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(54) **METHOD AND APPARATUS FOR CUSTOM FITTING FOOTWEAR**

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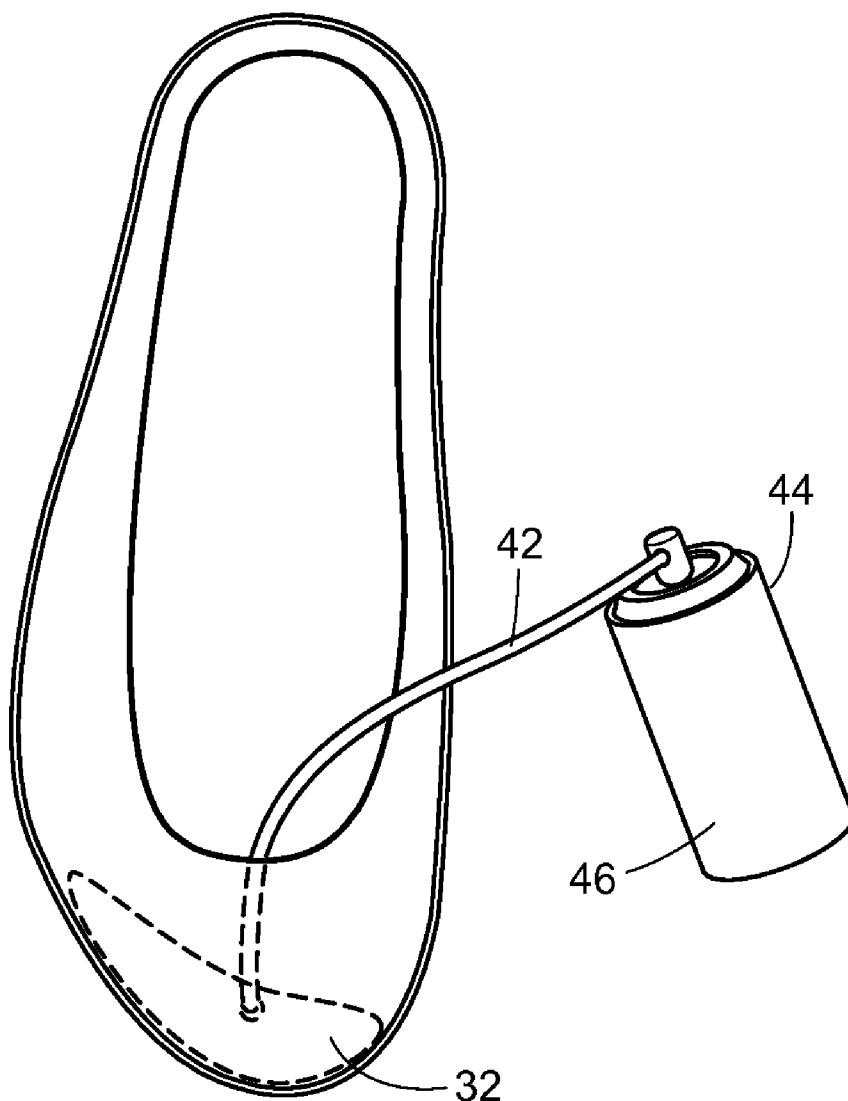
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(57) **ABSTRACT**

A method and apparatus of custom-fitting footwear, the method including receiving a fillable bag insert into footwear and receiving solidifying material into the fillable bag insert. The method further includes continuing to receive the solidifying material until a space between an interior portion of the footwear and a user's footspace is substantially filled.



