



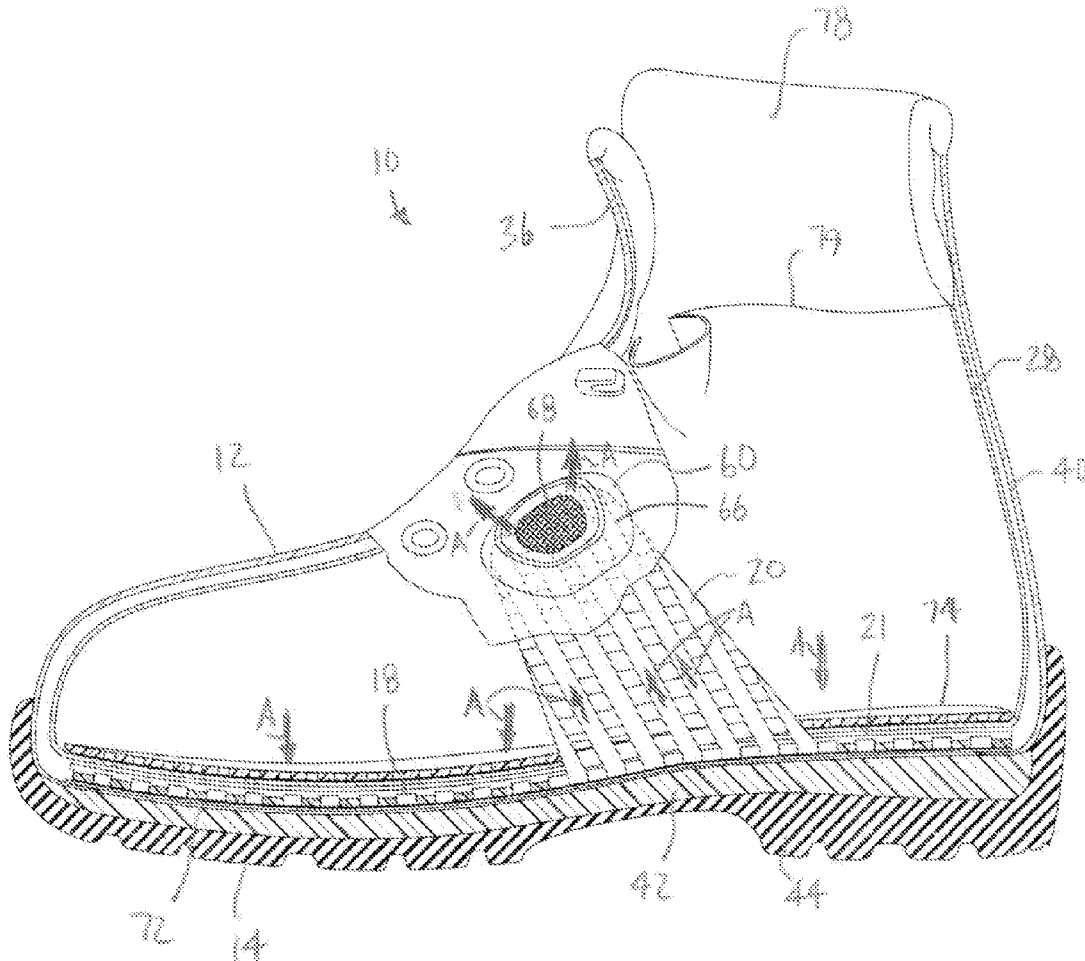
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(19) **United States**(12) **Patent Application Publication**
Nakano(10) **Pub. No.: US 2016/0213090 A1**(43) **Pub. Date: Jul. 28, 2016**(54) **VENTILATED FOOTWEAR CONSTRUCTION**(71) Applicant: **Wolverine World Wide, Inc.**, Rockford,
MI (US)(72) Inventor: **Kiyotaka Nakano**, Rockford, MI (US)(21) Appl. No.: **14/604,094**(22) Filed: **Jan. 23, 2015****Publication Classification**(51) **Int. Cl.****A43B 7/08** (2006.01)**A43B 23/02** (2006.01)**A43B 13/38** (2006.01)**A43B 23/26** (2006.01)(52) **U.S. Cl.**CPC **A43B 7/085** (2013.01); **A43B 23/26**
(2013.01); **A43B 23/0245** (2013.01); **A43B**
13/38 (2013.01)

(57)

ABSTRACT

A ventilation system for an article of footwear including a ventilated midsole and a ventilated wing for routing warm/moist air from around a wearer's foot to at least one vent in the upper. The ventilated midsole and wings may be integrally formed from a sheet of ventilated material. Alternatively, the ventilated midsole and the ventilated wing are separately formed and fitted together within the article of footwear. When formed separately, the ventilated midsole may be molded with a cavity in the bottom surface to receive the wing. The wing may include a first portion disposed in the cavity and a second portion providing a flow path to the vent. The ventilation system may be used with a waterproof/breathable bootie. The ventilation system may be positioned inside or outside the bootie. The tongue may also include a tongue ventilation system with a tongue ventilation insert and a tongue vent.



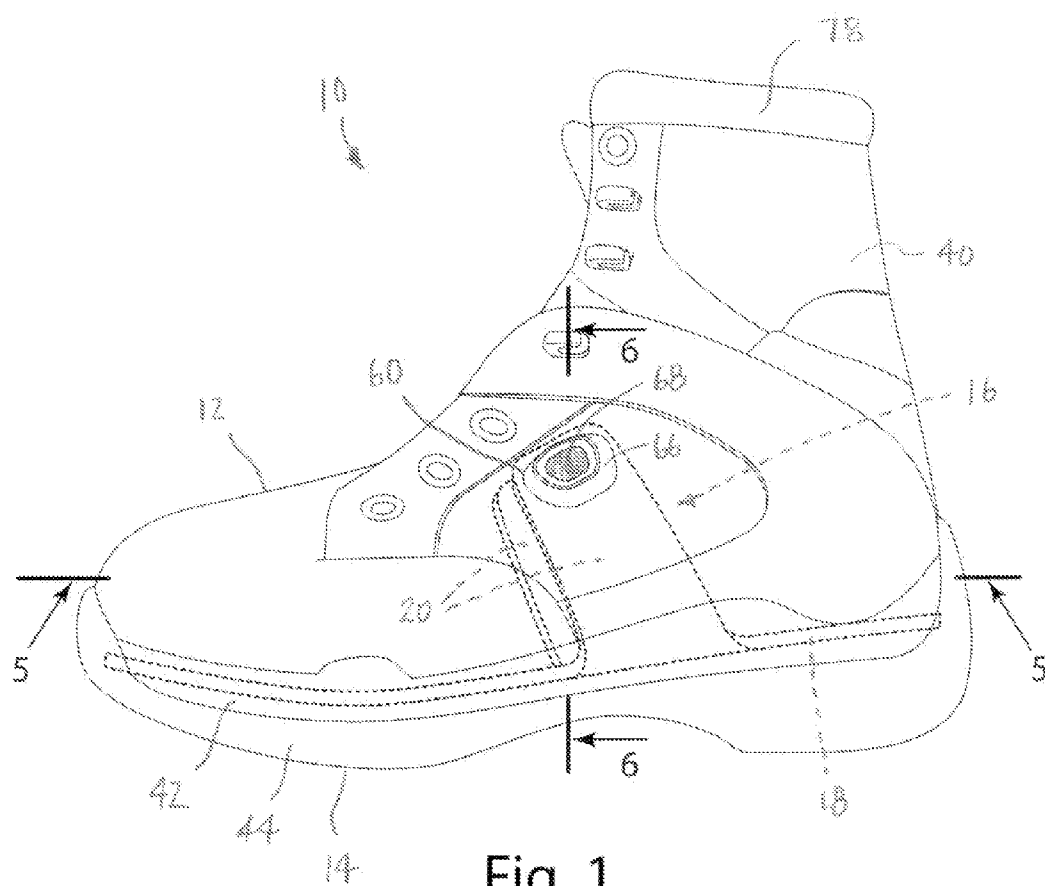


Fig. 1

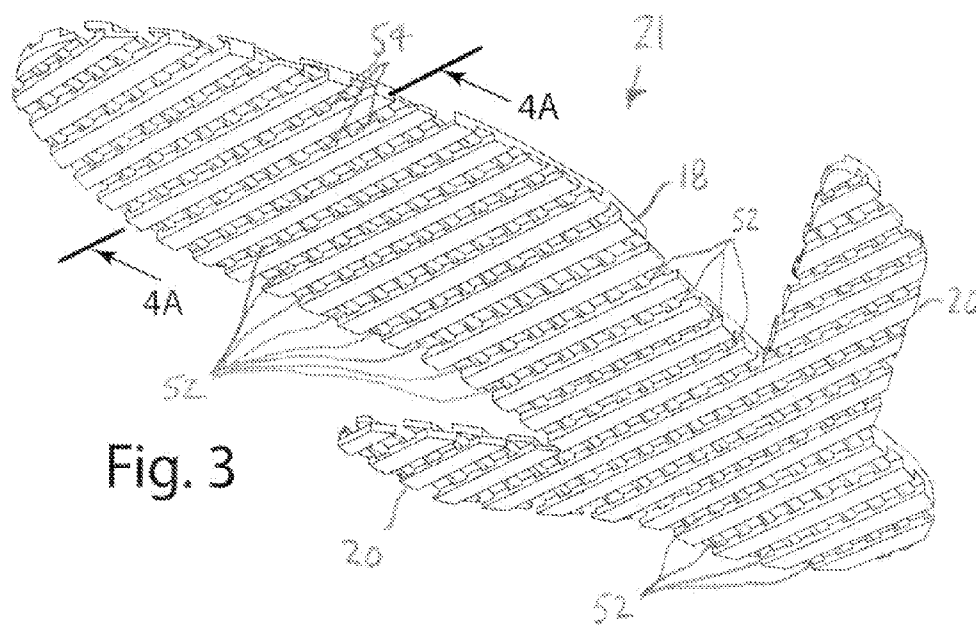
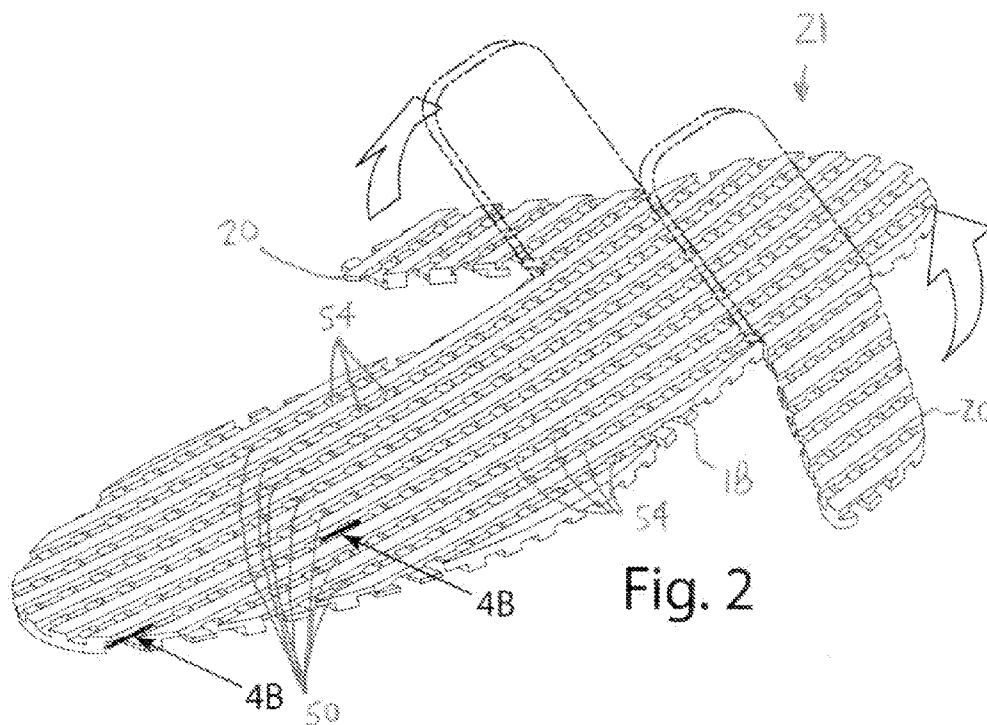




