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(54) **AERATED SHOE HAVING CUSHIONING EFFECT, WITH AIR FLOW REGULATOR**

BELÜFTETER SCHUH MIT DÄMPFENDER WIRKUNG, MIT LUFTMENGENREGLER

CHAUSSURE AEREE A EFFET AMORTISSANT, AVEC REGULATEUR DE FLUX D'AIR

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Description

Field of the art

[0001] The present invention refers to the industrial field of footwear, and in particular of aerated shoes, i.e. those provided with means which permit atmospheric air to enter, naturally in a limited manner, inside the shoe, so to give a feeling of comfort to the user's foot.

Prior art

[0002] Shoes of every type and form are already known in this sector that have ventilated or aerated sole.

[0003] The aeration inside the shoe by means of the entrance of air from the sole or laterally makes the foot comfortable and determines a secure remedy against sweating. Nevertheless, it is also true that in the shoes whose aeration is obtained by means of sole perforation, there is always the problem of passage of moisture inside the shoe and towards the foot - even if the air is "filtered" by means of a membrane, since the sole is in contact with the underlying ground. On the other hand, it has been shown that the air which enters the shoe for remedying the sweat problem should preferably enter from below the sole, and then "rise" towards the foot. Indeed, if the system is such that the air enters from the sole, it naturally rises towards the foot, while if it enters laterally with respect to the foot it has a hard time flowing downward, i.e. under the foot.

[0004] In addition, in both technical solutions, the volume of air which flows inside the shoe towards the foot mostly cannot be modified by the user. In other words, currently there are only few systems which allow for a regulation of the air flow rate.

[0005] The disadvantage of this state of the art is easily illustrated.

[0006] In case of even high variations of the outside temperature, the shoe always preserves the same air flow.

[0007] In addition, even with the heat, it does not always make the foot comfortable, since sensitivity varies from person to person. Indeed, if a person prefers an air flow of "X", for example, another person enjoys an air flow five times that, i.e. "5X", in order to feel comfortable.

[0008] Thus, even more so, in cold weather, the impossibility of regulating the air flow rate constitutes a real problem, since with the entrance of cold air there is inevitably a lowering of the temperature inside the shoe, which is immediately felt by the sole of the foot (being a sensitive area).

[0009] One could object that an aerated shoe is in any case not usable in winter or late fall, however this is false, since the effect on the foot produced by the aeration first of all depends - as said - on the specific sensitivity of the individual; in addition, in case of a sports shoe, a shoe with high ventilation is however preferable for the sport activity undertaken, in order to oppose the odors produced by sweating and thus benefit the foot.

[0010] Returning to the problem of individual sensitivity, it has actually been proven that every user feels a different sensation with regard to the entering air temperature: some people really enjoy warm air on their feet, while others prefer lower, medium or higher temperatures.

[0011] A non-suitable air flow also causes foot discomfort. An uncontrolled air flow towards the foot is like the classical "draught", always annoying and possibly even harmful.

[0012] In general, the ideal would be a warm shoe in the winter and a cool shoe in the summer; thus closed or semi-closed in the winter, and open or semi-open in the summer.

[0013] One object of the present invention is that of making a shoe which is aerated from the sole, which blocks the entrance of moisture towards the foot, which is suitably cushioned, and which has a system for adjusting the quantity of entering/exiting air, allowing the air to carry out its natural beneficial 'conditioning effect'. Particular mechanical expedients are avoided for modifying the entering air temperature, which in addition to being costly and hard to apply would not bring about the desired benefits, but rather, considering the foot's sensitivity, could even prove to be harmful.

Description of the invention

[0014] The aforesaid objects of the invention are obtained by means of the characteristics contained in claim 1 of the patent.

[0015] A natural ventilation type footwear with air flow regulator (vent frame member and shutter member) according to the preamble of claim 1 is disclosed in US 4,837,948.

[0016] According to claim 1, the shoe it comprises the following characteristics:

- a lower sole (5) and an upper sole (3) joined together along their perimeter by a border (10) bearing fixed slits (12), preferably equidistant and distributed all around said border (10); said lower sole (5), said border (10) and said upper sole (3) forming an inner chamber or hollow space for the circulation of atmospheric air which entered from the fixed slits (12);
- the lower sole (5) lacking holes or micro-holes, while the upper sole (3) has holes or micro-holes (4) adapted to allow the air coming from said hollow space to pass through;
- an air flow regulator (13, 14, 15, 16, 17, 18, 19), operable manually or directly by the user's finger or with a special tool, and comprising a movable part (13) bearing a plurality of movable slits (15) that are superimposable in all or part of said fixed slits (12) so to ensure an adjustable flow rate of the atmospheric air towards said hollow space;
- a plurality of elements (7), arranged in said hollow

space between the lower surface of the upper sole (3) and the upper surface of the lower sole (5), said elements (7) being made of a hard material that is however provided with a certain elasticity, so as to ensure a suspension and a "pump effect" for the natural cyclic suction and expulsion of the atmospheric air during walking;

- the air freely circulating in the hollow space, between and/or through said elements (7), since said elements (7) have interstices which separate them, or openings made thereon.

[0017] According to the characterizing part of claim 1, by making the movable part (13) of the flow regulation device in the shape of a closed belt, semi-rigid but flexible, which extends
along the entire side of the shoe and is slidable within a perimeter groove (11) of said border (10), the shoe assumes an improved aesthetic appearance. Indeed, the flow regulation device remains inside the perimeter groove or slot (11), or at most remains flush with the outer profile of the soles (3, 5).

[0018] Most importantly, the closed semi-rigid belt ensures a more uniform ventilation of the whole sole periphery with a single movable member.

[0019] In order to simplify the production process, the entire sole, comprising the two soles (3, 5) and the border (10), is made of a single piece together with the inner cushioning elements (7).

[0020] Preferably, a positioning lock (locking means) is provided for, adapted to prevent undesired movements of the semi-rigid belt.

[0021] Further characteristics and advantages of the invention are clear from the following detailed description, or they will be fully understood when the invention itself is practically actuated.

