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(54) **A device for soles of shoes suitable for increasing the elevation of the user, and shoes provided with said device**

(57) The present invention refers to a device for soles of shoes, preferably gym shoes, comprising an elastic element (9) combined with an adjustable adapter (11) suitable for increasing the elevation of the user, particularly during a sport practice, in an optimal way because easily customisable by everyone depending on one's own weight and/or on the kind of performed activity.

Moreover, the present invention refers to shoes (1), preferably gym shoes, provided with said device.

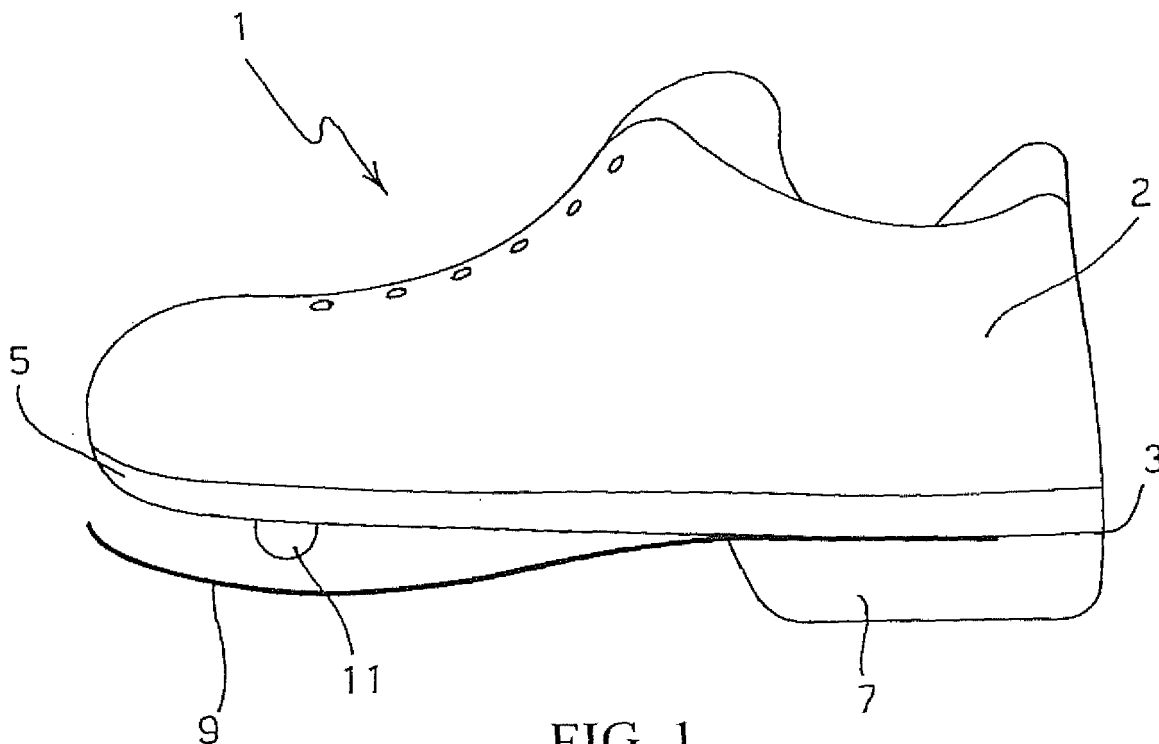


FIG. 1

Description

Technical Field

[0001] The present invention refers to a device for soles of shoes. More precisely, the present invention refers to a device for soles of shoes suitable for increasing the elevation of the user.

[0002] Preferably, but not exclusively, the present invention refers to a device for soles of gym shoes suitable for increasing the elevation of the user during a sport practice.

[0003] Moreover, the present invention refers to shoes, preferably gym shoes, provided with said device suitable for increasing the elevation of the user, particularly during a sport practice.

Known Art

[0004] A particularly important requirement, specifically for athletes, both professional and amateur, in particular in sports such as basketball, volleyball, high jump and so on, is being in a position to benefit from shoes helping to increase the elevation.