Fig. 4A

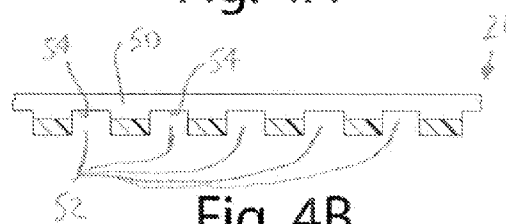


Fig. 4B

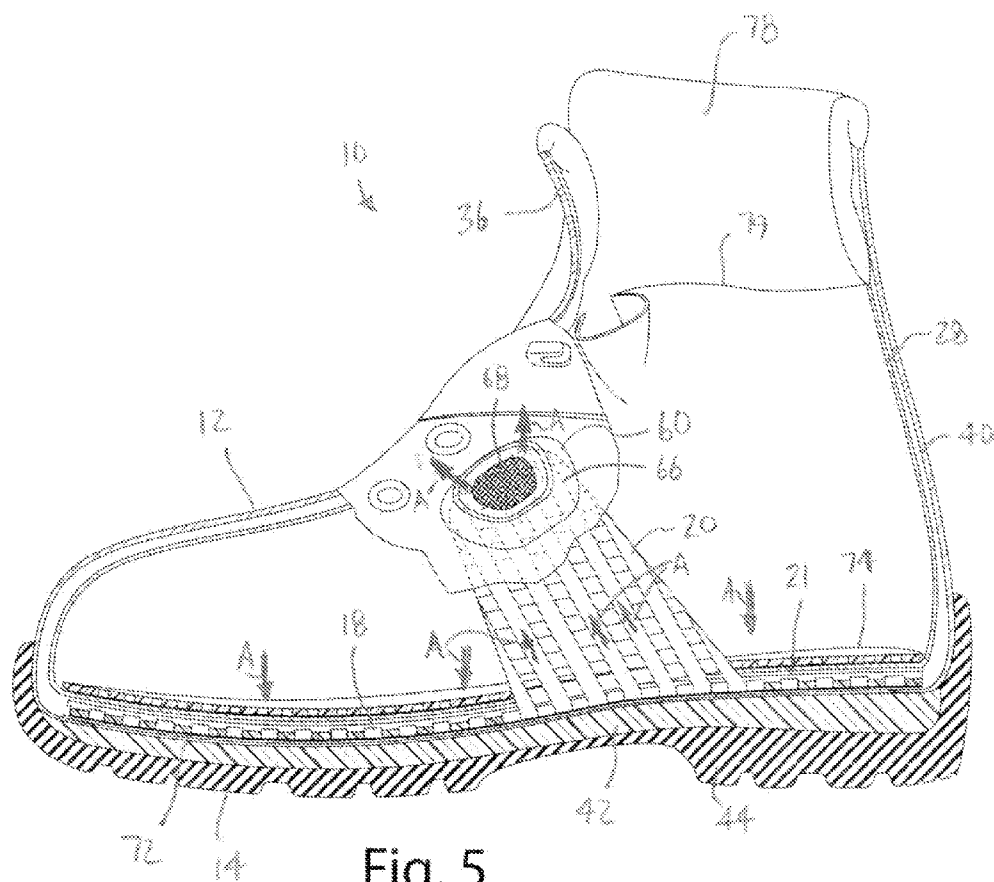


Fig. 5

Fig. 6

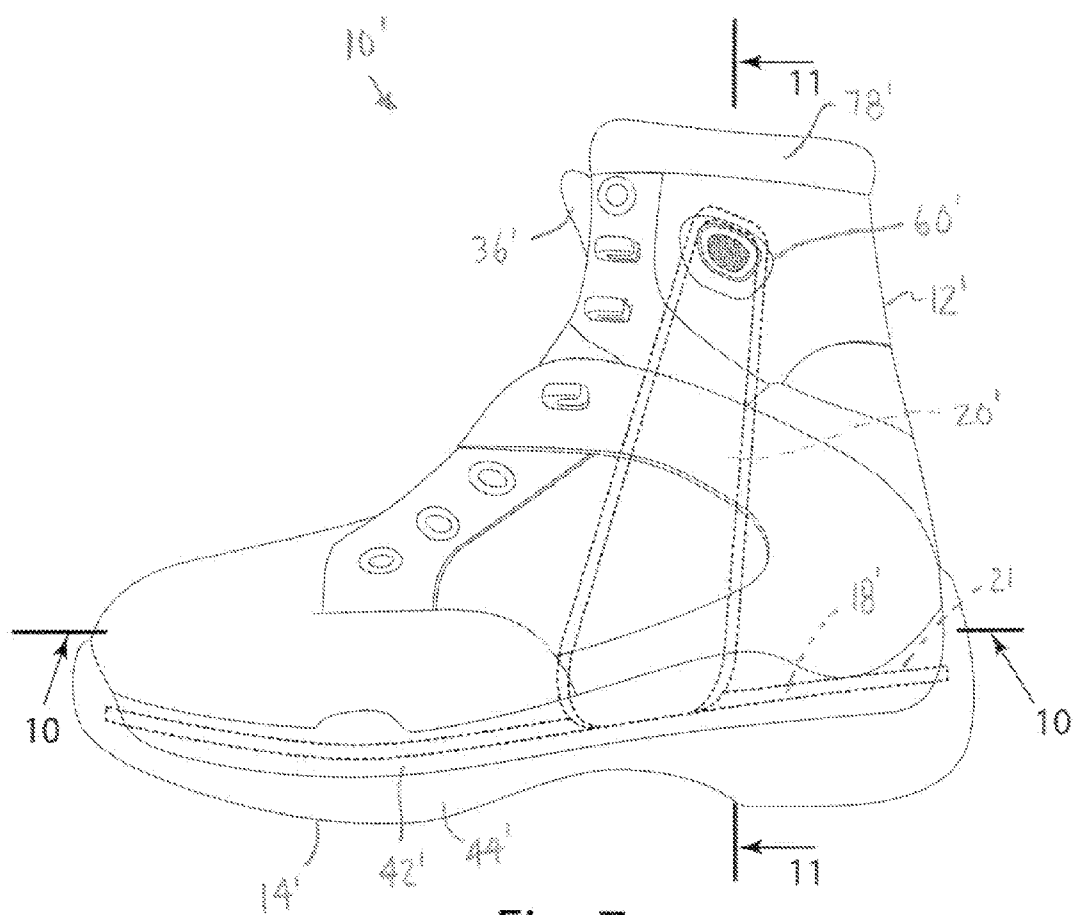


Fig. 7

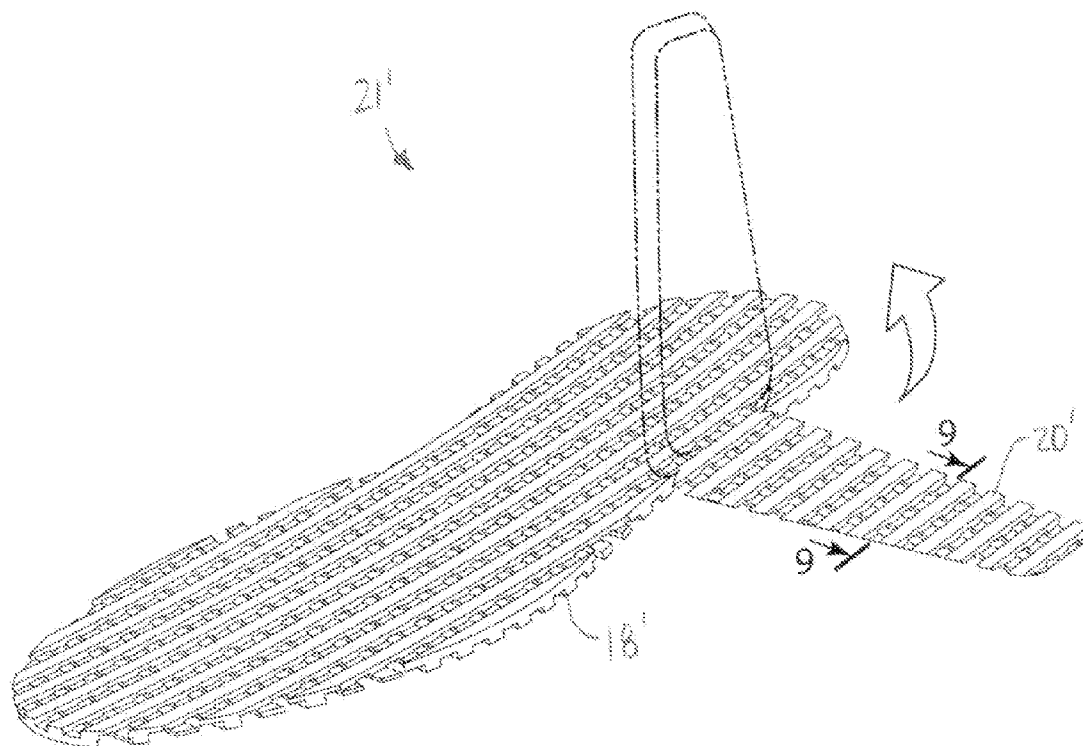


Fig. 8



Fig. 9

Fig. 10

