limiting, embodiment of the insole 1 of the invention is shown, such insole 1 being made through an inventive process for producing a transpiring insole 1 comprising the steps of:

- making a net-type supporting structure 2 of the insole 1 by casting elastomeric foamed material, preferably polyurethane, through a die equipped with inserts

adapted to make a plurality of through-holes 3 in the net-type supporting structure 2: such net-type supporting structure 2 is cast or glued onto at least one layer 5 made of natural transpiring material; and

- coupling at least one layer 7 for bearing a foot to such at least one layer 5 made of natural transpiring material, wherein the bearing layer 7 is coupled to the layer 5 on the opposite side of the layer 5 with respect to the side on which the net-type supporting structure 2 has been cast or glued.

[0021] Through the above process, the inventive insole 1 is thereby produced, such insole 1 comprising:

- at least one net-type supporting structure 2 equipped with a plurality of through-holes 3;
- at least one layer 5 made of natural transpiring material coupled to the net-type supporting structure 2 on a first side thereof; and
- at least one layer 7 for bearing a foot coupled to the layer 5 on a second side thereof opposite to the first side to which the net-type supporting layer 2 is coupled.

[0022] Preferably, but not in a limiting way, the through-holes 3 can have the shape of a pyramid with square plan and are progressively tapered and reduced in section when they approach the layer 5 made of natural transpiring material. Such holes 3 have an upper opening 4 placed on the side of the net- type supporting layer 2 coupled to the layer 5 made of natural material, and a lower opening 6 placed on the opposite side of the net-type supporting layer 2, wherein the lower opening 6 has a cross sectional area much greater than the cross sectional area of the upper opening 4.

[0023] Still preferably, the through-holes 3 are adapted to change their volume when walking, generating the passage of an air flow through their upper opening 4, while the lower opening 6 of the through-holes 3 is substantially closed by the shoe sole (not shown).

[0024] The distribution and/or the sizes of the through-holes 5 therefore determine the flexibility of the insole 1 suitable to allow a better waling easiness.

[0025] Moreover, the through- holes 3 has such distributions and/or sizes that they allow a differentiated ventilation in the different areas of the insole 1.

[0026] According to some preferred, not limiting, arrangements, of the invention, the layer 5 made of natural transpiring material is made of cork or cork-lattice or wood, or other natural transpiring material suitable for its purpose.

[0027] Moreover, the bearing layer 7 can be made of leather or tissue, or another material chosen by the user according to his needs.

[0028] With the above-described inventive process, it is possible to obtain:

- any type of insole in any polyurethane adapted for casting;
- insoles with any polyurethane shore and colour;
- insoles with any anatomy and with any shape of the through-holes;
- insoles capable of being cast or glued onto any surface: leather, tissue, cork-lattice, wood, etc.

Claims

1. Process for producing a transpiring insole (1) comprising the steps of:

   - making a net-type supporting structure (2) of the insole (1) by casting elastomeric foamed material, preferably polyurethane, through a die equipped with inserts adapted to make a plurality of through-holes (3) in the net-type supporting structure (2), said net-type supporting structure (2) being cast or glued onto at least one layer (5) made of natural transpiring material; and
   - coupling at least one layer (7) for bearing a foot to said at least one layer (5) made of natural transpiring material, said bearing layer (7) being coupled to said layer (5) on an opposite side of said layer (5) with respect to a side on which said net-type supporting structure (2) has been cast or glued.

2. Insole (1) produced through the process according to claim 1, **characterised in that** it comprises:

   - at least one net-type supporting structure (2) equipped with a plurality of through-holes (3);
   - at least one layer (5) made of natural transpiring material coupled to said net-type supporting structure (2) on a first side thereof; and
   - at least one layer (7) for bearing a foot coupled to said layer (5) on a second side thereof opposite to the first side to which the net-type supporting layer (2) is coupled.

3. Insole according to claim 2, **characterised in that** said through-holes (3) are progressively tapered and reduced in size till they approach said layer (5) made of natural transpiring material, said holes (3) having an upper opening (4) placed on a side of said net-type supporting layer (2) coupled to said layer (5) made of natural material, and a lower opening (6) placed on an opposite side of said net-type supporting layer (2), said lower opening (6) having a cross-sectional area much greater than the cross-sectional area of said upper opening (4).

4. Insole according to claim 3, **characterised in that** said through-holes (3) have a shape of a pyramid with square plan.

