A method of forming an article of footwear according to an embodiment of the present invention includes injection molding a footbed component as a single monolithic piece, the footbed component comprising a footbed having a top surface configured to contact a user’s foot when the article of footwear is worn by the user, the footbed component further comprising a stitch-out flange extending laterally outwardly about the footbed, the stitch-out flange having a top surface and a bottom surface; arranging at least a portion of an upper as a layer against the top surface of the stitch-out flange; stitching the upper to the stitch-out flange by applying a stitching pattern completely through the upper and the top and bottom surfaces of the stitch-out flange, for example along a vertical direction with respect to the footbed component.
ARTICLES OF FOOTWEAR INCLUDING UNITARY FOOTBED-SOLE COMPONENTS AND STITCHING AND METHODS OF MANUFACTURING THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 61/857,127, filed on Jul. 22, 2013, which is incorporated herein by reference in its entirety for all purposes.

TECHNICAL FIELD

[0002] The present disclosure relates to articles of footwear and methods of manufacturing the same. More specifically, the present disclosure relates to articles of footwear including unitary footbed-sole components and stitching and methods of manufacturing the same.

BACKGROUND

[0003] Some articles of footwear include stitching to connect components (see FIGS. 1 and 2). In some stitch-out constructions, the upper is attached to a flat board then an insole is inserted inside the upper. Unfortunately, such constructions include a relatively high number of components and require a relatively high number of manufacturing steps to connect the same. Furthermore, some stitch-out constructions also increase the stiffness and weight of the article of footwear depending on the specific materials and construction methods that are used.

SUMMARY

[0004] A method of forming an article of footwear according to an embodiment of the present invention includes injection molding a footbed component as a single monolithic piece, the footbed component comprising a footbed having a top surface configured to contact a user’s foot when the article of footwear is worn by the user, the footbed component further comprising a stitch-out flange extending laterally outwardly about the footbed, the stitch-out flange having a top surface and a bottom surface; arranging at least a portion of an upper as a layer against the top surface of the stitch-out flange; stitching the upper to the stitch-out flange by applying a stitching pattern completely through the upper and the top and bottom surfaces of the stitch-out flange.

[0005] In some cases, applying the stitching pattern includes applying the stitching pattern along a vertical direction with respect to the footbed. The footbed may be injection molded of a foaming resin comprising ethylene vinyl acetate. An outsole component may be adhered to a bottom surface of the footbed. An indentation may be molded on the bottom surface of the footbed complementary in shape to the outsole component to receive the outsole component, according to embodiments of the present invention.

[0006] In some instances of the embodiments, a midsole component may be adhered or otherwise secured to a bottom surface of the footbed. The footbed may be injection molded to include an indentation on the bottom surface of the footbed complementary in shape to the midsole component to receive the midsole component. An outsole component may be adhered to the bottom surface of the midsole component, according to embodiments of the present invention. In some cases, the stitching pattern on the bottom surface of the stitch-out flange is covered by the midsole component. Such methods according to embodiments of the present invention may be accomplished without any cement or adhesives applied between the upper and the stitch-out flange. According to some embodiments, the upper is attached to the footbed component only by the stitching pattern.

[0007] An article of footwear according to an embodiment of the present invention includes a footbed component, wherein the footbed component is injection molded as a single monolithic piece, the footbed component comprising a footbed having a top surface configured to contact a user's foot when the article of footwear is worn by the user, the footbed component further comprising a stitch-out flange extending laterally outwardly about the footbed, the stitch-out flange having a top surface and a bottom surface; an upper; and stitching that extends completely through the upper and the top and bottom surfaces of the stitch-out flange to attach the upper to the footbed component. The stitching may extend along a vertical direction with respect to the footbed. In some cases, the footbed is formed of a foaming resin comprising ethylene vinyl acetate. An outsole component may be adhered to a bottom surface of the footbed.

[0008] According to some embodiments, the footbed further comprises an indentation on the bottom surface of the footbed complementary in shape to the outsole component to receive the outsole component.

[0009] A midsole component may be adhered to a bottom surface of the footbed, according to embodiments of the present invention. In some cases, the footbed comprises an indentation on the bottom surface of the footbed complementary in shape to the midsole component to receive the midsole component. An outsole component may be adhered to a bottom surface of the midsole component, according to embodiments of the present invention. In some cases, the midsole component covers the stitching on the bottom surface of the stitch-out flange. According to embodiments of the present invention, no cement or adhesives are applied between the upper and the stitch-out flange. According to some embodiments, the upper is attached to the footbed component only by the stitching.

