



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.08.2011 Bulletin 2011/32

(51) Int Cl.:
A43B 13/14 (2006.01) A43B 13/20 (2006.01)

(21) Application number: **10003354.7**

(22) Date of filing: **29.03.2010**

(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
Designated Extension States:
AL BA ME RS

(71) Applicant: **Pikolino's Intercontinental, S.A.**
03203 Elche Alicante (ES)

(72) Inventor: **Peran Ramos, Juan**
03205 Elche Alicante (ES)

(30) Priority: **04.02.2010 ES 201000104 U**

(74) Representative: **Fernandez Lerroux, Aurelio**
Nunez de Balboa, 54, 3rd Floor
28001 Madrid (ES)

(54) **Improved sole for footwear**

(57) The invention relates to an improved sole for footwear with a convex or rounded shape, provided with a stabilizer, with a damping system and with an internal system for the rotation of air, which modifies the phase of contact of the foot with the ground in a roller, such that it transforms the process of reception of the ground (with the heel of the foot) and forward translation of the pro-

PELLING forces (by means of the area of the metatarsus and toes) in a roller effect, obtaining the damping/stability/impulse effects, and the actuation of the airing system by means of a pad/wedge, the outsole thus configured allowing a rotation on the ground such that the inertia of the body and the vertical forces applied from the heel of the foot are more easily converted into horizontal propelling forces.

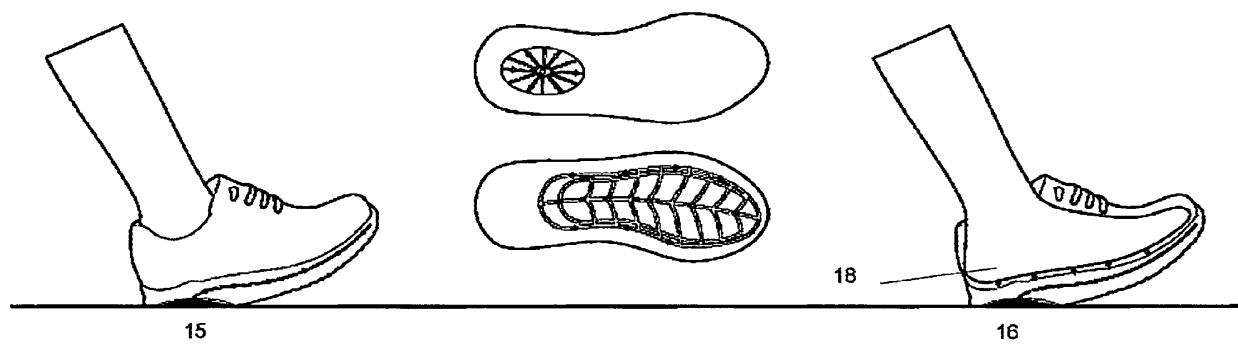


FIG. 9

Description

Object of the Invention

[0001] The present invention relates to an improved sole for footwear which modifies the phase of contact of the foot with the ground in a roller, such that it transforms the process of reception of the ground (with the heel of the foot) and forward translation of the propelling forces (by means of the area of the metatarsus and toes) in a roller effect.

[0002] The object of the invention is a sole with a curved shape, provided with a wedge which causes the damping/stability/impulse effects and which in turn actuates an airing system, the outsole thus configured allowing a rotation on the ground such that the inertia of the body and the vertical forces applied from the heel of the foot are more easily converted into horizontal propelling forces.

Field of the Invention

[0003] This invention is applicable within the sector of the footwear industry.

Background of the Invention

[0004] As is known, in most of the footwear which is marketed, the outsole is formed by a heel at the height of the heel of the foot and a hard surface encompassing the entire sole of the foot. This type of footwear causes a certain gait, through which some parts of the locomotor system are no longer used, which can generate back, joint, vein, pain or deviation problems.

[0005] The design of the aforementioned traditional footwear, however, includes in many of the cases a convex outsole, either rounded or not, the point of inflection being located where the new plane starts at approximately the height of the metatarsus, an angle of variable degrees being defined in each case. There are infinite shoes on the market having this feature, which is reflected, for example, in the drawings of patent AU613915 (Cohen).

[0006] In addition, there is a series of shoes with an outsole of considerable volumes, in which the convexity of the aforementioned outsole is obtained by means of a curved design thereof, the use of which entails a change in the gait, mainly providing two health benefits in comparison with common footwear: reduction of the load on the joints and increase of the muscular action (to maintain balance). This footwear is based on its instability, such that the body, due to its tendency to seek balance, performs small muscular works intended for the conservation of said balance, which translates into an almost imperceptible physical and toning activity.

[0007] There are a number of patents describing a convex outsole for obtaining the aforementioned effect.

[0008] Patents WO99/03368 (Muller) and WO2009/061103 (Kim) can be mentioned among such

patents since, either in their descriptions or in their marketing, they compare the effect caused by the rounded convex outsole with the gait of a "Masai" due to the peculiar way of walking of the members of said African tribe.

[0009] These patents described an angle which in the first of them ranges between 8 and 20 degrees, and in the second of them between 10 and 60 degrees.

[0010] However, regardless of other features which they may introduce, convex outsoles for the purpose of facilitating the mentioned gait have been previously described, for example in patent US3835556 (Panaretos), the object of which consists of providing a shoe which reduces the time and energy required for walking and which results in a movement which is quicker, more comfortable and graceful and which is characterized by its convex outsole causing the described gait.

[0011] In addition, aforementioned patents WO99/03368 (Muller) and W02009/061103 (Kim) configure the characteristic gait both by means of the convex outsole and by the existence in the heel of the foot of a material with a different density with respect to the rest of the outsole, accentuating the damping effect in the support phase. The use of materials with a different density for said purpose is also known and previously described in patents such as US4372059 (Ambrose) and JP6284903.

[0012] Finally, a number of patent background documents are known which incorporate an airing or ventilation system with a different configuration, some of them being based on a spring, such as the one described in patent CN2123899.

