FUNCTIONAL SHOE HAVING A CUSHIONING FUNCTION AND AN AIR CIRCULATION FUNCTION

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ABSTRACT

A functional shoe pertains to a cushioning function and an air circulation function, which integrally performs the cushioning function and the air circulation function. The functional shoe includes: an insole (110) and a midsole (120) having a tunnel portion (122). The tunnel portion (122) has a lower surface (122a) and an upper surface (122b) having a predetermined angle (\(\alpha\)) with the lower surface (122a); an outsole (130) having an anti-slip tread (132); a foldable resilient member (140) having a support portion (142) for supporting the lower surface (122a) of the tunnel portion (122); and a rotating portion (144). The rotating portion (144) is resiliently folded by the load being applied thereto; a sealing member (150); and an air channel (160) having one end connected to the closed tunnel (122) and the other end located at the front end of the insole (110).
FUNCTIONAL SHOE HAVING A CUSHIONING FUNCTION AND AN AIR CIRCULATION FUNCTION

TECHNICAL FIELD

[0001] The present invention relates to a shoe, and more particularly, to a functional shoe having cushioning and air circulation functions capable of providing good landing comfort and pleasant wearing comfort by simultaneously performing the cushioning and air circulation functions.

BACKGROUND ART

[0002] In shoes, one of daily necessities, as the standard of living is increased, various functional shoes based on an ergonomic design beyond a simple function for protecting the feet are being developed. Major functions of the functional shoes may include a cushioning function, an air circulation function, and so on.

[0003] The cushioning function is provided to absorb impact applied to a heel of a shoe that first comes in contact with the ground surface upon walking, improving landing comfort. That is, the impact applied from the heel through the cushioning function is attenuated to reduce fatigue felt by a walker. As a conventional art for the cushioning function, a method of manufacturing a sole such as a midsole or an outsole using an elastic material such as polyurethane or synthetic rubber, or a method of vertically installing a plurality of coil springs in a heel of a shoe, is mainly used. However, when elastic material is used, manufacturing cost is increased, and elasticity of the elastic material is gradually reduced as time elapses. In addition, since the method of installing coil springs in the heel is limited to a resilient distance of the spring, a sufficient cushioning function cannot be expected and a structure thereof becomes complex, making it difficult to manufacture the shoe.

[0004] The air circulation function is provided to remove moisture in the shoe and improve wearing comfort. That is, the air circulation function is provided to dry moisture due to sweat generated from the foot of a walker to prevent breeding of various bacteria, or prevent skin ailments such as athlete’s foot. One of conventional techniques for the air circulation function is a method of manufacturing leather uppers of a shoe mainly using a breathable material. However, since this technique is a passive method, air circulation efficiency is largely decreased. Accordingly, a technique of air-circulating the inside of the shoe through a more active method is needed.

DISCLOSURE

Technical Problem

[0005] In order to solve the foregoing and/or other problems, it is an aspect of the present invention to provide a functional shoe having cushioning and air circulation functions capable of remarkably improving shock-absorbing efficiency and air circulation efficiency, and increasing durability and production efficiency of the shoe through a simple structure.

[0006] In addition, it is another aspect of the present invention to provide a functional shoe having cushioning and air circulation functions capable of implementing rolling movement and sterilization action of the shoe to maximize landing comfort and wearing comfort.

Technical Solution

[0007] The foregoing and/or other aspects of the present invention may be achieved by providing a functional shoe having cushioning and air circulation functions, including: an insole (110) having an upper surface to which leather uppers (102) are adhered; a midsole (120) including a tunnel portion (122) formed at a rear end thereof, and having a lower side surface (122a) in contact with a lower surface of the insole (110) and formed parallel to the ground surface and an upper side surface (122b) configured to form a predetermined angle (α) with respect to the lower side surface (122a); an outsole (130) having a tread (132) adhered to a lower surface of the midsole (120) and configured to prevent slipping thereof; a foldable resilient member (140) having a support section (142) configured to support a lower side surface (122a) of the tunnel portion (122), and a pivot section (144) configured to support an upper side surface (122b) of the tunnel portion (122), wherein the pivot section (144) is resiliently folded by an applied load; a sealing member (150) installed to seal the tunnel portion (122); and an air channel (160) having one end in communication with the sealed tunnel portion (122) and the other end disposed at a front side of the insole (110).