[0010] While multiple embodiments are disclosed, still other embodiments of the present invention will become apparent to those skilled in the art from the following detailed description, which shows and describes illustrative embodiments of the invention. Accordingly, the drawings and detailed description are to be regarded as illustrative in nature and not restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a perspective view of stitching being attached to an article of footwear.

[0012] FIG. 2 is a detail sectional view of an article of footwear that includes a stitched construction.

[0013] FIG. 3 is a side view of an article of footwear according to an embodiment of the present invention.

[0014] FIG. 4 is a bottom view of the article of footwear of FIG. 3.

[0015] FIG. 5 is a perspective view of a unitary footbed-sole component for an article of footwear according to an embodiment of the present invention.

[0016] FIG. 6 is a top view of the unitary footbed-sole component of FIG. 5.

[0017] FIG. 7 is a bottom view of the unitary footbed-sole component of FIG. 5.
FIG. 8 is an inside view of the unitary footbed-sole component of FIG. 5.

FIG. 9 is an outside view of the unitary footbed-sole component of FIG. 5.

FIG. 10 is a front view of the unitary footbed-sole component of FIG. 5.

FIG. 11 is a rear view of the unitary footbed-sole component of FIG. 5.

FIG. 12 is an exploded perspective view of the unitary footbed-sole component of FIGS. 1-12 with an outside component according to an embodiment of the present invention.

FIG. 13 is an exploded outside view of the unitary footbed-sole component of FIG. 12.

FIG. 14 is an exploded side view of an article of footwear according to an embodiment of the present invention.

FIG. 15 is a front sectional view of the article of footwear of FIG. 14.

FIG. 16 is an exploded side view of an article of footwear according to an embodiment of the present invention.

FIG. 17 is a front sectional view of the article of footwear of FIG. 16.

FIG. 18 is an exploded side view of an article of footwear according to an embodiment of the present invention.

FIG. 19 is a front sectional view of the article of footwear of FIG. 18.

DETAILED DESCRIPTION

Some embodiments of the present invention include articles of footwear, such as flats, flats, boots, sandals, sneakers, loafers, and the like, that include unitary or monolithic footbed-sole components. In some embodiments, such a footbed-sole component is formed in a single injection molding procedure. In some embodiments, such a footbed-sole component includes a stitch-out flange, and the upper connects to the footbed-sole component via stitching that passes through the stitch-out flange. In some embodiments, the footbed-sole component reduces the number of components that form the article of footwear. In some embodiments, the footbed-sole component provides flexible, supportive, comfortable, low-cost, low-complexity and/or easily manufacturable articles of footwear.

FIGS. 3 and 4 illustrate an article of footwear 100 according to an embodiment of the present invention. The article of footwear 100 includes a unitary or monolithic footbed-sole component 102. The footbed-sole component 102 includes a stitch-out flange 104. The upper 106 connects to the footbed-sole component 102 via stitching 108 that passes through the stitch-out flange 104. The article of footwear 100 may include various materials, such as those shown in FIGS. 3 and 4, although other materials are also contemplated.

FIGS. 5-11 illustrate the unitary footbed-sole component 102 for an article of footwear according to an embodiment of the present invention. The footbed-sole component 102 includes a footbed 110, a midsole 112, and a stitch-out flange 104.

FIGS. 12 and 13 illustrate the unitary footbed-sole component 102 for an article of footwear according to an embodiment of the present invention. The footbed-sole component 102 includes a footbed 110, a midsole 112, and a stitch-out flange 104. The lower surface of the footbed-sole component 102 carries an insert 214 (for example, a rubber insert), which may also be referred to as an outsole component 214.

FIGS. 14 and 15 illustrate an article of footwear 100 according to an embodiment of the present invention. The article of footwear 100 includes a unitary or monolithic footbed-sole component 302. The footbed-sole component 102 includes a footbed 110, a midsole 112, and a stitch-out flange 104. The upper 106 connects to the footbed-sole component 102 via stitching 108 that passes through the stitch-out flange 104. The lower surface of the footbed-sole component 102 carries an insert 114 (for example, a rubber insert).

FIGS. 16 and 17 illustrate an article of footwear 300 according to an embodiment of the present invention. The article of footwear 300 includes a unitary or monolithic footbed-sole component 302. The footbed-sole component 302 includes a footbed 310, a first midsole 312, and a stitch-out flange 304. The upper 106 connects to the footbed-sole component 302 via stitching 108 that passes through the stitch-out flange 304. The lower surface of the footbed-sole component 302 carries a second midsole 316.