[0013] However, no footwear for frequent daily use which is capable of offering all the aforementioned features is known.

[0014] The improved sole for footwear proposed by the invention consists of a sole with a convex curved shape, provided with a wedge which causes the damping/stability/impulse effects and which in turn actuates an airing system, the outsole thus configured allowing a rotation on the ground such that the inertia of the body and the vertical forces applied from the heel of the foot are more easily converted into horizontal propelling forces.

[0015] The technical solution provided represents a novelty compared to the footwear known up until now due to the fact that even though it is based on a rounded convex outsole, the gait and the damping/stability/impulse effect is obtained through a wedge, or pad, consisting of a part with an ellipsoidal plan which is integrated in the outsole at the height of the heel of the foot, in the central area thereof, which part in turn forms part of the airing system, specifically it is the air inlet part, using the walking action itself.

[0016] Likewise, the improved sole for footwear incorporates a central stabilizer providing stability at the time of the step, and fixes the position of the foot to prevent twists and sprains, which can be more usual as a consequence of the instability characterizing the known foot-

wear with a convex outsole.

Description of the Invention

[0017] The improved sole for footwear proposed by the invention has all the aforementioned features: convex or rounded shape, provided with a stabilizer, with a damping system and with an internal system for the rotation of air.

[0018] To that end, and more specifically, the improved sole for footwear proposed by the invention is configured from a sole (1) with a curved or rounded convex shape, formed by four main parts, which are structured as follows, from top to bottom:

- A stabilizer (2), with the curve of the last, consisting of a rigid sheet of a thermoplastic material or the like which encompasses the entire sole of the foot, providing stability and rigidity to the footwear at the time of the step, fixes the position of the foot to prevent twists and sprains, and distributes the pressures along the sole. Furthermore, this part fulfills the function of securing the shoe for the purpose of favoring the walking with a rocking effect and securing the foot, so that it does not twist towards the sides, upon giving way due to the weight of the body, since the wedge (4) is soft. This stabilizer (2) has a series of holes (17) allowing the passage of air towards the insole. The stabilizer (2) is adhered to the sole (3) at its upper part.
- actual sole (3), of TPU material or similar material, consisting of the sole of the footwear, and to which the stabilizer (2) and the outsole/runner (5) are adhered, and in which the pad/wedge (4) is integrated; the sole (3) has a network of channels (6) for the circulation of air and its distribution in the entire surface of the insole.
- pad/wedge (4), of PU or similar material, with a convex, slightly rounded shape (7) at its lower part to cause the damping (12) / stability (13) / impulse (14) effects, consisting of a part with a preferably ellipsoidal plan (8) in the form of a suction cup (9) in its central body, and cylindrical (10) at its upper part. The part in the form of a suction cup (9) is internally hollow and is provided with perimetric air inlet holes (11).

[0019] The pad/wedge (4) is housed at the rear part of the sole, coinciding with the part of the heel of the foot, and performs two functions:

a.- During the step, in the first contact of the heel of the foot with the ground (12), the object of the hollow cavity is to be compressed with the weight of the body and recover its initial shape when it is free of the weight of the step in the heel (13) and (14) of the foot. This modification of the state provides the footwear with the damping effect which facilitates the

"rocking walk", causing a natural movement bending similar to the sensation of walking barefoot over sand,

b.- During the step, in the stability phase (13) and impulse phase (14), the hollow cavity of the suction cup (9) recovers its initial shape, expanding and filling with air (16) which penetrates through the perimetric holes (11); the air stored in this cavity (9) has a tendency to rise, and in the damping phase (12), when the weight of the body (15) compresses the suction cup (9) it impulses the circulation of air which moves through the network of channels (6) located inside the sole (3), generating a system for the rotation of air which rises to the sole of the foot (18) through the holes (17) existing in the stabilizer (2).

- outsole/runner (5) of TPU material or similar material, with a high strength, which provides greater grip and maximum durability to the sole.

Description of the Drawings

[0020] To complement the description which is being made and for the purpose of aiding to better understand the features of the invention, a set of drawings is attached as an integral part of said description, in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows an elevational view of the complete sole with the three parts, stabilizer, sole and outsole, integrated therein.

Figure 2 shows a top plan view of the stabilizer and of the air passage holes.

Figure 3 shows an elevational view of the actual sole. Figure 4 shows a bottom plan view of the outsole/runner.

Figure 5 shows an elevational exploded view of the three elements, stabilizer, sole and outsole.

Figure 6 shows a schematic depiction of the three phases of the rocking walk (damping/stability/impulse) and the effect occurring in the convex cavity existing in the pad/wedge during the step, which is compressed due to the effect of the weight and expands after the step, recovering its convex shape.

Figure 7 shows a top plan view of the pad/wedge in which the air inlet channels are observed.

Figure 8 shows a top plan view of the sole in which the network of channels for the circulation of air.

Figure 9 shows a schematic depiction of the operation of the airing system due to the effect of the step on the pad/wedge.

Figure 10 shows a sectional exploded view of the three elements, stabilizer, sole and outsole, which allows observing the location of the pad/wedge.

Figure 11 shows a sectional view of the three elements, stabilizer, sole and outsole, integrated therein, observing the location of the pad/wedge.

Figure 12 shows a plan view of the pad/wedge.

Figure 13 shows an elevational view of the pad/wedge.

Figure 14 shows a sectional view of the pad/wedge.

Preferred Embodiment of the Invention

[0021] In view of the mentioned figures, it can be observed how the improved sole for footwear, object of this invention, configures a footwear with the sole in a convex or rounded shape, provided with a stabilizer, a damping system and an internal system for the rotation of air.

[0022] The sole (1) is configured from four main parts, the stabilizer (2), the actual sole (3), the pad/wedge (4) and the outsole/runner (5), the stabilizer (2) being adhered to the sole (3) at the upper part thereof, and the outsole (5) being adhered to the sole (3) at the lower part thereof. The pad/wedge (4) is integrated in the sole (3) and projects slightly from the outsole (5).