Brief description of the drawings

[0022] The present invention will now be illustrated in more detail, with reference to some embodiments thereof shown in the attached drawings, having merely exemplifying, non-limiting or non-binding character, wherein:

FIGURE 1 is a very schematic general perspective view of the shoe of the present invention;

FIGURE 2 is a perspective view of the body of the sole of the shoe of Fig. 1, sectioned and with parts partially removed only for description purposes;

FIGURE 3 is an overall view analogous to Fig. 2, in which however a large part of the upper sole 3 was removed for description purposes, creating a window in order to view the structure of the inner aeration and cushioning system, arranged between the upper sole and the lower sole;

FIGURE 4 separately shows the semi-rigid belt of the air flow regulation device, ideally taken off the shoe for description purposes;

FIGURE 5 shows a detail of the semi-rigid belt of Fig. 4, which is assumed to be mounted on the shoe and is found in completely open position;

FIGURE 6 is analogous to Fig. 5, but shows a position of the semi-rigid belt such to ensure an only-partial entrance of the air;

FIGURE 7 shows the details of the means for locking in position the semi-rigid belt of the air flow regulation device, so to prevent its accidental movement during the use of the shoe;

FIGURE 8 shows a breathable band of protection from dirt and water;

FIGURE 9 shows, in a partial perspective view of the sole, a special hole that allows the outward downflow of possible water formations.

Detailed description of the preferred embodiment

[0023] The invention concerns an aerated shoe of the type indicated as a non-limiting or non-binding example in the attached figures, Figures 1-9.

[0024] The shoe represented in these figures, as will be seen from the following description, attains all the aforesaid objects.

[0025] It is essential to understand that in the description, all details are omitted that may be already known to those skilled in the art but which do not specifically regard the invention. This is not an incorrect omission, but rather a way of focusing the description on the most pertinent details of the invention, such that a man skilled in the art will be able to actuate the core of the invention, as well as allowing full freedom with regard to possible variants. In particular, the present description does not intend to place any limits on the materials, configurations and technical production specifications employed in the footwear sector and which could be validly applied to the invention.

[0026] Keeping in mind the above considerations, Fig. 1 schematically shows the overall appearance, at the end of the production and assembly phase, of a shoe incorporating the air flow regulation device, and inside, not visible in Fig. 1, the inner aeration and cushioning system arranged between the upper sole and the lower sole.

[0027] Fig. 2 and Fig. 3 show, in detail, only the inner aeration and cushioning system, incorporated in the sole body.

[0028] The body 2 of the sole, made of any suitable material known to the man skilled in the art (but preferably leather or rubber), comprises the upper sole 3 bearing holes or micro-holes 4 over its entire surface, and a lower sole 5 which is placed in contact with the ground and

which does not have holes.

[0029] Preferably, the body 2 of the sole is made of a single piece. Specifically, in the present preferred embodiment, the lower sole 5 and the upper sole 3, suitably spaced (separated from each other) by the inner aeration and cushioning system, as described below, form a single piece since there are joined along their outer perimeter by a border or vertical wall 10 in order to give rigidity and support to the structure. The border 10 laterally forms a slot or groove 11, such that it is recessed with respect to the outer perimeter profile of the two soles 3 and 5 which are of matching geometric form. On the border, or vertical wall 10 joining the upper 3 and lower 5 soles, equidistant (rectangular) slits 12 are made such to allow the entrance of the air inside the hollow space between the two upper 3 and lower 5 soles.

[0030] As can be seen in Figures 2 and 3, atop the upper sole 3 (and thus directly in contact with the sole of the user's foot), there is a so-called shoe liner 6 composed of a shaped layer of material that is breathable by means of holes or micro-holes, which allow the passage of the rising air coming from the upper sole 3.

[0031] The inner aeration and cushioning system is arranged so to join the two soles 3 and 5 in a uniform manner, and it also functions as a spacer adapted to create an aeration hollow space between the two soles. Such inner aeration and suspension system has constituent elements 7 which have the function of air circulation and suspension, placed at suitable mutual distances from each other. In the shown embodiment, the elements 7 are made of a single body with the soles, i.e. they are integral with the two soles 3 and 5. In such a manner, the body 2 of the sole could comprise, forming a single piece - for example in rubber - also the inner aeration and suspension system formed by the components 7 uniformly distributed between the soles. In the drawing, these components 7 which join the two soles form a plurality of "Arch of Titus" - like elements, whose central holes ensure the air circulation, laterally coming from the outside through the slits 12, into the hollow space created between the two soles 3 and 5. Of course, the components 7 of the aeration and suspension system could also be composed of small cylinders or have any other form, possibly also especially designed for ensuring maximum durability and optimal suspension of the entire system.

[0032] Preferably, the elements 7 are obtained from a single melting (molding) together with the two soles, but they could also be fixed between the two soles; alternatively, the soles could be made of leather, and the system formed by the elements 7 could be separately made of a single block by means of melting (molding) and then fixed to the soles in a suitable manner (for example, by means of gluing, etc.). It is clear that a man skilled in the art can choose from various, equally feasible possible solutions, and could possibly prefer a solution that ensures the greatest durability, or the greatest aeration, or the best suspension, or he could choose the optimal solution that leads to the best compromise between all these requirements. Of course, the speed and simplicity of the production process can also be important factors in order to limit the costs of the final product.

[0033] The air flows upward, i.e. towards the sole of the foot, passing through the (micro-) holes 4 of the upper sole 3 and then through the shoe liner, or shaped breathable material layer 6.

[0034] The elements 7 then "give a cushioning effect" to the feet during walking; the hardness degree of the material (for example rubber) will determine the desired elasticity. In addition, this suspension system caused by the body of the sole 2 in sandwich form, with its above-described cushioning elements 7, also produces an air compression and suction "pump effect" in the hollow space, in such a manner favoring the natural circulation of the air in the hollow space and thus in the shoe. Above all, the hollow space also acts as a "trap" for a possible condensate, preventing it from reaching the foot.

[0035] Naturally, the shape of the elements 7 could be of any type, as long as it is suitable for the purpose. Their arrangement could be as squares, like in Figure 2 and Figure 3, or as hexagons (known for being the shape with the most material savings), triangles, etc., of continuous form (as in the drawing) i.e. with continuous walls, or with interrupted form (separated cylinders, etc.) as said above, etcetera.

[0036] The air flow regulation device, as fundamental element of the present invention, will now be described.

[0037] In the shown embodiment, close to the slot 11 and covering the same along the entire perimeter, there is a semi-rigid belt 13:

- see Fig. 2 which shows - for description purposes - only a small section of belt 13 visible in its seat 11, the remaining belt part being covered by a breathable band 20 (see below), and
- see Fig. 4, which shows the entire semi-rigid belt 13, for description purposes separated from the shoe in order to better describe its structure and components.