[0008] In addition, in the functional shoe having cushioning and air circulation functions according to the present invention, the foldable resilient member (140) includes: a pivot shaft (145); the support section (142) and the pivot section (144) hinged by the pivot shaft (145); and a resilient section (146) having a torsional coil spring (146a) inserted into the pivot shaft (145), a first extension unit (146b) extending from the torsional coil spring (146a) to support the support section (142); and a second extension unit (146c) extending from the coil spring (146a) to support the pivot section (144). Here, the foldable resilient member (140) may be a flat spring in which the support section (142) and the pivot section (144) are integrally formed.

[0009] Further, in the functional shoe having cushioning and air circulation functions according to the present invention, a discharge check valve (162) is installed at one end of the air channel (160), and a suction check valve (164) is installed at one side of the sealing member (150). Here, the suction check valve (164) may be installed at one end of the air channel (160), and the discharge check valve (162) may be formed at one side of the sealing member (150).

[0010] Furthermore, in the functional shoe having cushioning and air circulation functions according to the present invention, the midsole (120) is curved such that a front side and a rear side are spaced apart from the ground surface.

[0011] In addition, in the functional shoe having cushioning and air circulation functions according to the present invention, the midsole (120) has at least one high elastic or solid reinforcement member (170) configured to maintain a shape of the midsole (120) and prevent a fracture of the foldable resilient member (140) from a front side of the midsole (120).

[0012] Further, in the functional shoe having cushioning and air circulation functions according to the present invention, the insole (110) contains an inorganic material of emitting far-infrared light, or is anion-treated.

Advantageous Effects

[0013] As described above, the functional shoe having the cushioning and air circulation functions according to the present invention has a foldable resilient member, and thus,
impact absorption efficiency can be improved to provide good landing comfort. At the same time, the inside of the shoe can be actively air-circulated to remarkably improve air circulation efficiency, and thus, the inside of the shoe can be maintained at a comfortable state to improve wearing comfort.

In addition, since the foldable resilient member according to the present invention has a simple structure, durability and production efficiency of the shoe can be remarkably improved.

Further, effective walking through natural rolling movement becomes possible, and wearing comfort can be maximized through discharge of far-infrared light or anion from the insole.

DESCRIPTION OF DRAWINGS

The above and other aspects and advantages of the present invention will become apparent and more readily appreciated from the following description of exemplary embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a side view showing major parts of a functional shoe having cushioning and air circulation functions according to an embodiment of the present invention, while an insole, a midsole and an outsole are cut;

FIG. 2 is an exploded perspective view showing a foldable resilient member of FIG. 1; and

FIG. 3 is a perspective view showing another example of the foldable resilient member.

DESCRIPTION OF MAJOR REFERENCE NUMERALS

100: functional shoe having cushioning and air circulation functions
102: leather uppers
110: insole
120: midsole
132: tread
132: support section
144: pivot section
145: pivot shaft
146: resilient section
146: first extension unit
146: second extension unit
148: pivot shaft fixing member
148: second extension unit
153: sealing member
160: air channel
162: discharge check valve
164: suction check valve
170: elastic reinforcement member

MODE FOR INVENTION

Reference will now be made in detail to the embodiments of the present invention, examples of which are illustrated in the accompanying drawings. However, it will be apparent to those skilled in the art that the following embodiments can be readily understood and modified into various types, and the scope of the present invention is not limited to the embodiments. Like elements are designated by like reference numerals throughout this specification as possible even though they are shown in the other drawings.

First, a configuration of a functional shoe having cushioning and air circulation functions according to an embodiment of the present invention will be described with reference to the accompanying drawings.

FIG. 1 is a side view showing major parts of the functional shoe having cushioning and air circulation functions according to the embodiment of the present invention, while an insole, a midsole and an outsole are cut, and FIG. 2 is an exploded perspective view showing a foldable resilient member of FIG. 1. As shown in FIG. 1, a functional shoe 100 having cushioning and air circulation functions according to an embodiment of the present invention generally includes an insole 110, a midsole 120, an outsole 130, a foldable resilient member 140, a sealing member 150 and an air channel 160.

The insole 110 is a sole that comes in contact with the sole of a wearer. Leather uppers 102 are adhered to an edge of an upper surface of the insole 110. In addition, the insole 110 may be adhered to an upper surface of the midsole 120, or may be exchangeably disposed on the upper surface of the midsole 120.