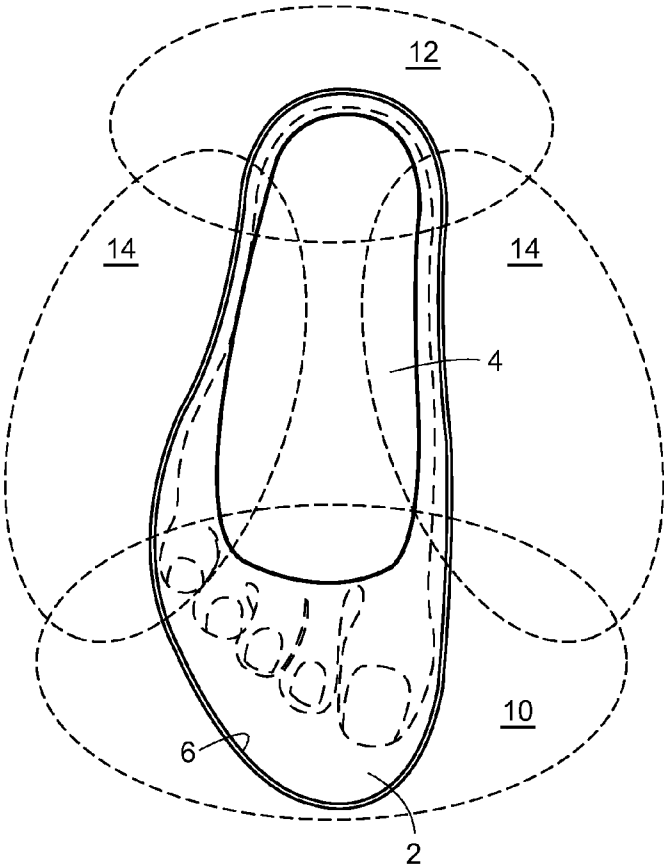


FIG. 1

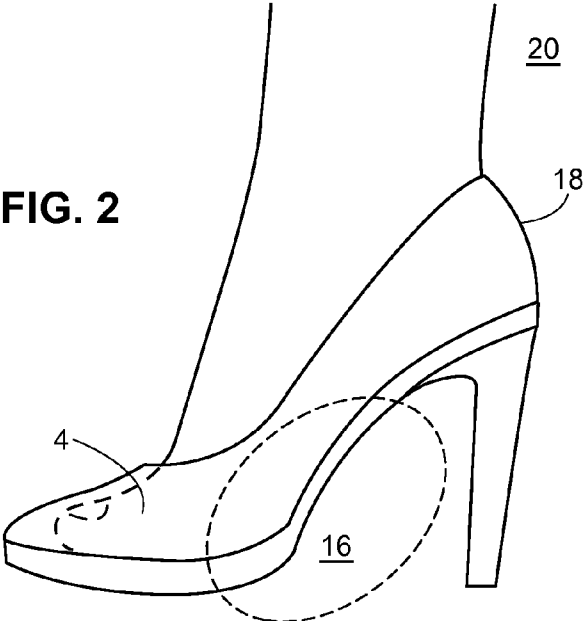


FIG. 2

FIG. 3

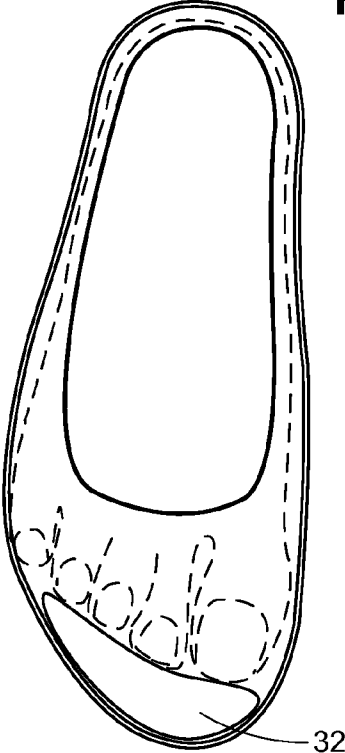
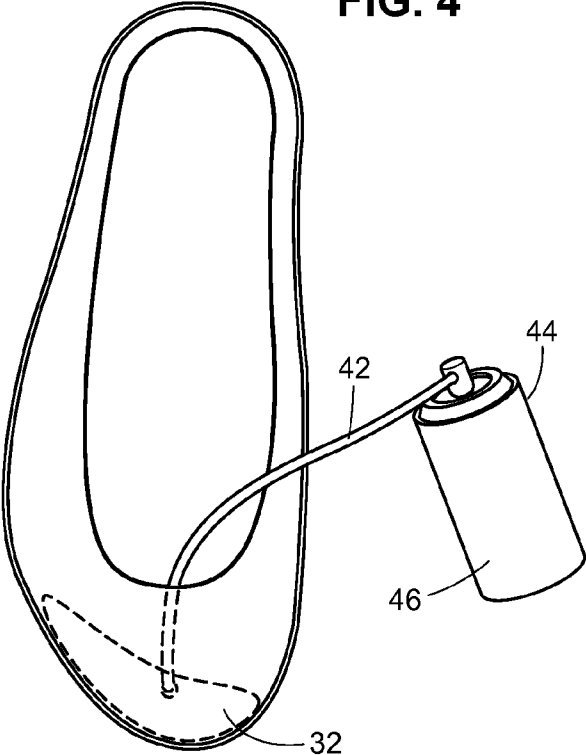