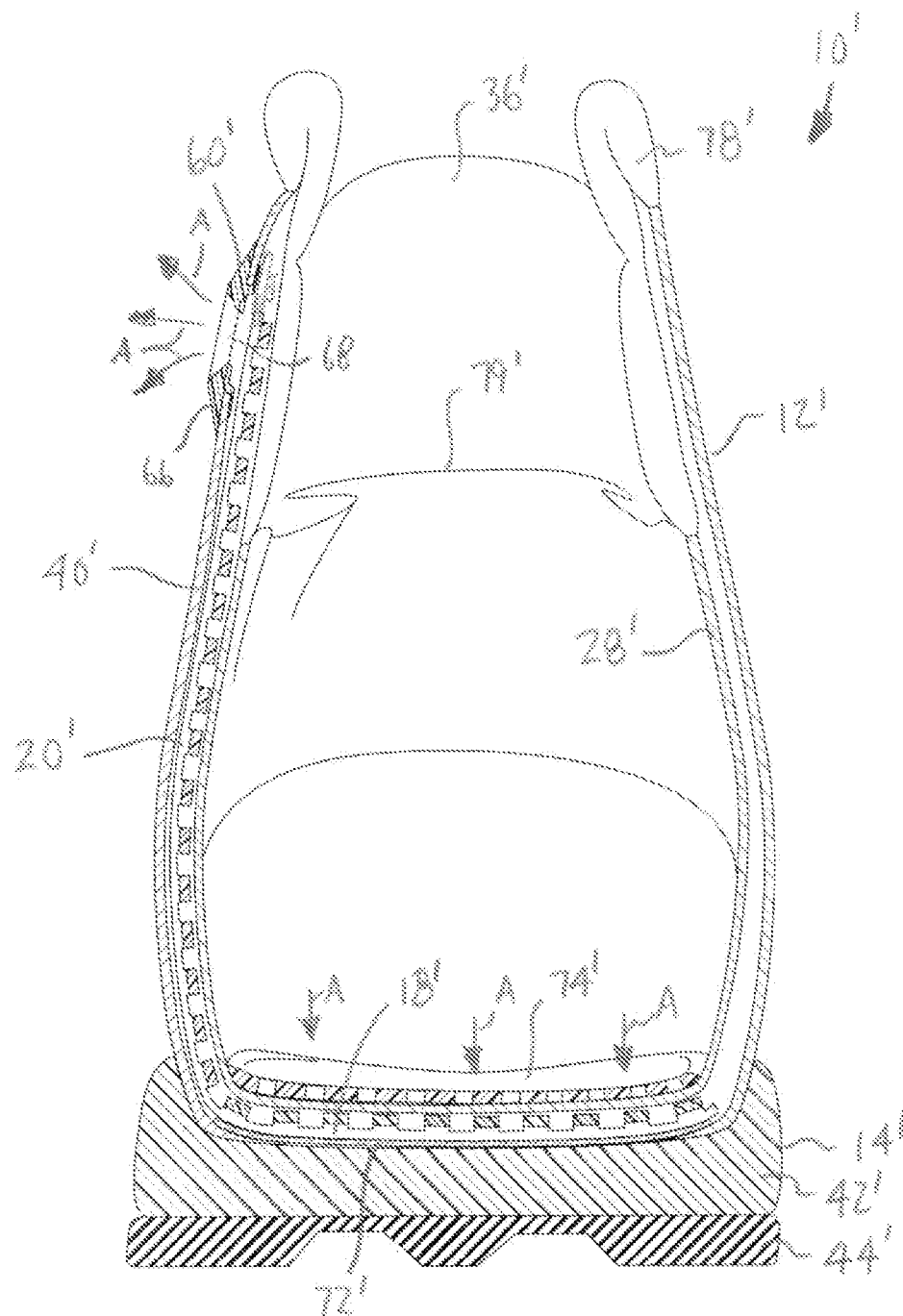


Fig. 11

Fig. 12

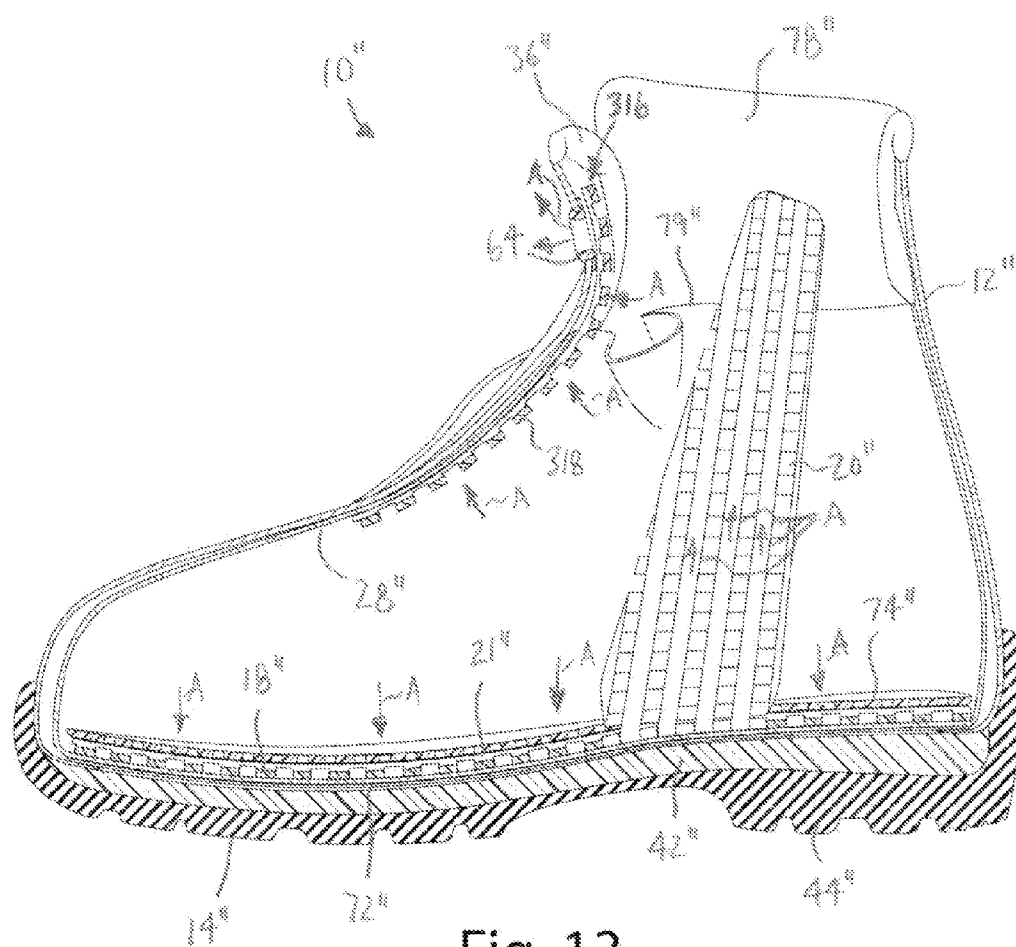


Fig. 13

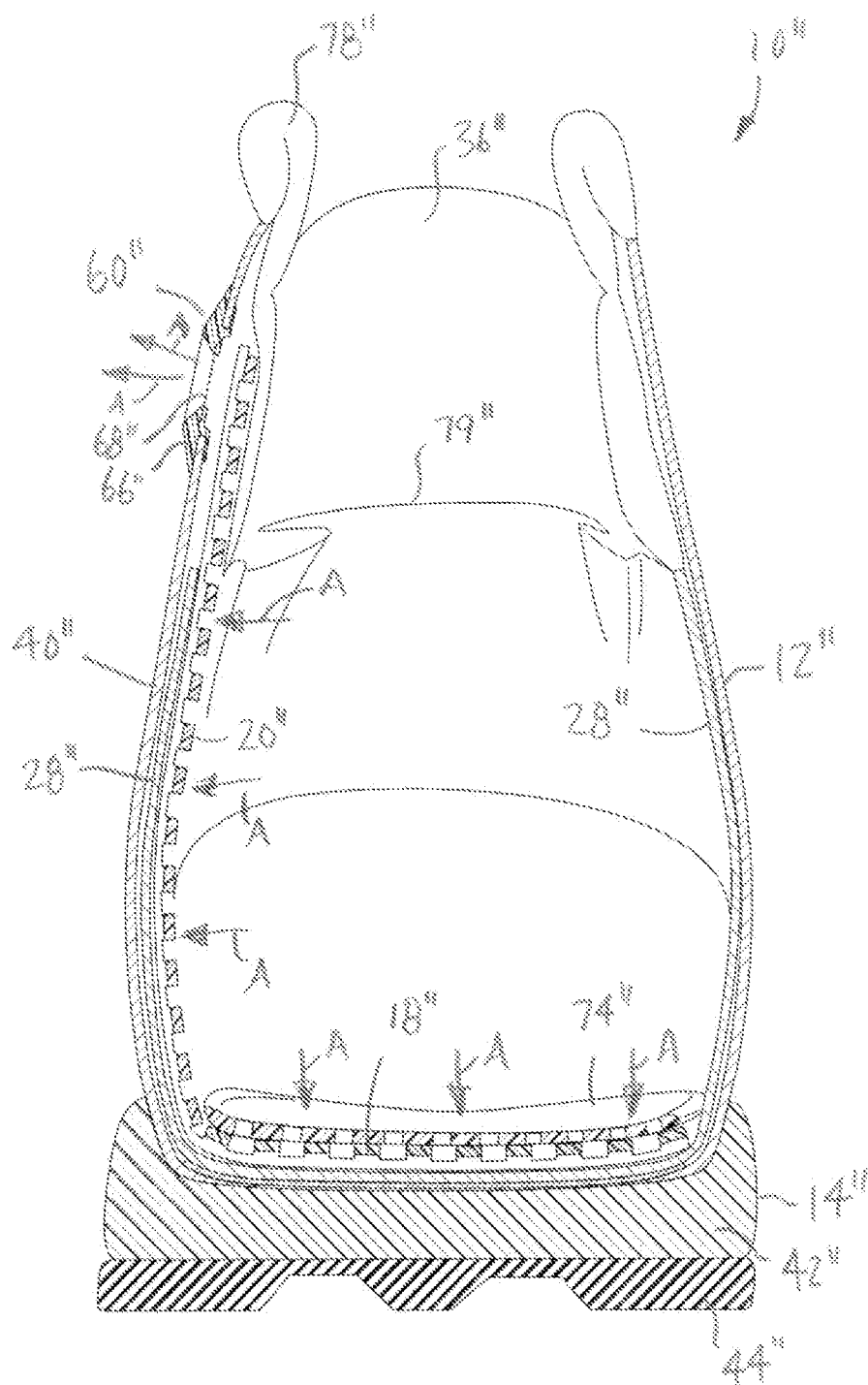
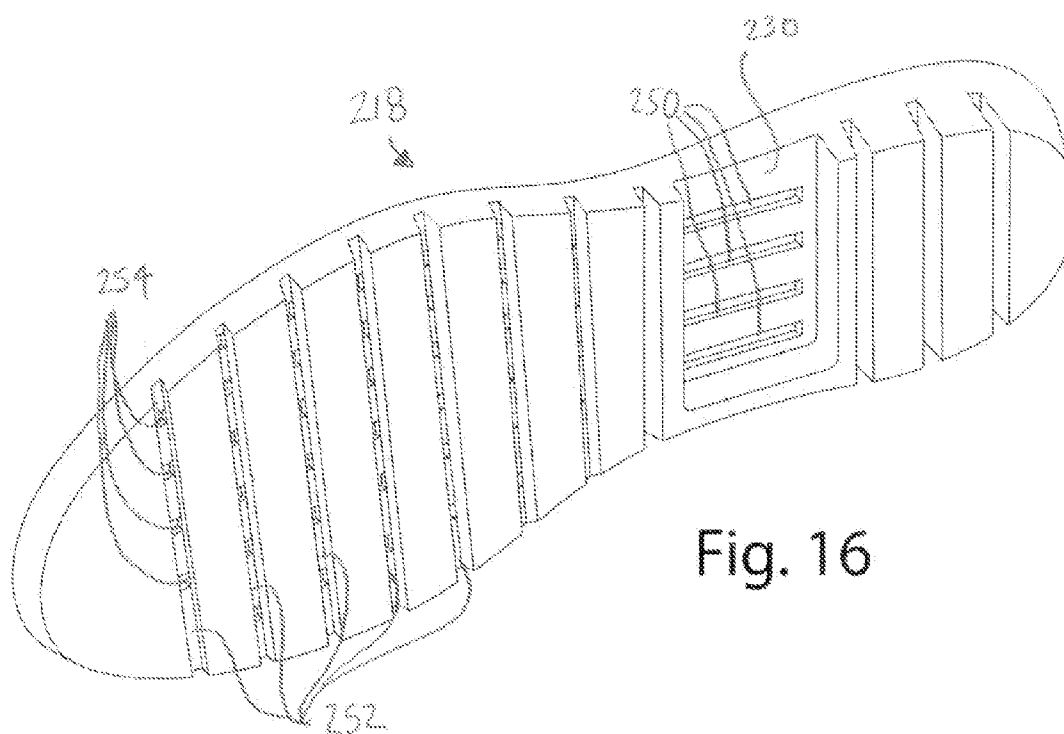
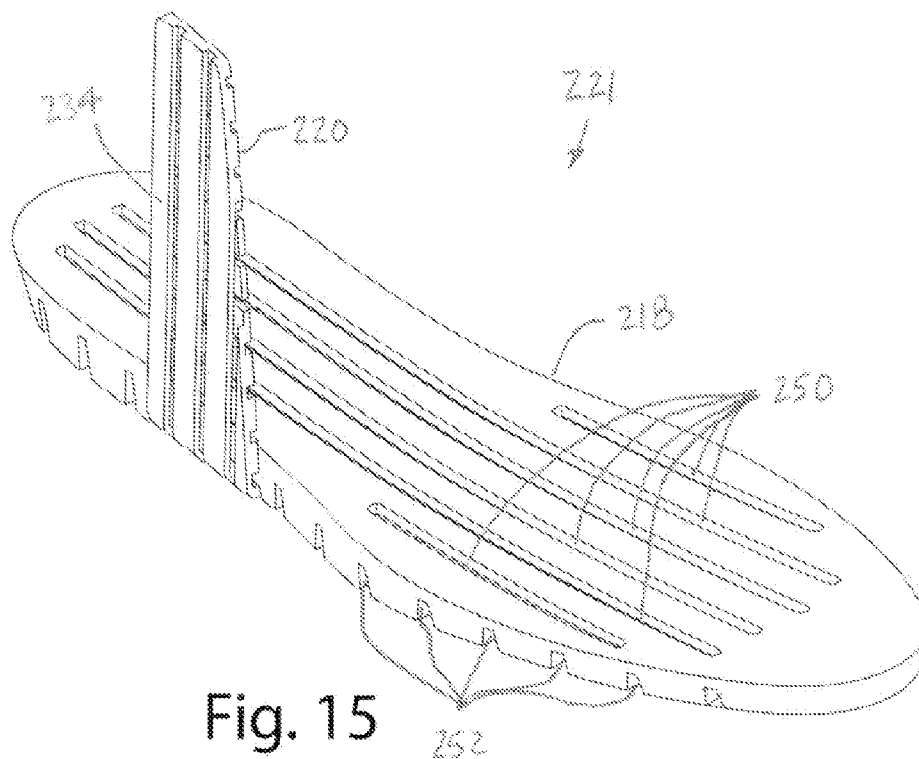


