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(54) **FOOTWEAR WITH REMOVABLE INSERT**

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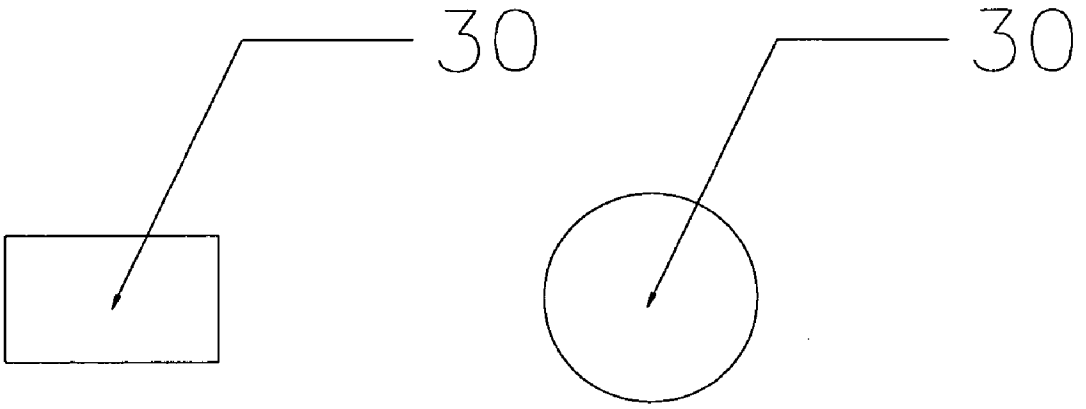
(57) **ABSTRACT**

A removable, disposable shoe insert that can increase the cushion and shock absorbing properties of a shoe without sacrificing durability or comfort is provided. By using different materials for the insert, the user has the option of when to replace the insert. The insert can be of varying sizes, shapes, hardness, and materials. The insert allows manufactures to make the outsole of more durable materials extending the life of the footwear.