[0005] Solutions concerning devices for soles of shoes, including gym shoes, suitable for increasing the elevation of the user, particularly when performing a sport activity, have been developed in the past.

[0006] For instance, Italian Patent No. IT 1 234 072 discloses shoes equipped with an elastic element able to increase the pulse of elevation propulsion given by the athlete, more precisely by a football player, said elastic element being fastened to the sole of each shoe and longitudinally fixed thereto, at the movement portion of the foot, by means of rivets; the bending undergone by said elastic element results in that it is loaded and causes an additional pulse of propulsion oriented in the motion starting direction.

[0007] Another example of device suitable for absorbing and releasing energy, during the phases of the heel contact with the ground and its following lift respectively, is disclosed in US Patent No. US 5,528,842, said device, embedded inside the sole of shoes, comprising one end at the heel, an intermediate portion, one end at the tiptoe and a fulcrum; said device, longitudinally arranged with respect to the foot sole, becomes flat because of the pressure exerted by the heel, thus absorbing an amount of energy which will be then released as an upwards propulsion.

[0008] A further example of shoes provided with a device comprising at least a spring, said device being placed at the heel and aiming at increasing the elevation of the user, is disclosed in US Patent No. US 6,928,756.

[0009] Similarly, International Patent application No. WO 2008/125716 published on October 23, 2008 discloses shoes equipped with two spring elastic elements suitable for increasing the elevation of a user, said first elastic element being tied in a first support point at the

shoe tip, cooperating to carry out the compression with at least a second support point fixed, in the front portion of the shoe, between said first elastic element and the sole and extending up to the middle portion of said shoe, and said second elastic element being tied in a first support point at the middle portion of the shoe, cooperating to carry out the compression with at least a second support point fixed, in the rear portion of the shoe, between said second elastic element and the sole and extending up to the heel of said shoe.

[0010] The aforesaid International Patent application provides that, among the disclosed alternative embodiments, the first spring elastic element could be replaced with a metal foil, for instance having elasticity characteristics variable in the length direction so that, upon contact with the ground, the compression resistance strength would be higher in the middle portion of the shoe than at the tip thereof.

[0011] Similarly, US Patent application No. US 2006/0021262 published on February 2, 2006 discloses a device, to be worn bare-foot or onto shoes, able to improve the performance during running or jumping even assuring the balance and the movement control; said device, that has a very complex articulated structure, comprises a contact element with the ground allowing to store energy reusable as propulsive pulse and, in some alternative embodiments, adapters intended however to assure the maximum stability, for instance in a side direction, and not to adjust the device itself depending on the user's weight and/or on the kind of performed activity.

[0012] Similarly, International Patent application No. WO 2006/047908 published on May 11, 2006 discloses a shoe equipped with springs, or other elastic elements, fixed to the sole thereof; said shoe, by taking advantage of the user's weight while he/she is walking, allows to reduce the physical strength and to increase the speed but, not being provided with adequate means, it does not allow to adjust the use thereof depending on the user's weight and/or on the kind of performed activity.

[0013] Similarly, German Utility Model Patent No. DE 85 08 599 U1 discloses a shoe, equipped with two soles connected through a leaf spring, suitable for improving a user's performances when running or jumping; the invention claimed in this document aims to reduce the weight of the springs, and consequently the shoe weight, by employing constructive materials lighter than steel though equally flexible such as the fibres-reinforced plastic materials.

[0014] The aforesaid German Utility Model Patent depicts numerous preferred embodiments, among which a first embodiment optimized for users with weights comprised between 60 and 90 Kg and, therefore, not fit for users with weights lower or higher than said range and a second embodiment providing the use of limiters for the elastic return effect of the springs; however, in none of these preferred embodiments, reference is made to means able to adjust the shoe depending on the user's weight and/or on the kind of performed activity.