[0038] The semi-rigid belt 13 can be made of any suitable material, flexible but semi-rigid, joined by means of a so-called regulator plate 14, which firmly joins the two opposite ends of the semi-rigid belt 13, as clearly shown in Fig. 4. The semi-rigid belt 13 bears rectangular slits 15, or in general slits 15 with shape identical to that of the slits 12 of the above-described border 10, belonging to the body 2 of the sole. In addition, the inter-spaces between the slits 15 exactly correspond to those of the slits 12 of the vertical wall of the border 10. The semi-rigid nature of the belt 13 is necessary in order to not create "hardenings" at the outer perimeter of the body 2 of the sole, which could be felt, even slightly, by the sole of the foot.

[0039] In the inner/outer part (i.e. right/left) of the sole, in any position, at the same level of the regulator belt 13, or air flow regulation device, there is a centrally open

plate 16, having a plurality of locking teeth on its inner edge (see in particular Fig. 7). The centrally open plate 16 is a particular non-binding embodiment of a possible means for temporarily locking the belt 13 in position, so as to prevent accidental longitudinal movements of the belt 13 in the slot 11 during shoe use.

[0040] In detail, the centrally open plate 16 is fixed in the border 10 (for example during the molding process, in the upper and lower sole, respectively) while the semi-rigid belt 13 can slide below the plate 16. In addition, the plate 14 of the semi-rigid belt 13 has a small lever or projection 18 which crosses through the central opening of plate 16 and is adapted to be engaged in different positions with the teeth 17 of the plate 16 itself (see Fig. 7). By laterally moving, with the simple action of a finger, the lever 18 which is integral with the plate 14 and thus also with the belt 13, there will be (due to the sliding of the semi-rigid belt 13 within the groove 11) a gradual opening or closing of the slits 12 of the body 2 of the sole, by virtue of the superimposition between the slits 12 and 15. In such a manner, one is able to quantify a desired air flow rate towards the shoe interior.

[0041] The reference number 19 shows the upper tip of the lever 18, which is engaged with a respective tooth 17 of the centrally open plate 16.

[0042] In summary, the air flow regulation device (or regulator) comprises the components 13, 14, 15, 16, 17, 18, 19, and in particular the locking means (or positioning lock) of the regulator, which prevents accidental movements thereof, comprises the components 16, 17, 18, 19.

[0043] Of course, a man skilled in the art could make other types of regulators and positioning locks, which allow the zero-partial-total superimposition between the lateral openings, selected by the user, in which the lateral openings associated with the regulator are "movable" and those associated with the aeration and suspension system are "immobile".

[0044] A breathable band 20 (which always remains immobile on the shoe unlike the semi-rigid belt 13), having an access slot 21 for the lever 18 of the regulator, has the object of protecting from dirt and water - see Fig. 8 - and therefore externally covers, along the entire perimeter, both the slot 11 and the semi-rigid belt 13 contained therein. Figure 2 shows the breathable band 20 in its position, assembled on the shoe. In order to not overly complicate Figures 2 and 3, these figures do not show the illustrative details which are instead shown in Figures 5, 6, 7 (even if, of course, all of these details could be found on the side not in view for the observer of Fig. 2, as already said above). Finally, the slightly hump-like form 22 of the lower sole 5 allows the outward downflow of possible water formations by means of the opposite holes 23, i.e. situated with one on the right and one on the left in the lower sole 5, in suitable position. Said holes 23 communicate with the inside of the shoe, or with the hollow space that acts as a trap of condensate between the two soles 3 and 5, being extended in an oblique and upward direction. Of course, such holes 23 are only optional.

[0045] The regulator could be of various type, also not directly operable by the finger but with a special tool or simple screwdriver.

Claims

1. A shoe comprising the following characteristics:

- a lower sole (5) and an upper sole (3) joined together along their perimeter by a border (10) bearing fixed slits (12) that are preferably equidistant and distributed all around said border (10); said lower sole (5), said border (10) and said upper sole (3) forming an inner chamber or hollow space for the circulation of atmospheric air that has entered from the fixed slits (12);
- the lower sole (5) lacking holes or micro-holes, while the upper sole (3) has holes or micro-holes (4) adapted to allow the air coming from said hollow space to pass through;
- an air flow regulator (13, 14, 15, 16, 17, 18, 19), manually or directly operable by the user's finger or with a special tool, and comprising a movable part (13) bearing a plurality of movable slits (15) superimposable over all or part of said fixed slits (12) so as to ensure an adjustable flow rate of the atmospheric air towards said hollow space;
- a plurality of elements (7), arranged in said hollow space between the lower surface of the upper sole (3) and the upper surface of the lower sole (5), said elements (7) being made of a material provided with a certain degree of elasticity, so as to ensure a suspension and a "pump effect" for the natural cyclic suction and expulsion of the atmospheric air during walking;
- the air freely circulating in the hollow space, between and/or through said elements (7), since said elements (7) have interstices which separate them, or openings made thereon, **characterized in that** the air flow regulator (13, 14, 15, 16, 17, 18, 19) comprises a flexible, closed semi-rigid belt (13) constituting said movable part (13), which laterally extends around the entire shoe and is slidable within a perimeter groove (11) of said border (10), and has said movable slits (15).

2. A shoe according to claim 1, wherein said movable slits (15) are geometrically matching with the fixed slits (12).

3. A shoe according to any one of the preceding claims, wherein said air flow regulator (13, 14, 15, 16, 17, 18, 19) comprises a locking means (16, 17, 18, 19) which prevents accidental movements thereof.

4. A shoe according to claim 1, wherein said upper sole (3), said lower sole (5) and said border (10), form a single piece, for example made by means of a single molding process.

5. A shoe according to claim 4, wherein said upper sole (3), said lower sole (5), said border (10), and said elements (7) arranged in the hollow space form a single piece, for example made by means of a single molding process.

6. A shoe according to claim 1, wherein said elements (7) are fixed between the upper sole (3) and the lower sole (5) and possibly form a single molded block.

7. A shoe according to claim 1, wherein said elements (7) form separate elements or continuous vertical walls that are however perforated in order to ensure the air passage, having for example triangular, hexagonal, square or other structure.