Meanwhile, the insole 110 contains an inorganic material that emits far-infrared light. Far-infrared light is generally well-known to penetrate the human body to show effects such as improvement of blood circulation through thermal action, sterilization action, prevention and improvement of diabetic diseases, or the like. Moreover, effects such as deodorization, dehumidification, air cleaning, and so on, are also well-known. Such an inorganic material that emits far-infrared light may include natural barley stone such as MgO, SiO2, or ZrO2, ceramic, charcoal, jade, germanium, and so on. Such a far-infrared light emitting material may be formed of a fiber, which may be used to manufacture the insole 110.

In addition, the insole 110 may be anion-treated to emit an anion. An anion is known to ionize and alkalize mineral elements such as calcium, sodium or potassium contained in blood, accomplishing effects such as purification of blood, improvement of blood circulation, activation of cells, fatigue recovery, pain relief, and so on.

The midsole 120 is disposed between the insole 110 and the outsole 130, and formed of a material such as polyurethane or synthetic rubber having a cushioning function itself. As shown in FIG. 1, the midsole 120 has a tunnel portion 122 opened at a rear end thereof. The tunnel portion 122 has a lower side surface 122a formed parallel to the ground surface, and an upper side surface 122b configured to form a predetermined angle α with respect to the lower side surface 122a. Here, the predetermined angle α of the tunnel portion 122 may be 10° to 30°.

Meanwhile, as shown in FIG. 1, the midsole 120 is curved such that a front side and a rear side are spaced apart from the ground surface to enable rolling movement of the shoe 100.

In addition, the midsole 120 has a reinforcement member 170 formed therein and configured to maintain a shape of the midsole 120. The midsole 120 is repeatedly deformed to reduce elasticity thereof and thus, recovery capability is also decreased. Accordingly, the reinforcement member 170 may be formed of a high elastic material such as synthetic rubber, or a solid material such as solid synthetic resin may be inserted into the midsole 120 to improve recovery capability. According to the embodiment, as shown in FIG. 1, the reinforcement member 170 includes a first reinforcement member 170a longitudinally formed in the midsole 120, and a second reinforcement member 170b formed under the tunnel portion 122. The first reinforcement member 170a reinforces a front side of the midsole 120, and the second reinforcement member 170b supports and reinforces the foldable resilient member 140. As described above, the reinforcement members 170a and 170b doubly reinforce the midsole 120, and thus, a fracture phenomenon in which a central portion of the midsole 120, i.e., a front side of the...
tunnel portion 122, is fractured, is prevented. As a result, upon rolling movement of the shoe 100, a shape of the midsole 120 is uniformly maintained to enable smooth rolling movement.

[0030] The outsole 130 is a portion that comes in contact with the ground surface, and is adhered to a lower surface of the midsole 120. Here, the outsole 130 includes a tread 132 having a plurality of grooves and protrusions, preventing slippage thereof.

[0031] The foldable resilient member 140 is inserted into the tunnel portion 122 to absorb impact due to a load of the wearer. According to the embodiment of the present invention, as shown in FIGS. 1 and 2, the foldable resilient member 140 includes a plate-shaped support section 142 configured to support the lower side surface 122a of the tunnel portion 122, and a plate-shaped pivot section 144 configured to support the upper side surface 122b of the tunnel portion 122. Then, the support section 142 and the pivot section 144 are hinged by a pivot shaft 145. Here, the pivot shaft 145 is fixed to a pivot shaft fixing member 145a. In addition, the pivot shaft 145 is disposed such that a resilient section 146 is disposed between the support section 142 and the pivot section 144. As shown in FIG. 2, the resilient section 146 is constituted by a pair of torsional coil springs 146a, and a first extension unit 146b and a second extension unit 146c having a “C” shape and extending from the torsional coil springs 146a, respectively. The first extension unit 146b and the second extension unit 146c form the predetermined angle \( \alpha \) and support the support section 142 and the pivot section 144, respectively. Here, since the support section 142 supports the lower side surface 122a of the tunnel portion 122 formed parallel to the ground surface, the pivot section 144 is folded with respect to the relatively fixed support section 142. Accordingly, in the foldable resilient member 140, when the load is applied to the upper surface of the pivot section 144, the pivot section 144 is resiliently folded by resiliency of the resilient section 146.

