A method of manufacturing an article of footwear includes providing an upper and an insole of the article of footwear, connecting the upper to the insole to provide a combined upper and insole having a foot-receiving chamber and a footbed-receiving opening, providing a unitary combined sole and footbed of the article of footwear, the unitary combined sole and footbed including at least a portion of a sole having an upper surface, a first portion of a footbed connected to the portion of the sole, and a second portion of the footbed connected to the first portion of the footbed, the second portion of the footbed having a lower surface detached from the upper surface of the portion of the sole, passing the second portion of the footbed through the footbed-receiving opening and into the foot-receiving chamber, and securing the insole to the portion of the sole.
Fig. 1

1. Provide Upper
2. Provide Insole
3. Connect Upper to Insole to Provide Combined Upper and Insole
4. Provide Monolithic Lower Component
5. Pass one or more portions of footbed through opening in combined upper and insole
6. Secure Insole to upper surface of portion of sole
ARTICLES OF FOOTWEAR INCLUDING UNITARY SOLE AND FOOTBED COMPONENTS 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. 61/791,006, filed on Mar. 15, 2013, which is incorporated by reference herein in its entirety for all purposes.

TECHNICAL FIELD

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

BACKGROUND

[0003] Articles of “strobé” footwear typically include an upper that is connected to an insole, also referred to as a “lower” or “strobé board”, via strobé stitching. The insole typically connects to other portions of the sole, such as the midsole and the outsole, via one or more adhesives. Articles of footwear including the above components are considered relatively comfortable compared to other types of articles of footwear.

[0004] Unfortunately, articles of strobé footwear are typically relatively expensive due to the number of manufacturing processes used to form the various components (for example, forming the midsole and the outsole, stitching the upper and the insole, and the like).

SUMMARY

[0005] In some embodiments, a method of manufacturing an article of footwear includes providing an upper of the article of footwear, providing an insole of the article of footwear, connecting the upper to the insole to provide a combined upper and insole, the combined upper and insole having a foot-receiving chamber and a footbed-receiving opening coupled to the foot-receiving chamber, providing a unitary combined sole and footbed of the article of footwear, the unitary combined sole and footbed including at least a portion of a sole having an upper surface, a first portion of a footbed connected to the portion of the sole, and a second portion of the footbed connected to the first portion of the footbed, the second portion of the footbed having a lower surface detached from the upper surface of the portion of the sole, passing the second portion of the footbed through the footbed-receiving opening and into the foot-receiving chamber, and securing the insole to the portion of the sole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. 1 illustrates an exemplary method of manufacturing an article of footwear according to embodiments of the present invention;

[0010] FIG. 2 illustrates a side view of an embodiment of an article of footwear manufactured according to the method of FIG. 1;

[0011] FIG. 3 illustrates another side view the article of footwear of FIG. 2;

[0012] FIG. 4 illustrates a side view of an embodiment of a combined upper and insole manufactured during the method of FIG. 1;

[0013] FIG. 5 illustrates another side view of the combined upper and insole of FIG. 4;

[0014] FIG. 6 illustrates a upper perspective view of the combined upper and insole of FIG. 4;

[0015] FIG. 7 illustrates a bottom view of the combined upper and insole of FIG. 4;

[0016] FIG. 8 illustrates a side view of an embodiment of a combined sole and footbed manufactured during the method of FIG. 1;

[0017] FIG. 9 illustrates another side view of the combined sole and footbed of FIG. 8, a heel-supporting portion of a footbed and a forefoot-supporting portion of the footbed are shown elevated from a sole for illustrative purposes;

[0018] FIG. 10 illustrates a perspective view of the combined sole and footbed of FIG. 8;

[0019] FIG. 11 illustrates a bottom view of the combined sole and footbed of FIG. 8;

[0020] FIG. 12 illustrates a rear view of the combined sole and footbed of FIG. 8, the heel-receiving portion of the footbed is shown elevated from the sole for illustrative purposes;

[0021] FIG. 13 illustrates a front view of the combined sole and footbed of FIG. 8, the forefoot-receiving portion of the footbed is shown elevated from the sole for illustrative purposes;

[0022] FIG. 14 illustrates a perspective view of the article of footwear prior to connecting the combined upper and insole of FIG. 4 and the combined sole and footbed of FIG. 8;

[0023] FIG. 15 illustrates a side view of the article of footwear prior to connecting the combined upper and insole of FIG. 4 and the combined sole and footbed of FIG. 8;
Fig. 16 illustrates a side view of the article of footwear prior to connecting the combined upper and insole of Fig. 4 and the combined sole and footbed of Fig. 8.