8. A shoe according to any one of the preceding claims, wherein a shaped breathable material layer (6), called shoe liner and preferably of removable type, is provided for, situated atop the upper sole (3).

9. A shoe according to any one of the preceding claims, wherein holes (23) are provided for on the lower sole, communicating with the aforesaid hollow space or with the shoe interior, and which extend through the border in an oblique and upward direction.

Patentansprüche

1. Schuh, die folgenden Merkmale aufweisend:

   - eine untere Sohle (5) und eine obere Sohle (3), die an ihrem Umfangsrand mit einem Rahmen (10) aneinander angefügt sind, welcher nicht verschiebbare Schlitze (12) aufweist, die vorzugsweise gleiche Abstände zueinander aufweisen und rings um den Rahmen (10) verteilt sind; wobei die obere Sohle (5), der Rahmen (10) und die untere Sohle (3) eine Innenkammer oder einen Hohlraum bilden, in der oder in dem von außen kommende Luft, die an den nicht verschiebbaren Schlitzen hinein gelangt ist, zirkulieren kann;
   - wobei die untere Sohle (5) keine Löcher oder Mikrolöcher aufweist, während die obere Sohle (3) Löcher oder Mikrolöcher (4) aufweist, die dafür ausgelegt sind, Luft, die aus dem Hohlraum kommt, hindurchzulassen;
   - einen Luftmengenregler (13, 14, 15, 16, 17, 18, 19), der von einem Anwender manuell oder direkt mit einem Finger oder mit einem speziellen Werkzeug betätigt werden kann und der einen verschiebbaren Teil (13) aufweist, der eine Mehrzahl verschiebbarer Schlitze (15) aufweist, die über allen oder über einem Teil von den nicht verschiebbaren Schlitzen (12) angeordnet werden können, um die Menge der von außen kommenden, zum Hohlraum strömenden Luft regulieren zu können;
   - eine Mehrzahl von Elementen (7), die in dem Hohlraum zwischen der unteren Oberfläche der oberen Sohle (3) und der oberen Oberfläche der unteren Sohle (5) angeordnet sind, wobei die Elemente (7) aus einem Material bestehen, das mit einem bestimmten Grad an Elastizität versehen ist, um eine Federung und eine "Pumpwirkung" für die natürliche zyklische Ansaugung und Verdrängung der von außen kommenden Luft während des Laufens zu gewährleisten;
   - wobei die Luft im Hohlraum zwischen den Elementen und/oder durch die Elemente (7) hindurch frei zirkuliert, da die Elemente (7) Zwischenräume aufweisen, die sie voneinander trennen, oder mit Öffnungen versehen sind, **dadurch gekennzeichnet, dass** der Luftmengenregler (13, 14, 15, 16, 17, 18, 19) einen flexiblen, geschlossenen, halbsteifen Riemen (13) umfasst, der den verschiebbaren Teil (13) darstellt und der lateral um den gesamten Schuh herum verläuft und in einer Umfangsrandkerbe (11) des Rahmens (10) gleiten kann, und der die verschiebbaren Schlitze (15) aufweist.

2. Schuh nach Anspruch 1, wobei die verschiebbaren Schlitze (15) geometrisch mit den nicht verschiebbaren Schlitzen (12) übereinstimmen.

3. Schuh nach einem der vorangehenden Ansprüche, wobei der Luftmengenregler (13, 14, 15, 16, 17, 18, 19) eine Verrastungseinrichtung (16, 17, 18, 19) aufweist, die verhindert, dass er sich unbeabsichtigt verschiebt.

4. Schuh nach Anspruch 1, wobei die obere Sohle (3), die untere Sohle (5) und der Rahmen (10) einstückig ausgebildet sind, beispielsweise anhand ein und desselben Formverfahrens.

5. Schuh nach Anspruch 4, wobei die obere Sohle (3), die untere Sohle (5), der Rahmen (10) und die Elemente (7), die im Hohlraum angeordnet sind, einstückig ausgebildet sind, beispielsweise anhand ein und desselben Formverfahrens.

6. Schuh nach Anspruch 1, wobei die Elemente (7) zwischen der oberen Sohle (3) und der unteren Sohle (5) fixiert sind und einen einstückig geformten Block bilden können.

7. Schuh nach Anspruch 1, wobei die Elemente (7) se-

parate Elemente oder kontinuierliche vertikale Wände bilden, die jedoch perforiert sind, um zu gewährleisten, dass Luft hindurchtreten kann, und beispielsweise eine dreieckige, sechseckige, quadratische oder andere Struktur aufweisen.

8. Schuh nach einem der vorangehenden Ansprüche, bei dem eine oberhalb der Obersohle (3) angeordnete, geformte Lage aus einem atmungsaktiven Material (6), eine sogenannte Schuheinlage, die vorzugsweise herausgenommen werden kann, vorhanden ist.

9. Schuh nach einem der vorangehenden Ansprüche, wobei die untere Sohle mit Löchern (23) versehen ist, die mit dem genannten Hohlraum oder dem Schuhinneren in Verbindung stehen und die durch den Rahmen hindurch schräg und aufwärts verlaufen.

Revendications

1. Chaussure présentant les caractéristiques suivantes :

- une semelle inférieure (5) et une semelle supérieure (3) qui sont reliées le long de leur périmètre par une bordure (10) portant des fentes fixes (12) qui sont de préférence équidistantes et réparties tout autour de ladite bordure (10) ; la semelle inférieure (5), la bordure (10) et la semelle supérieure (3) formant une chambre intérieure ou un espace creux pour la circulation de l'air atmosphérique qui est entré par les fentes fixes (12) ;
- la semelle inférieure (5) ne présentant pas de trous ou de microtrous, tandis que la semelle supérieure (3) présente des trous ou des microtrous (4) aptes à permettre le passage de l'air qui arrive de l'espace creux ;
- un régulateur de flux d'air (13, 14, 15, 16, 17, 18, 19) qui est apte à être actionné manuellement ou directement par le doigt de l'utilisateur ou à l'aide d'un outil spécial, et qui comprend une pièce mobile (13) qui porte plusieurs fentes mobiles (15) aptes à couvrir tout ou partie des fentes fixes (12) de manière à assurer un débit réglable de l'air atmosphérique vers l'espace creux ;
- plusieurs éléments (7) qui sont disposés dans l'espace creux entre la surface inférieure de la semelle supérieure (3) et la surface supérieure de la semelle inférieure (5), ces éléments (7) se composant d'un matériau pourvu d'un certain degré d'élasticité, de manière à assurer une suspension et un "effet de pompe" pour l'aspiration et l'expulsion cycliques naturelles de l'air atmosphérique pendant la marche ;
- l'air circulant librement dans l'espace creux, entre et/ou à travers les éléments (7), étant donné que les éléments (7) ont des interstices qui les séparent, ou des ouvertures réalisées sur eux, **caractérisée en ce que** le régulateur de flux d'air (13, 14, 15, 16, 17, 18, 19) comprend une bande (13) flexible fermée semi-rigide qui constitue ladite pièce mobile (13), qui s'étend latéralement sur tout le tour de la chaussure et qui est apte à coulisser à l'intérieur d'une rainure périphérique (11) de la bordure (10), et présente les fentes mobiles (15).