Fig. 14



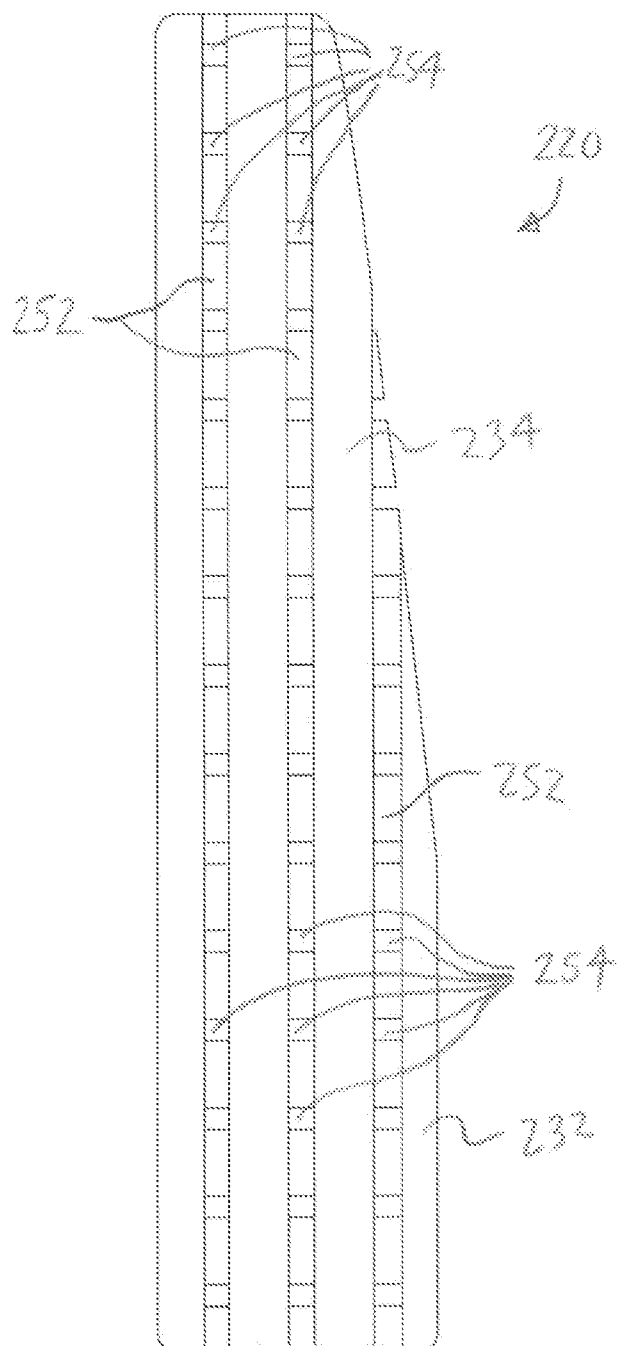


Fig. 17

Fig. 18

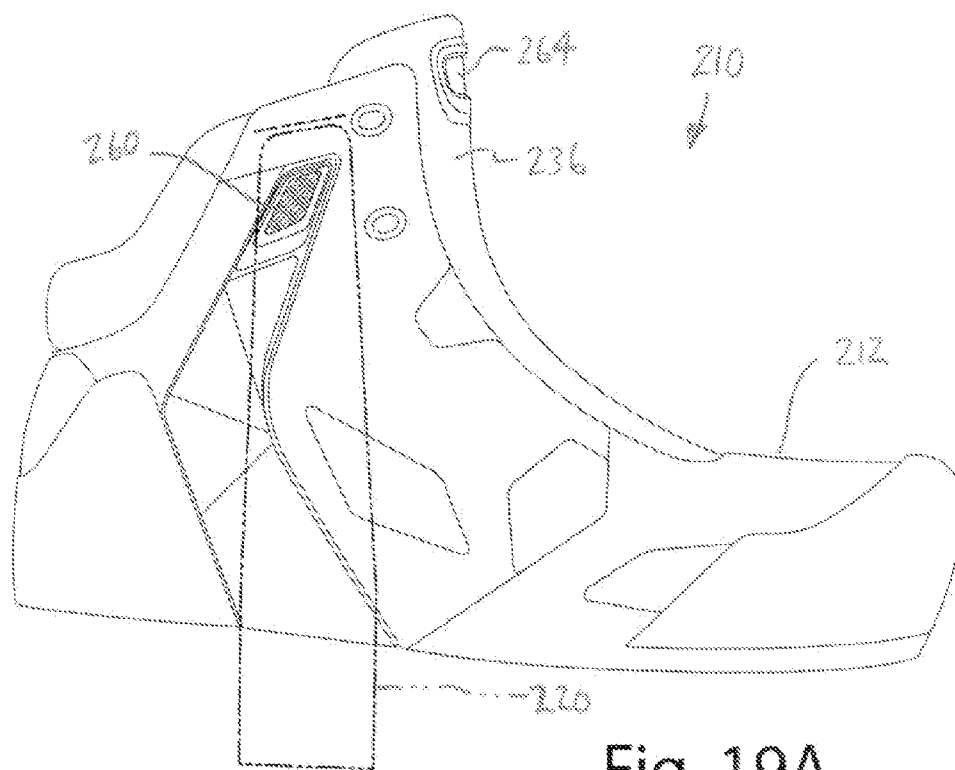


Fig. 19A

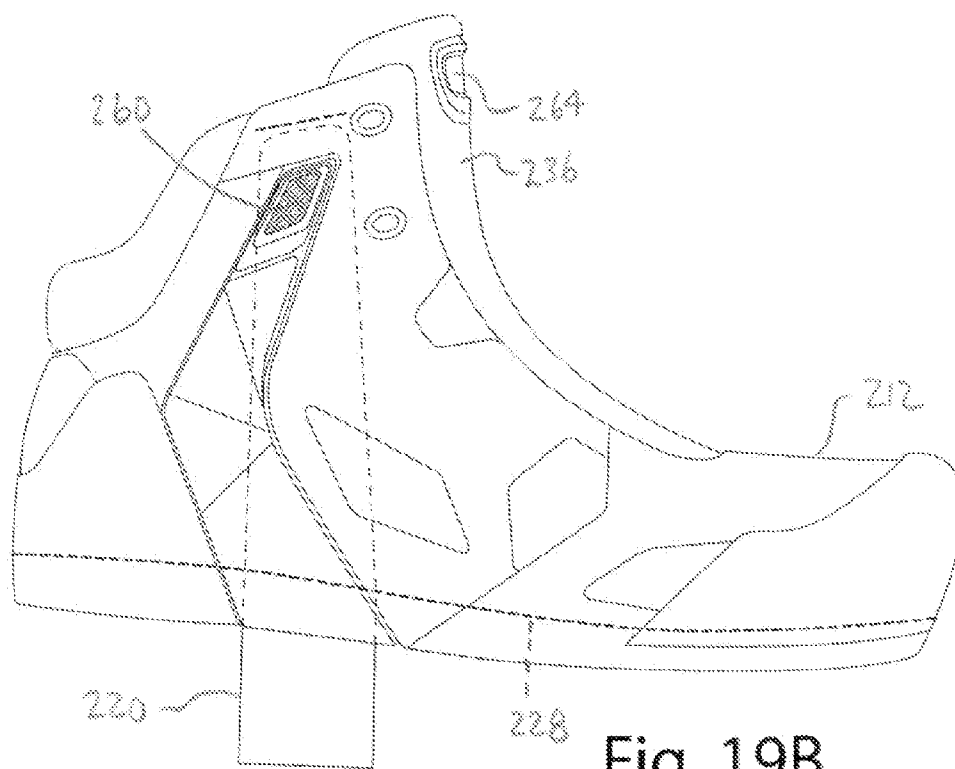


Fig. 19B

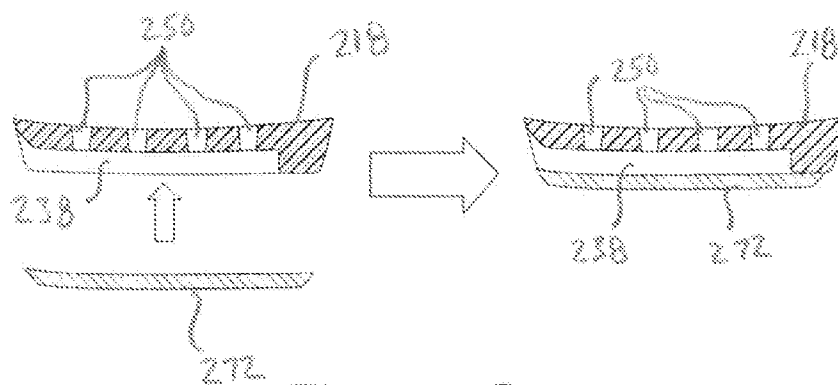


Fig. 19C

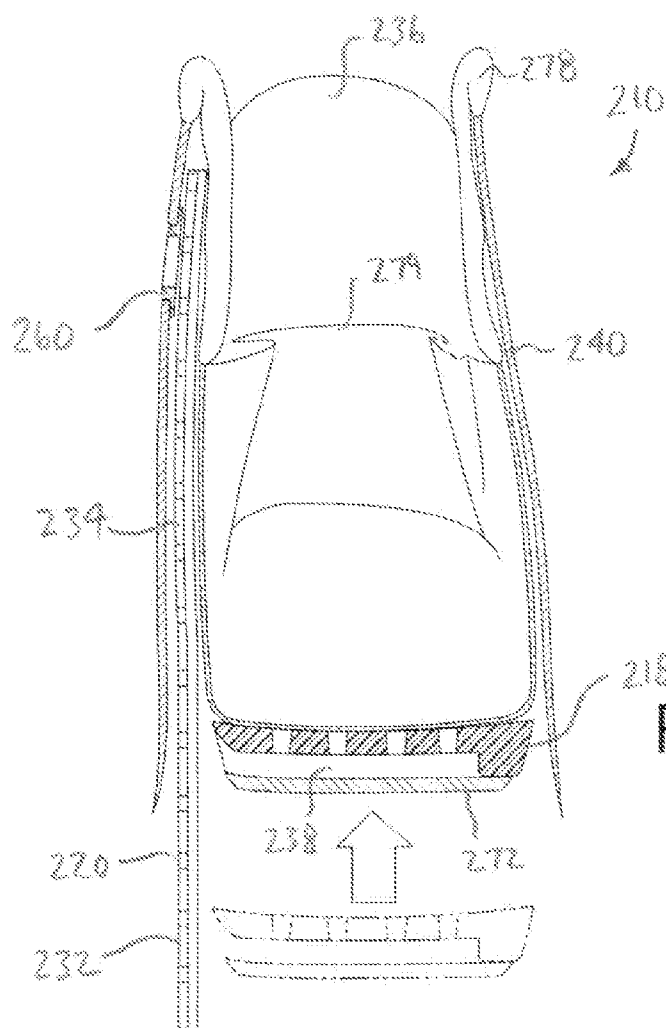
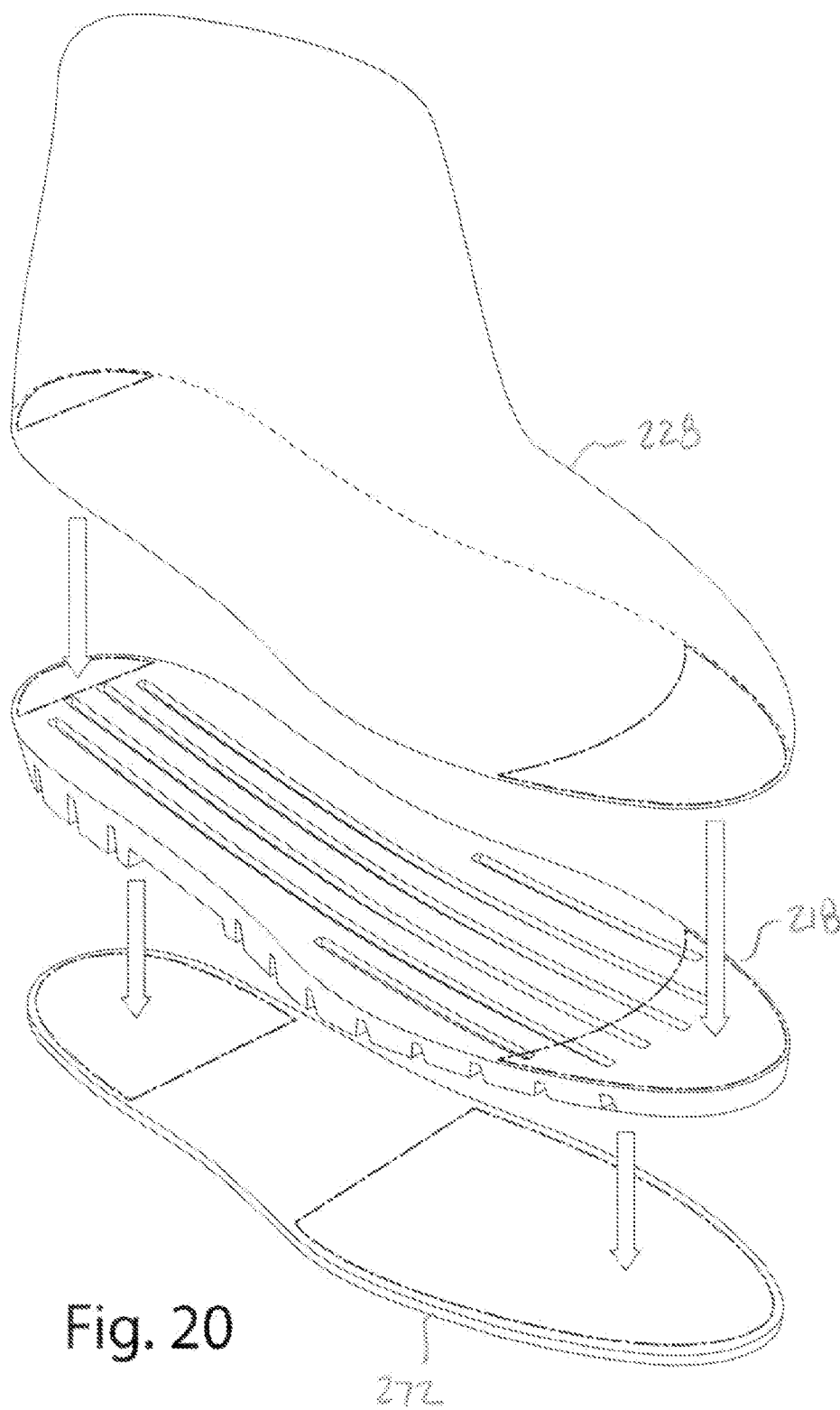