[0023] The stabilizer (2), with the curve of the last, formed by a rigid sheet of a thermoplastic material or the like, fixes the foot by counteracting the instability involved in the "sinking" of the area of the heel of the foot when the step starts, causing the damping. The stabilizer therefore provides stability and rigidity to the footwear at the time of the step, and fixes the position of the foot to prevent twists and sprains, and distributes the pressures along the sole.

[0024] The stabilizer (2) also forms part of the airing system as it has a series of holes (17) allowing the passage of the air towards the insole.

[0025] The actual sole (3) of TPU material or similar material, to which the stabilizer (2) and the outsole/runner (5) are adhered and in which the pad/wedge (4) is integrated, has a series of channels (6) for the circulation of air.

[0026] The pad/wedge (4), of PU or similar material, as a result of its convex, slightly rounded shape (7) at its lower part, with an ellipsoidal plan (8), causes the damping/stability/impulse effect, causing a natural movement bending similar to the sensation of walking barefoot over sand.

[0027] The outsole/runner (5) of TPU material or similar material, with a high strength, which provides greater grip and maximum durability to the sole.

[0028] With the thus configured improved sole for footwear, the dual functionality thereof, as a damping/stability/impulse system and as an airing system, is obtained.

[0029] During the step, in the first contact of the heel of the foot with the ground (12), the object of the hollow cavity is to be compressed with the weight of the body and recover its initial shape when it is free of the weight of the step in the heel (13) and (14) of the foot. This modification of the state provides the footwear with the damping effect which facilitates the "rocking walk", since in the moment in which there is no step and therefore no stress, its convex shape is maintained, whereas when the step starts, and the heel of the foot exerts a pressure in this area, the cavity is compressed and ends up dis-

appearing, being flat and thus causing a shock absorbing effect.

[0030] During the step, in the stability phase (13) and impulse phase (14), the hollow cavity of the suction cup (9) expands and recovers its initial shape and fills with air (16) which penetrates through the perimetric holes (11); the air stored in this cavity (9) has a tendency to rise, and in the damping phase (12), the weight of the body (15) acting on the suction cup (9) impulses the circulation of the air which moves through the cylindrical part (10) and reaches the network of channels (6) located inside the sole (3), generating a system for the rotation of air, which air rises to the sole of the foot (18) through the holes (17) existing in the stabilizer (2).

[0031] The damping/compression - stability/expansion - impulse/ expansion gait scheme is repeated with every step and is parallel to that of airing, compression/impulse and circulation of air - expansion/absorption of air, therefore obtaining not only the damping/stability/impulse effects, but also the actuation in turn of an airing system, the outsole thus configured allowing a rotation on the ground such that the inertia of the body and the vertical forces applied from the heel of the foot are more easily converted into horizontal propelling forces.

Claims

1. An improved sole for footwear, **characterized in that** it is provided with a stabilizer, with a damping system, with an internal system for the rotation of air, and **in that** it has a convex or rounded shape, being configured by the following elements:

- the stabilizer (2) for securing the shoe and fixing the foot has the curve of the last and consists of a rigid sheet of a thermoplastic material or the like which encompasses the entire sole of the foot, and has holes (17) allowing the passage of air towards the insole.

- the actual sole (3) of PU, thermoplastic material or the like, to which the stabilizer (2) is adhered at its upper part and the outsole/runner (5) is adhered at its lower part, and which integrates the pad/wedge (4); the sole (3) is provided with a network of channels (6) for the circulation of air.

- The pad/wedge (4) of PU or similar material, with a convex or rounded shape in its base and with a preferably ellipsoidal plan (8), located in the central area of the sole (2) in the part of the heel of the foot, with a dual function of damping and absorption and impulse of the air of the airing system, and consisting of:

- a convex cavity (9) in the form of a suction cup the elastic composition of which allows its compression or sinking (12) with the weight of the body and the expansion or re-

covery of its initial shape (13) and (14);

- air inlet holes (11);

- cylinder (10) for the rising of air;

- The outsole/runner of TPU material or similar material, with a high strength, which provides greater grip and maximum durability to the sole. 5

2. The improved sole for footwear according to claim 1, **characterized in that** the stabilizer (2) provides stability and rigidity to the footwear and at the same time distributes the pressures along the sole, favoring the walk with a rocking effect and the securing of the foot, so that it does not twist towards the sides, upon giving way due to the weight of the body, since the wedge (4) is soft. 10 15

3. The improved sole for footwear according to claim 1, **characterized in that** the pad/wedge (4) with a convex or rounded shape causes the damping/stability/impulse effects by articulating a natural movement bending similar to the sensation of walking barefoot over sand and which provides the footwear with the damping effect facilitating the "rocking walk" and, in turn, the compression thereof due to the weight of the body impulses the air through a system of channels (6) located inside the sole, generating a rotation of air which rises to the sole of the foot through holes (17) made in the stabilizer (2). 20 25 30