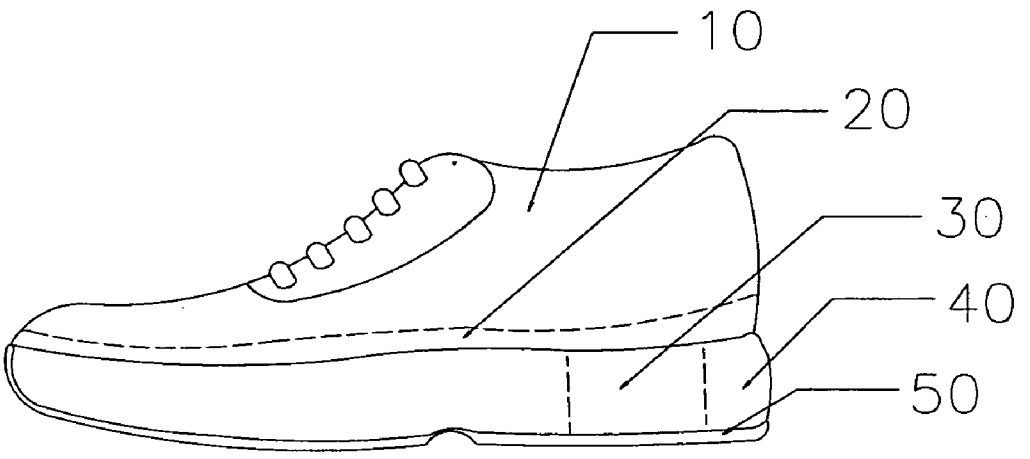


Fig. 1

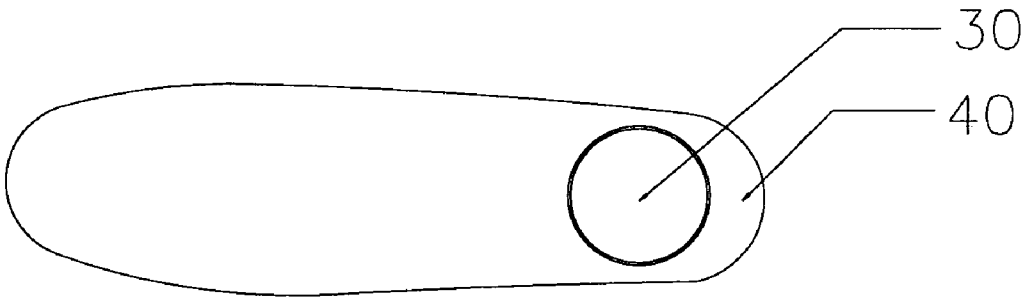


Fig. 2

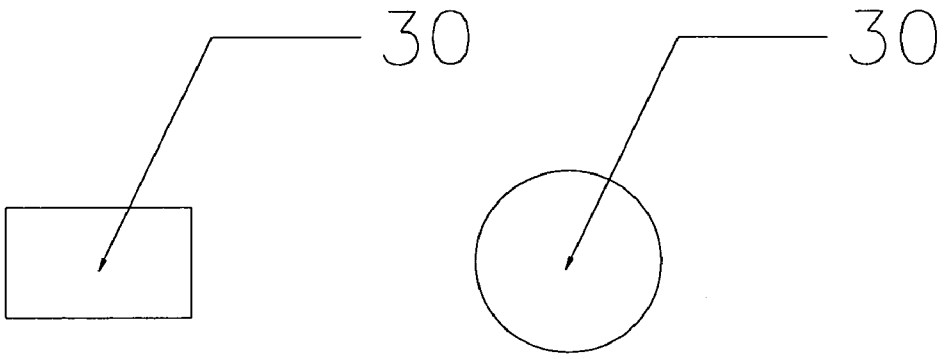


Fig. 3

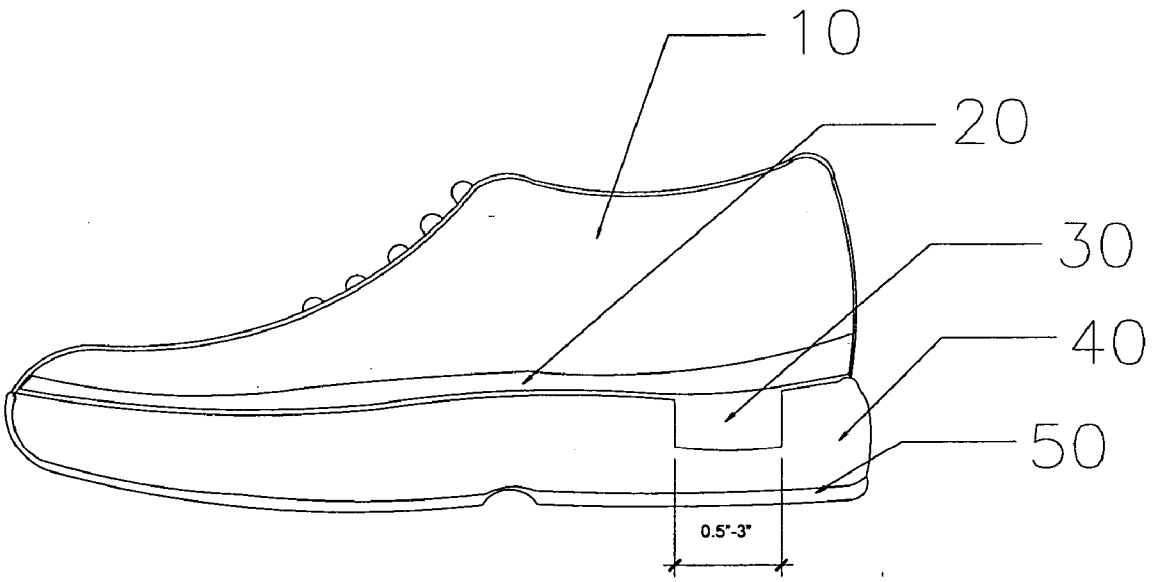


Fig. 4

FOOTWEAR WITH REMOVABLE INSERT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention is directed to footwear and, more particularly, to a removable, disposable shoe insert for cushioning and absorbing shock, footwear embodying the same, and a method of making.