FIG. 4



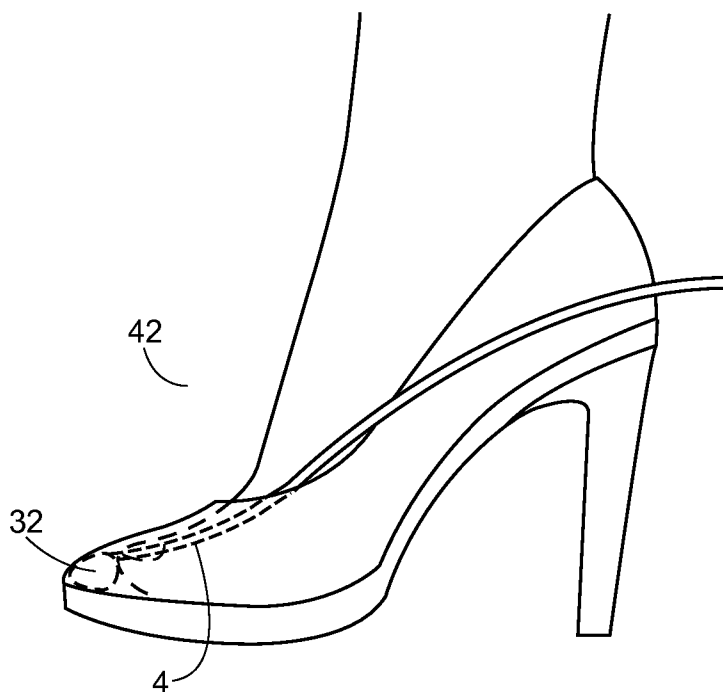


FIG. 5

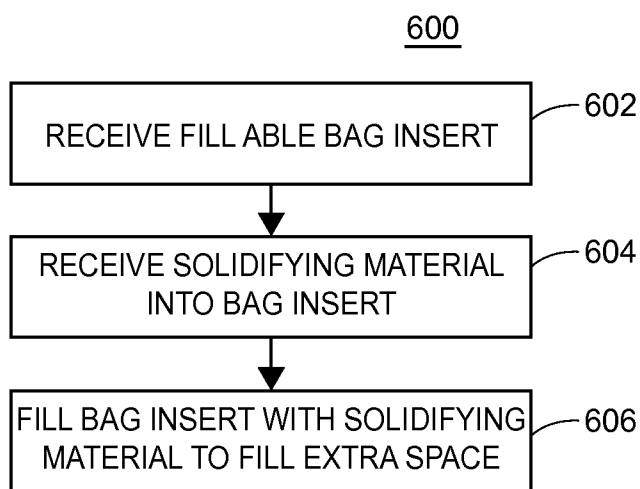


FIG. 6

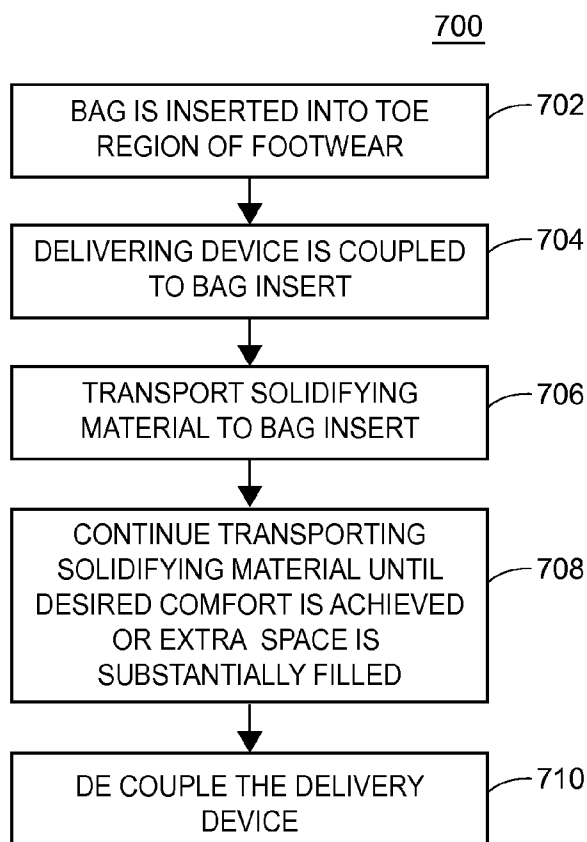


FIG. 7

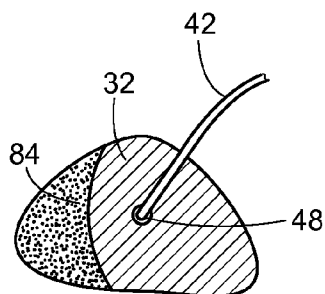


FIG. 8

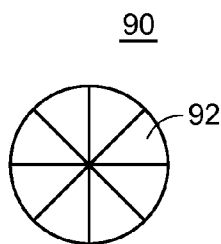


FIG. 9

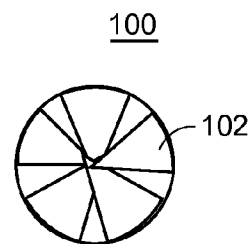


FIG. 10

METHOD AND APPARATUS FOR CUSTOM FITTING FOOTWEAR

FIELD OF THE DISCLOSURE

[0001] The present disclosure relates generally to a footwear insert and more particularly to a method and apparatus for custom fitting footwear.

BACKGROUND

[0002] Conventional footwear inserts do not adequately address the problem a user has when one foot is bigger than the other. Conventional footwear inserts provide a user having the problem of different foot sizes with a heel insert. The heel insert is placed inside the interior portion of the back part of the shoe to adjust the shoe to better fit the user's foot. The heel insert adds thickness to the interior back part of the shoe when it is inserted into the back heel portion of the shoe. This moves the user foot forward into the shoe causing another comfort problem where the arch of the foot becomes unaligned with the shoe design.

[0003] For some people, heel inserts may help keep their larger shoe from slipping off. However, some people may need more adjustment to the larger shoe to lessen the likelihood of the shoe slipping off.

[0004] U.S. Pat. No. 6,954,997 describes a panel insert that extends across a toe box of an interior portion of footwear. This attempt at a solution is clumsy, as it requires attachment to the footwear via stitching, adhesive bonding, or thermal welding.

[0005] U.S. Pat. Nos. 7,827,707 and 8,181,362 describes heat-sensitive visco-elastic polyurethane foam material inserts that are cut from initial solid pillow shaped inserts. The cut inserts are inserted into footwear to substantially occupy the distal end of the shoe toe region and present a proximal toe-engaging face that substantially spans the cross sectional dimension of the toe region. This attempt at a solution is inefficient and it requires the user to approximate the size of the insert and then the user is required to cut the insert to the approximated size. Cutting the insert to an approximate size is guesswork. An incorrect guess produces a wasted insert.

[0006] Accordingly, there is a need for a method and apparatus for inserting custom fitted footwear inserts and the custom fitted footwear inserts that adjust for a user's variance in size between his/her left foot and right foot.