FIGS. 18 and 19 illustrate an article of footwear 400 according to an embodiment of the present invention. The article of footwear 400 includes a unitary or monolithic footbed-sole component 302. The footbed-sole component 302 includes a footbed 310, a first midsole 412, and a stitch-out flange 304. The upper 106 connects to the footbed-sole component 302 via stitching 108 that passes through the stitch-out flange 304. The lower surface of the footbed-sole component 302 carries a second midsole 416. The lower surface of the second midsole 416 carries an outsole 418.

With current stitch out construction, uppers are attached to a flat board then an insole is inserted inside, as shown in FIG. 2. By contrast, embodiments of the present invention apply stitch out construction methods to a single injection midsole and footbed to reduce layers and increase footbed cushioning. This also allows additional midsoles and outsoles to be attached to the main module, and/or also permits the construction to be accomplished without any cement and/or adhesives applied between the footbed layers, according to embodiments of the present invention.

Stitch out construction methods and materials according to embodiments of the present invention create shoes that are less stiff and less heavy than the shoes made with current stitch out construction methods. Embodiments of the present invention permit construction of an outsole that is extremely flexible while maintaining support and comfort. Outsole constructions according to embodiments of the present invention are also cost effective and easily manufacturable. This technology may be used to make flips, flats, boots, sandals, sneakers, loafers, and the like, according to embodiments of the present invention. Embodiments of the present invention permit creation of outsoles with increased flexibility, increased cushion, reduced complexity and layers, increased manufacturability, and/or reduced cost and labor.

A method of forming an article of footwear 100, 300, 400 according to an embodiment of the present invention includes injection molding a footbed component 302, 302 as a single monolithic piece, the footbed component 302, 302 comprising a footbed 110, 310 having a top surface 111, 311 configured to contact a user's foot when the article of footwear is worn by the user, the footbed component 302, 302 further comprising a stitch-out flange 104, 304 extending laterally outwardly about the footbed 110, 310, the stitch-out
flange 104, 304 having a top surface 105, 305 and a bottom surface 107, 307; arranging at least a portion of an upper 106 as a layer against the top surface 105, 305 of the stitch-out flange 104, 304; stitching the upper 106 to the stitch-out flange 104, 304 by applying a stitching pattern completely through the upper 106 and the top 105, 305 and bottom 107, 307 surfaces of the stitch-out flange 104, 304.

[0040] In some cases, applying the stitching pattern includes applying the stitching pattern along a vertical direction V with respect to the footbed 110, 310. This is in contrast to the welt stitching used to connect the insole to the upper as shown in FIG. 2, which is instead horizontal, or perpendicular to the vertical direction V. The footbed may be injection molded of a foaming resin comprising ethylene vinyl acetate. For example, the footbed may be injection molded of a Crosllite® material available from Crocs, Inc. An outsole component 214 may be adhered to a bottom surface 113 of the footbed component 102. An indentation 201 may be molded on the bottom surface 113 of the footbed component 102 complementary in shape to the outsole component 214 to receive the outsole component 214, according to embodiments of the present invention.

[0041] In some instances of the embodiments, a midsole component 316, 416 may be adhered or otherwise secured to a bottom surface of the footbed component 302. The footbed component 302 may be injection molded to include an indentation 313 on the bottom surface of the footbed component 302 complementary in shape to the midsole component 316, 416 to receive the midsole component. An outsole component 418 may be adhered to the bottom surface of the midsole component 416, according to embodiments of the present invention. In some cases, the stitching pattern 108 on the bottom surface of the stitch-out flange (as shown in FIG. 4) is covered by the midsole component 316, 416, as shown in FIGS. 17 and 19. Such methods according to embodiments of the present invention may be accomplished without any cement or adhesives applied between the upper 106 and the stitch-out flange 104, 304. According to some embodiments, the upper 106 is attached to the footbed component 102, 302 only by the stitching pattern 108.

[0042] An article of footwear 100, 300, 400 according to an embodiment of the present invention includes a footbed component 102, 302 wherein the footbed component 102, 302 is injection molded as a single monolithic piece, the footbed component 102, 302 comprising a footbed 110, 310 having a top surface 111, 311 configured to contact a user’s foot when the article of footwear 100, 300, 400 is worn by the user, the footbed component 102, 302 further comprising a stitch-out flange 104, 304 extending laterally outwardly about the footbed 110, 310, the stitch-out flange 104, 304 having a top surface 105, 305 and a bottom surface 107, 307; an upper 106; and stitching 108 that extends completely through the upper 106 and the top 105, 305 and bottom 107, 307 surfaces of the stitch-out flange 104, 304 to attach the upper 106 to the footbed component 102, 302. The stitching 108 may extend along a vertical direction V with respect to the footbed component 102, 302. In some cases, the footbed component 102, 302 is formed of a foaming resin comprising ethylene vinyl acetate. An outsole component 214 may be adhered to a bottom surface 113 of the footbed.