[0015] The solutions illustrated in the previous documents have nevertheless the disadvantage of not taking into account the user's weight and the different impact way on the ground depending on the performed sport.

[0016] The US Patent application No. US 2003/0093921 published on May 22, 2003 discloses sport shoes equipped with means suitable for storing and successively releasing energy; particularly, said means allow to store energy during the impact phase of the user with the ground for using it in the following propulsion and/or elevation phase, in this way improving the athletic performance.

[0017] The shoes provided according to the aforesaid US patent application comprise an elastic and compressible element, for instance a spring, placed between the foot and the ground and embedded inside the sole; the elastic properties of said elastic element are determined by the spring constant k , which allows to take into consideration the user's weight and also the performed sport activity, thus making the elastic element effective in terms of energy storage and release.

[0018] The preferred embodiment shown in the aforesaid US Patent application has however the disadvantage of providing different kinds of shoes for users of different weight and/or for different sport activities.

[0019] Therefore there exists the need for a solution allowing the athlete to achieve the maximum advantage in terms of elevation increase, taking into account his/her weight and/or the performed activity.

[0020] Furthermore, both a manufacturing and commercial need exists to obtain a sport shoes assortment variable only in terms of size but otherwise adjustable to users having different weights and/or performing different sport activities.

Disclosure of the Invention

[0021] The object of the present invention is to overcome the disadvantages of the cited known art, meeting the still unsatisfied needs.

[0022] Such object is achieved with the device comprising an elastic element, embedded inside each sole, coupled to a movable adapter placed on the front portion of each sole, according to the invention that, advantageously, allows the user to optimally increase his/her elevation, depending on his/her weight and/or the performed activity.

[0023] Moreover, advantageously, the aforesaid device offers the possibility of manufacturing shoes in an assortment variable only in terms of size but otherwise adjustable to users having different weights and/or performing different sport activities.

Brief Description of the Drawings

[0024] The following figures, given by way of non-limiting example, help to illustrate the present invention, a preferred embodiment of which will be disclosed in detail

afterward:

- FIG. 1 is a side view of a shoe equipped with the device according to the invention in rest position;
- FIG. 2 is the shoe of FIG. 1 during use;
- FIG. 3 is a bottom perspective view of the shoe of FIG. 1.

Description of a Preferred Embodiment

[0025] Making reference to FIGS. 1 and 2, a shoe 1 is shown comprising at least an upper portion, or upper, 2 and a lower portion, or bottom, 3.

[0026] Said bottom 3, in turn, comprises at least a sole 5 and a heel 7, said sole 5 being the part of the shoe in contact with ground and said heel 7 being the support of the shoe at the rear part thereof, that is the support present under the sole at the user's heel.

[0027] Said shoe 1 further comprises a device suitable for achieving a higher elevation of the user, said device comprising an elastic element 9 and a movable adapter 11.

[0028] Said elastic element 9 substantially consists of a flexing spring, that is of a foil force-fitted at one end thereof and loaded at the other end.

[0029] The plane shape of said elastic element 9 can be rectangular, trapezoidal or, preferably, similar to the sole shape in order to increase the spring flexibility without reducing the resistance capacity.

[0030] Moreover, said elastic element 9 preferably has a curved profile that, following the profile of the sole, fits the shoe.

[0031] Said elastic element 9 is embedded inside each sole, more precisely it is embedded in the junction area between said sole 5 and said heel 7, and it progressively diverges from said sole 5 as it proceeds towards the tip of the shoe 1.

[0032] According to the preferred embodiment of the invention, said elastic element 9 is inserted during the manufacturing stage, before forming the heel, thus being embedded inside the shoe. However, it is also possible to provide the insertion of the elastic element 9 at the end of the shoe manufacturing cycle, for instance by fixing through screws or other means that allow the removal and the possible replacement thereof.

[0033] Said element 9 is preferably made of a metallic material, preferably made of steel; however, other materials can be employed such as, for instance, carbon fibres or other composite materials, in order to obtain better performances together with a smaller overall weight.

