



US 20060096123A1

(19) **United States**

(12) **Patent Application Publication**  
**Grandini**

(10) **Pub. No.: US 2006/0096123 A1**

(43) **Pub. Date: May 11, 2006**

(54) **WATERPROOFED AND VENTILATED ITEM OF FOOTWEAR**

**Publication Classification**

(75) Inventor: **Gabriele Grandini**, Milan (IT)

(51) **Int. Cl.**  
**A43B 7/06** (2006.01)

(52) **U.S. Cl.** ..... **36/3 B**

Correspondence Address:  
**WENDEROTH, LIND & PONACK, L.L.P.**  
**2033 K STREET N. W.**  
**SUITE 800**  
**WASHINGTON, DC 20006-1021 (US)**

(57) **ABSTRACT**

An item of footwear is described which comprises in combination: an outsole (11) having in its forepart at least a vent opening (12) which is made through the thickness of said outsole (11), a grating-like element (13) which is set into said vent opening (12) and acts as a screen by separating and protecting the inside of the footwear from the ground which comes into contact with said outsole (11), a pliable sheet material insert (15) made from a breathable and waterproofed material which is embedded into the outsole (11) and is positioned inside the outsole (11) so as to overlie said vent opening (12), an insole (16) made of a breathable and waterproofed material, and an upper (17) made of a breathable and waterproofed material.