[0032] On the other hand, as shown in FIG. 3, the foldable resilient member 140 may be a flat spring 140a in which a support section 142a and a pivot section 144a are integrally formed. That is, the flat spring 140a is resiliently folded by elasticity of a portion thereof to which the support section 142a and the pivot section 144a are connected.

[0033] As described above, the foldable resilient member 140 may be designed by adjusting an elastic modulus of the torsional coil springs 146a and the flat spring 140a in considerations of wearing comfort or impact absorption efficiency of the shoe 100. The foldable resilient member 140 has a simple structure to enable easy manufacture. In addition, since the foldable resilient member 140 is largely deformed by the predetermined angle \( \alpha \), impact absorption efficiency can be remarkably improved in comparison with the conventional art.

[0034] The sealing member 150 is manufactured using an elastic material to be formed in a thin film shape, acting to seal the tunnel portion 122. As shown in FIG. 1, the sealing member 150 is inserted into the tunnel portion 122 while completely surrounding an outer edge of the foldable resilient member 140. On the other hand, the tunnel portion 122 can also be sealed by attaching the sealing member 150 to the tunnel portion 122 into which the foldable resilient member 140 is inserted.

[0035] The air channel 160 functions to bring the tunnel portion 122 in communication with air in the shoe 100. According to the embodiment, the air channel 160 uses a hose. In addition, one end of the air channel 160 is disposed at the front side of the insole 110 to be in communication with the inside of the shoe 100, and the other end is in communication with the tunnel portion 122 through a through-hole 143 formed in the support section 142 of the foldable resilient member 140.

[0036] Check valves 162 and 164 are small valves using a thin film, which function to flow air in one direction. According to the embodiment of the present invention, as shown in FIG. 1, the discharge check valve 162 is installed at one end of the air channel 160 disposed at the front side of the insole 110, and the suction check valve 164 is installed at one side of the sealing member 150. As air is continuously supplied into the inside of the shoe 100 through a pumping action of the tunnel portion 122, the inside of the shoe 100 is ventilated.

[0037] On the other hand, the suction check valve 164 may be installed at one end of the air channel 160, and the discharge check valve 162 may be installed at one side of the sealing member 150. As the air in the shoe 100 is continuously suctioned and discharged to the outside, the inside of the shoe 100 is ventilated.

[0038] Hereinafter, an operation of the functional shoe 100 having cushioning and air circulation functions according to the embodiment of the present invention will be described with reference to the accompanying drawings.

[0039] First, the cushioning function and rolling movement of the present invention will be described.

[0040] When a wearer wears the shoes 100 according to the embodiment of the present invention and walks, the rear side of the shoe 100 first comes in contact with the ground surface. Here, the load of the walker is applied to the heel, and the foldable resilient member 140 inserted into the tunnel portion 122 is resiliently folded to effectively absorb impact applied to the heel, remarkably improving landing comfort. Here, the midsole 120 and the outsole 130 of the shoe 100 have a curved shape spaced apart from the ground surface at the front and lower sides thereof, enabling soft landing and providing a wide landing area to reduce impact applied to the heel.

[0041] Next, the load of the walker after the landing is moved to the ball of the foot. Then, as the outsole 130 of the shoe 100 performs rolling movement along the ground surface, the impact still not absorbed in the foldable resilient member 140 is continuously distributed and absorbed. In addition, since the load of the wearer is gradually moved toward the ball of the heel along the curved surface of the outsole 130, smooth and natural walking becomes possible. The resilient member 140 folded in this process is spread again by a resilient recovering force to generate a repulsive force, and thus, the foot of the walker is pushed forward. As a result, effective walking becomes possible.

[0042] Next, the air circulation function of the present invention will be described.

[0043] When the walker wears the shoes 100 according to the embodiment of the present invention and walks, the foldable resilient member 140 is folded upon landing, and simultaneously, the tunnel portion 122 of the midsole 120 is contracted. Here, the air in the tunnel portion 122 is pumped to be supplied into the shoe 100 through the discharge check valve 162 via the air channel 160. Then, when the load applied to the foldable resilient member 140 is released, the foldable resilient member 140 is spread to the original state, and the tunnel portion 122 is expanded to the original state. Here, air is introduced through the suction check valve 164 installed at one side of the sealing member 150. As the above processes are repeated, fresh external air is continuously introduced into
the shoe 100, and thus, air circulation can be effectively performed to accomplish pleasant wearing comfort. In addition, in an opposite case in which the suction check valve 164 is installed at one end of the air channel 160 and the discharge check valve 162 is installed at one side of the sealing member 150, wet air in the shoe 100 is continuously suctioned to be discharged to the outside, and the air in the shoe 100 is circulated.