BRIEF DESCRIPTION OF THE FIGURES

[0007] The accompanying figures, where like reference numerals refer to identical or functionally similar elements throughout the separate views, together with the detailed description below, are incorporated in and form part of the specification, and serve to further illustrate embodiments of concepts that include the claimed invention, and explain various principles and advantages of some of those embodiments.

[0008] FIG. 1 illustrates a top down view of footwear showing the space between a users foot and the interior portion of the footwear in accordance with some embodiments.

[0009] FIG. 2 illustrates side view of footwear showing the space between a users foot and the interior portion of the footwear in accordance with some embodiments.

[0010] FIG. 3 illustrates a view, similar to FIG. 1, showing example placement of a fillable bag insert in accordance with some embodiments.

[0011] FIG. 4 illustrates a view, similar to FIG. 1, showing a fillable bag insert and a delivery device attached to the bag insert in accordance with some embodiments.

[0012] FIG. 5 illustrates a view, similar to FIG. 2, showing a fillable bag insert and a delivery device attached to the bag insert in accordance with some embodiments.

[0013] FIG. 6 is a flow diagram of a method for custom fitting footwear in accordance with some embodiments.

[0014] FIG. 7 is another flow diagram of a method for custom fitting footwear in accordance with some embodiments.

[0015] FIG. 8 is a close up view of a fillable bag insert coupled to a delivery device to deliver the solidifying material in accordance with some embodiments.

[0016] FIG. 9 is an embodiment of a coupler of the fillable bag insert in accordance with some embodiments.

[0017] FIG. 10 is another embodiment of a coupler of the fillable bag insert in accordance with some embodiments.

[0018] Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of embodiments of the present invention.

[0019] The method and apparatus components have been represented where appropriate by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the embodiments of the present invention so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein.

DETAILED DESCRIPTION

[0020] Generally speaking, pursuant to the various embodiments, the present disclosure provides a method and apparatus for custom fitting footwear.