35

40

45

50

55

5

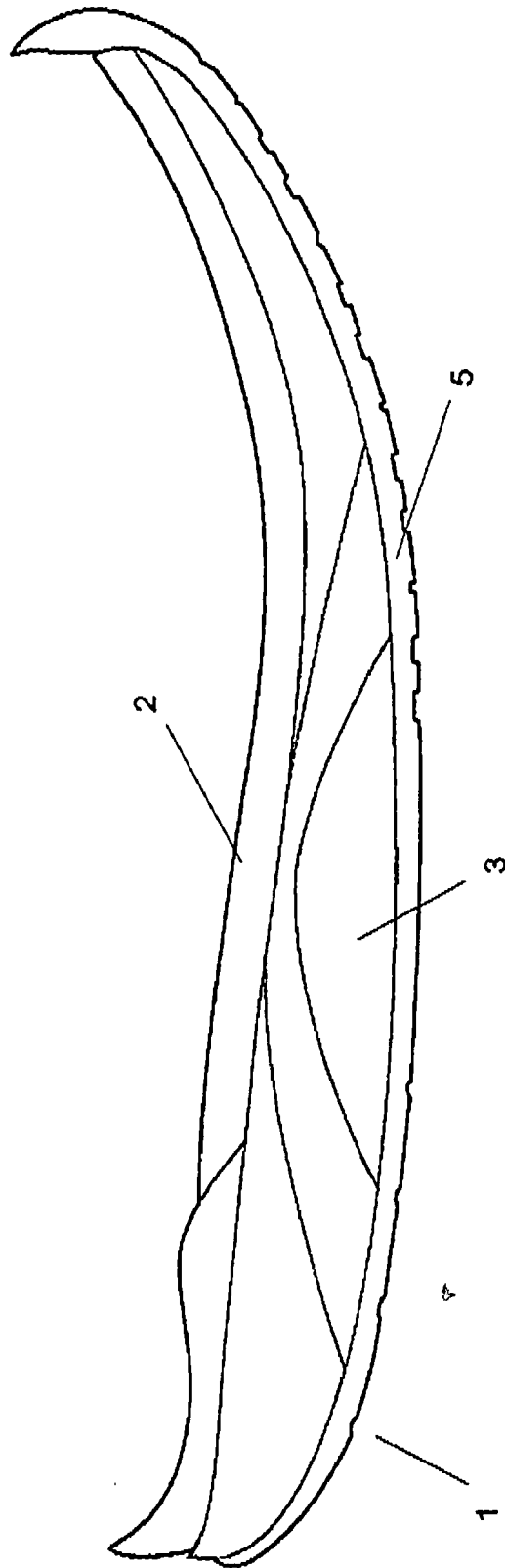


FIG. 1

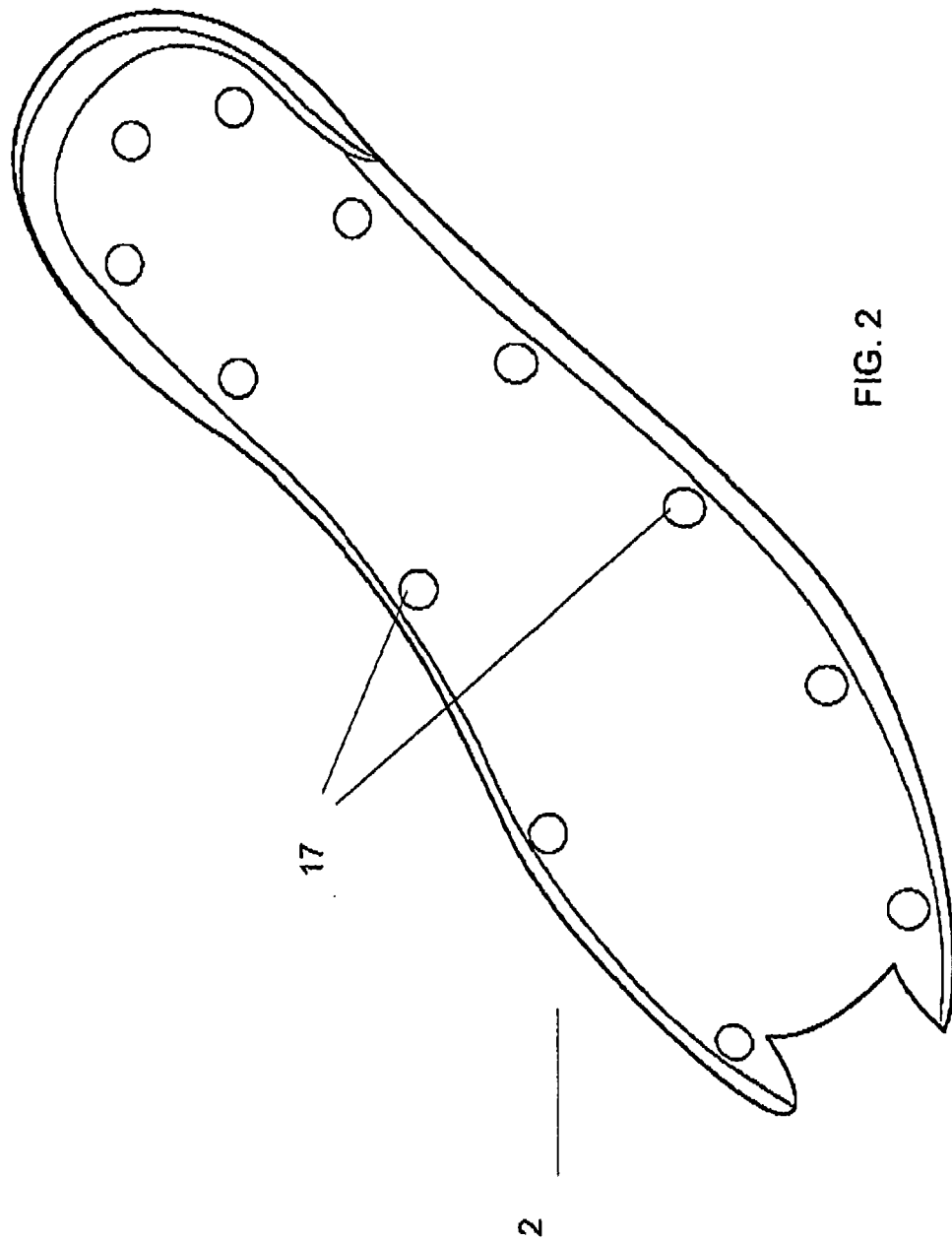




FIG. 3