(73) Assignee: **SIPORT S.P.A.**

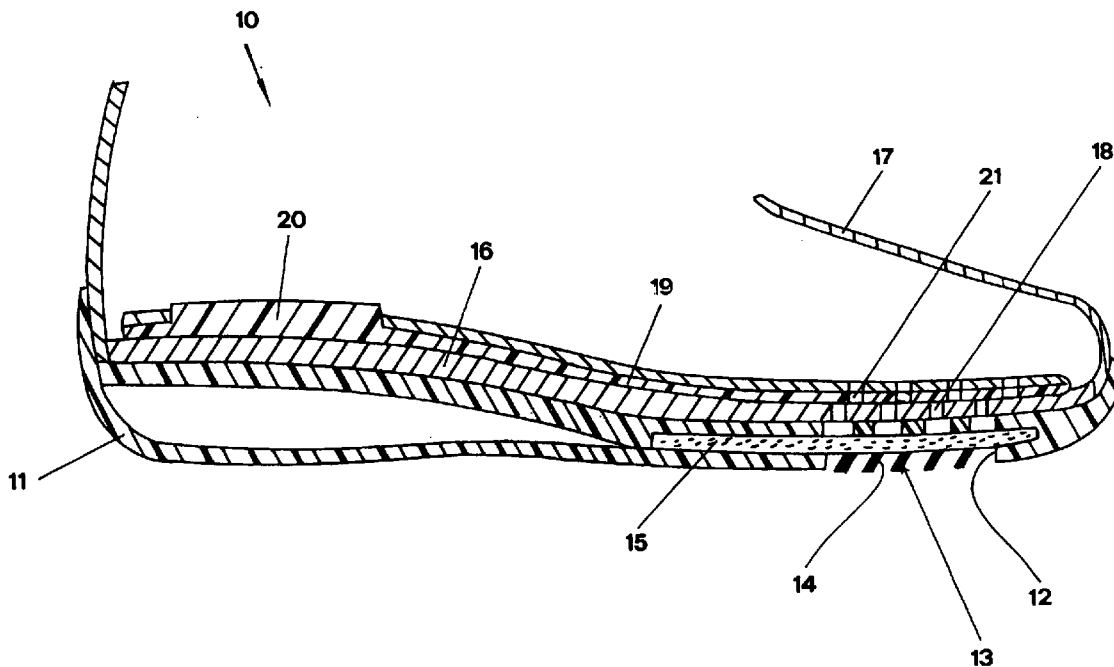
(21) Appl. No.: **10/522,674**

(22) PCT Filed: **Mar. 4, 2003**