[0034] The lower portion of said elastic element 9, that is the portion in contact with the ground, can be optionally provided with an insole (not shown), having a minimum thickness, to prevent the user from slipping.

[0035] As said before, the elastic element 9 is free at the front portion, but its profile is such as to minimise the distance thereof from the tip of the shoe; anyway, said elastic element 9, even when compressed during the us-

ing phase depicted in Fig. 2, never manages to touch said tip of the shoe.

[0036] The device able to achieve a higher elevation of the user according to the present invention further comprises an adapter 11 coupled to said elastic element 9, said adapter 11 being placed on the front portion of each sole 5.

[0037] More precisely, said adapter 11 is movable, i.e. able to be variably positioned relative to the sole 5, so as to allow the most convenient adjustment depending on the user's weight and/or on the kind of performed activity.

[0038] In other words, the device according to the present invention, thanks to the possibility of displacing the adapter 11 at different positions relative to the sole 5, allows to change the stiffness of the elastic element 9 and, consequently, to adjust the shoe depending on the user's weight and/or on the performed sport activity.

[0039] In the preferred embodiment herein illustrated, said movable adapter 11 has a semi-cylindrical shape, with semicircular transversal section and plane longitudinal section; as shown in FIG. 3, said adapter 11 is provided with a pair of holes 13a, 13b at its ends.

[0040] Said sole 5, in turn, is provided with pairs of holes 15a, 15b, longitudinally arranged with respect to the sole itself, corresponding to said pair of holes 13a, 13b.

[0041] Said adapter 11 is fastened to the sole 5, for instance through rivets, screws or another known fastening system, so that the pair of holes 13a, 13b of said adapter 11 perfectly couples with a corresponding pair of holes 15a, 15b of said sole 5, said adapter consequently being transversally positioned with respect to said sole 5, the plane portion of said adapter 11 being in contact with said sole 5 and the protruding portion of said adapter 11 being turned towards the outside and, more precisely, towards the elastic element 9.

[0042] Said adapter 11 can be displaced at different positions with respect to the sole 5 by simply fixing it at a different pair of holes 15a, 15b of said sole 5.

[0043] Of course, it will be possible to provide other shapes for this movable adapter 11 as well as ways of connection to the sole of the shoe and directions of positioning with respect to sole itself different from that herein illustrated by means of a non-limiting illustrative embodiment, shapes, ways of connection and directions of positioning reflecting the same inventive principle of the adjustable adapter and that therefore do not depart from the scope of the invention.

[0044] The device according to the invention, thanks to the possibility of displacing the adapter 11 at different positions relative to the sole 5, allows to change the stiffness of the elastic element 9 as much as one likes, depending on the user's weight and/or on the performed sport activity.

[0045] The combination of said adapter 11 with said elastic element 9 allows to take the most advantage of the yield of said elastic element 9 since, by changing the

position of said adapter 11 along the sole 5, the arm of said elastic element when it is under stress is changed.

[0046] In particular, as it can be seen in FIG. 1, when the elastic element 9 is not subjected to pressure, the adapter 11 does not exert any action; when, on the contrary, as it can be seen in FIG. 2, the elastic element 9 undergoes a high compression, for instance upon jumping, said elastic element 9 is put in contact with said adapter 11, that shortens the arm of the elastic element 9, increasing the stiffness thereof.

[0047] It is evident that, the nearer the adapter 11 is placed to the tip of the shoe 1, the higher the stiffness of the elastic element 9 turns out to be and the more enlarged the push upwards is while, on the contrary, the nearer the adapter 11 is placed to the heel 7 of the shoe 1, the lower the stiffness of the elastic element 9 turns out to be and the more limited the push upwards is.

[0048] The user can position the adapter 11 taking into account his/her weight and the kind of push, more or less significant, he/she wants to receive, thus increasing his/her elevation in an optimal way.