[0043] According to some embodiments, the footbed component 102, 302 further comprises an indentation 201 on the bottom surface 113 of the footbed component 102, 302 complementary in shape to the outsole component 214 to receive the outsole component 214.

[0044] A midsole component 316 may be adhered to a bottom surface of the footbed component 302, according to embodiments of the present invention. In some cases, the footbed component 302 comprises an indentation 313 on the bottom surface of the footbed component 302 complementary in shape to the midsole component 316 to receive the midsole component 316. An outsole component 418 may be adhered to a bottom surface of the midsole component 416, according to embodiments of the present invention. In some cases, the midsole component 316, 416 covers the stitching 108 on the bottom surface 107, 307 of the stitch-out flange 104, 304. According to embodiments of the present invention, no cement or adhesives are applied between the upper 106 and the stitch-out flange 104, 304. According to some embodiments, the upper 106 is attached to the footbed component 102, 302 only by the stitching.

[0045] Various modifications and additions can be made to the exemplary embodiments discussed without departing from the scope of the present invention. For example, while the embodiments described above refer to particular features, the scope of this invention also includes embodiments having different combinations of features and embodiments that do not include all of the above described features.

What is claimed is:
1. A method of forming an article of footwear, the method comprising:
   - injection molding a footbed component as a single monolithic piece, the footbed component comprising a footbed having a top surface configured to contact a user’s foot when the article of footwear is worn by the user, the footbed component further comprising a stitch-out flange extending laterally outwardly about the footbed, the stitch-out flange having a top surface and a bottom surface;
   - arranging at least a portion of an upper as a layer against the top surface of the stitch-out flange;
   - stitching the upper to the stitch-out flange by applying a stitching pattern completely through the upper and the top and bottom surfaces of the stitch-out flange.
2. The method of claim 1, wherein applying the stitching pattern comprises applying the stitching pattern along a vertical direction with respect to the footbed.
3. The method of claim 1, wherein injection molding the footbed comprises injection molding the footbed component of a foaming resin comprising ethylene vinyl acetate.
4. The method of claim 1, further comprising adhering an outsole component to a bottom surface of the footbed component.
5. The method of claim 4, wherein injection molding the footbed component comprises molding an indentation on the bottom surface of the footbed component complementary in shape to the outsole component to receive the outsole component.
6. The method of claim 1, further comprising adhering a midsole component to a bottom surface of the footbed component.
7. The method of claim 6, wherein injection molding the footbed comprises molding an indentation on the bottom surface of the footbed component complementary in shape to the midsole component to receive the midsole component.
8. The method of claim 6, further comprising adhering an outsole component to a bottom surface of the midsole component.
9. The method of claim 6, further comprising covering the stitching pattern on the bottom surface of the stitch-out flange with the midsole component.
10. The method of claim 1, wherein stitching the upper to the stitch-out flange is accomplished without any cement or adhesives applied between the upper and the stitch-out flange.
11. The method of claim 1, wherein the upper is attached to the footbed component only by the stitching pattern.
12. An article of footwear comprising:
   a footbed component, wherein the footbed component is injection molded as a single monolithic piece, the footbed component comprising a footbed having a top surface configured to contact a user’s foot when the article of footwear is worn by the user, the footbed component further comprising a stitch-out flange extending laterally outwardly about the footbed, the stitch-out flange having a top surface and a bottom surface; and
   stitching that extends completely through the upper and the top and bottom surfaces of the stitch-out flange to attach the upper to the footbed component.
13. The article of footwear of claim 12, wherein the stitching extends along a vertical direction with respect to the footbed.
14. The article of footwear of claim 12, wherein the footbed component is formed of a foaming resin comprising ethylene vinyl acetate.
15. The article of footwear of claim 12, further comprising an outsole component adhered to a bottom surface of the footbed component.
16. The article of footwear of claim 15, wherein the footbed component further comprises an indentation on the bottom surface of the footbed complementary in shape to the outsole component to receive the outsole component.
17. The article of footwear of claim 12, further comprising a midsole component adhered to a bottom surface of the footbed component.
18. The article of footwear of claim 17, wherein the footbed component comprises an indentation on the bottom surface of the footbed component complementary in shape to the midsole component to receive the midsole component.
19. The article of footwear of claim 17, further comprising an outsole component adhered to a bottom surface of the midsole component.
20. The article of footwear of claim 17, wherein the midsole component covers the stitching on the bottom surface of the stitch-out flange.
21. The article of footwear of claim 12, wherein no cement or adhesives are applied between the upper and the stitch-out flange.
22. The article of footwear of claim 12, wherein the upper is attached to the footbed component only by the stitching.