Fig. 19D

Fig. 19F



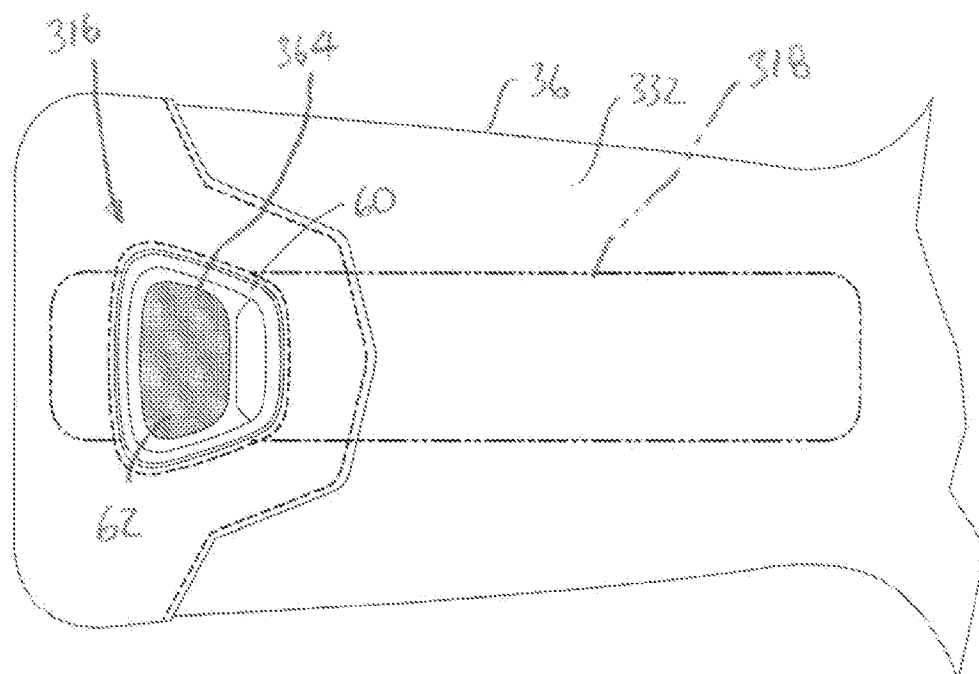


Fig. 21

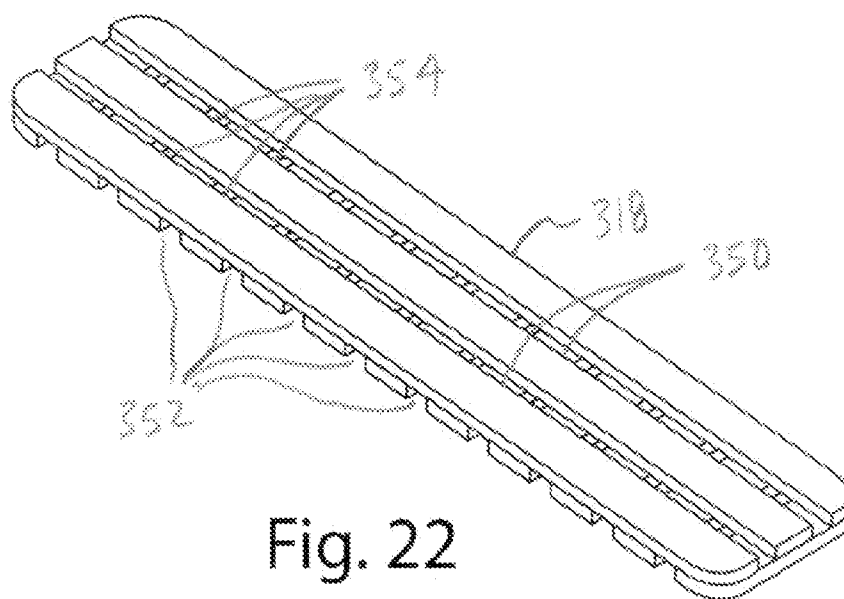
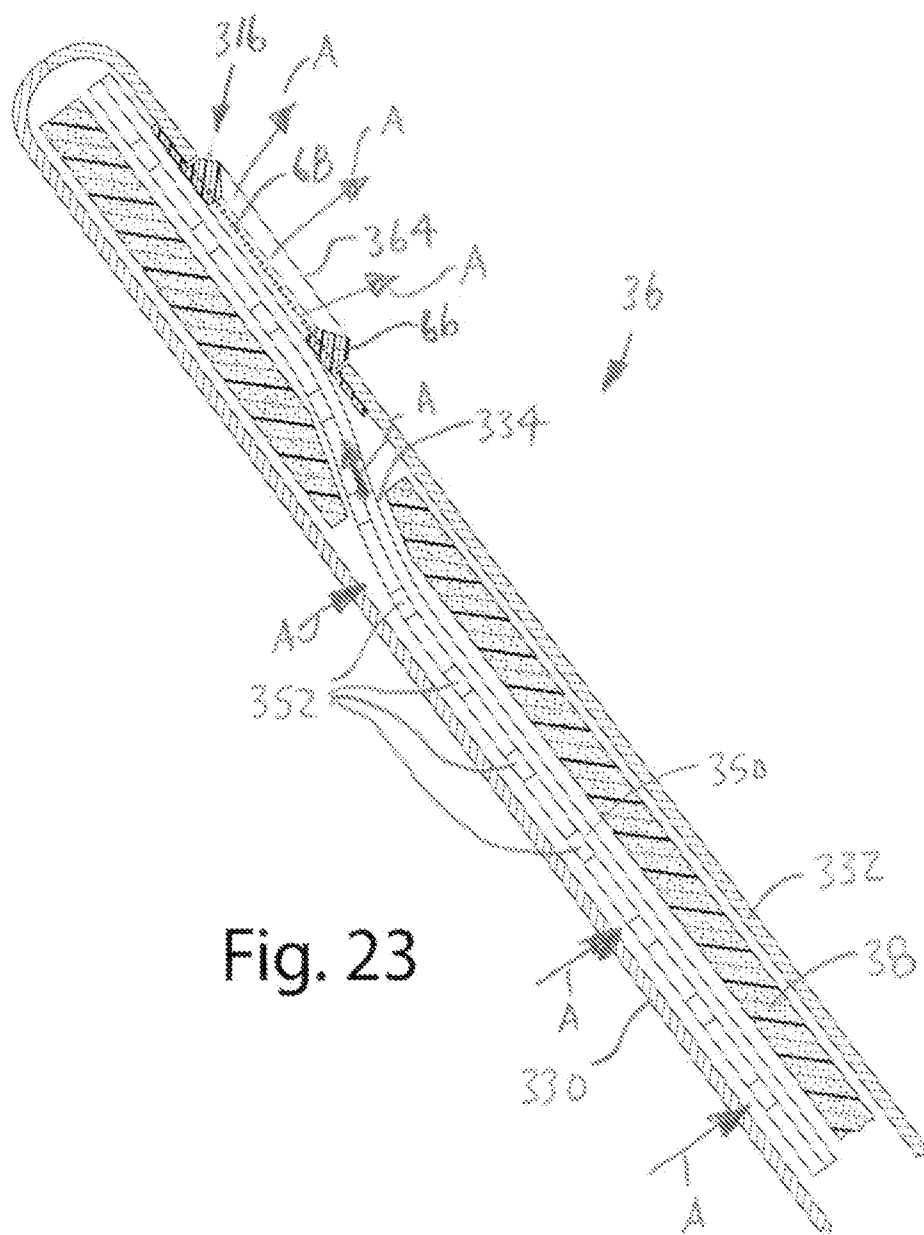


Fig. 22



VENTILATED FOOTWEAR CONSTRUCTION

BACKGROUND OF THE INVENTION

[0001] The present invention relates to ventilated footwear and more particularly to an article of footwear with internal venting channels.

[0002] One common objective in developing footwear is to provide ventilation to help to remove heat and moisture from around the foot. A variety of different constructions have been developed that allow air flow between the environment and the interior of an article of footwear. In perhaps its simplest form, an upper is formed from materials, such as open mesh materials, that allow air to flow through the walls of the upper. Similarly, there have been a number of constructions that provide an air flow path from the interior of the article of footwear to environment through the sole, such as the midsole or the outsole.

[0003] In another conventional construction, a boot is provided with a one-way ventilation system in which air enters the interior of the boot on one side, flows from the interior down through an insole and then exits the boot on the other side. Inlet and outlet vents are provided on opposite sides of the upper toward the top of the boot. An air inlet plate member extends down from the inlet vent to convey air to the interior of the boot. The insole has vertical apertures that allow the air to flow from the interior through the insole to its undersurface and channels on its undersurface. An air outlet plate member extends from the insole to the outlet vent to convey air from the insole to the outlet vent. A one-way flow valve is positioned between the insole and the air outlet plate to control the direction of air flow through the system. As can be seen, this is a complex system that requires a one-way valve and attempts to provide a complete flow path into, through and out of the boot.

[0004] Ventilation can be particularly difficult to provide in waterproof footwear. Most efforts to ventilate waterproof footwear have focused on the use of waterproof and vapor permeable materials that prevent water from entering the footwear while still allowing heat and water vapor to escape. Although waterproof/breathable materials provide significantly greater ventilation than conventional waterproof/non-breathable materials, conventional waterproof/vapor permeable constructions do not provide sufficient ventilation for a wide range of applications. As a result, despite the advancement made possible by waterproof and vapor-permeable materials, there continues to be a desire for footwear with enhanced ventilation capabilities.

SUMMARY OF THE INVENTION

[0005] The present invention provides a footwear construction having a ventilation system to provide improved ventilation for the interior of the upper. The ventilation system includes a ventilated midsole and one or more ventilated wings that cooperatively route warm air and moisture from around a wearer's foot to the environment through one or more vents in the upper. The ventilation system may be used in combination with a waterproof and vapor-permeable bootie. In some embodiments, the ventilated midsole and ventilated wing(s) are positioned outside the bootie between the bootie and the outer layer of the upper. In other embodiments, the ventilated midsole and the ventilated wing(s) are fitted into the bootie. When fitted inside the bootie, the wing(s) may

extend upwardly beyond the upper end of the bootie and vent through the upper above the bootie.

[0006] In one embodiment, the ventilated midsole and wings are integrally formed as a one-piece ventilation insert that is die cut from a sheet of ventilated material. In one embodiment, the ventilated material has an arrangement of channels in opposite sides of the ventilated material that run perpendicular to one another and intersect. The intersection of the channels may form through-holes that provide fluid communication between the channels on opposite sides of the ventilated material. The ventilation insert may be formed in a shape that forms a ventilated midsole with a pair of wings that extend in opposite directions from the lateral and medial sides of the midsole. The wings may extend from the central region (or arch region) of the ventilated of the midsole. In use, the wings can be folded up to extend substantially vertically along the upper.

[0007] In one embodiment, the ventilation system includes a ventilated midsole and a ventilated wing that are separately formed and fitted together within the article of footwear. In this embodiment, the ventilated midsole may be injection molded with ventilation channels in opposite sides and with a cavity in the bottom surface. The injection molded midsole may be a substantial cushioning structure and may have variations in shape that are difficult to achieve in sheet stock. The wing may be die cut from a ventilated material, such as the sheet stock discussed above, and may include an extension portion that is fitted into the cavity in the bottom of the midsole and an upright portion that extends vertically to a vent in the upper.

[0008] In one embodiment, the tongue may also include a ventilation insert. The tongue may generally include an inner layer, an outer layer and a cushioning layer disposed between the inner and outer layers. The inner layer may be a fabric that is sufficiently open to allow ventilation from the interior of the boot through the inner layer. The inner layer of the tongue may be a portion of a waterproof/vapor-permeable bootie. The outer layer may include a vent located toward the top of the tongue. The tongue ventilation insert may be disposed between the inner and outer layers. The ventilation insert may include a lower portion that extends between the inner layer and the cushioning material and an upper portion that extends between the cushioning material and the outer layer. To facilitate this configuration, the cushioning layer may define a slit and the ventilation insert may be threaded through a slit.