Fig. 17 illustrates a side view of the article of footwear while connecting the combined upper and insole of Fig. 4 and the combined sole and footbed of Fig. 8.

Fig. 18 illustrates a side view of an embodiment of a sandal manufactured using the mold of Fig. 19, and Fig. 20 illustrates a bottom perspective view of the sandal of Fig. 20.

Detailed description

Fig. 1 illustrates an exemplary method of manufacturing the article of footwear 200 shown in Figs. 2 and 3. The article of footwear 200 may be, for example, a "strobob" shoe, such as a casual shoe as shown in Fig. 2. In some embodiments, the article of footwear 200 may be a different type of shoe, such as a running shoe, a golf shoe, a walking shoe, a tennis shoe, a shoe with cleats, a shoe without cleats, a hiking boot, a roller skate shoe, an ice skating shoe, or any other kind of shoe or footware.

The method begins at block 100 by providing an upper 202 of the article of footwear 200. The upper 202 may include various materials, such as one or more fabrics or the like. The upper 202 may be formed by cutting various portions from one or more sheets of fabric and subsequently connecting the portions, via stitching or the like. In some embodiments, the upper 202 is shaped to subsequently define, in part, a footbed-receiving opening 402 (see Fig. 4). The footbed-receiving opening 402 is described in further detail below.

At block 102, an insole 404, which may also be referred to as a lower or "strobob board", of the article of footwear 200 (see Fig. 4) is provided. The insole 404 may include various materials, such as one or more fabrics or the like. The insole 404 may be formed by cutting various portions from one or more sheets of fabric. In some embodiments, the insole 404 is provided as multiple separate portions, such as a heel portion 406 and a forefoot portion 408 as shown in the figures. The space between such portions 406 and 408 subsequently defines, in part, the footbed-receiving opening 402.

At block 104, the upper 202 is connected to the insole 404 to provide a combined upper and insole 400 (see Figs. 4-7). The upper 202 and the insole 404 may be connected, for example, via strobob stitching 410. The combined upper and insole 400 includes a foot-receiving opening 204 that is coupled to a foot-receiving chamber 206. The foot-receiving chamber 206 is also coupled to the footbed-receiving opening 402 opposite the foot-receiving opening 204. In some embodiments, the footbed-receiving opening 402 is defined together by the upper 202 and the insole 404. In some embodiments, the footbed-receiving opening 402 is defined by one of the upper 202 and the insole 404.

The method continues at block 106 by providing a monolithic or unitary combined sole and footbed 800 (see Figs. 8-13) of the article of footwear 200. The unitary combined sole and footbed 800 may comprise various materials, such as a copolymer resin foam (for example, ethylene vinyl acetate (EVA)) other foams, combinations thereof, or the like. Further, the unitary combined sole and footbed 800 may be formed via, for example, an injection molding process.

The unitary combined sole and footbed 800 includes a portion of a sole 802. In some embodiments, the portion of the sole 802 may be a midsole. In some embodiments and as shown in the figures, the portion of the sole 802 may be the midsole and a unitarily connected outsole. The portion of the sole 802 includes a lower surface 804. In some embodiments, the lower surface 804 includes one or more features 806 that serve functional purposes (for example, to provide improved traction and/or aesthetic purposes. The portion of the sole 802 further includes an upper surface 808 opposite the lower surface 804.

The upper surface 808 of the portion of the sole 802 integrally or unitarily connects to a footbed 810 disposed thereabove. In some embodiments, the upper surface 808 specifically connects to an arch-supporting portion 812 of the footbed 810. The arch-supporting portion 812 in turn connects to a heel-supporting portion 814 of the footbed 810 and a forefoot-supporting portion 816 of the footbed 810 disposed opposite the heel-supporting portion 814. Both of the heel-supporting portion 814 and the forefoot-supporting portion 816 have a lower surface 902 that is detached from the upper surface 808 of the portion of the sole 802. The lower surfaces 902 may include one or more grooves 904 that facilitate flexing the portions 814 and 816 in subsequent manufacturing actions.