Meanwhile, the insole 110 effectively performs deodorization, dehumidification, and an antibacterial function through air circulation and effective discharge of far-infrared light in the shoe 100, further improving wearing comfort. In addition, foot health of the wearer such as improvement of blood circulation, prevention and improvement of diabetic diseases, and pain relief, can be enhanced through far-infrared light and anion discharged from the insole 110.

The foregoing description concerns an exemplary embodiment of the invention, is intended to be illustrative, and should not be construed as limiting the invention. The present teachings can be readily applied to other types of devices and apparatuses. Many alternatives, modifications, and variations within the scope and spirit of the present invention will be apparent to those skilled in the art.

A functional shoe having cushioning and air circulation functions, comprising:

an insole (110) having an upper surface to which leather uppers (102) are adhered;
a midsole (120) including a tunnel portion (122) formed at a rear end thereof, and having a lower side surface (122a) in contact with a lower surface of the insole (110) and formed parallel to the ground surface and an upper side surface (122b) configured to form a predetermined angle (α) with respect to the lower side surface (122a); an outsole (130) having a tread (132) adhered to a lower surface of the midsole (120) and configured to prevent slippage thereof;
a foldable resilient member (140) having a support section (142) configured to support a lower side surface (122a) of the tunnel portion (122) and a pivot section (144) configured to support an upper side surface (122b) of the tunnel portion (122), wherein the pivot section (144) is resiliently folded by an applied load;
a sealing member (150) installed to seal the tunnel portion (122); and
an air channel (160) having one end in communication with the sealed tunnel portion (122) and the other end disposed at a front side of the insole (110).

1. The functional shoe having cushioning and air circulation functions according to claim 1, wherein the foldable resilient member (140) comprises:
a pivot shaft (145);
the support section (142) and the pivot section (144) hinged by the pivot shaft (145); and
a resilient section (146) having a torsional coil spring (146a) inserted into the pivot shaft (145), a first extension unit (146b) extending from the torsional coil spring (146a) to support the support section (142), and a second extension unit (146c) extending from the coil spring (146a) to support the pivot section (144).

3. The functional shoe having cushioning and air circulation functions according to claim 1, wherein a discharge check valve (162) is installed at one end of the air channel (160), and a suction check valve (164) is installed at one side of the sealing member (150).

5. The functional shoe having cushioning and air circulation functions according to claim 1, wherein a suction check valve (164) is installed at one end of the air channel (160), and a discharge check valve (162) is formed at one side of the sealing member (150).

6. The functional shoe having cushioning and air circulation functions according to claim 1, wherein the midsole (120) is curved such that a front side and a rear side are spaced apart from the ground surface.

7. The functional shoe having cushioning and air circulation functions according to claim 1, wherein the midsole (120) has at least one high elastic or solid reinforcement member (170) configured to maintain a shape of the midsole (120) and prevent a fracture of the foldable resilient member (140) from a front side of the midsole (120).

8. The functional shoe having cushioning and air circulation functions according to claim 1, wherein the insole (110) contains an inorganic material of emitting far-infrared light or is anion-treated.

9. The functional shoe having cushioning and air circulation functions according to claim 2, wherein a discharge check valve (162) is installed at one end of the air channel (160), and a suction check valve (164) is installed at one side of the sealing member (150).

10. The functional shoe having cushioning and air circulation functions according to claim 3, wherein a discharge check valve (162) is installed at one end of the air channel (160), and a suction check valve (164) is installed at one side of the sealing member (150).

11. The functional shoe having cushioning and air circulation functions according to claim 2, wherein a suction check valve (164) is installed at one end of the air channel (160), and a discharge check valve (162) is formed at one side of the sealing member (150).

12. The functional shoe having cushioning and air circulation functions according to claim 3, wherein a suction check valve (164) is installed at one end of the air channel (160), and a discharge check valve (162) is formed at one side of the sealing member (150).

13. The functional shoe having cushioning and air circulation functions according to claim 6, wherein the midsole (120) has at least one high elastic or solid reinforcement member (170) configured to maintain a shape of the midsole (120) and prevent a fracture of the foldable resilient member (140) from a front side of the midsole (120).