[0003] 2. Description of the Related Art

[0004] Footwear on the market today is designed to reduce stress on the feet, legs and body of the wearer while providing comfort and flexibility. Unfortunately over time many materials footwear are made of breakdown and become harder reducing the ability of the footwear to provide shock absorption and comfort properties to the wearer. This holds true for most all types of footwear when standing, walking, running, or performing a work related task. To solve this issue three main components of footwear have been designed to provide comfort, cushion, and shock absorbing properties.

[0005] The outsole of a shoe that comes in contact with the ground can be made of various types of materials. One typical material is a hardened carbon additive rubber outsole that provides durability, reduce wear, and extend the life of the product. Unfortunately if the outsole is made of a highly durable material, such as hardened rubber, its shock absorbing properties are sacrificed, and other parts of the shoe must be designed to provide shock absorption and cushion. In some applications footwear is designed with the outsole as the main component of the shoe, resulting in a hard and ridged shoe. This may be desirable for durability in a work environment, but it reduces the comfort level to the wearer.

[0006] Another component of footwear is the insole, typically a piece designed to provide a barrier between the foot and the materials from which the footwear is manufactured. Typically an insole is made of a comfortable material that is not irritating to the skin. In order to extend the usefulness or improve the comfort of the footwear or both, improvements have been developed where the insole is replaced. Unfortunately the insole piece covers the complete contact area between the foot and the footwear, becoming costly to replace. The insole is not designed for shock absorption properties and is typically of thin design. To add shock absorption properties to the insole can make the insole thicker, thus changing the configuration and properties of the footwear. The relatively thin design of some aftermarket replacement insoles makes them susceptible to replacement in a fraction of the life span of the footwear. This may result in a costly endeavor due to the various sizes and shape of footwear.

[0007] The main component of many types of footwear, including athletic footwear, that is designed to provide shock absorption and cushion is the midsole. Midsoles that are typically made of Ethyl-Vinyl-Acetate, rubber, polyethylene or other materials provide significant shock absorbing and cushioning properties initially, but they can break down after prolonged use. The midsole tends to lose its elasticity and will actually reduce in thickness due to standing or repeated compression from the impact of walking or running. Once these properties are lost, the footwear becomes less effective and obsolete.

[0008] Typically, in the design of footwear the midsole is the focus for providing shock absorbing properties. It is estimated a good running shoe will perform well for 300 miles. At that point the midsole has broken down to a harder and thinner form of the original material and will not provide essential shock absorption. In the case of many average runners, this is less than a year. Other components of the shoe at this point may be in good shape but the midsole component is worn out.

[0009] In some applications, such as work footwear, the product is designed with only an outsole and insole. The foregoing arguments hold true here as well. The outsole could be made of a more durable material, but it would not provide shock absorption or cushion for the wearer. If the outsole is made of more elastic material for better cushioning, its wear properties are sacrificed and the life of the product is short.

[0010] The ideal material providing shock absorbing properties and wear that returns the midsole, outsole, or insole to its original size after repeated use has not yet been invented, and many have been issued trying to solve this problem and extend the useful life of footwear.

[0011] Numerous patents have been issued describing various methods and architectures for providing interchangeable insoles and midsoles. These patents are summarized below.

[0012] U.S. Pat. No. 4,897,936 describes inserts for the forefoot and heel. Inserts are inserted from the insole side and outsole side. Inserts are attached using rings to hold in place. This may prove to be costly for manufacturing and less durable than other options.

[0013] U.S. Pat. No. 5,533,280 describes many interchangeable components with interlocking properties. The many parts and complexity of this arrangement may be costly to manufacture or replace. In addition wear and stability would be major concern.

[0014] U.S. Pat. No. 6,023,857 describes a removable midsole. Disadvantage being the size of the insert taking away from the stability of the shoe, and cost of replacement for different size shoes.

[0015] U.S. Pat. Nos. 6,023,859 and 5,799,417 describe a hinged part of the outsole to allow for a replaceable insert. The outsole requires two hinged mechanisms and locking devices to keep the outsole in place. This may prove to be costly during manufacturing and cumbersome for use.

[0016] U.S. Pat. No. 4,942,677 describes an adjustable insert which may be primarily for medical rehabilitative purposes. This type of design incorporate single or multiple parts of wedge shaped design which may not be desirable under heavy use.