[0049] Normally, the positioning operation will be carried out just once, after having bought the shoes, so as to adjust the device to one's own weight and to the kind of athletic performance that one seeks to obtain; however, since the adapter 11 is fixed to the sole 5 in a removable way, the user will be able to modify the position of said adapter in case the conditions of weight and sport activity have changed. The positioning or re-positioning operation of the adapter 11 can be simply carried out by any user, because it only consists in removing the internal insole of the shoe, in screwing and unscrewing of the fastening system and in reintroducing the insole.

[0050] Said adapter 11 is preferably made of a metallic material, preferably made of steel; however, other materials can be employed such as, for instance, plastic materials or other composite materials having a high mechanical resistance.

[0051] As it results clear from the description provided above, the fact that the adapter 11 is freely positionable by the user allows to customise the stiffness of the elastic element 9 coupled thereto depending on the user's weight and on the kind of performed sport activity.

[0052] The adjusting possibility offered by the device according to the invention allows a wide diffusion, at limited prices, of the shoes provided with said device.

[0053] As a matter of fact, it can be appreciated that the implementation of elastic elements with suitable stiffness for users of different weights is not needed, elastic elements that would then couple with shoes of different sizes, thus creating considerable assortment difficulties for both manufacturers and sellers.

[0054] On the contrary, according to the present invention it is possible to provide for the production of a single elastic element 9, or anyhow of a small number of elastic elements 9, variable only in dependence on the size of the shoe.

[0055] From the description of a preferred embodiment

provided above in detail, the advantages deriving from the device for shoes comprising an elastic element and an adapter according to the present invention become evident; in particular:

- the possibility for the user to increase his/her elevation in an optimal way;
- the complete use flexibility depending on the needs and the preferences of the user; in particular, the use flexibility for different sports achieved by changing the position of the adapter depending on the performed activity and the use flexibility in the case of weight variation of the user by changing the position of the adapter depending on either the decrease or the increase of the user's weight;
- the optimisation of the manufacturing and the commercialisation of shoes in an assortment variable only in terms of size but otherwise adjustable to users of different weights and/or performing different sport activities;
- the simplicity and cheapness of realisation.

