(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 890 322 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
13.01.1999 Bulletin 1999/02

(51) Int. Cl.[6]: **A43B 13/12**, A43B 13/14

(21) Application number: **97111526.6**

(22) Date of filing: **08.07.1997**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV SI

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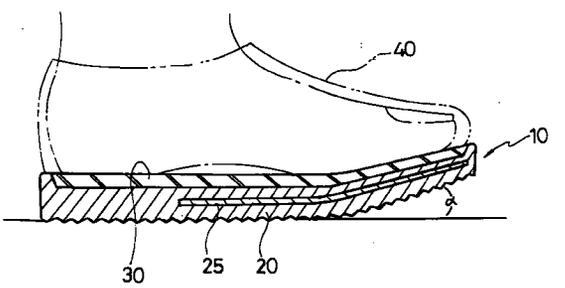
(54) Shoe sole

(57) A shoe sole (10) is embedded with an elastic plate (25) into either one of a bottom sole (20) or middle sole (30) for allowing a portion corresponding to the toe part of the sole of the foot to be upwardly-slanted by a predetermined angle. The front end of the shoe sole (10) constantly maintains an angle within a range of 5° to 20° to afford favorable sense of wearing shoes (40) and attain correct walking mechanism of the sole of the foot.

FIG.2



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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a shoe sole, and more particularly to a shoe sole, wherein an angle of a portion corresponding to toes is regularly maintained at any time for attaining the correct walking mechanism of the sole of the foot.

2. Description of the Prior Art

The sole of a person may be partitioned into a toe part, an arch part and a heel part from the front side. When a person walks around in his bare feet, the general walking mechanism of the sole of the foot will be explained as follows.

In more detail, the heel of the right foot for example contacts the ground first, and almost at the same time, the arch part becomes in contact with the ground. Under this state, while the toe portion of the right foot closely touches the ground, the left foot is moved to the front side. Then, with moving the body forward at the moment the heel part of the left foot becomes in contact with the ground, the heel part and arch part of the right foot are upward separated from the ground. At the same time, the toe part is thoroughly attached onto the ground. At this time, the toe part pushes the ground to move one's body forward. During this motion, the toe part is closely in contact with the ground, and the heel part is moved upward, so that an angle formed by the toe part and heel part greatly differs from that of normal times. Such a walking mechanism is repeatedly executed by alternating the right foot and left foot.

However, the above-described walking mechanism cannot be appropriately maintained when using a conventional shoe sole. In other words, since most conventional shoe soles are formed to be flat, the foregoing walking mechanism cannot be performed. That is, the conventional shoe sole is flat to be detrimental to performing the above-stated normal walking mechanism. Therefore, when the shoe provided with the conventional shoe sole is worn, the gait becomes abnormal to negatively walk with a measure step.

For the purpose of solving the above problem, the angle of the portion corresponding to the toe part of the shoe sole has a specific value, but the shape thereof is easily deformed during wearing the same to have no effect. Moreover, in order to make the angle of the portion corresponding to the toe part have the specific value, the shoe sole should be thick to involve a problem of significantly consume the materials.

SUMMARY OF THE INVENTION

The present invention is developed to solve the aboveenumerated conventional problems. Accordingly, it is an object of the present invention to provide a shoe sole for allowing the foot to perform the normal walking mechanism by maintaining the angle of the front end of the shoe sole corresponding to the toe part by a constantly regular angle.

To achieve the above object of the present invention, a shoe sole formed by joining a middle sole and a bottom sole to provide a regular inclination angle upon a front end corresponding to a toe part includes an elastic plate embedded into the internal front end of the bottom sole for allowing the front end of the bottom sole to maintain an inclination angle within a range of 5° to 20°.

BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and other advantages of the present invention will become more apparent by describing in detail preferred embodiments thereof with reference to the attached drawings in which:

FIG. 1 is an exploded perspective view showing a formation of a shoe sole according to the present invention;

FIG. 2 is a sectional view showing the formation of the shoe sole according to the present invention;

FIG. 3 is a sectional view showing another embodiment of the shoe sole according to the present invention; and

FIG. 4 is a sectional view showing still another embodiment of the shoe sole according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinbelow, a shoe sole according to the present invention will be described in detail.