2. Chaussure selon la revendication 1, étant précisé que les fentes mobiles (15) correspondent géométriquement aux fentes fixes (12).

3. Chaussure selon l'une quelconque des revendications précédentes, étant précisé que le régulateur de flux d'air (13, 14, 15, 16, 17, 18, 19) comprend des moyens de verrouillage (16, 17, 18, 19) qui les empêchent de se déplacer accidentellement.

4. Chaussure selon la revendication 1, étant précisé que la semelle supérieure (3), la semelle inférieure (5) et la bordure (10) forment une seule pièce, réalisée par exemple à l'aide d'une seule opération de moulage.

5. Chaussure selon la revendication 4, étant précisé que la semelle supérieure (3), la semelle inférieure (5), la bordure (10) et les éléments (7) disposés dans l'espace creux forment une seule pièce, réalisée par exemple à l'aide d'une seule opération de moulage.

6. Chaussure selon la revendication 1, étant précisé que les éléments (7) sont fixés entre la semelle supérieure (3) et la semelle inférieure (5) et forment éventuellement un seul bloc moulé.

7. Chaussure selon la revendication 1, étant précisé que les éléments (7) forment des éléments séparés ou des parois verticales continues qui sont toutefois perforées afin d'assurer le passage de l'air, avec une structure par exemple triangulaire, hexagonale, carrée ou autre.

8. Chaussure selon l'une quelconque des revendications précédentes, étant précisé qu'une couche profilée de matériau respirant (6), appelée garniture de chaussure et de préférence de type amovible, est prévue, de préférence sur la semelle supérieure (3).

9. Chaussure selon l'une quelconque des revendications précédentes, étant précisé que des trous (23) sont prévus sur la semelle inférieure, qui communiquent avec l'espace creux mentionné précédem-

ment ou avec l'intérieur de la chaussure, et qui traversent la bordure dans une direction oblique et vers le haut.