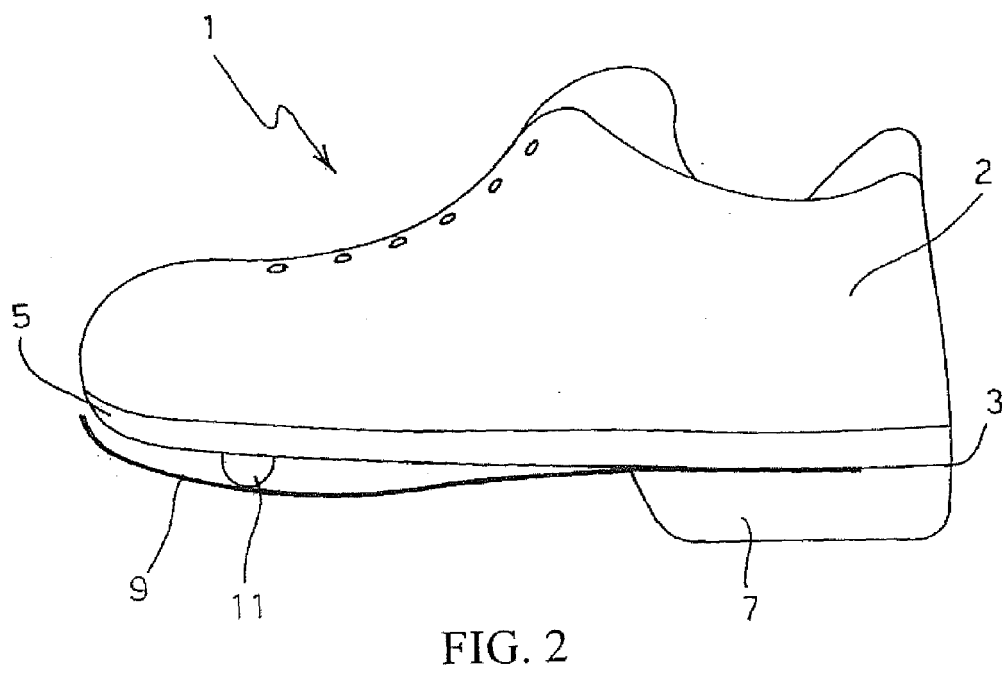
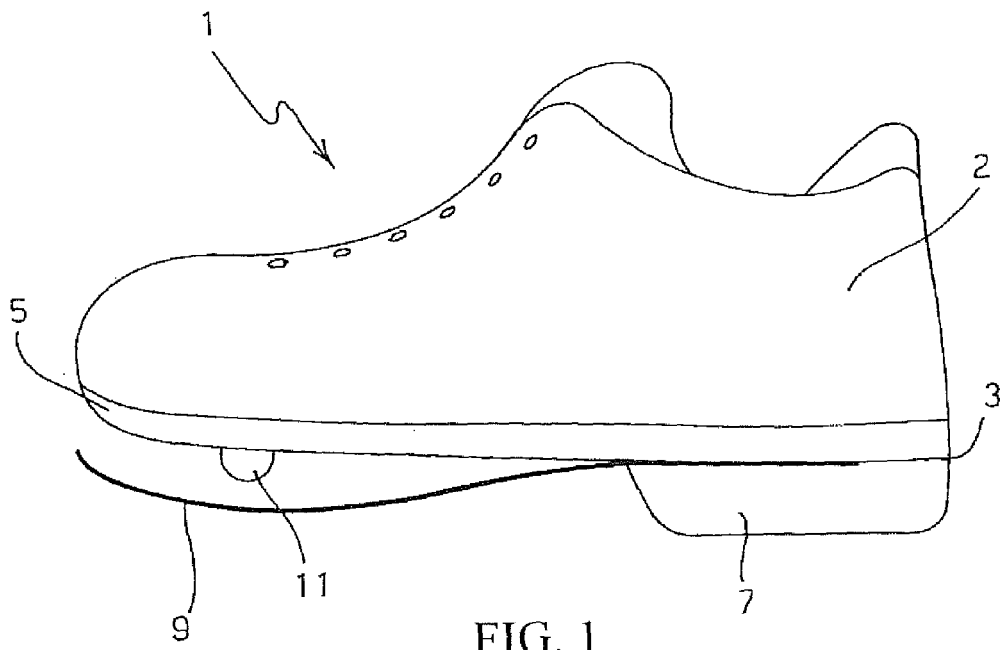
[0056] It is evident that the device for shoes comprising an elastic element and an adapter according to the present invention, herein disclosed through a preferred embodiment given by way of non-limiting example, can be modified in accordance with ways known to the expert of the technical field without departing from the scope of the present invention; in particular, the systems for embedding the elastic element in each sole and for fastening the adapter, as well as the shape of both the elastic element and the adapter, could be conceived in a way different from those illustrated and, specifically, they could be chosen among the solutions available in the known art depending on the best constructive opportunity.

Claims

1. A device for soles (5) of shoes (1) comprising an elastic element (9) and an adapter (11) suitable for increasing the elevation of a user, wherein said adapter (11) is movable.
2. A device according to claim 1, wherein said elastic element (9) consists of a flexing spring.
3. A device according to claim 1 or 2, wherein said elastic element (9) is embedded in or hinged at the sole (5) of a shoe (1).
4. A device according to any of the preceding claims, wherein said elastic element (9) has a rectangular-shape plan, a trapezoidal-shape plan or, preferably, a plan having a shape similar to the sole shape.
5. A device according to any of the preceding claims, wherein said elastic element (9) preferably has a

curved profile that, following the profile of said sole (5), fits said shoe (1), progressively diverges from said sole (5) as it proceeds towards the tip of the shoe (1) and it is free at the front portion.