One embodiment of the present invention is illustrated in FIGS. 1 to 3. The shoe sole 10 herein illustrated is formed by a bottom sole 20 and a middle sole 30. Bottom sole 20 forms the lower portion of shoe sole 10, which becomes in contact with the ground. Bottom sole 20 has the front end upwardly-slanted by as many as a regular angle α. Here, regular angle α has a value within a range of 50 to 20°, and most preferably, 13.7°. Here, 13.7° is the upwardly-slanted angle of the toe in view of the normal sole of one's foot.

Bottom sole 20 is embedded with an elastic plate 25 for maintaining the angle of the front end of bottom sole 20 with the above value. Elastic plate 25 also has the front end which is upwardly-slanted by as many as 5° to 20° with respect to the rear end thereof.

In terms of the substance constituting elastic plate 25, elastic plate 25 may be formed of a plastic resin only. At this time, the hardness thereof is to be larger than that of the bottom sole while the elasticity is provided. Otherwise, the plastic resin is mixed with any one

of a material selected from the group consisting of metal particles, glass fiber particles, carbon fiber particles and glass carbon fiber particles.

Here, the ratio for mixing respective materials will be explained. For example, the elastic plate can be formed by mixing 90% of plastic resin with 10% of metal particles; 80% of plastic resin with 20% of glass fiber particles; 75% of plastic resin with 25% of carbon fiber particles; or 80% of plastic resin with 20% of glass fiber particles.

If the glass fiber particle and carbon fiber particle are mixed, the mixing is performed in the ratio of 6:4. The reason of mixing the variety of materials in the variety of ratios is for using a suitable one in accordance with the kind of a shoe 40.

Such elastic plate 25 has a characteristic of considerably great elasticity in considering the property of the substance utilized. Consequently, the shape of the bottom sole is not deformed regardless of wearing shoe 40 for a long time period.

Middle sole 30 is placed onto the upper plane of bottom sole 20, of which front end is upwardly-slanted, too.

FIG. 3 illustrates another embodiment of the present invention, in which an elastic plate 35 is embedded into a middle sole 30. That is, elastic plate 35 is embedded into middle sole 30 to maintain the angle of the front end of middle sole 30 within the range of 5° to 20°. In another embodiment of the present invention, the front end of bottom sole 20 is upwardly-slanted by as many as 5° to 20°.

Other details such as the substance of elastic plate 35 are the same as those of the above-described one embodiment of the present invention, which further description will thus be omitted.

FIG. 4 illustrates still another embodiment of the present invention. Here, shoe sole 10 is formed by only bottom sole 20, of which front end is upwardly-slanted by as many as 5° to 20°. Also, elastic plate 25 is embedded into the front end for maintaining the slope of the front end of bottom sole 20. Since the substance, shape and the like of elastic plate 25 are the same as those of foregoing embodiments, further description will not be presented.

The operation of the shoe sole according to the present invention having the above-described formation will be described in detail.

Generally, when a person stands with a correct posture, great force is applied to the toe part for keeping the balance. The great force applied to the toe part incites problems such as straining the calf muscle. This is because the toes are upwardly-slanted by approximately 13.7°. Therefore, shoe sole 10 according to the present invention has the front end upwardly-slanted by approximately 13.7° to consistently distribute one's body weight throughout the arch part and heel part of the sole of one's foot, thereby lowering the fatigue of the leg muscle.

In addition, by employing shoe sole 10 according to the present invention, the aforementioned walking mechanism can be correctly executed. That is, when the person walks around in one's bare feet, the heel part of the sole of one's foot contacts the ground first, and the arch part is then in contact with the ground. Lastly, while the toe part of the foot touches the ground, the heel part is detached from the ground. The toe part is further closely attached to the ground at the moment the heel part is detached from the ground, and the toe part is separated from the ground while the toe part pushes the ground. In this walking mechanism, a contact point between the sole of the foot and ground is continuously moved from the heel part to the toe part.

The above-stated walking mechanism can be correctly performed when wearing shoe 40 provided with shoe sole 10 according to the present invention. More specifically, the front end of shoe sole 10 is formed to have the angle identical to the upwardly-slanted angle of the toe part, so that the normal walking mechanism is performed even when walking in one's shoes. That is, since the front end of shoe sole 10 is formed to be upwardly slanted, the contact point of shoe sole 10 with the ground is moved from the rear end to the front end while the front end of shoe sole 10 is naturally in contact with the ground. Thus, the normal walking is performed as a tire rolls over and over.