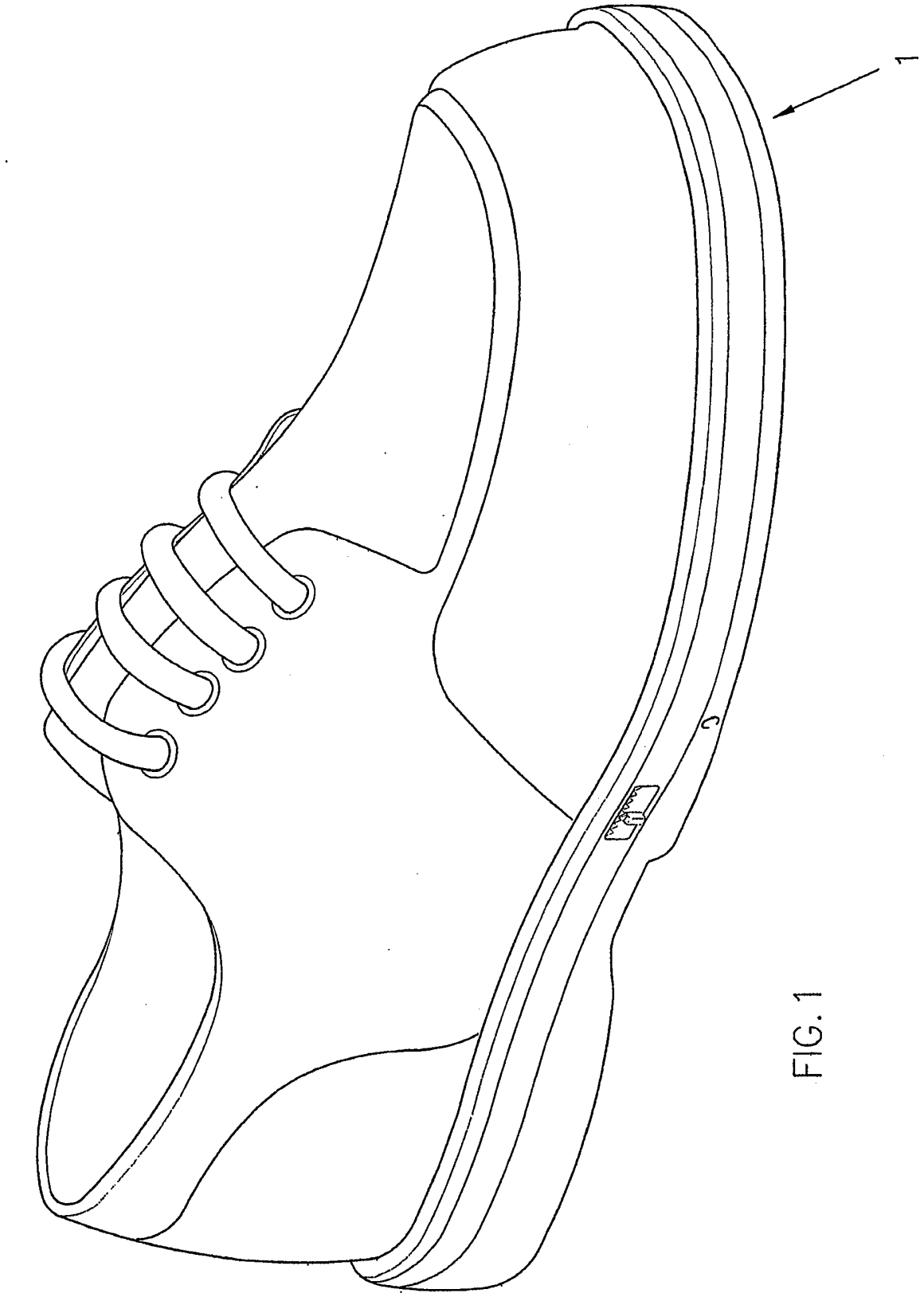


FIG. 1

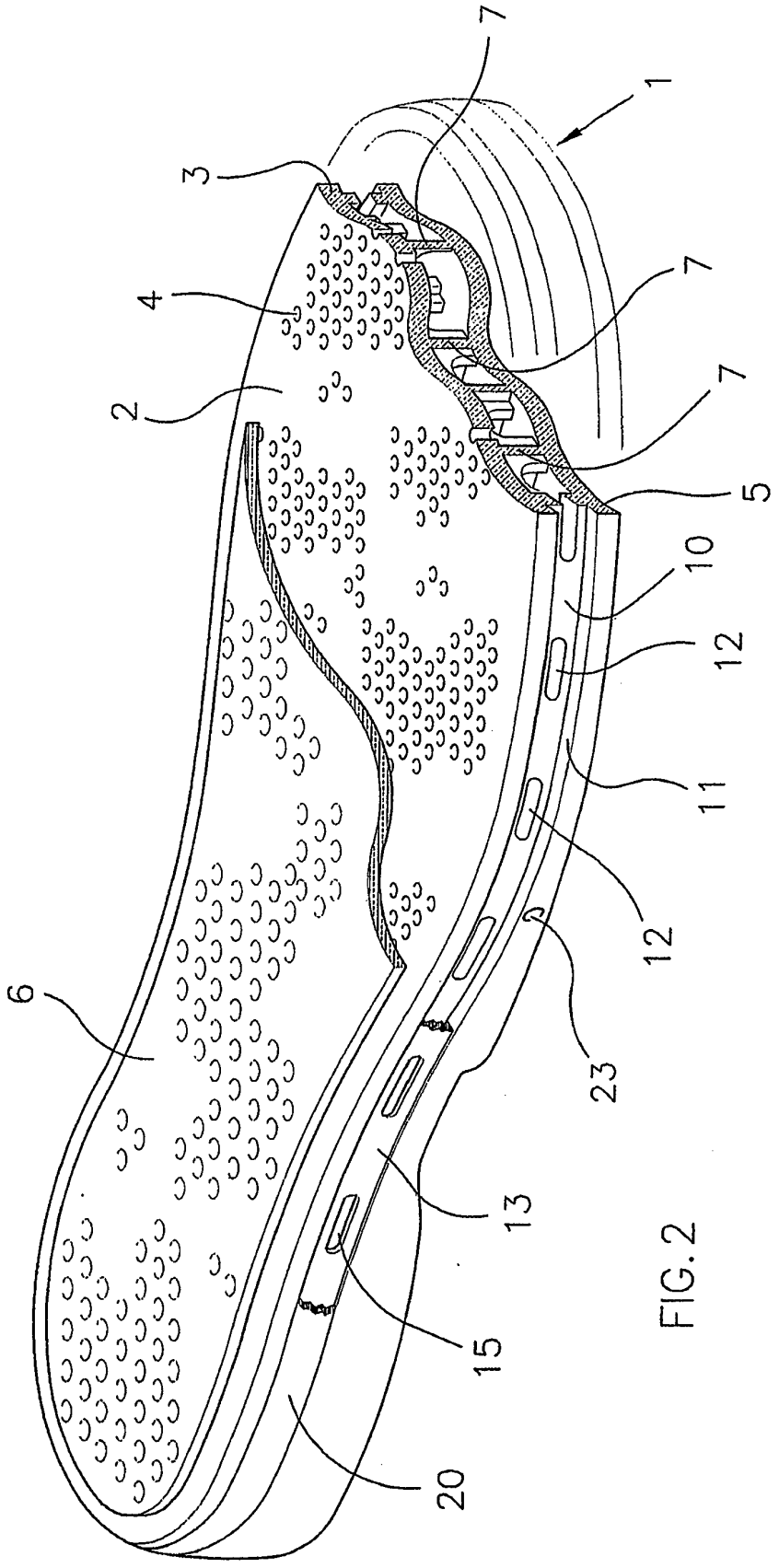


FIG. 2

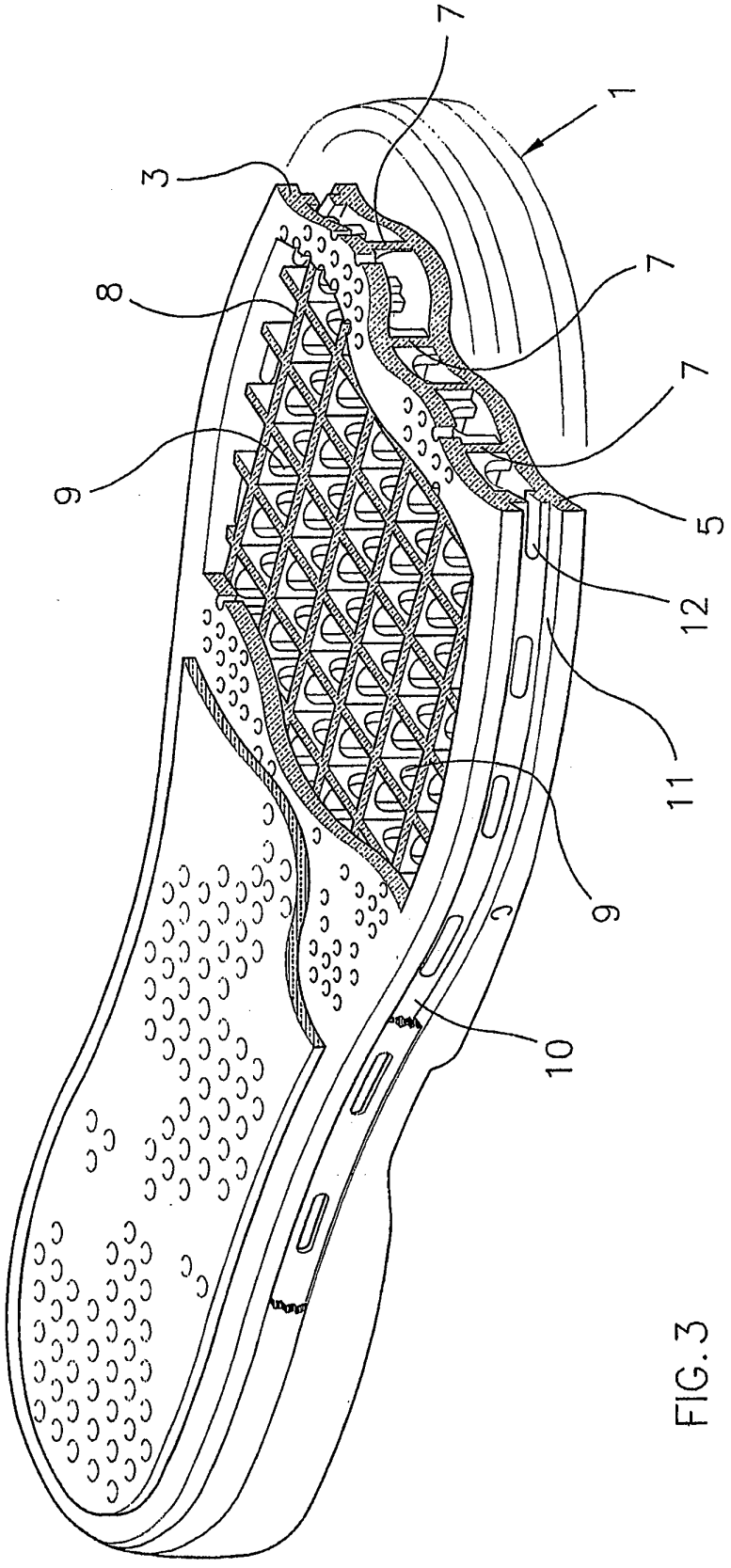


FIG. 3

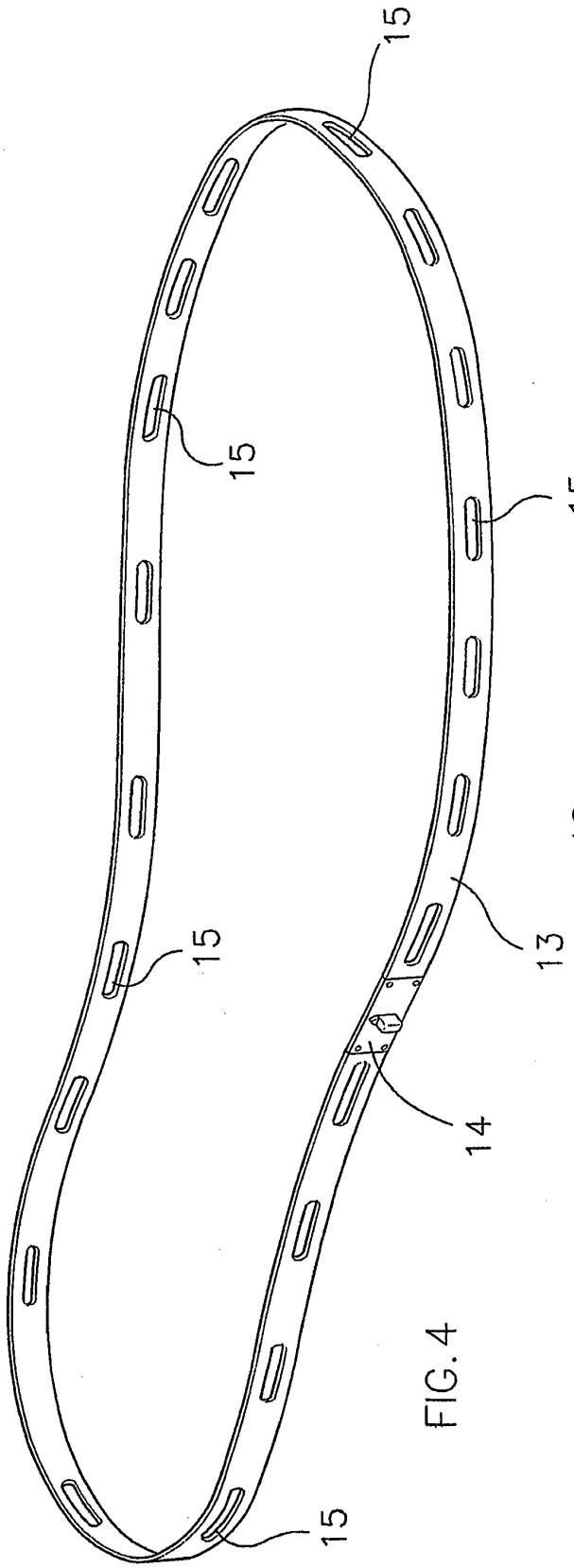