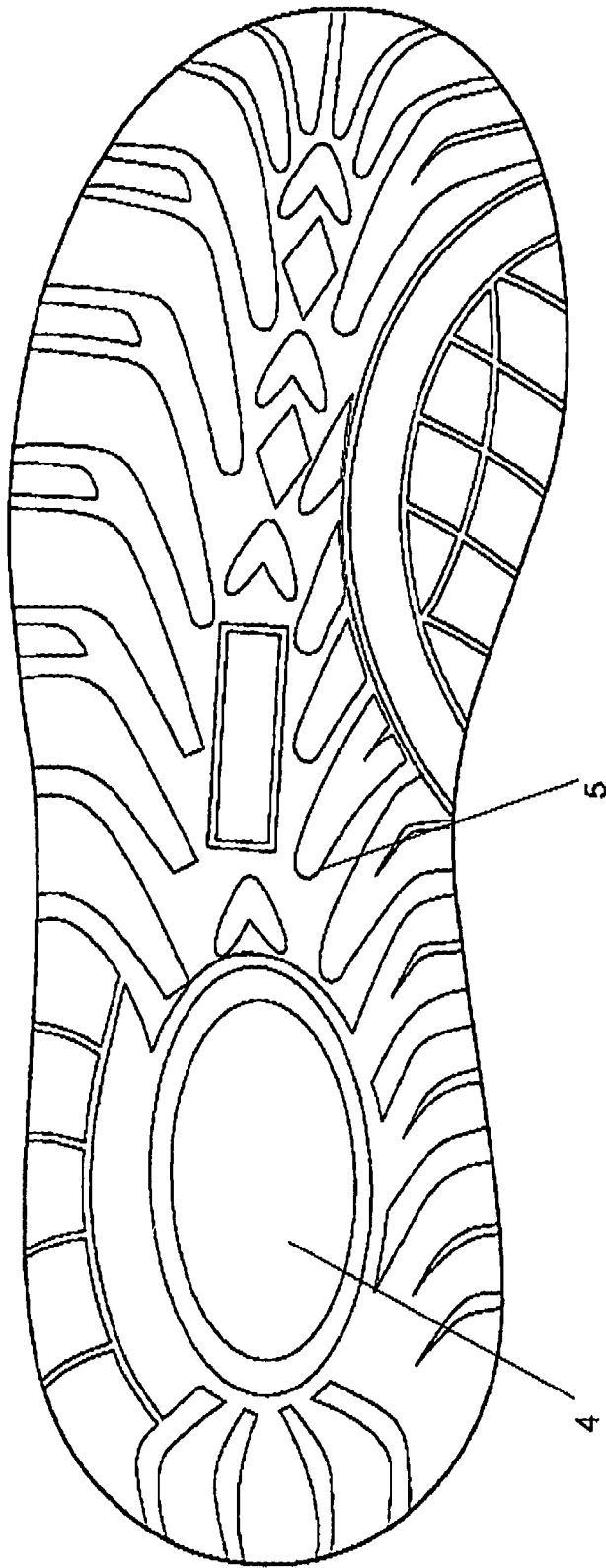


FIG. 4

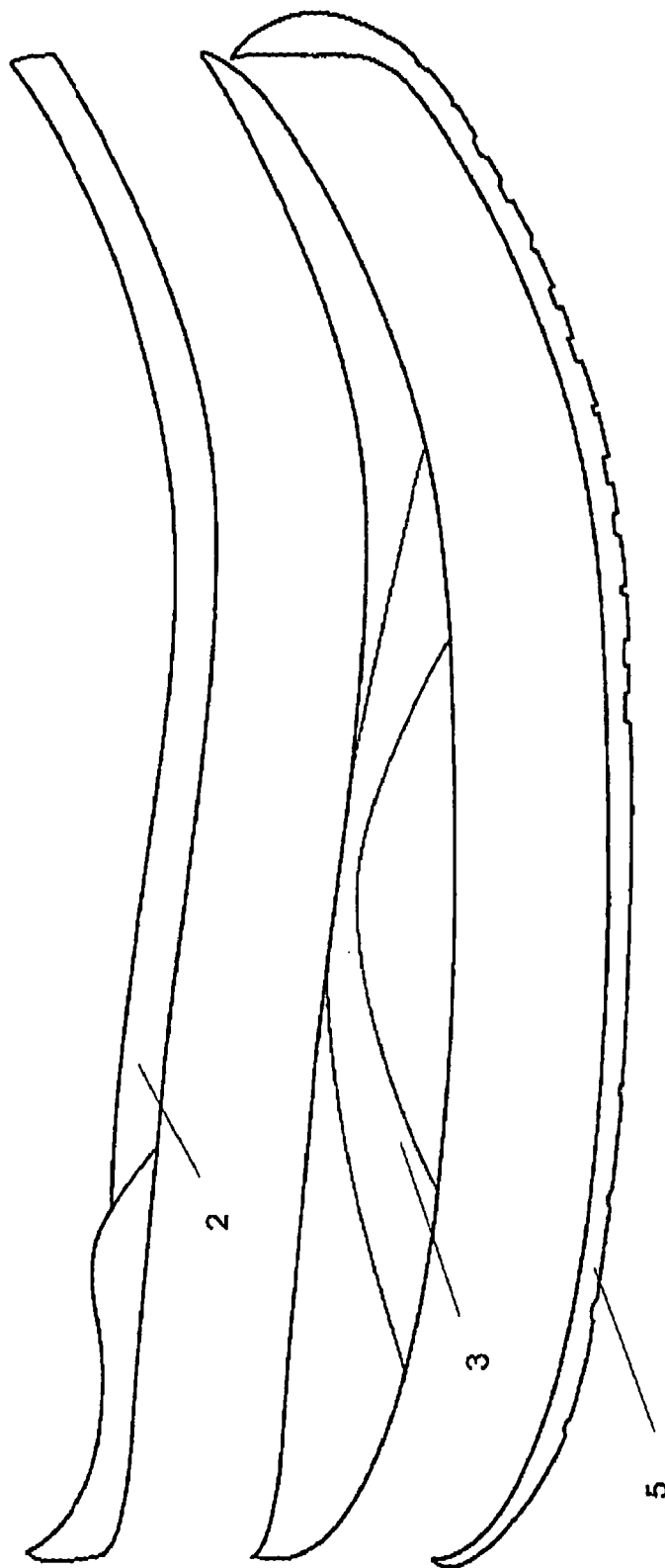


FIG. 5