[0021] In one embodiment, a method of custom-fitting footwear, the method including receiving a fillable bag insert into footwear, receiving solidifying material into the fillable bag insert; and continuing to receive the solidifying material until a space between an interior portion of the footwear and a user's footspace is substantially filled.

[0022] In another embodiment, a method of custom-fitting footwear, the method including inserting a fillable bag insert into a footwear space, coupling a delivery device for a solidifying material to the fillable bag insert, delivering the solidifying material to the fillable bag insert, continuing to deliver the solidifying material to the fillable bag insert until an extra space is substantially filled; and decoupling the delivery device from the fillable bag insert.

[0023] In another embodiment, a method of custom-fitting footwear, the method including placing a delivery device for a solidifying material into extra space of a footwear, delivering the solidifying material to the extra space, continuing to deliver the solidifying material until the extra space is substantially filled, and removing the delivery device from the footwear.

[0024] In another embodiment, a footwear insert including a solidifying material delivered to substantially fill an extra space between a footwear interior and a footspace, wherein the solidifying material solidifies after entry into the extra space.

[0025] In another embodiment, a footwear insert including a malleable material delivered to substantially fill an extra

space between a footwear interior and a footspace, wherein when two different portions of the material are pressed together the two portions join to form a single portion.

[0026] In another embodiment, a footwear insert system including a solidifying material container, a fillable bag insert configured for placement between a toe portion of a foot and an interior portion of a footwear, and a delivery device configured to direct the solidifying material into the fillable bag insert to reduce an extra space between the toe portion and the interior portion.

[0027] Referring now to the drawings, and in particular FIG. 1 and FIG. 2, a user's foot is shown wearing footwear. FIG. 1 shows a top-down view and FIG. 2 shows a side-view. Many people have one foot that is bigger than the other. Footwear manufacturers do not accommodate for a difference in user's foot sizes. As a result, a person who has one foot bigger than the other usually has one shoe that does not fit as well as the other.

[0028] Other times when embodiments of the disclosure provided herein may also be useful is when a user does not find the size they need and then ends up buying a slightly larger size for both feet. In that case, the method and apparatus described herein may be useful for both feet. Further, there are times when extra space between a user foot and footwear is a bigger problem. For example, when a user engages in a sport. A user may wear athletic type footwear, e.g., hockey skates or figure skates, which does not fit very well. A competitive athlete may want a better fit so that the athlete has better control over the skate when maneuvering edges while skating. Having too much space between the user foot and the footwear makes it more difficult for an athlete to control movement. An athlete may want better control of movement to, for example control skating edges, or have more agility that is beneficial when engaging in most sports. A better fit enables for better control of motion when using footwear.

[0029] In one example, embodiments described herein help to reduce the extra space in a toe region 10 of footwear. Other embodiments may be used to decrease or eliminate extra space in another part of the footwear, such as the heel-region 12, either side-region 14, 14 or an under-arch region 16. Each of these footwear spaces may be filled with respective embodiments of the disclosure.

[0030] Conventional footwear is not easily customized for a person, much less customized for a user with different sized feet. Custom manufactured, which herein is termed as customized or "custom-sized" footwear, is not available at a price that meets most people's budgets. Some embodiments herein allow for a solution by providing custom-fitted footwear to a user. By using some embodiments described herein, a user is able to custom-fit footwear that is not custom-sized for the user.

[0031] Footwear includes all types of shoes or athletic footwear a person may use that does not come custom-sized for a perfect fit. For example, footwear includes men's shoes, women's shoes 18, children's shoes, skates, ski boots, soccer shoes, basketball shoes, tennis shoes, squash shoes, and any other sport type or dress type shoe, etc.

[0032] FIG. 1 illustrates how a space 2 (sometimes referred to herein as "extra space") exists between a user's foot 4 and a footwear interior portion 6. The extra space may become a problem. For example, the space 2 causes a problem when it is large enough to cause the users foot to slip inside the shoe. The slipping may occur in any direction causing irritation to the part of the foot that keeps rubbing against the shoe portion.

The slipping may cause injury to the foot 4, such as blisters, etc. Also, the extra space may pose a larger danger when the extra space is large enough to cause the shoe 18 to slip off, for example, when a person is walking down the stairs, possibly causing a fall.