At block 108, the heel-supporting portion 814 and the forefoot-supporting portion 816 are flexed and passed through the footbed-receiving opening 402 of the combined upper and insole 400 (see Figs. 14-16, which precede such an action, and Fig. 17, which illustrates such an action). Thus, the heel-supporting portion 814 and the forefoot-supporting portion 816 are disposed in the foot-receiving chamber 206 of the combined upper and insole 400. Upon being disposed in the foot-receiving chamber 206, the heel-supporting portion 814 and the forefoot-supporting portion 816 unflex and are disposed proximate the insole 404 (that is, near the bottom of the foot-receiving chamber 206).

At block 110, the insole 404 is secured to the upper surface 808 of the portion of the sole 802 via, for example, one or more adhesives and the like to form the completed article of footwear 200 (see Fig. 2). Thus, the article of footwear 200 includes the combined upper and insole 400. The combined upper and insole 400 includes the foot-receiving chamber 206 and the footbed-receiving opening 402. The article of footwear 200 further includes the unitary combined sole and footbed 800. The unitary combined sole and footbed 800 includes the portion of the sole 802, and a first portion of the footbed 810 (for example, the arch-supporting portion 812) connects to the portion of the sole 802. Second and third portions of the footbed 810 (for example, the heel-supporting portion 814 and the forefoot-supporting portion 816) connect to the first portion of the footbed 810. The second and third portions of the footbed 810 extend through the footbed-receiving opening 402 and are disposed within the foot-receiving chamber 206.

In some embodiments, other portions of the footbed connect to the portion of the sole and other portions of the footbed are disposed within the foot-receiving chamber. Fig. 18 illustrates an exemplary embodiment of a combined upper and insole 1800 and a unitary combined sole and footbed.
1802 of such an article of footwear. The combined upper and insole 1800 defines a footbed-receiving opening 1804 proximate the heel of the article of footwear. In addition, the unitary combined sole and footbed 1802 includes a heel-supporting portion 1806 that connects to a portion of a sole 1808. The heel-supporting portion 1806 also connects to an arch-supporting portion 1810, which in turn connects to a forefoot-supporting portion 1812. Both the arch-supporting portion 1810 and the forefoot-supporting portion 1812 include a lower surface 1814 that is detached from the portion of the sole 1808. Further, both the arch-supporting portion 1810 and the forefoot-supporting portion 1812 pass through the footbed-receiving opening 1804 and are disposed in a foot-receiving chamber 1816 of the combined upper and insole 1800.

[F0040] FIG. 19 illustrates a mold 1900 which may be used to form, for example, the combined sole and footbed 800 or 1802 described above. The mold 1900 includes a first or top plate 1902 and a second or middle plate 1904 that define a first molding chamber 1906. The first molding chamber 1906 receives a molten material (for example, a polymer, copolymer, or the like) via a first injection port 1908 to form, for example, the footbed 810. The first molding chamber 1906 is also coupled to a vent 1910. The mold 1900 further includes a third or lower plate 1912. The third plate 1912 and the middle plate 1904 define a second molding chamber 1914. The second molding chamber 1914 receives a molten material (for example, a polymer, copolymer, or the like) via a second injection port 1916 to form, for example, the portion of the sole 802. Further, the second molding chamber 1914 is coupled to the first molding chamber 1906 at an interface 1918 such that the molten materials contact each other and the portion of the sole 802 and the footbed 810 are unitarily formed. The second molding chamber 1914 is also coupled to the vent 1910.

[F0041] The materials delivered to the first and second molding chambers 1906 and 1914 may have different properties. For example, the materials may be polymers or copolymers having different colors, or the polymers or copolymers may form components having different mechanical characteristics, such as hardness, or the like.