[0017] U.S. Pat. No. 4,624,061 describes two insert components slotted and interconnected one from the inside, the other from the outside of the shoe. Again manufacturing cost may be high and replacement of insert may be complex or prove to be a disadvantage when not interlocking correctly.

[0018] U.S. Pat. No. 6,543,158 describes an insole insert. Insole inserts are generally thin in design and would not provide the amount of shock absorption or comfort as an insert of significant depth. In addition an insole insert is

typically manufactured of multiple materials and varying shoe sizes raising the cost of manufacturing. It is possible to standardize the shape, size or single material the heel insert is made of. This allows the insert to be a relatively inexpensive alternative in maintaining footwear characteristics over the life of a shoe.

[0019] U.S. Pat. No. 6,745,499 describes a fluidic cushioning solution to improving shock absorption properties. Providing cushioning by fluid flow is one solution but does not address the problem with materials breaking down over time and repeated use. The manufacturing and overall cost may be a negative for this design. In addition the insert is independent of the forefoot area, reducing complexity of the design.

[0020] U.S. Pat. No. 6,751,891 describes a complex springs and return assembly manufactured into the footwear. Expense of manufacturing would be an issue. The overall footwear may be heavier and noisy. In addition there may be a reduction in performance by the springs over time limiting the life span of the product. A removable insert eliminates the need for long term performance, material return characteristics by being removable. The insert can simply be replaced after it losses its ability to cushion impact which is determined by the wearer or a recommended time period based on wear, weight or size of shoe. The insert improves the shock absorbing properties of the overall shoe by not requiring durability as one of its main traits. No return system is required.

[0021] U.S. Pat. No. 6,754,982 describes multiple cone system with a plate that can be used with any different number of pieces. The plate system adds rigidity, which is an undesirable effect while the cones are providing shock absorption, a desirable effect. With a single insert multiple pieces or additional parts are not required reducing replacement and manufacturing costs.

[0022] U.S. Pat. No. 6,722,058 describes a cartridge that is "U" shaped with multiple pieces. These types of designs and others like it require multiple parts or plates increase manufacturing cost, weight and in some cases create side-to-side stability issues. In addition with multiple components the chance of failure is greater. An insert as described in this patent is a single component that is removable and replaced when the wearer determines the insert has reached its life. The insert can be manufactured out of inexpensive materials allowing the user to replace at their convenience.

BRIEF SUMMARY OF THE INVENTION

[0023] The disclosed embodiments of the present invention are directed to a replaceable insert for footwear, footwear embodying the same, and a method of making. In accordance with one embodiment of the invention, an insert is provided formed of cushioned material sized and shaped to be received in the sole of a shoe, and preferably within the heel, although multiple inserts may be used at multiple locations in the shoe.

[0024] In accordance with another embodiment of the invention, footwear is provided that includes at least one cushioned insert removeably positioned in the outsble of the shoe to provide cushioning to a user and configured for replacement by slideably removing the same from the shoe.

[0025] In accordance with another embodiment of the invention, a method of making footwear with a removable insert is provided, the method including providing footwear with at least one opening in the outsole and a cushioned insert sized and shaped to be slideably received within the opening, and slideably positioning the insert within the opening.

[0026] In accordance with another aspect of the foregoing embodiment, providing the opening in the shoe includes sizing and shaping the opening such that the opening and the insert will have a tight fit, preferably an interference fit.

[0027] In accordance with another embodiment of the invention, a shoe is provided that includes a body having a closed bottom and an opening in a top thereof that communicates with an interior through which a user inserts a foot, the shoe having a toe portion and a heel portion, the bottom of the shoe formed to have at least an outsole, the outsole having a bottom surface that is exposed when the shoe is worn and a top surface, the midsole having a bottom surface that abuts the top surface of the outsole, and a top surface, the bottom having a cavity formed therein that opens through one of the outsole and the midsole; and a plurality of inserts sized and shaped to be received within the cavity through an opening formed in one of the outsole and the midsole, each of the plurality of inserts sized to have a tight fit within the cavity to retain its position in the cavity and yet permit removal by the user for replacement with another of the plurality of inserts.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0028] The foregoing and other features and advantages of the present invention will be more readily appreciated as the same become better understood from the following detailed description when taken in conjunction with the accompanying drawings, wherein:

[0029] **FIG. 1** is a side view of footwear having a removable insert formed in accordance with the present invention;

[0030] **FIG. 2** is a bottom view of the footwear of **FIG. 1**;

[0031] **FIG. 3** is an illustration of various geometric configurations of the insert formed in accordance with the present invention; and

[0032] **FIG. 4** is a cross-sectional illustration of a shoe with a heel insert formed in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0033] **FIGS. 1 through 3** illustrate footwear, in this case a shoe **10** having an insole **20**, a midsole **40**, and an outsole **50**. **FIG. 1** shows the basic configuration of footwear with an added insert device **30**. Some footwear may not include one component such as the midsole **40**. In those cases the insert would be inserted into the outsole **50**, which would include the area displayed as the midsole **40**.

[0034] The removable insert **30** is shown inserted through the midsole **40**. An alternate design would have the insert **30** inserted through the outsole. In this case, the lower face of the insert **30** would be exposed to the elements. This may require removal or partial removal of the outsole and some type of locking device. The preferred method for simplicity would be insertion through the inside of the shoe **10**. **FIG.**

2 illustrates a plan view or top view illustrating the interior **60** of the shoe **10** with the insert **30** in place. The insert **30** is located in the midsole **40**, or in some instances the outsole **50** if no or a limited midsole is manufactured into the shoe **10**. The tolerances between the insert and the midsole or outsole are minimal in order to provide a firm placement and retention of the insert into the shoe **10**.

[**0035**] **FIG. 3** illustrates the insert design. The insert **30** can be a cylinder of specific depth and diameter. In different applications it may be better to manufacture the insert in the form of, but not limited to a square **70**, oval or closed "U" shape design, of varying depths. The insert **30** is designed to be made of but not limited to materials such as EVA (Ethyl-Vinyl-Acetate), rubber, polyurethane, materials the midsole, outsole, insole are typically made from. By doing this a piece of footwear can be configured to the user's personal preference or use. An example would be an athletic running shoe that has a midsole **40** made of EVA, the insert **30** could be made of EVA returning the footwear to its original intended shock absorbing parameters each time the insert is replaced. If the insert **30** was made of a softer porous material the advantage of greater shock absorbing and cushioning properties could be obtained without the Worry of repeated use. After a single or limited number of uses the insert could be replaced, returning the footwear to its original improved shock absorbing properties.

[**0036**] This present invention is not limited to athletic footwear but is applicable to all types of footwear. Examples include, but are not limited to, athletic, casual, dress, and specialty footwear.

[**0037**] The footwear is manufactured or modified after manufacturing to include a cavity in which the insert is placed. The heel of the footwear provides most of the shock absorbing requirements for the wearer during movement such as walking, running, or while stationary. The preferred location of the cavities in a pair of shoes in which the insert **30** is ideally directly under the impact point of the wearer's heels. This location may be offset but it is most desirable at the point of impact between the heel of the foot and the center of the insert. For example, insert **30** may be a cylindrical insert with a circular diameter in the range of 0.5 inch to 3.0 inches and preferably of 2.0 inches for a size 12 shoe. The size and shape of the insert may vary depending on the size and application of the footwear. The shape and diameter are not limited to a specific dimension or to the cylindrical design but are the most obvious for discussion purposes. Other shapes such as ovals, rectangles, squares, or a closed "U" shape, with the closed flat end of the "U" facing the toe may be more desirable for manufacturing or coverage. The desired goal of the insert **30** is to provide enough area of impact for shock absorption while maintaining the footwear integrity and comfort. If the cavity area is too big, the footwear may not provide the required support or stability. The insert **30** and cavity in the footwear may vary in depth. The cavity depth and vertical dimension of the insert **30** may range from a fraction of an inch from the outside of the outsole **50** to a percentage of that depth. This would be most desirable if the footwear incorporates other shock absorbing devices or materials layered into the footwear. The insert **30** would only seat a percentage of the way between the insole and outside of the outsole as shown in **FIG. 4**. The insert **30** may also be made of materials that do not require the use of an insole. In addition the insert **30** may be designed with holes or notched out areas, may be of a unitary design, or it may be layered or formed of adhered segments. An example of varying designs include a single center hole, or a notched out area on one edge that may be desirable for manufacturing, removal, material performance or air transfer. In addition various shapes of this insert **30** may include but are not limited to a cone, bar or strip of specified depth. The advantage of these shapes includes providing variance in the area of coverage for different applications or reduced manufacturing costs.