(86) PCT No.: **PCT/IT03/00130**

(30) **Foreign Application Priority Data**

Jul. 2, 2002 (IT) ..... M122002U000344



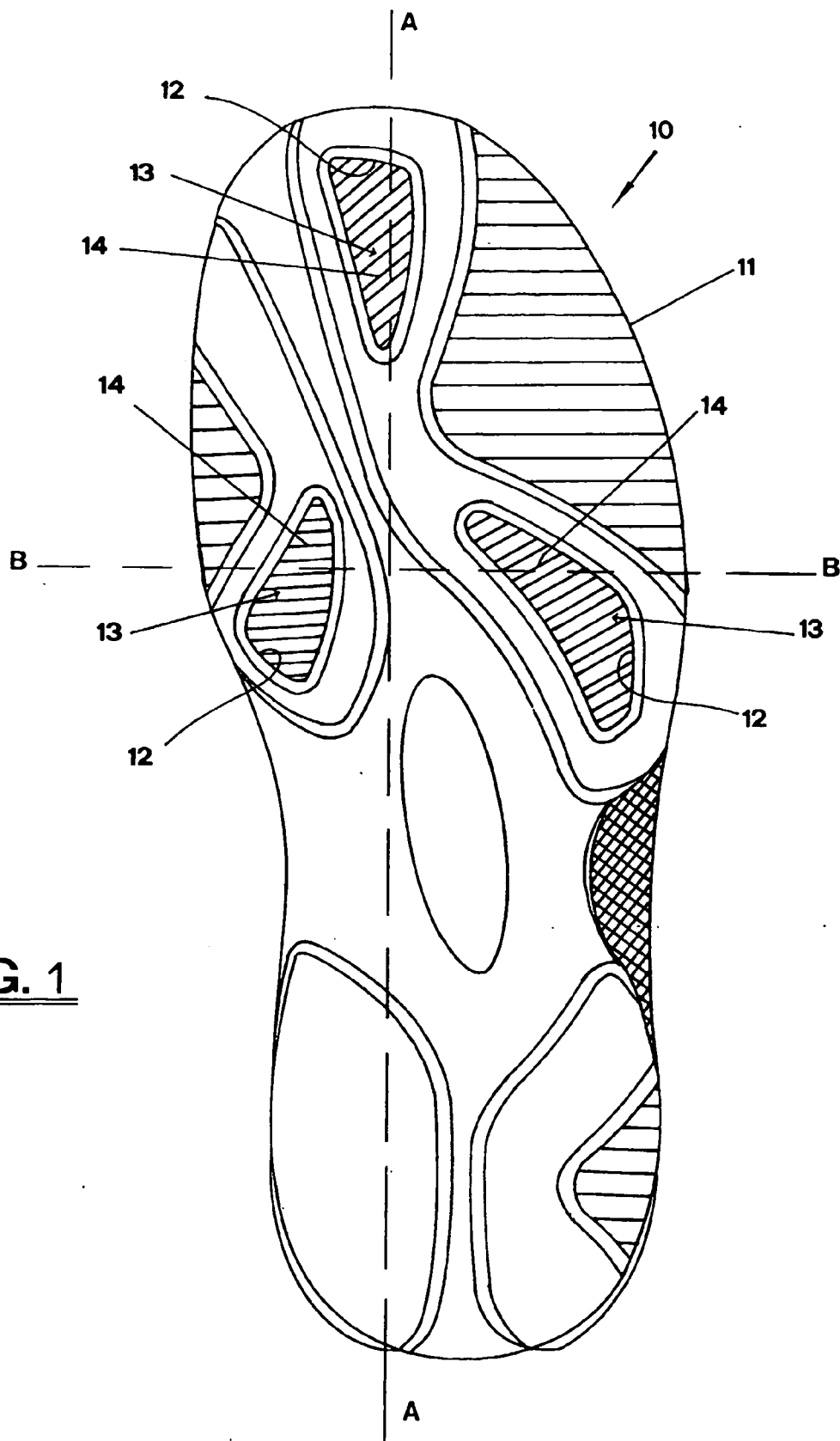


FIG. 1

FIG. 2

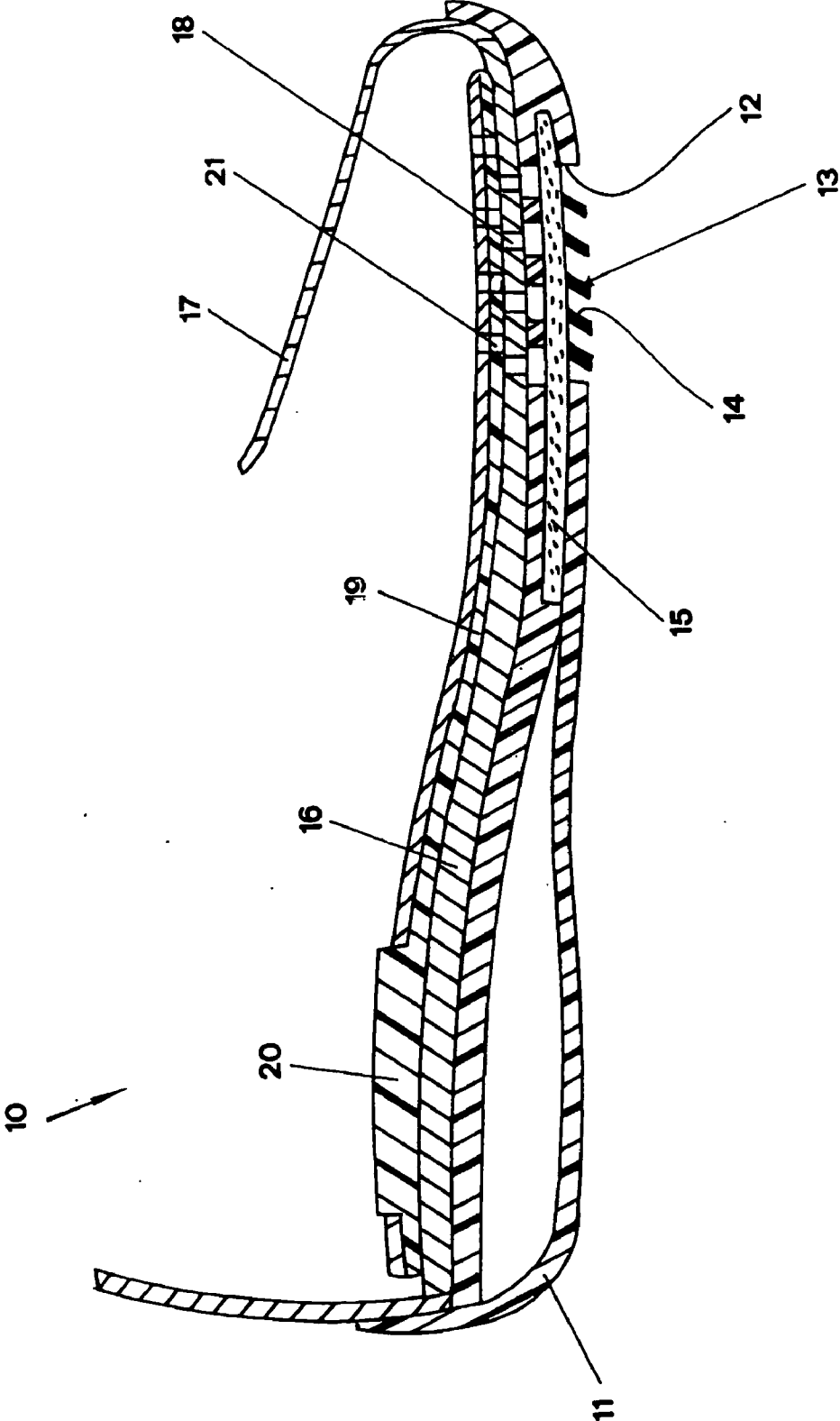
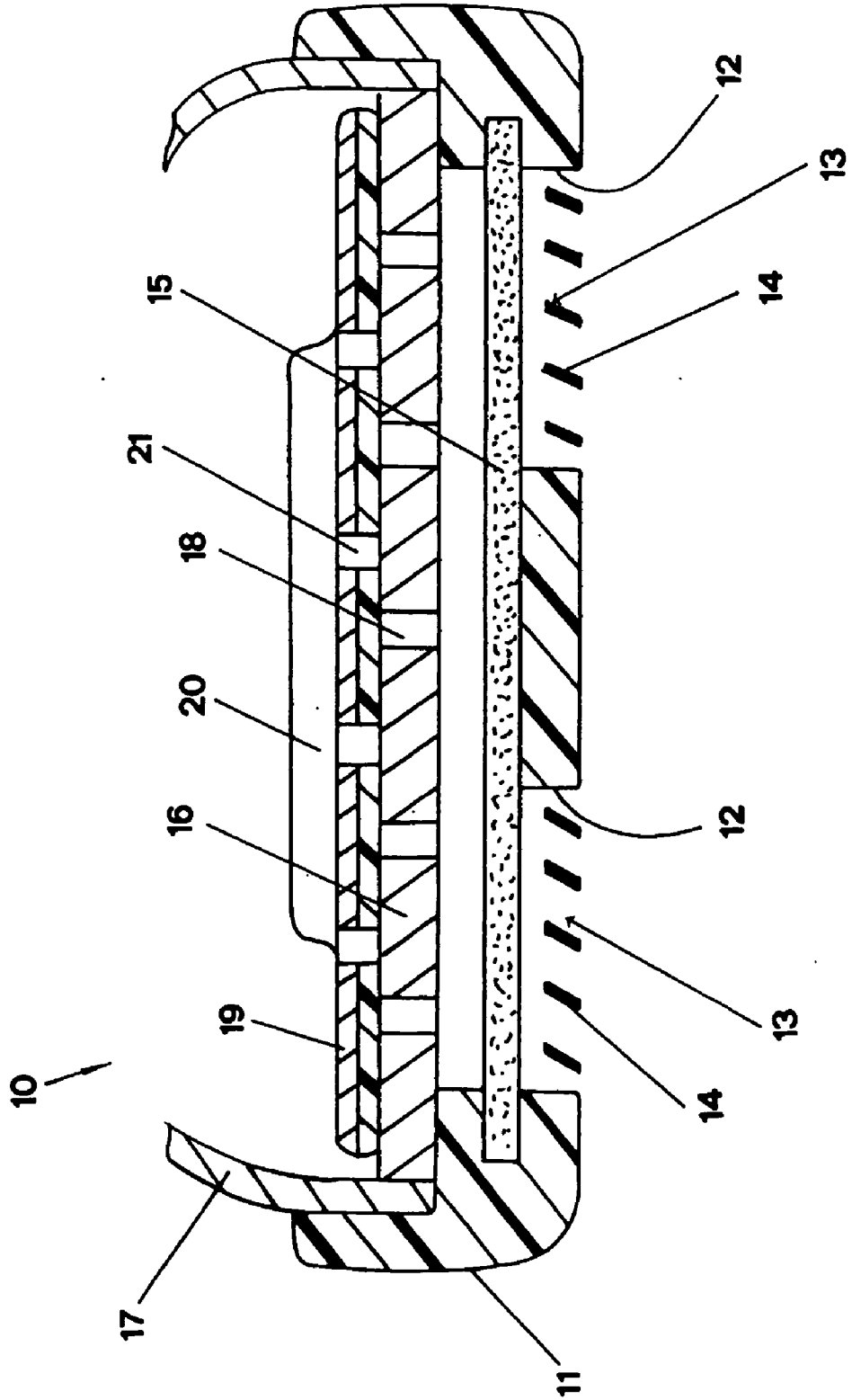