FIG. 4

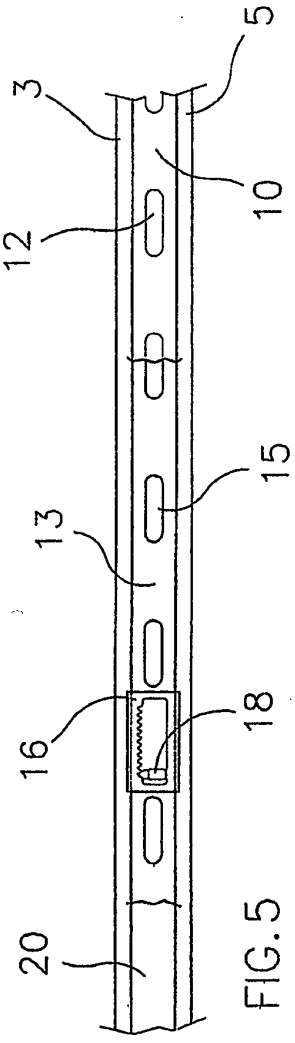


FIG. 5

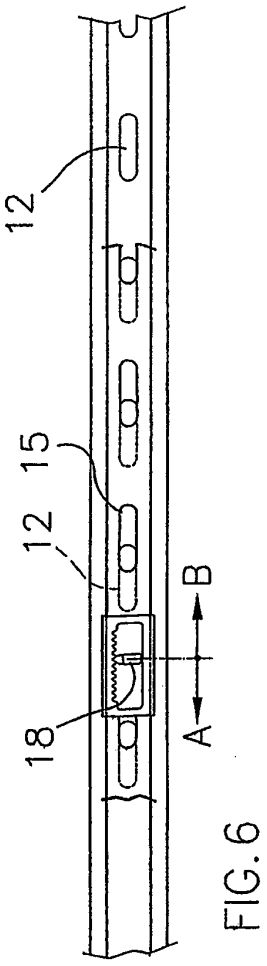


FIG. 6

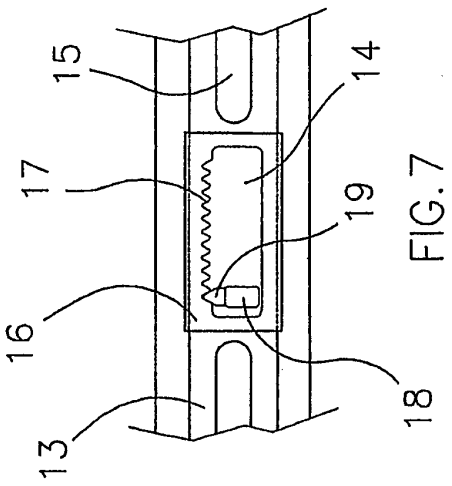


FIG. 7