[0033] FIG. 6 is a flow diagram that describes a method 60 of custom-fitting footwear. Footwear receives a fillable bag insert (62). The fillable bag insert 30 receives the solidifying material (64). The fillable bag insert continues receiving the solidifying material until a space between an interior portion of the footwear and a user's footspace is substantially filled (66). In another embodiment, receiving the solidifying material continues up to a reaching of the user's comfort level.

[0034] A user's footspace includes the space that the foot takes up for the purposes of sizing and fitting. For example, footspace includes the space the foot takes up when in the footwear. Other methods of providing a footspace are included, such as having a three dimensional rendering of a foot for purposes of determining how much solidifying material is required to substantially fill the space between the footspace and the footwear interior portion 6. The three dimensional rendering of the foot may be accomplished with lasers or by other electromagnetic or mechanical means.

[0035] The embodiments described herein may be integrated prior to or during the manufacturing of footwear. A user having a different size foot or a foot that does not fit well into standard footwear sizes may provide their foot for footspace analysis. The footspace analysis produces a custom footspace rendering or footspace data that may be used in alternative embodiments of the disclosure made herein. For example, a user may provide their footspace data to a manufacturer so that the manufacturer may fill their standard size footwear with solidifying material or other footwear material that may be manufactured into the custom-fitted footwear. Alternatively, the footspace data may be used during manufacturing to produce custom-sized footwear. For example, receiving a fillable bag insert into footwear occurs during manufacturing of the footwear.

[0036] FIG. 7 is a flow diagram that describes another method 700 of custom-fitting footwear. A user inserts the fillable bag insert into a footwear space, e.g., toe region 10 (702). Footwear space is the interior space of footwear. Other footwear spaces may receive the bag insert depending upon where the user has the fit problem. In an embodiment, the user couples a delivery device 42 for the solidifying material 44 to the fillable bag insert 32 (704). The user inserts a foot into the footwear. The solidifying material 46 is delivered to the fillable bag insert 32 (706). The solidifying material 46 continues being delivered into the fillable bag insert 32 (708) until the desired comfort is achieved or the extra space is substantially filled (e.g., the extra space in the toe region 10 is filled). The delivery device 42 is decoupled (710).

[0037] The material that fills the bag insert may be any type of solidifying material 46. For example, polyurethane-solidifying foam is the solidifying material that is delivered to the fillable bag insert 32. Spray foam is another solidifying material 46 that is used. Micro-air beads are also used with embodiments described herein. In other embodiments, other materials are delivered to the fillable bag insert 32, as long as such materials still provide filling of the extra space 2. For example, a non-solidifying material, such as buckwheat hull, is used with some embodiments described herein. In other embodiments, pellets of memory foam or silica gel or sodium silicate or aerogel are delivered into the bag insert 32. Mate-

rials that increase in size after adding another material are used with some embodiments of the disclosure described herein.

[0038] FIG. 3 is a view similar to FIG. 1, but showing an empty bag insert 32 of the insert system, used to hold a solidifying material 46. The bag insert 32 is shown placed in the toe region 10 of the footwear. FIG. 4 is a view similar to FIG. 1, but showing a bag insert 32 and a delivery device 42 attached to the bag insert 32. In an embodiment, a footwear insert system includes a solidifying material container 44; a fillable bag insert 32 configured for placement between a toe portion of a foot and an interior portion 6 of a footwear; a delivery device 42 configured to direct the solidifying material 46 into the fillable bag insert 32 to reduce an extra space between the toe portion and the interior portion 6.

[0039] The delivery device 42 embodiment shown is a flexible tube that couples to the bag insert 32 and a solidifying material source, depicted in the embodiment as a pressurized canister 44 that holds the solidifying material 46. In an embodiment, the delivering the solidifying material 46 to the fillable bag insert 32 is accomplished with a pressurized canister 44. FIG. 5 is a view similar to FIG. 2, but showing a bag insert 32 and a delivery device 42 attached to the bag insert 32.

[0040] The flexible tube embodiment of the delivery device 42 is flexible enough to be bent enough to allow sliding of the delivery device 42 in between the footwear interior 6 and the user's foot 4 to get the opening of the delivery device 42 to a place so that the extra space 2 in the footwear may be filled.

[0041] In another embodiment, the user estimates how much solidifying material 46 or other material is needed. The user fills the bag insert 32 prior to placing the insert 32 into the footwear where the extra space was a previous problem. The user then places her foot into the footwear to see if more or less solidifying material 46 is required. If less is required, the user removes the excess material 46 from the fillable insert bag 32 before the solidifying material has time to solidify. If more material is required to fill the extra space 2, the user inserts more solidifying material 46 or other material into the bag insert 32 and tries again, until the fit is right.