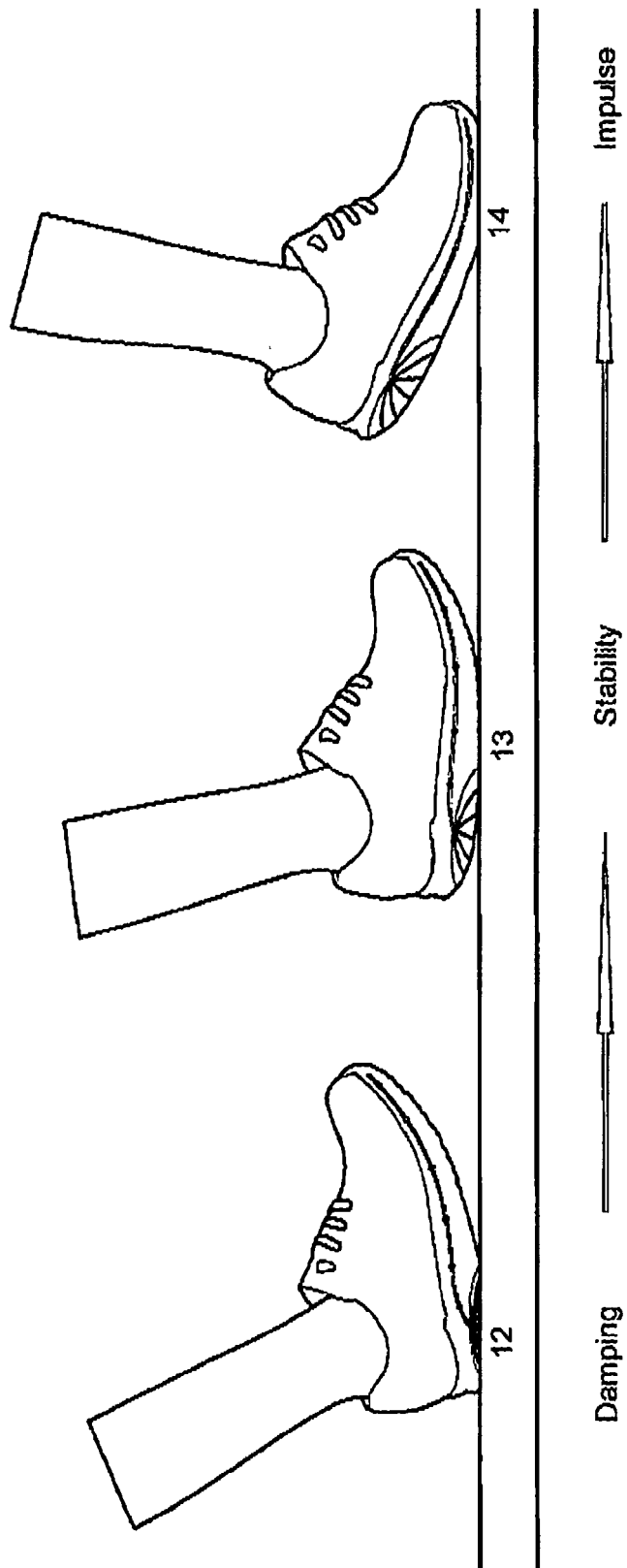


FIG. 6

FIG. 7

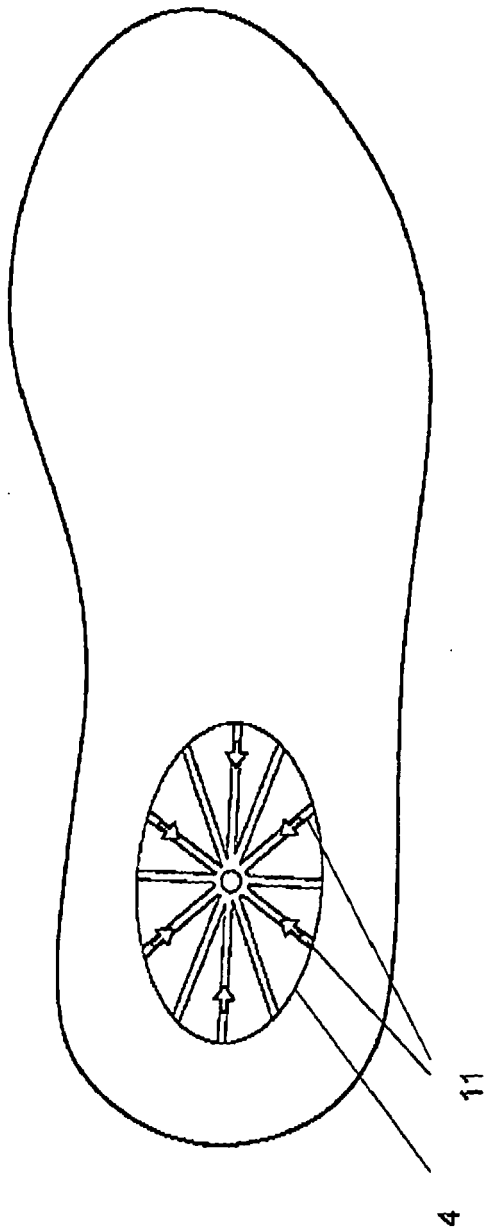
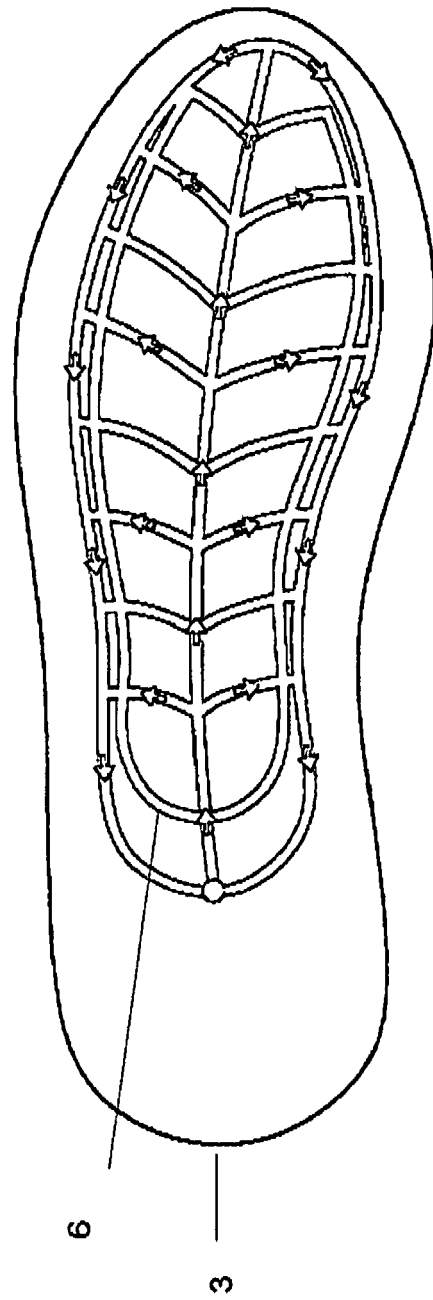