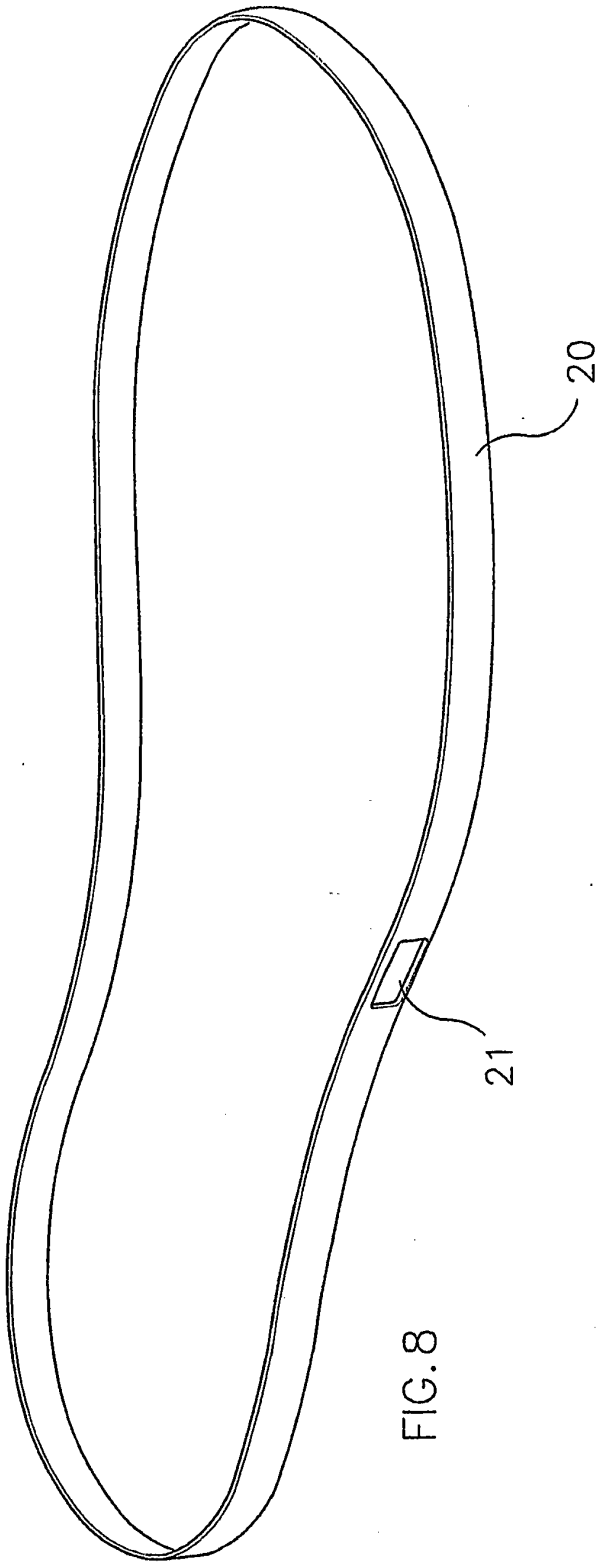


FIG. 8

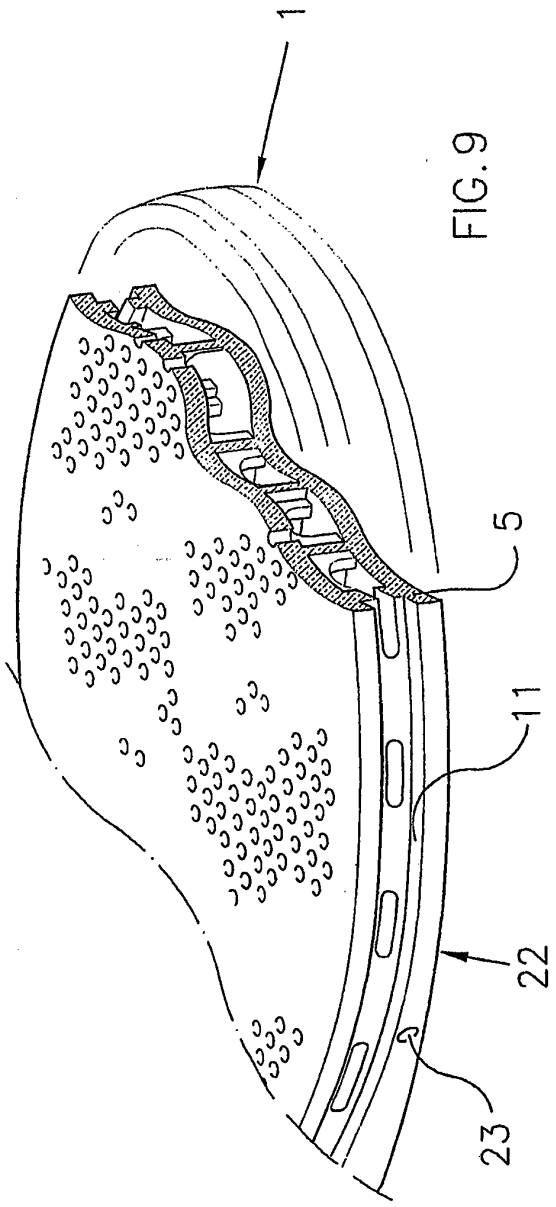


FIG. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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