[0009] The present invention provides a simple and effective ventilation system that is capable of providing a high degree of ventilation even when combined with a waterproof/vapor permeable membrane. In those embodiments that utilize a one-piece die cut construction, the ventilation insert is inexpensive to manufacture and easily incorporated into an article of footwear with a high degree of reliability. The channels in the sheet material provide fluid communication between the midsole and wing(s) without the need to provide alignment or registration between the components. In those embodiments that utilize separate midsole and wing components, the midsole can be formed using a manufacturing technique, such as injection molding or compression molding, that permits the midsole to be formed with contours and other characteristics that are typically not practical with sheet materials. As a result, the use of separate midsole and wing components may allow the ventilation midsole to have enhanced cushioning properties. In some application, the ventilation midsole may provide sufficient cushioning to eliminate the

need for any additional midsole component. Further, the use of a cavity in the undersurface of the midsole provides simple and reliable registration of the wing(s) while yielding effective air flow. When desired, the tongue ventilation insert can be readily added to essentially any article of footwear to supplement the midsole/wing ventilation system and enhance overall ventilation. Those embodiments that use a tongue ventilation insert laced through the cushioning layer can provide effective air flow using a simple and inexpensive manufacturing technique.

[0010] These and other objects, advantages, and features of the invention will be more fully understood and appreciated by reference to the description of the current embodiment and the drawings.

[0011] Before the embodiments of the invention are explained in detail, it is to be understood that the invention is not limited to the details of operation or to the details of construction and the arrangement of the components set forth in the following description or illustrated in the drawings. The invention may be implemented in various other embodiments and of being practiced or being carried out in alternative ways not expressly disclosed herein. Also, it is to be understood that the phraseology and terminology used herein are for the purpose of description and should not be regarded as limiting. The use of “including” and “comprising” and variations thereof is meant to encompass the items listed thereafter and equivalents thereof as well as additional items and equivalents thereof. Further, enumeration may be used in the description of various embodiments. Unless otherwise expressly stated, the use of enumeration should not be construed as limiting the invention to any specific order or number of components. Nor should the use of enumeration be construed as excluding from the scope of the invention any additional steps or components that might be combined with or into the enumerated steps or components. Any reference to claim elements as “at least one of X, Y and Z” is meant to include any one of X, Y or Z individually, and any combination of X, Y and Z, for example, X, Y, Z; X, Y; X, Z; and Y, Z.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. 1 is a side elevational view of an article of footwear incorporating a ventilation system in accordance with an embodiment of the present invention.

[0013] FIG. 2 is a top perspective view of a ventilation insert.

[0014] FIG. 3 is a bottom perspective view of a ventilation insert.

[0015] FIG. 4A is a sectional view of the ventilation insert taken along line 4A-4A of FIG. 3.

[0016] FIG. 4B is a sectional view of the ventilation insert taken along line 4B-4B of FIG. 3.

[0017] FIG. 5 is a partially sectional view of the article of footwear taken along line 5-5 of FIG. 1.

[0018] FIG. 6 is a sectional view of the article of footwear illustrating air flow through the ventilation system taken along line 6-6 of FIG. 1.

[0019] FIG. 7 is a side elevational view of a first alternative article of footwear incorporating an alternative ventilation system.

[0020] FIG. 8 is a top perspective view of an alternative ventilation insert.

[0021] FIG. 9 is a sectional view of the alternative ventilation insert taken along line 9-9 of FIG. 8.

[0022] FIG. 10 is a partially sectional view of the first alternative article of footwear taken along line 10-10 of FIG. 7.

[0023] FIG. 11 is a sectional view of the first alternative article of footwear illustrating air flow through the ventilation system taken along line 11-11 of FIG. 7.

[0024] FIG. 12 is a sectional view of the first alternative article of footwear similar to FIG. 10, except including a tongue ventilation system.

[0025] FIG. 13 is a sectional view similar to FIG. 10 showing a second alternative article of footwear in which the ventilation system is fitted into the bootie.

[0026] FIG. 14 is a sectional view similar to FIG. 11 showing the second alternative article of footwear in which the ventilation system is fitted into the bootie.

[0027] FIG. 15 is perspective view of a ventilation insert assembly for a third alternative article of footwear.

[0028] FIG. 16 is a perspective view of the alternative ventilated midsole.

[0029] FIG. 17 is a top plan view of the alternative ventilated wing.

[0030] FIG. 18 is a sectional view similar to FIG. 11 showing the third alternative article of footwear.

[0031] FIGS. 19A-F are schematic representations of the steps associated with assembly of the third alternative article of footwear.

[0032] FIG. 20 is a schematic representation showing potential regions of adhesive application between the lasting board, ventilated midsole and bootie.

[0033] FIG. 21 is a front view of a tongue portion of an article of footwear with a tongue ventilation system.

[0034] FIG. 22 is a perspective view of a tongue ventilation insert.

[0035] FIG. 23 is a sectional view of a tongue showing the tongue ventilation system.

DESCRIPTION OF THE CURRENT EMBODIMENT

[0036] An article of footwear 10 incorporating a ventilation system 16 in accordance with an embodiment of the present invention is shown in FIG. 1. In this embodiment, the article of footwear 10 includes an upper 12 and a sole 14. The ventilation system 16 generally includes a ventilated midsole 18 that is fitted into the upper 12 above the sole 14, and a pair of wings 20 that extend upwardly from the ventilated midsole 18 along opposite sides of the upper 12 and terminate adjacent to vents 60, 62. The ventilated midsole 18 includes a plurality of channels 50, 52 that allow air to flow through and across the ventilated midsole 12. Similarly, the wings 14 may include a plurality of channels 50, 52 that allow air to flow up the wings 14 and escape from the vents 60, 62. If desired, the ventilation system 16 may be integrated into an article of footwear 10 having a conventional internal bootie 28 manufactured from a waterproof and vapor permeable material, such as Gore-Tex®. In such applications, the ventilation system 16 may be fitted inside the bootie 28 or positioned outside between the bootie 28 and the outer layer 40 of the upper 12. In an alternative embodiment, the ventilation system 216 may include a ventilated midsole 218 and a wing 220 that are separately manufactured and fitted together after manufacture. In this alternative embodiment, the ventilated midsole 218 may be molded with a plurality of channels 250, 252 and may be contoured to correspond with the wearer's foot. The ventilated midsole 218 may define a cavity 230 configured to

receive the wing 220. The channels 250, 252 may provide air flow paths that allow air to move through the midsole into the cavity 230. In this embodiment, the wing 220 generally includes an extension portion 232 and an upright portion 234 that defines a plurality of channels 250, 252. The extension portion 232 is fitted into the cavity 230 to receive air from the ventilated midsole 218 and the upright portion 234 extends upwardly to move air to a vent 260 in the upper 212. The ventilation system 16, 216 may be supplemented by a tongue ventilation system 316. The tongue ventilation system 316 may include a ventilation insert 318 that is fitted into the tongue 36 of the upper 12. The ventilation insert 318 may include a plurality of channels 350, 352 to provide air flow paths through the tongue ventilation insert 318. The tongue 36 may include a cushioning layer 38. The ventilation insert 318 may extend along the inner side of the cushioning layer 38 to receive air from inside the upper 12. The upper end of the ventilation insert 318 may extend through the cushioning layer 38 to a vent 64 that allows air to exit the upper 12.

[0037] Directional terms, such as “vertical,” “horizontal,” “top,” “bottom,” “upper,” “lower,” “inner,” “inwardly,” “outer” and “outwardly,” are used to assist in describing the invention based on the orientation of the embodiments shown in the illustrations. The use of directional terms should not be interpreted to limit the invention to any specific orientation (s).

[0038] Although the present invention is described in the context of a conventional mid-height boot (e.g. 6 inches), the invention may be incorporated into a wide range of footwear. For example, the present invention may be incorporated into full-height boots (e.g. 8-10 inches), hiking shoes, running shoes, pac boots, ski boots or essentially any other footwear that includes a sole and an upper whether enhanced ventilation may be desired.

[0039] As noted above, the footwear 10 of FIG. 1 generally includes an upper 12 and a sole 14. The present invention may be incorporated into footwear that includes essentially any upper construction and any sole construction. However, for the purposes of disclosure, the present invention is described in the context of a conventional mid-height work boot. For example, in this embodiment, the article of footwear 10 is a 6 inch work boot. In the illustrated embodiment, the upper 12 is generally conventional and includes an outer layer 40 and a waterproof/vapor-permeable bootie 28. The outer layer 40 may be manufactured from one or more pieces of material that are joined together to form a foot containing space. The outer layer 40 may be manufacture from a single type of material or from a combination of two or more materials. For example, in the illustrated embodiment, the outer layer includes a primary material, such as leather (e.g. full grain leather), and a secondary material, such as nylon fabric (e.g. 1680 denier nylon fabric) that are joined together by sewing and/or adhesive. The upper 12 may also include internal lining materials. The upper 12 may include additional components, such as a heel counter, a composite toe and/or internal padding. For example, in the illustrated embodiment, the upper 12 includes padding in the collar 78 where the top portion of the upper 12 will engage the wearer's leg. The bottom of the upper 12 may be closed using an insole board, such as lasting board 72. For example, the upper 12 may be fitted over a last and its bottom peripheral edge may be secured to the lasting board 72 using conventional techniques and apparatus. The upper 12 may be closed using alternative constructions, such as other types of lasting boards.

[0040] As described in more detail below, the upper 12 may include a plurality of vents 22 that allow air to escape from the interior of the article of footwear 10 to the environment. The location of the vents 22 may vary from application to application. In the embodiment of FIGS. 1-6, a lateral vent 60 is positioned in the upper 12 toward the top of the foot on the lateral side and a medial vent 62 is positioned in the upper 12 toward the top of the foot on the medial side (See, e.g. FIGS. 1 and 6). These vents 60, 62 provide ventilation for wings 20 on opposite sides of the upper 12. In the alternative embodiment of FIG. 7-11 (described below), the upper 12' includes a single wing vent 60' that is located on the lateral side of the collar 78 near the top edge of the article of footwear 10. Vent 60' provides ventilation for a single wing 60' extending along the lateral side of the upper 12'. Further, in applications that include a tongue ventilation system 316, a tongue vent 64 is positioned toward the top of the tongue (See FIGS. 12, 13, 21 and 23). The tongue vent 64 provides ventilation for a ventilated tongue insert 318 fitted within the tongue 36.

[0041] The design and configuration of the vents 60, 62 and 64 may vary from application to application. However, in the illustrated embodiments, each vent 60, 62 and 64 includes a frame 66 and a cover 68 that are mounted in or over a corresponding opening through the outer layer 40. In the illustrated embodiment, the frame 66 is a molded plastic component that can be secured to the upper 12, for example, by sewing or adhesives. The frame 66 may include integral stitch grooves (not shown) to recess the stitches and protect them from damage during use. For example, the frame 66 may be molded with a shallow stitch groove that extends peripherally around the frame 66 near the peripheral edge. The frame 66 may, however, be manufactured from other suitable materials and may be secured to the upper 12 using other suitable techniques. In the illustrated embodiment, each cover 68 is section of monofilament mesh with intersecting monofilaments configured to provide the desired ventilation. The monofilament mesh may be manufactured from nylon, polyester or other suitable materials. The size (e.g. diameter) of the monofilaments and the spacing between adjacent monofilaments may vary from application to application. The intersecting strands of the monofilament mesh may be interwoven or non-interwoven and they may be welded or non-welded, as desired. The covers 68 may alternatively be manufactured from other materials capable of allowing air flow. For example, the covers 68 may be manufactured from other fabrics that are sufficiently open to allow adequate air flow, such as a mesh fabric or an open-weave fabric. As another example, the covers 68 may be manufactured from screen, such as nylon, polyester or metal screen. In some applications, the frames 66 may be eliminated and the covers 68 may be secured directly to the upper 12. For example, the covers 68 may be sewn directly to the upper 12. In some applications, the vents 62, 64 and 66 may be formed by perforations or other openings in the upper 12 rather than by separate frames 66 and covers 68. For example, the vents 22 may be formed by an array of small circular openings die cut through the upper 12.

[0042] As noted above, the article of footwear 10 is waterproof and includes a waterproof/vapor permeable bootie. The bootie 28 is a generally conventional waterproof/vapor-permeable bootie 28 formed from a waterproof/vapor-permeable material, such as Gore-Tex® fabric. A variety of waterproof/vapor-permeable booties are commercially available. For example, suitable booties are available from W. L. Gore &

Associates, Inc. Waterproof/vapor-permeable booties are well-known in the footwear industry and therefore will not be described in detail. Although the illustrated article of footwear **10** is waterproof, the upper **12** need not be waterproof and the bootie **28** may be eliminated. In applications that do not include a bootie, the upper **12** may include an alternative internal liner formed from any of a wide variety of lining materials. The bootie **28** may be fitted into the article of footwear **10** and secured to the upper **12** and/or the sole **14** using essentially any suitable techniques and apparatus. Referring now to FIG. 1, the bootie **28** may be attached to the outer layer **40** of the upper **12** to secure it in place within the interior of the article of footwear **10**. In this embodiment, the upper edge of the bootie **28** is sewn to the upper **12** near the top of the article of footwear **10**. As shown in FIG. 5, the outer layer **40** of the upper **12** folds over and extends down into the collar **78** where it is joined to the top edge of the bootie **28**, for example, along seam **79**. The bootie **28** may alternatively or additionally be secured to the upper using other techniques and apparatus. For example, the bootie **28** may be secured to the upper **12** and/or sole **14** in select regions, such as the toe and heel, using adhesive.