If the above-described correct walking mechanism is carried out, the toe part never fails to press the ground just before the foot is separated from the ground. By doing so, the arch part of the sole of the foot is continuously stimulated to excite the spots on the body suitable for acupuncture, thereby being good for health.

Especially, if the shoe sole according to the present invention is applied to mountain-climbing boots, the forward sliding of the foot within the mountain-climbing boot is prevented to make it possible to protect the toes when descending the mountain. Furthermore, it is effective when those who wear the shoes for a long time like soldiers or medical staffs employ the shoe sole according to the present invention.

In connection with the shoe sole according to the present invention as described in detail as above, the elastic plate is inserted into the bottom sole or inner sole to lead the front end to upwardly slant, thereby realizing the correct walking mechanism. Therefore, the shoe sole is advantageous of having favorable sense when being worn, inhibiting the fatigue upon the leg muscle when being walked for a long time period, and stimulating the spots of the body suitable for acupuncture distributed throughout the sole of the foot to be good for health.

While the present invention has been particularly shown and described with reference to particular embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be effected therein without departing from the spirit

and scope of the invention as defined by the appended claims.

Claims

1. In a shoe sole having a middle sole and a bottom sole, said shoe sole comprising an elastic plate located at a predetermined part of the shoe for allowing a front end of the bottom sole to maintain an inclined angle within a range of 5° to 20°.

2. The shoe sole as claimed in claim 1, wherein said elastic plate is embedded into internal front end of the bottom sole.

3. The shoe sole as claimed in claims 1, wherein said elastic plate is embedded into the front end of the middle sole.

4. The shoe sole as claimed in claims 1, wherein said elastic plate has a front end upwardly-slanted by as many as 5° to 20° as compared with a rear end thereof.

5. The shoe sole claimed in claim 1, wherein said elastic plate is comprised of a plastic resin or a plastic resin mixed with a material selected from the group consisting of metal particles, carbon fiber particles, glass fiber particles and glass carbon fiber particles.

6. The shoe sole as claimed in claim 1, wherein elastic plate is comprised of a substance obtained by mixing glass fiber particles and carbon fiber particles.

7. In a shoe sole formed by only a bottom sole, said shoe sole comprising an elastic plate embedded into the internal front end of the bottom sole for allowing a front end of said bottom sole to maintain an-inclined angle within a range of 5° to 20°.

8. The shoe sole as claimed in claim 7, wherein said elastic plate has a front end upwardly- slanted by as many as 5° to 20° as compared with a rear end thereof.

9. The shoe sole as claimed in claim 7, wherein said elastic plate is comprised of plastic resin mixed with a material selected from the group consisting of metal particles, carbon fiber particles, glass fiber particles and glass carbon fiber particles.

10. The shoe sole as claimed in claim 7, wherein elastic plate is comprised of a substance obtained by mixing glass fiber particles and carbon fiber particles.