[0042] In another embodiment, the solidifying material 46 has a faster solidification property so that it solidifies upon exit of the delivery device 42 and into the extra space 2. The delivery device 42 is positioned into the footwear space so that the material 46 will be delivered directly into the extra space 2. In this embodiment, there is no fillable bag insert 32 as the material 46 itself hardens upon delivery to the space 2.

[0043] In an embodiment, a footwear insert includes a solidifying material 46 that is delivered to substantially fill an extra space 2 between a footwear interior 6 and a footspace, wherein the solidifying material solidifies after entry into the extra space 2. In another embodiment, a method of custom-fitting footwear includes placing a delivery device 42 for a solidifying material 46 into extra space 2 of a footwear; delivering the solidifying material 46 to the extra space 2; continue delivering the solidifying material 46 until the extra space is substantially filled; and removing the delivery device 42 from the footwear. In an embodiment, the solidifying material is polyurethane-solidifying foam. In an embodiment, the solidifying material is a spray foam. Other embodiments of solidifying material 46 include acrylic latex caulk, silicone caulk, or similar materials that cure quickly. Another embodiment of a delivery system is a caulking gun (not shown) and a flexible tube. In an embodiment, the solidifying

material 46 cures to a hardness configured to stabilize a foot 4 inside of the footwear. In another embodiment, adhesive is placed into the footwear prior to the delivery of the solidifying foam insert so that the solidifying foam insert is assisted in remaining inside the footwear by the adhesive.

[0044] In an embodiment, the user wears a covering (not shown), such as a plastic sock or other material sock, to separate the user's foot from the solidifying material until the solidifying material has hardened. The covering does not have to cover the entire foot. The covering covers the portion of the user's foot that comes up against the solidifying material 46. The covering keeps the user from directly coming into contact with some embodiments of the solidifying material 46 or malleable material, depending on the particular embodiment.

[0045] In another embodiment, the solidifying material 46 may be replaced throughout the embodiments described herein with a malleable material, such as a silicone polymer. In some embodiments that use a malleable material to fill the extra space 2, the above-described delivery system 42, 44 is not used. Embodiments of the malleable material footwear insert include a viscoelastic liquid silicone. In another embodiment, malleable material footwear insert includes silly putty or silly putty with thixotropic agents added to reduce the flow and enable the putty to better hold its shape. Malleable means capable of being shaped. Embodiments of the malleable material include a material wherein when two different portions of the material are pressed together the two portions join to form a single portion. In some embodiments the footwear insert is made of a material, like play-doh, e.g., a compound that includes a mixture of water, salt, and flour. In some embodiments, the malleable material includes any one or more from the group: water, a starch-based binder, a retrogradation inhibitor, salt, lubricant, surfactant, preservative, hardener, humectant, fragrance, and color. In some embodiments, a petroleum additive is added. In some embodiments, borax is added to prevent mold from developing. In some embodiments, vegetable, canola, or olive oil or cream of tartar are added.

[0046] When using malleable material instead of solidifying material, the user estimates how much malleable material is required to fill the extra space 2 in the footwear. Until the fit is suitable or the extra space is substantially filled, the user keeps adding or subtracting from the malleable material, until the desired fit is achieved.

[0047] FIG. 8 is a close up view of a fillable bag insert 32 as it is coupled via coupler 48 to a delivery device 42 to deliver the solidifying material 46. The bag insert 32 may be made of plastic or plastic based material, or cloth, or any other material that may hold the solidifying material in place inside the interior 6 of the footwear. In some embodiments, the fillable bag insert 32 has adhesive 84 on a portion of the exterior of the fillable bag insert 32. The adhesive 84 helps the fillable bag insert 32 to remain secured in a portion of the interior 6 of the footwear.

[0048] FIG. 9 is an embodiment of a closing receiving coupler 90 that may be used in some embodiments to allow the delivery device 42 to enter the bag insert 32 and to close after the delivery device 42 is removed or decoupled from the fillable bag insert 32. Coupler 90 is made up of pie sliced sections 92 that emanate from a circumference that is slightly larger than the circumference of the delivery device 42 coupler opening 48. FIG. 10 is another embodiment of a closing receiving coupler 100 for the fillable bag insert 32. In the

embodiment of a coupler **100**, the pie sliced sections **102** overlap over one or more of the ends of each separate sliced section **102**.

[0049] In the foregoing specification, specific embodiments have been described. However, one of ordinary skill in the art appreciates that various modifications and changes can be made without departing from the scope of the invention as set forth in the claims below. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of present teachings.