[0043] The article of footwear **10** may include essentially any sole construction. In the illustrated embodiment, the sole **14** generally includes a midsole **42** and an outsole **44**. Generally speaking, the midsole **42** provides cushioning for the wearer's foot and the outsole **44** provides durability and traction for the article of footwear **10**. Although the midsole **42** may vary from application to application, the midsole **42** of the illustrated embodiment is manufactured from a relatively resilient material selected to provide the article of footwear **10** with a desired level of cushioning. For example, the midsole **42** may be formed from ethyl vinyl acetate ("EVA") or polyurethane. The midsole **42** generally includes an upper surface **46** and a lower surface **48**. The upper surface **46** is configured to be secured to the lasting board **72**, for example, by adhesives, and the lower surface **48** is configured to be secured to the outsole **44**, for example, by adhesives. The midsole **42** may be secured to the upper **12** using other techniques and apparatus. For example, the midsole **42** may be molded directly onto the bottom of the upper **12** in direct contact with the lasting board **72**.

[0044] In this embodiment, the outsole **44** is secured to the lower surface **48** of the midsole **42**, and is configured to engage the ground and form the wear surface of the article of footwear **10**. The outsole **44** may be manufactured from a conventional outsole material that is selected provide the desired balance between comfort, wear, traction and cost. For example, the outsole **44** may be manufactured from a conventional rubber compound or from other suitable wear-resistant materials. The outsole **44** may include treads and/or lugs or be otherwise configured to enhance traction. The outsole **44** may be manufactured using injection or pour molding techniques utilizing conventional molding apparatuses. In the illustrated embodiment, the outsole **44** is secured to the lower surface **48** of the midsole **42** using cement or other suitable adhesives. The midsole **42** and outsole **44** may be secured using alternative techniques, if desired. For example, the midsole **42** may be integrally molded onto the outsole **44** or vice versa.

[0045] The sole **14** may also include a sock liner **74**. The sock liner **74** may be positioned inside the bootie **28** to provide cushioning for the foot. In the illustrated embodiment, sock liner **74** is perforated to allow airflow through the sock

liner **74**. For example, the sock liner **74** may be covered with an array of small apertures **76** that extend vertically through the sock liner **74**. In the illustrated embodiment, the apertures **76** cover substantially the entire surface of the sock liner **74**. Alternatively, the apertures **76** may exist only in select regions of the sock liner **74**. The sock liner **74** may include alternative structure for allowing air to flow through the sock liner **74**. For example, as an alternative to vertical apertures **76**, the sock liner **74** may include an arrangement of intersecting top and bottom channels (not shown), such as those disclosed below in connection with ventilated midsole **18**.

[0046] As noted above, the article of footwear **10** includes a ventilation system **16** that allows air to ventilate through the article of footwear **10**. In the embodiment of FIG. 1, the ventilation system **16** is disposed between the outer layer **40** and the bootie **28**. The ventilation system **16** of this embodiment generally includes a ventilated midsole **18** and a pair of wings **20**. In this embodiment, the ventilated midsole **18** underlies and is substantially coextensive with the upper surface **46** of the midsole **42** and the bottom surface of the bootie **28**. The size and shape of the ventilated midsole **18** may, however, vary from application to application. Rather than being substantially coextensive with the midsole **42** and the bootie **28**, the ventilated midsole **18** may extend through only one or more select regions of the article of footwear **10**. For example, the ventilated midsole **18** may extend only through the forefoot region, the arch region, the heel region or any combination thereof. The ventilated wings **20** extend upwardly from opposite lateral edges of the ventilated midsole **18** along opposite sides upper **12** and terminate adjacent to vents **22**. In the illustrated embodiments, the wings **20** overlie the vents **22**. The wings **20** of this embodiment are positioned toward the middle of the ventilated midsole **18**. Although the ventilation system **16** of the illustrated embodiment includes a pair of ventilated wings **20** that extend from opposite sides of the ventilated midsole **18**, the ventilation system **16** may include a different number of wings **20**. For example, the ventilation system **16** may include only a single wing **20** that extends upwardly from the medial or lateral side of the ventilated midsole **18** (See, e.g., FIGS. 7-12). The single wing construction may be desirable when the article of footwear **10** includes a zipper or other closing structure on the medial side of the upper **12**. As another example, the ventilation system **16** may include a plurality of wings **20** extending from one or both sides of the ventilated midsole **18** (not illustrated). This may include two wings **20** extending from the medial side of the ventilated midsole **18** and/or two wings **20** extending from the lateral side of the ventilated midsole **18**. In the illustrated embodiment, the wings **20** extend upwardly from the middle region of the ventilated midsole **18**. However, the wings **20** may extend upwardly from other regions of the ventilated midsole **18**. For example, the ventilation system **16** may include a wing **20** that extends upwardly from the heel region of the ventilated midsole **18** (not shown). The heel wing **20** may extend upwardly along the rear of the article of footwear **10**, or it may be positioned on the lateral or medial side of the heel. If desired, the peripheral edges of the wings **20** may be skived to eliminate harsh edges. The taper may vary from application to application.

[0047] The location of the vents **22** may vary from application to application. For example, in the embodiment of FIG. 1, the vents **60**, **62** are located toward the top the foot. In this embodiment, the wings **20** extend upwardly and forwardly to provide a flow path from the ventilated midsole **18** to the vents

60, 62. As another example, in the embodiments of FIGS. 7-20, a single vent 60 is located in the collar 78 near the top of the article of footwear 10', 210 to provide ventilation using a single wing 20', 220. These alternative embodiments are described in more detail below.

[0048] In the embodiment of FIG. 1, the ventilated midsole 18 and the ventilated wings 20 are integrally formed as a one-piece ventilation insert 21 from a single sheet of material (See FIGS. 2 and 3). For example, the ventilated midsole 18 and wings 20 may be die cut in one-piece from a sheet of ventilated material. As illustrated in broken lines in FIG. 2, the wings 20 may be folded upwardly during assembly to extend in a generally vertical configuration. The ventilated material may include essentially any ventilation structure that provides the desired air flow through the ventilated material. In the illustrated embodiment, the ventilated material has an arrangement of channels defined in opposite sides of the material. In the embodiment of FIGS. 1-6, the channels in one side of the ventilated material run at an angle to the channels in the opposite side. For example, the channels 50 in the top side of the ventilated material may extend in a direction that is perpendicular to the channels 52 in the bottom side of the ventilated material (Compare FIGS. 2 and 3). The angular offset between the top channels 50 and the bottom channels 52 vary from application to application. As shown, the bottom channels 52 may extend laterally across the article of footwear from lateral to medial side (See FIG. 3), while the top channels 50 may extend longitudinally along the article of footwear from heel to toe (See FIG. 2). The top channels 50 and the bottom channels 52 may cover the entire top and bottom surfaces of the ventilated material. Alternatively, the top channels 50 and the bottom channels 52 may be present in only select portions of the top and bottom surfaces of the ventilated material. The top channels 50 and the bottom channels 52 may extend the full length and width of the article of footwear 10. Alternatively, one or more of the top channels 50 or the bottom channels 52 may extend only partially through the length and/or width of the article of footwear 10. The top channels 50 and the bottom channels 52 may be reversed with the top channels 50 extending laterally and the bottom channels 52 extending longitudinally. The configuration, number, location and size of the channels 50 and 52 may vary as desired from application to application. As perhaps best shown in FIGS. 4A and 4B, the channels 50 and 52 are generally rectangular in cross section. The channels 50 and 52 may have other cross-sectional shapes, such as V-shaped grooves, half circles, ellipses and other rectilinear or curved regular or irregular shapes.

[0049] In the illustrated embodiment, the depths of the channels 50 and 52 are selected so that the top channels 50 and the bottom channels 52 intersect to create openings 54 that allow fluid communication between the top channels 50 and the bottom channels 52 (See FIG. 4A and 4B). The size and shape of the defined openings 54 may vary from location to location, depending on the shape, width and depth of the channels 50 and 52, as well as the angle of intersection of the channels 50 and 52. Alternatively, the characteristics of the channels 50 and 52 may be selected such that the top channels 50 and bottom channels 52 do not intersect. With this alternative, openings may be provided by supplemental passages (not shown) defined in the ventilated material to interconnect and create fluid communication between the top channels 50 and the bottom channels 52. In the illustrated embodiment, openings 54 are defined at every intersection point between

the top channels 50 in the bottom channels 52. It is not necessary, however, for openings 54 to exist at each intersection. Instead, openings 54 may be provided only in one or more portions of the ventilated midsole 18 or wings 20.

[0050] In the illustrated embodiment, the channels in the ventilated midsole 18 are in fluid communication with the channels in the ventilated wings 20. As such, the wings 20 provide a flow path between the vents 22 and the ventilated midsole 18. In the embodiment of FIGS. 1-6, the bottom channels 52 extend continuously across the ventilated sheet material and are oriented to extend laterally across the ventilated midsole 18 and vertically up the ventilated wings 20 when assembled in the article of footwear 10. The configuration of channels may, however, vary so that fluid communication between the ventilated midsole 18 and the wings 20 is provided by either or both of the top and bottom channels 50, 52, or by supplemental air flow passages in the ventilated midsole 18, wings 20 or an additional component interposed between the ventilated midsole 18 and the wings 20.

[0051] In the illustrated embodiment, the ventilation system 16 is secured in the interior of the article of footwear 10. FIGS. 5 and 6 are sectional views showing the ventilation system 16 within the assembled article of footwear 10. To facilitate disclosure, FIG. 5 is shown as a partial sectional view in which the lateral wing 20 and a portion of the upper 12 containing the lateral vent 60 are shown. As can be seen in FIGS. 5 and 6, the ventilated midsole 18 is situated above the lasting board 72 and below the bootie 28. As perhaps best shown in FIG. 6, the wings 20 extend upwardly from the ventilated midsole 18 between the outer layer 40 and the bootie 28 to terminate above the lateral vent 60 and the medial vent 62. The overlapping relationship between the wings 20 and the vents 60, 62 facilitates airflow between the wings 20 and the vents 60, 62. In the embodiment of FIGS. 1-6, the ventilation system 16 is permanently assembled within the article of footwear 10. For example, the uppermost ends of the wings 20 may be sewn or otherwise secured to the upper 12. In this embodiment, the uppermost ends of the wings 20 are secured to the outer layer 40 by one or more lines of stitching (not shown). The wings 20 may be affixed to the upper 12 at alternative or additional locations, as desired. For example, the wings 20 may be stitched to the outer layer 40 along its entire periphery or along select portions of its periphery. In the illustrated embodiment, the ventilated midsole 18 is not directly secured to the upper 12. The ventilated midsole 18 may, however, be directly secured, for example, by cementing to the bottom of the bootie 28 or to the top of the lasting board 72.

[0052] In use, the ventilation system 16 provides improved air flow through the article of footwear 10. For example, with reference to FIGS. 5 and 6, hot and moist air may flow from within the interior of the article of footwear 10 to the exterior as shown by arrows A. As shown, air within the interior of the upper 12 may flow down through the perforations in sock liner 74, through the breathable bootie 28 and into the air flow paths in the ventilated midsole 18. The top and bottom channels 50, 52 allow air to enter and flow along essentially the full length and width of the ventilated midsole 18. From the ventilated midsole 18, air is free to flow into the wings 20 on the lateral and/or medial side of the ventilation insert 21. Air may then flow up the wings 20 to the vents 60, 62, and then out of the article of footwear 10. The flow of air may be facilitated by convection as hot/warm air within the article of footwear 10 flows up the wings 20 to create a chimney effect. It should

be noted that, in the illustrated embodiment, there are no valves or directional flow components in the ventilation system 16, and air is free to flow in and through the ventilation insert 21, including the ventilated midsole 18 and wings 20, in essentially any direction.