FIG. 3



**WATERPROOFED AND VENTILATED ITEM OF FOOTWEAR**

**TECHNICAL FIELD**

[0001] The present invention generally relates to the technical field of footwear, and particularly an item of footwear featuring some important improvements in relation to the ability of allowing the perspiratory moisture given off from the feet to pass through an outsole of the footwear which is specifically designed to this purpose, while ensuring at the same time an effective waterproofness.

**BACKGROUND ART**

[0002] There are known in the art items of footwear which comprise an outsole made from a soling material such as rubber, or a compound mixed with rubber, or also polyurethane or polyvinyl chloride. Such soling materials used in the production of outsoles are capable of providing protection, traction, durability, waterproofness and play also a role in flexibility, stability and cushioning.

[0003] However, the outsoles made from such materials suffer from an important disadvantage by not being permeable to the moisture which perspires from the plantar of the feet. Since the perspiration moisture can scarcely move away from the outsole of the footwear, it combines with the darkness and the warmth inside the footwear to create a fertile breeding ground for the fungi and bacteria that normally live on our skin. The decomposition of outer layers of the skin operated by the fungi and bacteria produces isovaleric acid which is associated with the typical foul foot odor. Moreover, if the perspiration moisture is not adequately removed from the footwear, the skin of the feet macerates and even mild friction in the footwear can cause painful blisters to appear on the skin of the feet.

[0004] To overcome this drawback and maintain the environment inside the footwear as dry and healthy as possible, attempts have been made in order to allow the perspiratory moisture given off from the feet to breathe not only through the upper of the footwear, but also through the outsole of the footwear in order to vent the moisture and cool the inside of the footwear.

[0005] Document EP 0 121 645 B1 concerns an item of footwear aimed at solving this technical problem. In particular, the footwear described in this document comprises a rubber outsole with holes distributed therethrough which are closed by small leather inserts arranged on the side intended to face the upper of the footwear. These leather inserts are glued and/or fixed into the holes with a suitable adhesive. The footwear is also provided with an insole made of cork.

[0006] According to EP 0 121 645 B1, the object of the through holes distributed in the outsole of the footwear is to provide perspiration of moisture through the outsole. However, also the footwear disclosed in EP 0 121 645 B1 suffers from some disadvantages, specifically in relation to its manufacturing process and to its ability to ensure a durable breathability and waterproofness.

[0007] As regards the process for manufacturing such a footwear, this process should comprise at least a first step for producing the perforated outsole, a second step for gluing the leather inserts into the holes made through the outsole and a third step for attaching the insole and the upper to the

top side of the outsole. A manufacturing process of this kind is rather inefficient, and moreover the quality of the footwear thereby produced does not meet the high standards which are demanded in footwear at the present time.

[0008] In relation to the waterproofness of a footwear of this kind, it has been found that the leather inserts which are glued into the holes provided in the outsole of the footwear can become detached from the outsole upon repeated bending of the outsole during the normal use of the footwear. Thus, under rainy weather conditions water from the outside ambient can penetrate the footwear through the holes and cause great discomfort. Moreover, no means is provided for imparting a level of waterproofness to the leather inserts which are inherently hydrophilic and in a short time tend to absorb and transmit liquid water, specially in the case the outsole of footwear contacts a wet or muddy ground.

[0009] In connection with the breathability of the footwear of the kind known in the art, a major drawback consists in that, eventually, the holes made in the outsole become clogged with dirt and mud, thus they are no more capable of venting the moisture given off in perspiring from the feet. This drawback becomes apparent specially in the case the footwear is intended for use in leisure time and/or sport activities, during which it often occurs that the outsole touches a dirty or muddy ground.

[0010] Also document WO 97/28711A addresses the task of developing a breathable outsole for both normal and watertight footwear. According to this document the outsole is formed of two layers with an elastic and water vapour-permeable inner layer and an outer layer which covers less than 70% of the inner layer.

[0011] However, the use of a footwear having such an outsole construction is rather uncomfortable because the outsole is not capable of providing stability, traction and cushioning action, especially in the case the footwear is intended for leisure time and/or sport activities. Moreover, the manufacturing process of the outsole disclosed in WO 97/28711A is rather inefficient and expensive.

**DISCLOSURE OF THE INVENTION**

[0012] It is therefore an object of the present invention to provide an item of footwear intended for leisure time and/or sport activities which is improved in relation to its breathability and waterproofness.