5. Insole according to any one of claims 2 to 4, **characterised in that** said through-holes (3) are suitable to change their volume when walking generating a passage of an air flow through their upper opening (4).

6. Insole according to any one of claims 2 to 5, **characterised in that** the lower opening (6) of said through-holes (3) is substantially closed by a show sole.

7. Insole according to any one of claims 2 to 6, **characterised in that** distributions and/or sizes of said through-holes (5) determine a flexibility of the insole (1) suitable to allow a better walking easiness.

8. Insole according to any one of claims 2 to 7, **characterised in that** said through-holes (3) have such distribution and/or sizes as to allow a differentiated ventilation in the different areas of the insole (1).

9. Insole according to any one of claims 2 to 8, **characterised in that** said layer (5) made of natural transpiring material is made of cork or cork-lattice.

10. Insole according to any one of claims 2 to 8, **characterised in that** said layer (5) made of natural transpiring material is made of wood.

11. Insole according to any one of claims 2 to 10, **characterised in that** said bearing layer (7) is made of leather.

12. Insole according to any one of claims 2 to 10, **characterised in that** said bearing layer (7) is made of tissue.

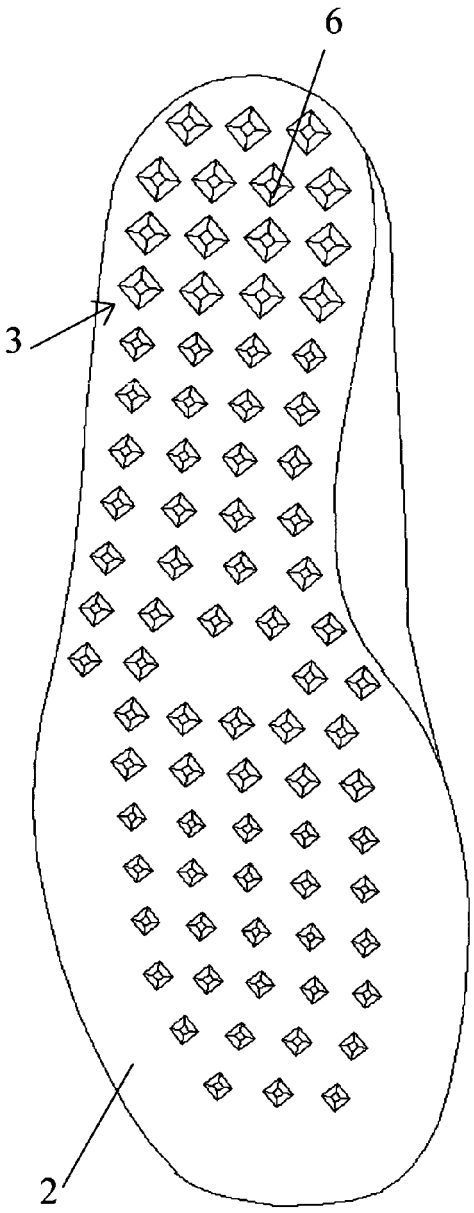

FIG. 1

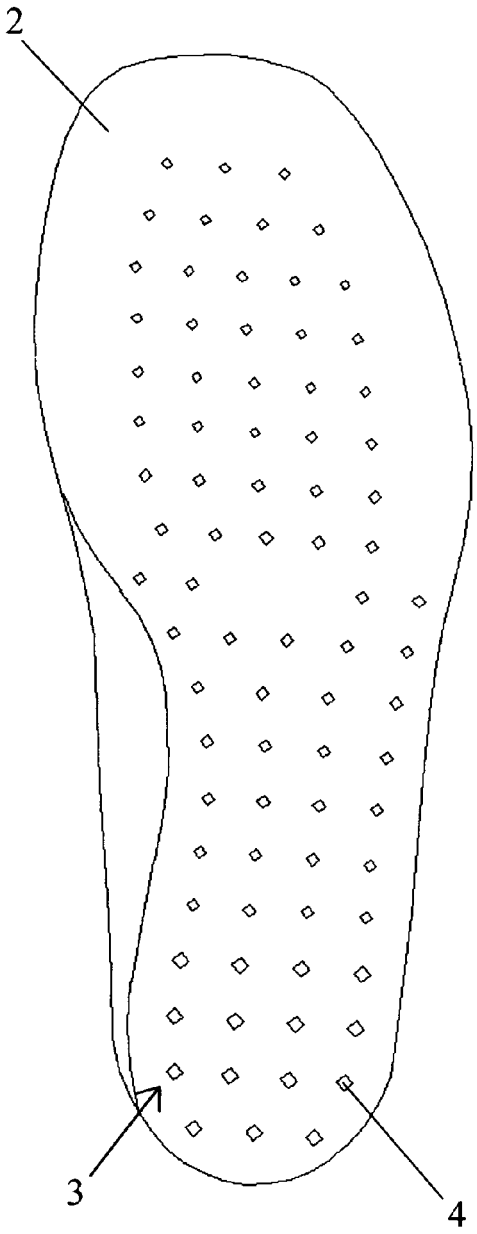

FIG. 2

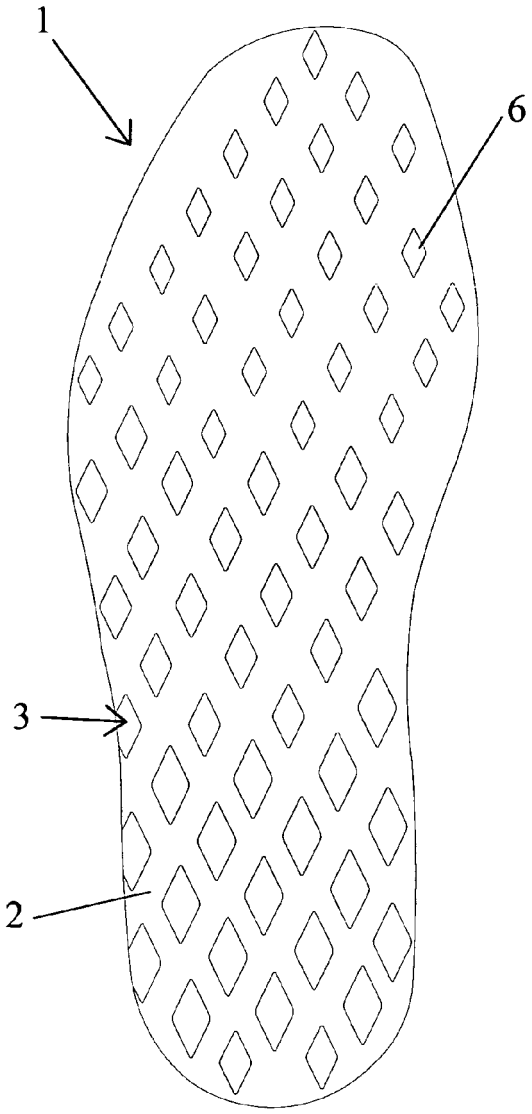

FIG. 3