[F0042] The mold 1900 may also be used to form other portions of articles of footwear. For example and referring to FIGS. 20 and 21, the mold 1900 may be used to form a sole 2002 of a sandal 2000. Such a sole 2002 may include a polymer or copolymer midsole 2004 having a first hardness (for example, the midsole 2004 may be relatively soft) and a unitarily connected polymer or copolymer outsole 2006 having a second hardness (for example, the outsole 2006 may be relatively hard).

[F0043] 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.

The following is claimed:

1. A method of manufacturing an article of footwear, comprising:
   - providing an upper of the article of footwear;
   - providing an insole of the article of footwear;
   - connecting the upper to the insole to provide a combined upper and insole, the combined upper and insole having a foot-receiving chamber and a footbed-receiving opening coupled to the foot-receiving chamber;
   - providing a unitary combined sole and footbed of the article of footwear, the unitary combined sole and footbed including at least a portion of a sole having an upper surface, a first portion of a footbed connected to the portion of the sole, and a second portion of the footbed connected to the first portion of the footbed, the second portion of the footbed having a lower surface detached from the upper surface of the portion of the sole;
   - passing the second portion of the footbed through the footbed-receiving opening and into the foot-receiving chamber; and
   - securing the insole to the portion of the sole.

2. The method of claim 1, wherein providing the unitary combined sole and footbed includes forming the unitary combined sole and footbed via an injection molding process.

3. The method of claim 1, wherein connecting the upper to the insole to provide the combined upper and insole includes connecting the upper and the insole via strobel stitching.

4. The method of claim 1, wherein the portion of the sole includes the midsole.

5. The method of claim 1, wherein the unitary combined sole and footbed further includes a third portion of the footbed connected to the first portion of the footbed, the third portion of the footbed having a lower surface detached from the upper surface of the portion of the sole, and further comprising passing the third portion of the footbed through the footbed-receiving opening and into the foot-receiving chamber.

6. The method of claim 5, wherein the first portion of the footbed includes an arch-supporting portion, the second portion of the footbed includes a forefoot-supporting portion, and the third portion of the footbed includes a heel-supporting portion.

7. The method of claim 1, wherein the first portion of the footbed includes an arch-supporting portion and the second portion of the footbed includes a forefoot-receiving portion.

8. The method of claim 1, wherein the first portion of the footbed includes a heel-supporting portion and the second portion of the footbed includes an arch-supporting portion.

9. The method of claim 1, wherein securing the insole to the portion of the sole includes adhering the insole to the portion of the sole.

10. An article of footwear, comprising:
   - a combined upper and insole having a foot-receiving chamber and a footbed-receiving opening coupled to the foot-receiving chamber;
   - a unitary combined sole and footbed including:
     - at least a portion of a sole;
     - a first portion of a footbed connected to the portion of the sole; and
     - a second portion of the footbed connected to the first portion of the footbed, the second portion of the footbed extending through the footbed-receiving opening and disposed within the foot-receiving chamber.

11. The article of footwear of claim 10, wherein the portion of the sole includes an upper surface adhered to the insole.

12. The article of footwear of claim 10, wherein the first portion of the footbed includes an arch-supporting portion and the second portion of the footbed includes a forefoot-receiving portion.
13. The article of footwear of claim 10, wherein the first portion of the footbed includes a heel-supporting portion and the second portion of the footbed includes an arch-receiving portion.

14. A method of manufacturing an article of footwear, comprising:
   providing a mold including a first molding chamber and a second molding chamber coupled to the first molding chamber at an interface;
   providing a first molten material to the first molding chamber, the first molten material having a first property;
   providing a second molten material to the second molding chamber such that the second molten material and the first molten material engage each other at the interface, the second molten material having a second property, and the second property being different than the first property; and
   permitting the first molten material and the second molten material to cure and thereby provide a unitary portion of the article of footwear.

15. The method of claim 14, wherein the first molten material forms a first portion of the unitary portion of the article of footwear, the first property provides the first portion with a first hardness, the second molten material forms a second portion of the unitary portion of the article of footwear, the second property provides the second portion with a second hardness, and the second hardness is different than the first hardness.

16. The method of claim 14, wherein the first property is a first color, and the second property is a second color, and the second color is different than the first color.

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