[0013] Accordingly, this object is achieved with an item of footwear comprising a combination:

[0014] an outsole having in its forepart at least a vent opening which is made through the thickness of said outsole,

[0015] a grating-like element which is set into said vent opening and acts as a screen by separating and protecting the inside of the footwear from the ground which comes into contact with said outsole,

[0016] a pliable sheet insert made from a breathable and waterproofed material which is embedded into the outsole and is positioned inside the outsole so as to overlie said vent opening,

[0017] an insole made of a breathable and waterproofed material, and

[0018] an upper made of a breathable and waterproofed material

#### BRIEF DESCRIPTION OF DRAWINGS

[0019] The features of the present invention will appear in the course of the following description of an embodiment thereof chosen by way of example and illustrated with reference to the accompanying drawings, in which:

[0020] **FIG. 1** is a plan view of the bottom surface with the tread pattern of the outsole of the item of footwear according to the present invention;

[0021] **FIG. 2** is a longitudinal section view of the footwear according to the present invention taken along line A-A of **FIG. 1**; and

[0022] **FIG. 3** is a cross section view of the footwear according to the present invention taken along line B-B of **FIG. 1**.

#### BEST MODE OF CARRYING OUT THE INVENTION

[0023] Referring to **FIGS. 1-3** of the drawings, there is shown the item of footwear according to the present invention, generally designated by **10**. The footwear comprises, in a manner known per se, an outsole **11** which is produced by injection moulding and is made of a suitable soling material such as rubber or a compound mixed with rubber, or also polyurethane or polyvinyl chloride.

[0024] The outsole **11** is provided in its forepart with at least one large vent opening **12** which is made through the thickness of the outsole **11**. In each vent opening **12** a grating-like element **13** is set which acts as a screen by separating and protecting the inside of the footwear from the ground contacted by the tread of outsole **11**. The grating-like element **13** is formed of juxtaposed straight or curved, parallel or latticed bar elements **14** which are preferably integral with the outsole **11** and are produced together therewith by injection moulding. Alternatively, the bar elements **14** of the grating-like element **13** are integral with an insert (not shown) which is adapted to be inserted into the vent opening **12** and fixed therein.

[0025] The length and width of the vent openings **12** provided in the outsole **11** are chosen so that any dirty or muddy ground matter which may contact the outsole **11** and enter the vent openings **12** is readily removed therefrom by the natural occurring bending movement of the outsole **11** when one walks or runs. Therefore, the possibility that the vent openings **12** become clogged by the ground matter is reduced to a minimum.

[0026] The outsole **11** includes a pliable sheet insert **15** which is made from a suitable breathable and waterproofed material and is embedded into the outsole **11**. The sheet insert **15** has a thickness preferably ranging from 2 to 3 mm. To ensure the breathability of the footwear, the sheet insert **15** is positioned inside the outsole **11** so as to overlie the vent openings **12** as shown particularly in **FIGS. 2 and 3** of the drawings. The sheet insert **15** is protected from wear and damage by the screening action of the grating-like elements **13**.

[0027] As mentioned above, the material of the sheet insert **15** is selected among breathable and waterproof

materials which are available in the art of footwear manufacturing. Preferably, the material used for the sheet insert **15** is waterproofed leather, i.e. leather which has been treated so as to improve its repellency to water.

[0028] Waterproofing of leather is a process known in the art by which the leather is coated with a protective hydrophobic, i.e. water repellent compound which is formulated so as to have no effect on the natural breathability of the leather. This protective coating can be applied to leather at the tannery during the tanning process and the leather produced thereby is capable of resisting absorption and transmission of liquid water. Moreover, such treated leather has a greater strength and durability than other known synthetic breathable and waterproof materials which are adapted to be used in footwear manufacturing. The use of leather is also advantageous because, as a natural material, leather is more effective in allowing perspiration moisture to breathe than other known synthetic materials.

[0029] The pliable sheet insert **15** is fixed firmly into position inside the outsole **11** when this is produced by injection moulding. By this means, the outsole **11** is produced together with the sheet insert **15** embedded therein in only one step and no further gluing step of the sheet insert **15** in the outsole **11** is required. Thus, the process for manufacturing the footwear is more energy and cost efficient than those required for producing other known footwear of this kind. Furthermore, an item of footwear exhibiting a higher quality can be produced because the sheet insert **15** is sealed along its border to the outsole **11**, thereby ensuring a durable watertight closure along the border of the vent openings **12**.