6. A device according to claim 1, wherein said sole (5) is provided with pairs of holes (15a, 15b), longitudinally arranged with respect to the sole itself.
7. A device according to claim 1, wherein said adapter (11) has a semi-cylindrical shape and it is provided with a pair of holes (13a, 13b) at its ends.
8. A device according to any of the preceding claims, wherein said adapter (11) is fastened to the sole (5) so that the pair of holes (13a, 13b) of said adapter (11) perfectly couples with a corresponding pair of holes (15a, 15b) of said sole (5), said adapter consequently being transversally positioned with respect to said sole (5).
9. A shoe (1) provided with a device according to any of the preceding claims 1 to 8 suitable for increasing the elevation of a user.
10. A shoe (1) according to claim 9, **characterised in that** it is a gym shoe able to increase the elevation of the user during a sport practice.



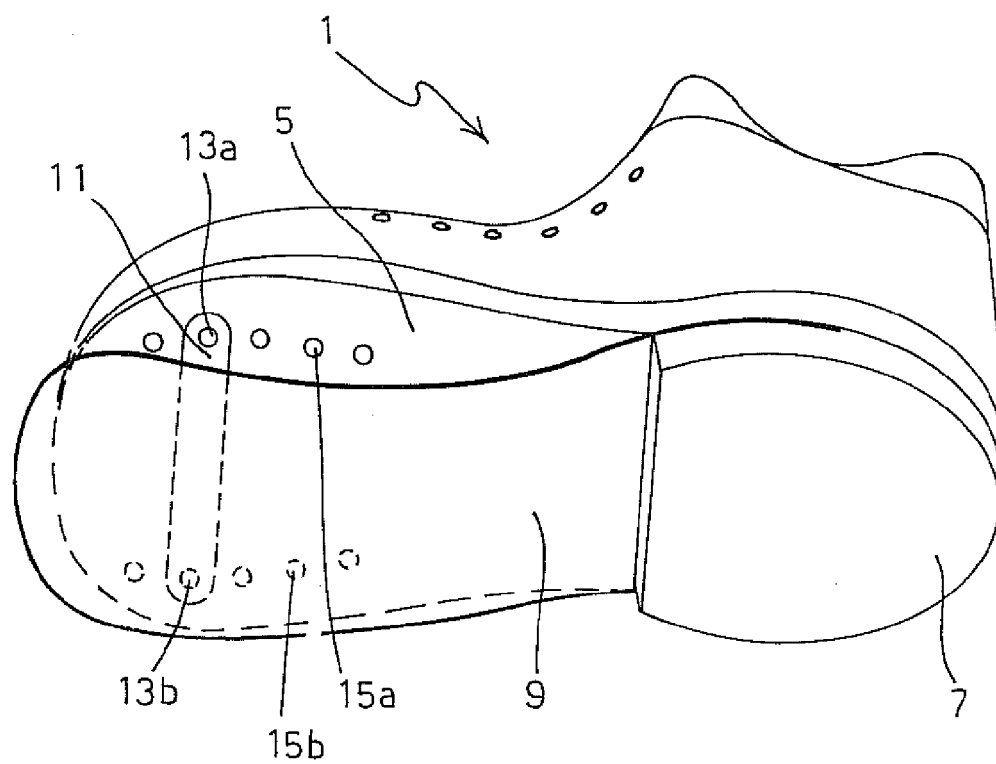


FIG. 3



EUROPEAN SEARCH REPORT

Application Number
EP 10 15 7001

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,D	DE 85 08 599 U1 (J. SCHNELL) 27 June 1985 (1985-06-27) * page 3, line 21 - page 4, line 12; figures 2,3 *	1-5,9,10	INV. A43B13/18
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A,D	WO 2006/047908 A1 (LENG WANEN [CN]) 11 May 2006 (2006-05-11) * figure 11 *	1,9	
			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		8 July 2010	Cianci, Sabino
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 15 7001

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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08-07-2010

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