FIG. 8



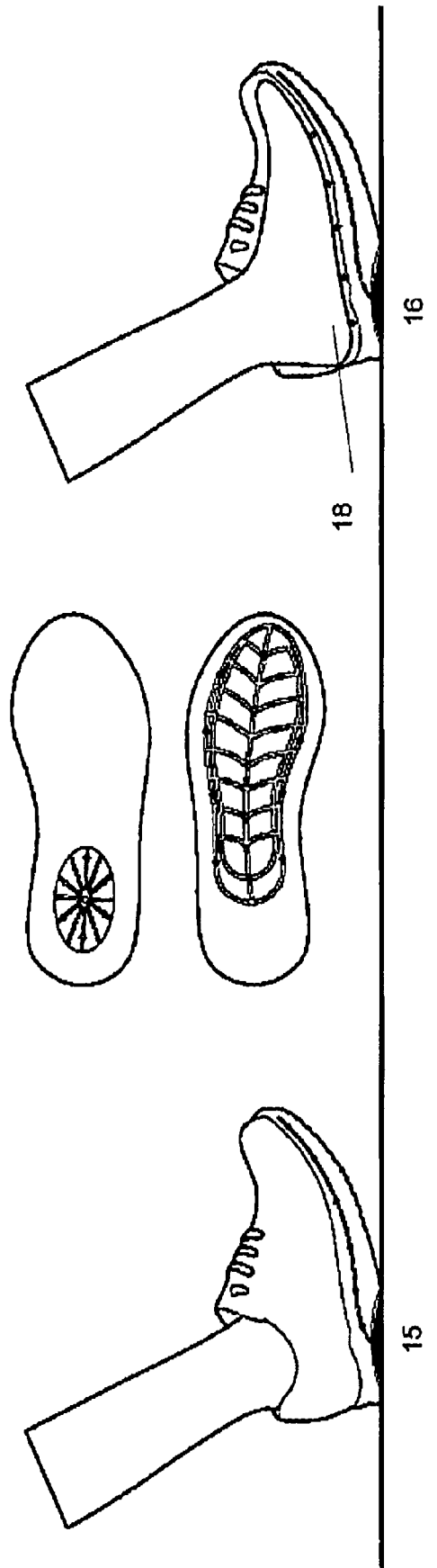


FIG. 9

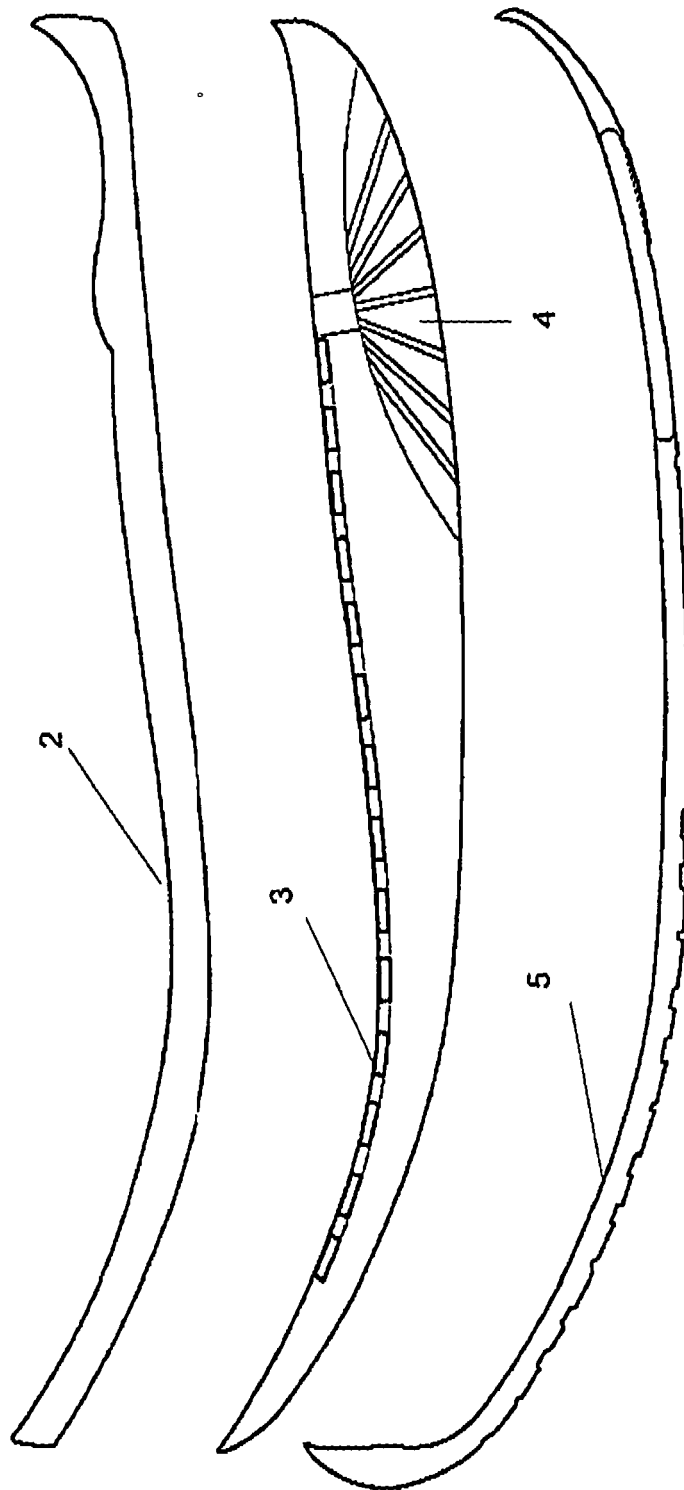


FIG. 10

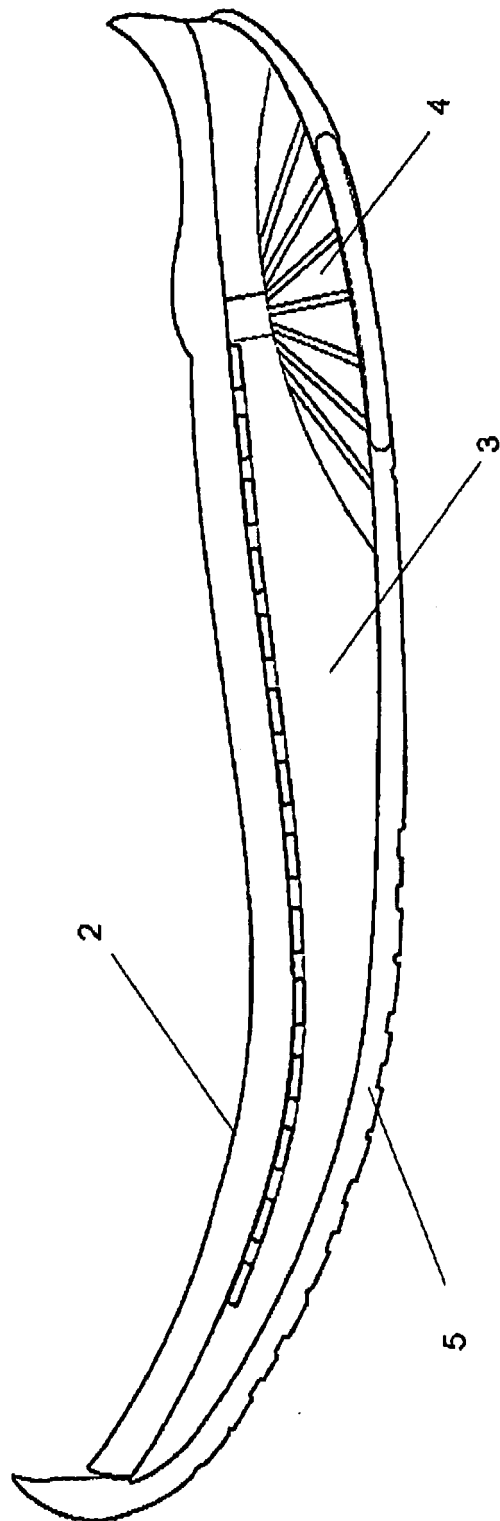
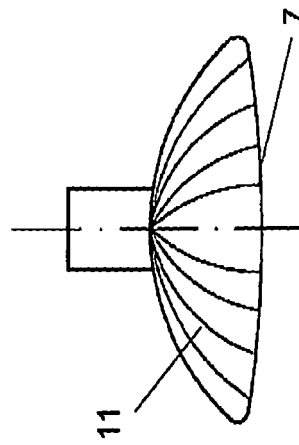
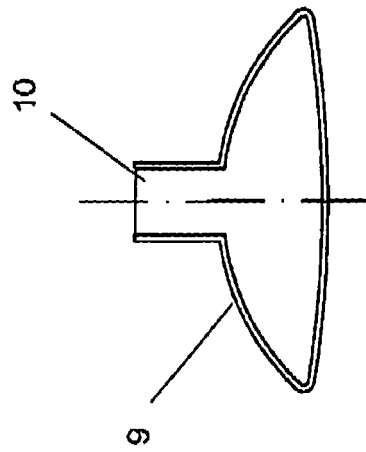
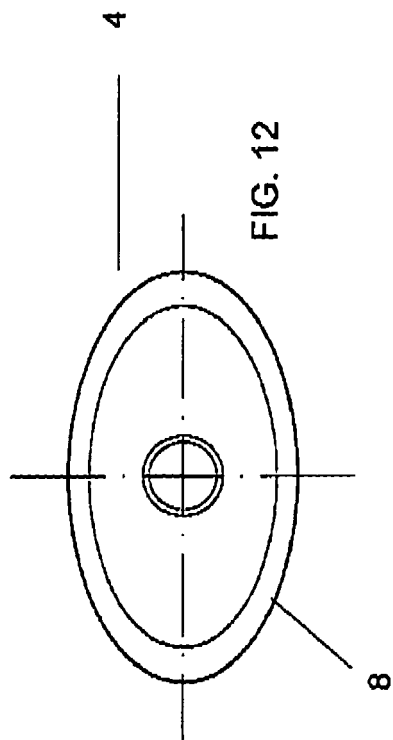


FIG. 11



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

- AU 613915, Cohen **[0005]**
- WO 9903368 A, Muller **[0008]** **[0011]**
- WO 2009061103 A, Kim **[0008]** **[0011]**
- US 3835556 A, Panaretos **[0010]**
- US 4372059 A, Ambrose **[0011]**
- JP 6284903 B **[0011]**
- CN 2123899 **[0012]**