[0030] The item of footwear according to present invention comprises also an insole **16** to which the upper **17** is attached by a stitching seam, f.i. with a Strobel working method, and then the insole **16** together with the upper **17** is attached to the outsole **11** in a manner known in the art of footwear manufacturing.

[0031] The insole **16** is preferably made of a breathable and waterproofed leather, leatherboard or fibreboard, and is flexible and able to absorb the moisture given off in perspiring from the feet. Other suitable materials for the insole **16** are ethylene vinyl acetate, polyesters, thermoplastics, graphite, and foam polymers which may add cushioning and support to moisture control. In fact, as shown in **FIGS. 2 and 3** of the drawings, the insole **16** is provided with through holes **18** located in its forepart which aid to moisture breathability of the insole. The insole **16** has a thickness generally in the range of 1.8-2.0 mm.

[0032] The insole **16** may be suitably covered by an insock **19** to conceal any stitches which may protrude. The insock **19** is preferably formed of layers of different materials joined together by a stitching seam. The insock **19** comprises at least a top layer made of leather which is joined to a bottom layer made of ethylene vinyl acetate. The insock **19** is also provided with a heel cushioning pad **20** located in its back part which may be integral with the bottom layer and protrude through an opening in the top layer in order to contact the heel portion of the feet. Alternatively, the heel cushioning pad **20** may be a separate pad which is attached to the top layer of the insock **19** and is filled inside with a gel-like padding material. The insock **19** is also provided with through holes **21** located in its forepart which aid to moisture breathability of the insock.

[0033] The upper 17 of the item of footwear 10 is made from a waterproof and breathable material such as waterproofed leather or a combination of materials such as waterproofed leather, foam polymers and nylon or polyester mesh bonded together in a laminated form and capable of ensuring in combination breathability and waterproofness to the upper.

[0034] From the foregoing it can be readily understood that the item of footwear according to the present invention obviates the drawbacks of other similar footwear known in the art. In fact, the item of footwear of the invention can be produced with a more efficient manufacturing process which requires a less number of steps. Furthermore, the item of footwear of the invention permits an optimum ventilation inside the footwear to be achieved which maintains the environment around the feet cool, dry and healthy by the use of high performance breathable and waterproofed leather and synthetic materials in combination with a novel outsole contraction.

1-12. (canceled)

13. An item of footwear comprising in combination:

an outsole consisting in a monolithic piece of synthetic material and having in its forepart at least a vent opening which is made through the thickness of said outsole,

a grating-like element which is set into said vent opening and acts as a screen by separating and protecting the inside of the footwear from the ground which comes into contact with said outsole,

a pliable sheet insert made from a breathable and water-repellent leather material which is embedded into the outsole and is positioned inside the outsole so as to overlie said vent opening,

an insole made of a breathable and water-repellent leather, leatherboard or fibreboard material, and

an upper made of a breathable and water-repellent leather material or a combination thereof with synthetic materials such as foam polymers and nylon or polyester mesh bonded together in a laminated form.

14. An item of footwear according to claim 13, wherein said grating-like element is formed of juxtaposed straight or curved, parallel or latticed bar elements which are integral with the outsole and are produced together therewith.

15. An item of footwear according to claim 13, wherein said grating-like element is formed of juxtaposed straight or curved, parallel or latticed bar elements which are integral with an insert intended to be inserted into said vent opening in the outsole and fixed therein.

16. An item of footwear according to claim 13, wherein said insole is provided with through holes located in the forepart thereof which aid to moisture breathability of the insole.

17. An item of footwear according to claim 13, wherein said insole is covered by an insock.

18. An item of footwear according to claim 17, wherein said insock is formed of layers of different materials joined together by a stitching seam.

19. An item of footwear according to claim 18, wherein said insock comprises at least a top layer made of leather and a bottom layer made of ethylene vinyl acetate.

20. An item of footwear according to claim 18, wherein the insock is provided with a heel cushioning pad located in its back part.

21. An item of footwear according to claim 18, wherein said insock is provided with through holes located in its forepart which aid to moisture breathability of the insock.

\* \* \* \* \*