[**0038**] By being removable, the insert can be replaced when the material begins to break down and the ability to provide shock-absorbing properties decreases. When to replace this insert **30** is dependent on the wearer. The insert can be replaced after each use or multiple uses over an extended time period. The insert can be constructed of the same material as the midsole or other materials that provide better cushioning and shock absorbing properties but less durable than the midsole or outsole construction. The shoe can provide optimum durability in the initial design of the shoe and increased shock absorbing properties with the disposable insert. In this configuration a shoe can last for a greater period of time than a shoe that is trying to provide both durability and shock absorption, sacrificing one and/or the other providing a mediocre performing shoe.

[**0039**] Alternative footwear such as work shoes or boots would provide an ideal application for an insert **30**. With some manufactured work footwear the outsole incorporates the midsole into its design. For these applications a removable insert **30** is ideal. The cavity can create an insert **30** area in order to provide better shock absorption and comfort characteristics to an otherwise ridged shoe. The design of some work footwear incorporating a one-piece outsole **50** and midsole **40** is for safety, corrosion resistance, traction and durability, an ideal application. Other applications include but not limited to all types of athletic footwear running, basketball, tennis, cross training, daily footwear casual, business, and specialty footwear.

[**0040**] For medical reasons the insert **30** materials could be made with highly elastic properties that may not last under repeated use, but would provide the best shock absorption for reduced impact to feet, legs, hips and back. The specific dimension of the insert, for example complete depth from insole to a fraction of an inch to the outside could improve range of motion for the foot. With the insert made of a softer material that compresses easily this would allowing the heel to travel with a greater range of motion relative to the front of the foot. Stretching and recoiling the calf muscle to greater distances.

[**0041**] As will be readily appreciated from the foregoing, the disclosed embodiments of the present invention provide for a replaceable insert that enables users to replace worn-out support in their footwear. In addition, the insert and shoe design of the present invention enables a user to selectively replace the insert to facilitate a particular activity, such as a high-impact insert for running, a low-impact insert for walking, and a medium impact insert for working conditions. In addition, various environmental factors may be accommodated, such as designing water resistance or water-repellant properties in the insert through the use of materials or architecture. The insert can also be constructed to facilitate breathability between the interior of the shoe and the

exterior, such as through the midsole and the outsole to the bottom of the shoe. This can include a pumping-type of action in a one-way or two-way direction to draw air in through the top of the shoe and expel it through the bottom of the shoe as the wearer is walking or running or moving up and down while standing in place.

[0042] More particularly, the disposable insert can be manufactured of a porous or semipermeable material that permits air to pass into and out of the interior of the shoe. This would circulate air in the shoe through repeated compression during movement of the foot. The material that provides circulation for the shoe itself can be manufactured with air passages from the sides, top, or bottom of the shoe or any combination of the foregoing. These passages allow air into and out of the shoe or in only one direction, depending on the design and the incorporation of valves in the insert or the shoe in conjunction with the insert operation. In order to restrict water from entering the shoe, valves or passageways can be designed to restrict water or to channel water away from the interior of the shoe. One design formed in accordance with the present invention; would enable the insert to be rotated about a longitudinal axis to open up air passages when the environment is dry and to rotate in an opposite direction to close air passages between the insert and the shoe to prevent the passage of air and fluid. Thus, passages in the shoe may match up or utilize the insert as a means to control air flow.

[0043] In another embodiment, the insert, which can be disposable, can incorporate a pump mechanism that utilizes valves or channels of different designs and quantities to force air movement in various flow patterns. This would be an actual pump that operates from the pressure of the foot as it moves in the interior of the shoe, and in particular as it exerts pressure on the outsole of the shoe from the interior.

[0044] All of the above U.S. patents, U.S. patent application publications, U.S. patent applications, foreign patents, foreign patent applications and non-patent publications referred to in this specification and/or listed in the Application Data Sheet, are incorporated herein by reference, in their entirety.