FIG.1

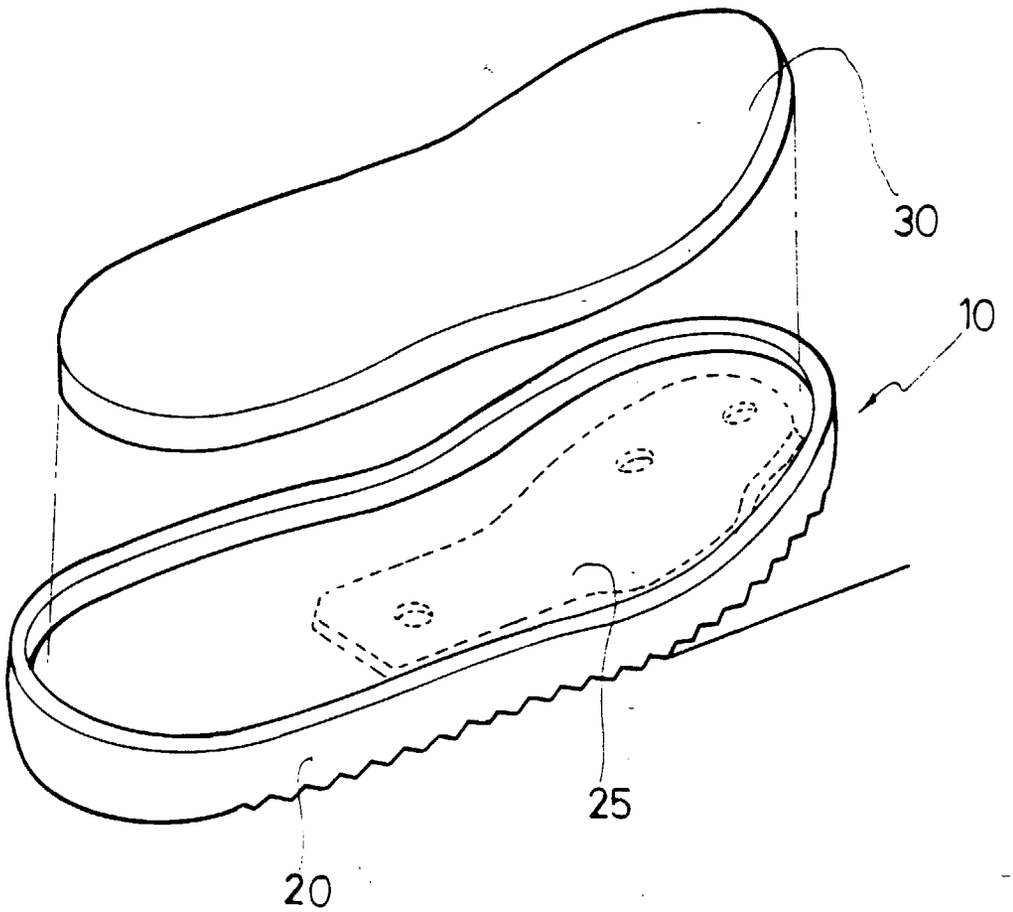


FIG.2

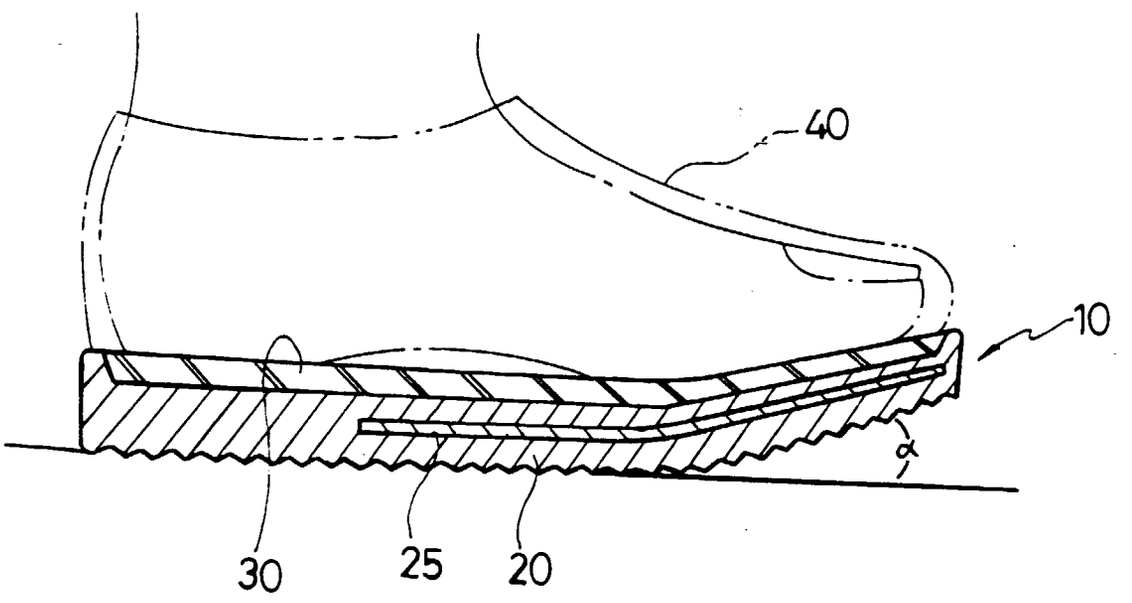


FIG.3

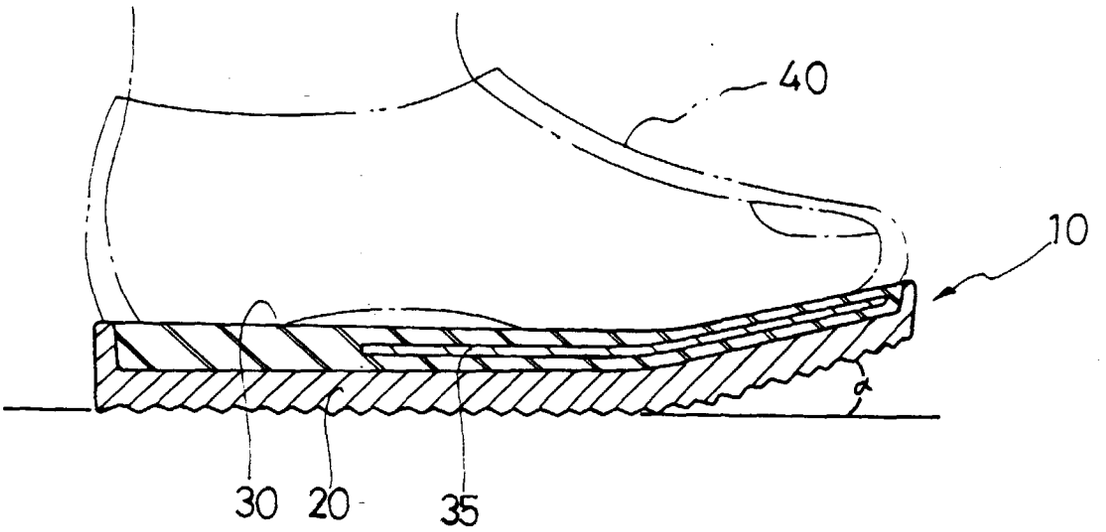
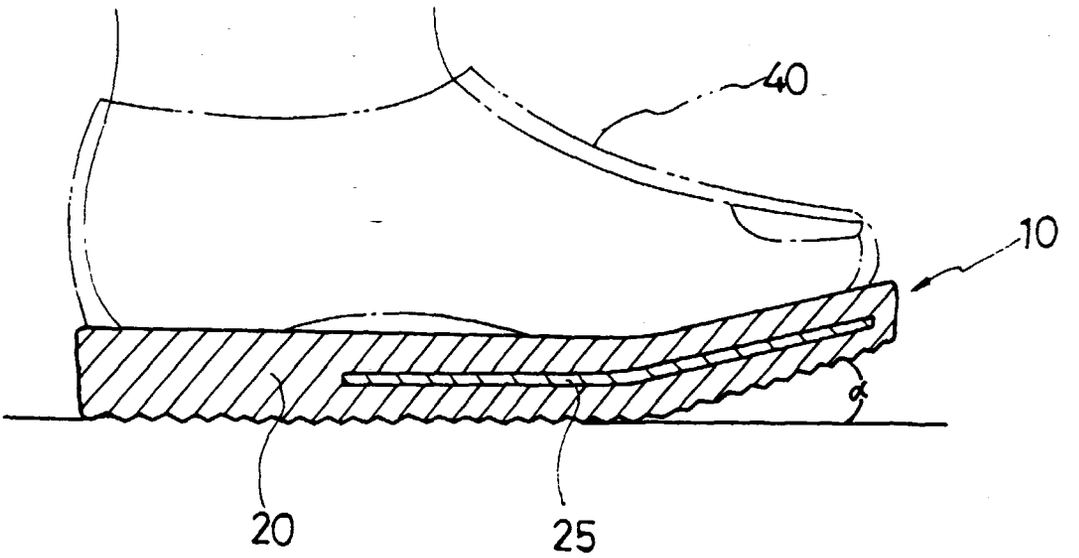


FIG.4



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EUROPEAN SEARCH REPORT

Application Number
EP 97 11 1526

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 458 174 A (FITSALL AG) * column 6, line 7 - column 7, line 12; figures *	1-10	A43B13/12 A43B13/14
Y	DE 27 52 491 A (HIETALA UKKO UUNO) * page 6, paragraph 2; figures *	1-10	
Y	EP 0 600 145 A (KEIHAN TSUSHO CO LTD) * page 5, line 52 - page 6, line 42; figures 5-12 *	1-10	
A	EP 0 044 086 A (MELCER ISRAEL) * claim 3; figures *	1,4,7,8	
A	DE 93 12 979 U (HERMES STEFAN ;HERMES RALF (DE)) * claim 14; figures *	1,4,7,8	
A	US 5 579 591 A (KOUSAKA SACHIKO ET AL) * claims 1,2; figures *	1,4,7,8	
A	US 5 528 842 A (RICCI GORDON K ET AL) * column 5, line 53 - column 6, line 13; figures *	5,6,9,10	TECHNICAL FIELDS SEARCHED (Int.Cl.6) A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 December 1997	Scholvinck, T

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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