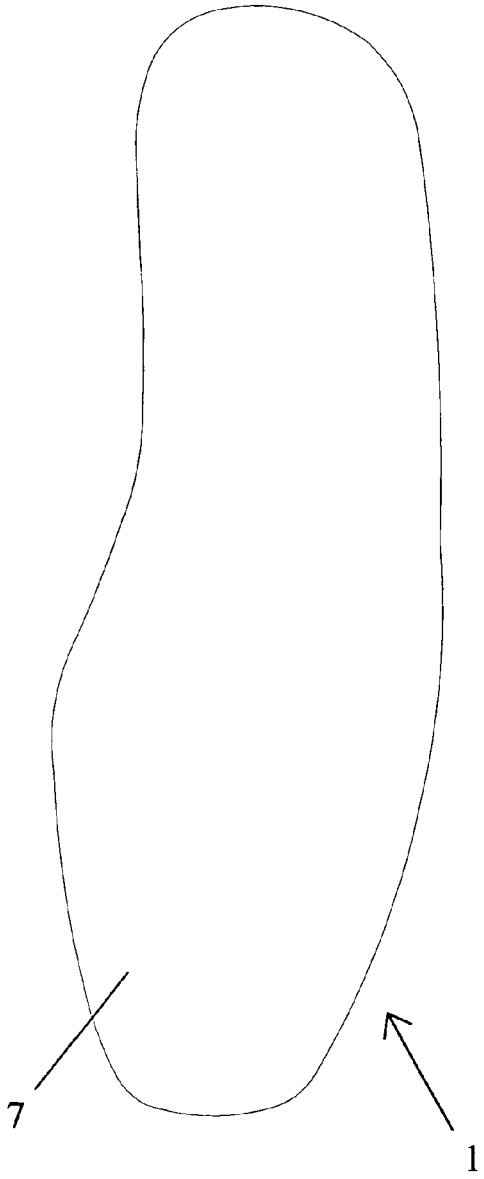

FIG. 4

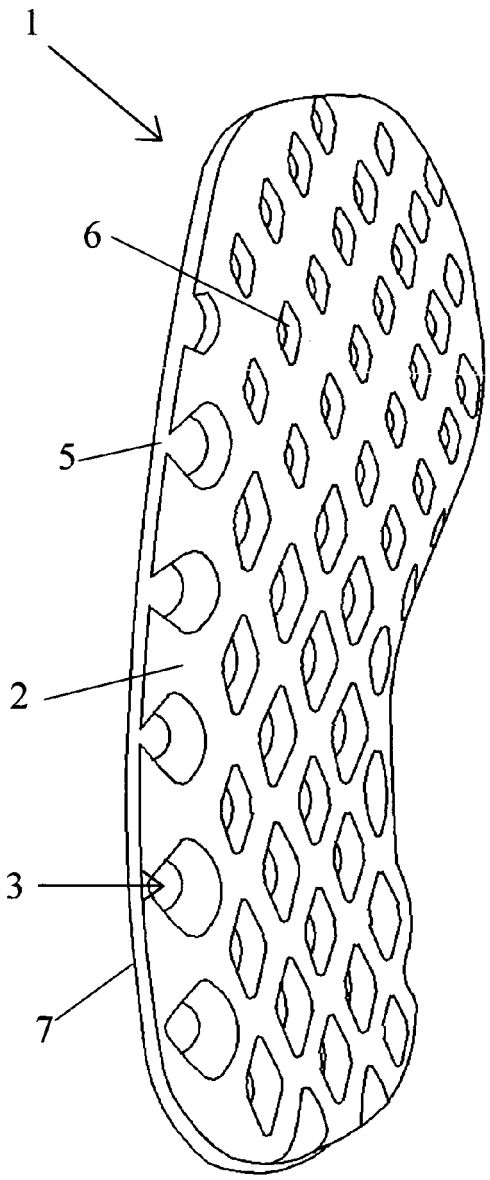

FIG. 5

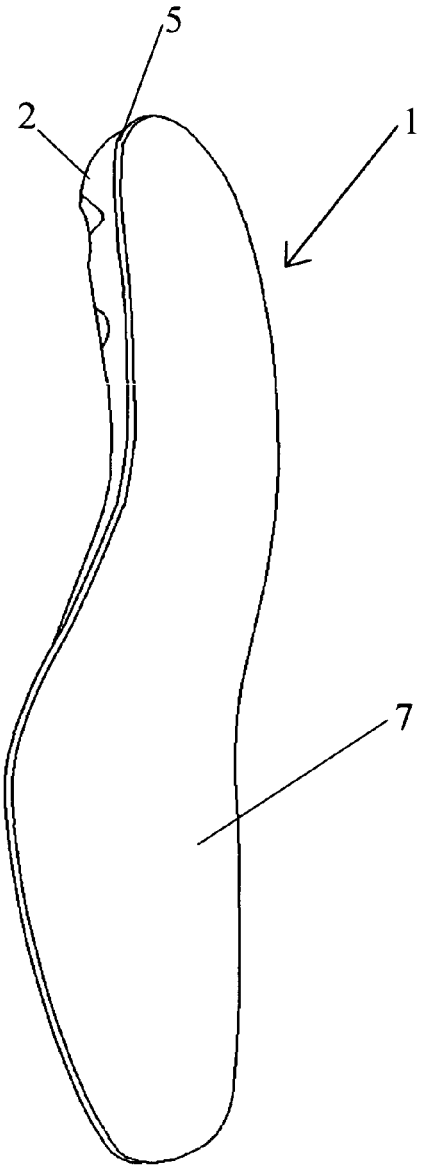

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 12 42 5052

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 Y	US 2011/041365 A1 (LUDEMANN JOHN F [US]) 24 February 2011 (2011-02-24) * paragraphs [0013] - [0020]; figures 3,4 * -----	1-3,5,8, 11,12 4,9,10	INV. A43B17/00 A43B17/08 A43B17/12
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TECHNICAL FIELDS SEARCHED (IPC)

A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 August 2012	Cianci, Sabino

CATEGORY OF CITED DOCUMENTS

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24-08-2012

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82