[0045] From the foregoing it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. Accordingly, the invention is not limited except as by the appended claims.

1. A removable insert for footwear, the insert comprising:

a body formed of resilient material and sized and shaped to be slideably received within a corresponding opening in the sole of the footwear such that a face of the body is exposed to the exterior of the shoe.

2. The method of claim 1 wherein providing the body comprises sizing and shaping the body to be slideably received within the opening in the shoe with at least a tight fit.

3. The method of claim 1 wherein the body is sized and shaped to have an interference fit with the opening in the shoe.

4. Footwear, comprising:

a shoe having at least an outsole and a midsole, the midsole having an opening formed therein; and

an insert sized and shaped to be slideably received within the opening, the insert configured to provide cushioning for a user's foot.

5. The footwear of claim 4 wherein the shoe has an interior that communicates with the midsole, and the opening is formed in the midsole and communicates with the interior of the shoe to enable a user to place the insert inside the opening from the interior of the shoe.

6. The footwear of claim 4 wherein the opening in the shoe communicates with the exterior of the shoe through the outsole only and extends into the midsole without communicating with an interior of the shoe such that a user can place the insert into the opening through the outsole of the shoe only.

7. Footwear for providing comfort and support to the foot of a user, comprising:

a shoe having a body defining an interior to receive the foot of the user, the body having an open top communicating with the interior and a closed bottom, the closed bottom having an opening formed therein; and

an insert to be received within the opening in the bottom of the shoe, the insert sized and shaped to be slideably received within the opening.

8. The footwear of claim 7 wherein the bottom of the shoe comprises an outsole on the exterior of the bottom and an insole having an exposed surface in the interior of the shoe, and the opening is formed in one of the outsole and the insole in a heel area of the shoe.

9. The footwear of claim 8, comprising a plurality of inserts, each insert configured to provide a different level of cushioning.

10. The footwear of claim 9 wherein the insert is inserted within the opening through the interior of the footwear only to have a face exposed to the interior of the footwear.

11. The footwear of claim 9 wherein the insert is inserted through the outsole only of the bottom of the footwear and has a face exposed through the outsole of the footwear.

12. A method of making footwear, comprising:

providing a shoe with an opening formed in at least a midsole of the shoes;

providing a body of cushioning material sized and shaped to be received within the opening in the shoe; and

inserting the body into the opening in the shoe.

13. The method of claim 3 wherein providing the body comprises sizing and shaping the body to be slideably received within the opening in the shoe with at least a tight fit.

14. The method of claim 4 wherein the body is sized and shaped to have an interference fit with the opening in the shoe.

15. A shoe, comprising:

a body having a closed bottom and an opening in a top thereof that communicates with an interior through which a user inserts a foot, the shoe having a toe portion and a heel portion, the bottom of the shoe formed to have at least an outsole, the outsole having a bottom surface that is exposed when the shoe is worn and a top surface, the midsole having a bottom surface that abuts the top surface of the outsole, and a top surface, the bottom having a cavity formed therein that opens through one of the outsole and the midsole; and

a plurality of inserts sized and shaped to be received within the cavity through an opening formed in one of the outsole and the midsole, each of the plurality of inserts sized to have a tight fit within the cavity to retain its position in the cavity and yet permit removal by the user for replacement with another of the plurality of inserts.

16. The shoe of claim 15, further comprising an insole having a bottom surface abutting the top surface of the midsole and a top surface, the insole having an opening therein to communicate with the cavity to enable the inserts to be placed in the cavity through the interior of the shoe.

17. The shoe of claim 15 wherein the cavity has an opening formed only in the outsole such that when the insert is placed in the cavity through the outsole, a face of the insert is exposed through the bottom surface of the outsole.

18. The shoe of claim 16 wherein the cavity formed in the bottom communicates between the interior of the shoe and an exterior of the shoe through the outsole, and further wherein at least one of the plurality of inserts is structured to facilitate the passage of air therethrough without permitting water to enter the interior of the shoe.

19. The shoe of claim 18 wherein the at least one insert is configured to pump air from the interior of the shoe through the outsole through the exterior of the shoe.

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