[0050] The benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential features or elements of any or all the claims. The invention is defined solely by the appended claims including any amendments made during the pendency of this application and all equivalents of those claims as issued.

[0051] Moreover in this document, relational terms such as first and second, top and bottom, and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions. The terms “comprises,” “comprising,” “has,” “having,” “includes,” “including,” “contains,” “containing” or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises, has, includes, contains a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element preceded by “comprises . . . a”, “has . . . a”, “includes . . . a”, “contains . . . a” does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises, has, includes, contains the element. The terms “a” and “an” are defined as one or more unless explicitly stated otherwise herein. The terms “substantially”, “essentially”, “approximately”, “about” or any other version thereof, are defined as being close to as understood by one of ordinary skill in the art, and in one non-limiting embodiment the term is defined to be within 10%, in another embodiment within 5%, in another embodiment within 1% and in another embodiment within 0.5%. The term “coupled” as used herein is defined as connected to accomplish delivery of embodiments of materials described herein. A device or structure that is “configured” in a certain way is configured in at least that way, but may also be configured in ways that are not listed.

[0052] The Abstract of the Disclosure is provided to allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In addition, in the foregoing Detailed Description, it can be seen that various features are grouped together in various embodiments for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as reflecting an intention that the claimed embodiments require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive subject matter lies in less than all features of a single disclosed embodiment. Thus the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separately claimed subject matter.

We claim:

1. A method of custom-fitting footwear, the method comprising:
 - receiving a fillable bag insert into footwear;
 - receiving solidifying material into the fillable bag insert; and
 - continue receiving the solidifying material until a space between an interior portion of the footwear and a user's footspace is substantially filled.
2. A method of claim 1, wherein receiving the solidifying material continues up to a reaching of the user's comfort level.
3. A method of claim 1, wherein footspace includes the space the foot takes up when in the footwear.
4. A method of claim 1, wherein receiving a fillable bag insert into footwear occurs during manufacturing of the footwear.
5. A method of custom-fitting footwear, the method comprising:
 - inserting a fillable bag insert into a footwear space;
 - coupling a delivery device for a solidifying material to the fillable bag insert;
 - delivering the solidifying material to the fillable bag insert;
 - continue delivering the solidifying material to the fillable bag insert until an extra space is substantially filled; and
 - decoupling the delivery device from the fillable bag insert.
6. A method of claim 5, wherein the solidifying material is polyurethane-solidifying foam.
7. A method of claim 5, wherein the solidifying material is a spray foam.
8. A method of claim 5, wherein the delivery device is a flexible tube, and the delivering the solidifying material to the fillable bag insert is accomplished with a pressurized canister.
9. A method of claim 5, wherein the fillable bag insert has adhesive on a portion of the exterior of the fillable bag insert.
10. A method of custom-fitting footwear, the method comprising:
 - placing a delivery device for a solidifying material into extra space of a footwear;
 - delivering the solidifying material to the extra space;
 - continue delivering the solidifying material until the extra space is substantially filled; and
 - removing the delivery device from the footwear.
11. A method of claim 10, wherein the solidifying material is polyurethane-solidifying foam.
12. A method of claim 10, wherein the solidifying material is spray foam.
13. A footwear insert comprising:
 - a solidifying material delivered to substantially fill an extra space between a footwear interior and a footspace;
 - wherein the solidifying material solidifies after entry into the extra space.
14. A footwear insert of claim 13, wherein the solidifying material is polyurethane-solidifying foam.
15. A footwear insert of claim 13, wherein the solidifying material cures to a hardness configured to stabilize a foot inside of the footwear.
16. A footwear insert of claim 13, further comprising a fillable bag insert configured to receive the solidifying material.
17. A footwear insert of claim 13, further comprising adhesive placed into the footwear prior to the delivery of the footwear insert so that the footwear insert is assisted in remaining inside the footwear by the adhesive.

18. A footwear insert comprising:
a malleable material delivered to substantially fill an extra space between a footwear interior and a footspace;
wherein when two different portions of the material are pressed together the two portions join to form a single portion.

19. A footwear insert of claim **18**, wherein the malleable material is a viscoelastic liquid silicone.

20. A footwear insert system comprising:
a solidifying material container;
a fillable bag insert configured for placement between a toe portion of a foot and an interior portion of a footwear;
a delivery device configured to direct the solidifying material into the fillable bag insert to reduce an extra space between the toe portion and the interior portion.

* * * * *