[0053] The ventilation system 16 of FIGS. 1-6 includes a pairs of wings 20 that extend from opposite sides of the ventilated midsole 18 to vents 60, 62 position toward the top of the foot. As noted above, the number and configuration of wings may vary from application to application. As an example, an alternative ventilation system 16' with a single wing 20' is shown in FIGS. 7-11. The article of footwear 10' shown in FIGS. 7-11 is essentially identical to the article of footwear 10 shown in FIGS. 1-6, except to the extent described or shown in FIGS. 7-11. In this embodiment, the ventilation system 16' includes a one-piece ventilation insert 21' with a ventilated midsole 18' and a single wing 20' (See FIG. 8). The ventilation insert 21' may be die cut from the ventilation material described above in connection with the ventilation insert 21. Alternatively, the ventilation insert 21' may be assembled from separately manufactured components. As show in FIG. 8, the wing 20' may extend from one side of the ventilated midsole 18' and may be configured to reach a vent 60' located in the collar 78' near the top of the article of footwear 10'. As shown in phantom lines in FIG. 8, the wing 20' may be folded into an upright position at the edge of the ventilated midsole 18'. As perhaps best shown in FIG. 9, the peripheral edges of the wing 20' may be skived to provide the wing 20' with a tapered peripheral edge. This may soften the edges of the wing 20'. Sectional views of the article of footwear 10' showing the ventilation system 16' are shown in FIGS. 10 and 11. To facilitate disclosure, FIG. 11 is a partial sectional view in which the wing 20' and a portion of the upper 12' containing the vent 60' are shown. Referring now to FIG. 10, the ventilated midsole 18' of this embodiment is sandwiched between the top of the lasting board 72' and the bottom of the bootie 28'. In this embodiment, the ventilated midsole 18' is not directly secured to the lasting board 72' or the bootie 28'. However, the ventilated midsole 18' may be attached if desired. For example, the ventilated midsole 18' may be cemented to the lasting board 72' and/or the bootie 28', if desired. The wing 20' extends along the lateral side of the article of footwear 10' between the bootie 28' and the outer layer 40' (See FIG. 11). The upper end of the wing 20' may be stitched or otherwise secured to the outer layer 40'. For example, a single line of stitching may join the top edge of the wing 20' to the outer layer 40'. The wing 20' may overlap the vent 60' to facilitate air flow between the wing 20' and the vent 60'. In use, air may flow through the article of footwear 10' as illustrated by arrows A in FIGS. 10 and 11. As can be seen, air may flow from the interior of the article of footwear 10' through the sock liner 74', through the bootie 28', and into the ventilated midsole 18'. From the ventilated midsole 18', the air may flow up the lateral wing 20' to the lateral vent 60'.

[0054] As noted above, an article of footwear may be provided with a tongue ventilation system 316 that facilitates air flow through the tongue 36. Although the tongue ventilation system 316 is described in more detail below, FIG. 12 shows a partially sectional view similar to FIG. 10 illustrating air flow through an alternative embodiment of article of footwear 10' with a tongue ventilation system 316. As shown, air from within the article of footwear 10' is free to flow though the bootie 28' into the tongue 36 where it may enter the tongue ventilation insert 318. Air may then flow along the channels in

the tongue ventilation insert 318 to the tongue vent 64, where it may exit into the environment.

[0055] In the embodiments of FIGS. 1-12, the ventilation system 16, 16' is positioned outside the bootie 28, 28'. The ventilation system 16, 16' may alternatively be positioned inside the bootie 28, 28', if desired. For example, an alternative article of footwear 10'' with a ventilation system 16'' internal to the bootie 28'' is shown in FIGS. 13 and 14. In this embodiment, the ventilation system 16'' is essentially identical to ventilated midsole 18' and ventilated wing 20' of FIG. 12, including tongue ventilation insert 318. The ventilation insert 21'' includes a ventilated midsole 18'' and a single wing 20'' extending upwardly along the lateral side of the upper 12''. In this embodiment, the bootie 28'' terminates below the lateral vent 60'' and the tongue 64'' (e.g. approximately 75-80% of the height of the article of footwear 10''). The lateral wing 20'' and the tongue insert 318 extend upwardly beyond the uppermost extent of the bootie 28'' to the lateral vent 60'' and the tongue vent 64''. This avoids any need to provide openings through the bootie 28'' to provide fluid communication between the wing 20'' and the lateral vent 60'' or between the tongue ventilation insert 318 and the tongue vent 64''. The ventilation insert 21'' and tongue ventilation insert 318 may be secured in essentially any suitable manner. For example, the top edges of the wing 20'' and tongue ventilation insert 318 may be sewn to the upper 12''. Other portions of the ventilation insert 21'' and the tongue ventilation insert 318 may be secured to the outer layer 40'' or the bootie 28'' using stitching or adhesives. For example, the bottom edge of the tongue ventilation insert 318 may be cemented to the inside of the bootie 28''. Although not shown, the upper 12'' may include an additional internal liner to cover the ventilation insert 21'' and the tongue ventilation insert 318 to separate them from the wearer's foot. For example, a separate bootie-like liner manufactured from a lining material may be manufactured and sewn into the article of footwear 10'' inside the bootie 28''. The separate bootie-like liner may be made in the shape of a sock and may be sewn to the upper 12'' (e.g. outer layer 40'') along its upper edge. The bootie-like liner may then be fitted into the waterproof/breathable bootie 28'' to provide a cover layer over the various components of the ventilation system 16, including the tongue ventilation system 316.

[0056] As shown, the wing 20'' and the tongue ventilation insert 318 of this embodiment extend beyond the uppermost extent of the bootie 28''. In an alternative embodiment (not shown), the bootie 28'' may extend above the vents 60'', 64''. In alternative embodiments of this nature, the bootie 28'' may be provided with openings (not shown) that allow the air to flow between the wings 20'' and the vents 60'' and 62''. For example, the openings in the bootie 28'' may be aligned with the lateral vent 60'' and the tongue vent 64'' to provide a flow path from outwardly-facing air flow passages in the wing 20'' to lateral vent 60'' and from outwardly-facing air flow passages in the tongue ventilation insert 318 to the tongue vent 64''. As another example, the upper portion of the wing 20'' may extend from the interior of the bootie 28'' through an opening so that the wing 20'' extends between the bootie 28'' and the outer layer 40'' to overlie the lateral vents 60''. Similarly, the upper portion of the tongue ventilation insert 318 may extend through an opening in the bootie 28'' to overlie the tongue vent 64''.

[0057] In the embodiments shown in FIGS. 1-14, the ventilated midsole 18 and ventilated wings 20 are manufactured

from a single sheet of ventilated stock material. As an alternative, the ventilated midsole **18** and the ventilated wings **20** may be separately manufactured, if desired. For example, FIGS. **15-20** illustrate an alternative embodiment in which the ventilation system **216** includes a ventilated midsole **218** and a wing **220** that are manufactured separately and fitted together after manufacture. FIG. **15** shows the ventilated midsole **218** and the wing **220** assembled into a ventilation insert **221**. In this embodiment, the article of footwear **210** is generally identical to the article of footwear **10** discussed above, except as shown and described. In this embodiment, the ventilated midsole **218** is significantly thicker than the ventilated midsole **18** manufactured from sheet stock. As a result, the ventilated midsole **218** may be configured to provide more cushioning than provided by ventilated midsole **18**. In this embodiment, the ventilated midsole **218** is of sufficient thickness to eliminate the need for a separate midsole. Accordingly, as shown in FIG. **8**, the outsole **244** may be secured directly to the undersurface of the lasting board **272** without any midsole.

[0058] In this alternative embodiment, the ventilated midsole **218** defines a plurality of top channels **250** and bottom channels **252** that allow lateral and longitudinal air flow along and through the ventilated midsole **218** (See FIGS. **15** and **16**). The top channels **250** and bottom channels **252** may be joined by openings **254** to allow fluid communication therebetween. The openings **254** may be defined by the intersection between the top and bottom channels **250**, **252**, or they may be separate passages that extend between the top and bottom channels **250**, **252**. The ventilated midsole **218** of this embodiment may be manufactured using conventional molding techniques and apparatus, such as compression molding, injection molding and pour molding. Given that the ventilated midsole **218** is molded rather than formed from sheet stock, it can be provided with the desired shape, including variations in thickness and contoured major surfaces that are relatively difficult to form with sheet stock. In the illustrated embodiment, the ventilated midsole **218** is a relatively deep sole component that is intended to function as a high performance cushioning layer. Although not shown, the ventilated midsole **218** may include an upper surface that is contoured to correspond with the shape of the wearer's foot. This may be particularly beneficial when the ventilated midsole **218** is intended to function as a footbed or inner sole. As perhaps best shown in FIG. **16**, the ventilated midsole **218** may define a cavity **230** in its undersurface to receive the wing **220**. The channels **224a-b** may provide air flow paths that allow air to move through the midsole **218** into the cavity **230**. Although the illustrated embodiment includes a single cavity **230** disposed in the arch region, the number, size, shape and configurations of the cavity may vary from application to application. For example, additional cavities may be provided to accommodate additional wings.

[0059] In this embodiment, the wing **220** generally includes an extension portion **232** and an upright portion **234**. The extension portion **232** and the upright portion **234** are ventilated to allow air to flow through and along the wing **220**. The extension portion **232** is fitted into the cavity **230** to provide fluid communication between the wing **220** and the ventilated midsole **218** and the upright portion **234** extends upwardly to provide fluid communication between the extension portion **232** and the vent **260** in the upper **212**. In this embodiment, the wing **220** is a one-piece component manufactured from ventilated sheet material, such as the ventilated

sheet material described above in connection with ventilated midsole **18** and vented wings **20**. For example, a top view of the wing **220** is shown in FIG. **17**. The ventilated sheet material may be die cut and then bent approximately ninety degrees to form the extension portion **232** and the upright **234**. The wing **220** may be secured to the ventilated midsole **218** when desired. For example, the extension portion **232** may be secured in the cavity **230** by friction, mechanical interlock, adhesive or stitching. The wing **220** may also be secured to the upper **212**, as desired. For example, the upper end of the upright portion **234** may be secured to the upper **212** by stitching or adhesive. Although the illustrated embodiment includes a single wing **220**, the ventilation system **216** may include a plurality of wings **220**. For example, the ventilation system **216** may include a pair of wings **220** disposed on opposite sides of the ventilated midsole **218**. In this alternative embodiment, both wings **220** may be formed from a single piece of ventilated sheet stock that has upright portions extending from opposite lateral sides of the extension portion **232**. As with ventilation system **16**, ventilation system **216** may be fitted into the bootie **228** or it may be positioned between the bootie **228** and the upper **212**.

[0060] Assembly of article of footwear **210** will now be described with reference to FIGS. **19A-F**. FIG. **19A** is an illustration of the upper **212** manufactured generally in accordance with conventional techniques and apparatus. In FIG. **19A**, the lasting margin of the upper **212** extends downwardly ready to be wrapped over the lasting board **272**. FIG. **19A** also shows the eventual position of the wing **220** in phantom lines. The upper **212** includes outer layer **240** and bootie **228**. The outer layer **240** and bootie **228** are generally conventional and therefore will not be described in detail. Suffice it to say that the outer layer **240** includes lateral vent **260** and tongue vent **264**, and that the bootie **228** is a waterproof/breathable bootie.

[0061] FIG. **19B** shows the wing **220** attached to the upper **212** with the extension portion **232** extending downwardly. As can be seen, an upper portion of the wing **220** overlies the lateral vent **260** so that air can easily flow between the wing **220** and the environment. The wing **220** may be die cut from ventilated sheet stock, such as the sheet stock described above. In this embodiment, the upper edge of the wing **220** is sewn to the outer layer **240**. The wing **220** may be attached to the upper **212** using additional or alternative attachments. For example, the wing **220** may be sewn or cemented to the upper **212** at additional or alternative locations. FIG. **19B** also shows the bottom edge of the bootie **28** in broken lines.

[0062] FIG. **19C** is a sectional view illustrating attachment of the lasting board **272** to the undersurface of the ventilated midsole **218**. In this embodiment, the lasting board **272** is joined to the bottom of the ventilated midsole **218** by cement or other adhesives. Referring to FIG. **20**, cement may be applied between the ventilated midsole **218** through the forefoot and heel regions, excluding only the central region that corresponds with cavity **230**. As can be seen, the sectional view of FIG. **19C** is drawn through cavity **230**. As a result of cavity **230**, the ventilated midsole **218** and lasting board **272** cooperatively define an opening capable of receiving the extension portion **232** of the wing **220**. In this embodiment, the cavity **230** is configured to closely receive the extension portion **232**.

[0063] FIG. **19D** illustrates insertion of the ventilated midsole **218**/lasting board **272** combination into the bottom of the upper **212**. Although the last is not shown, this step may be performed with the upper **212** and bootie **228** fitted over a last.

The upper surface of the ventilated midsole **218** may be cemented to the bottom surface of the bootie **228**, if desired. For example, as shown in FIG. **20**, cement may be applied between the ventilated midsole **218** and the bootie **228** only in the heel and toe regions. The amount of area receiving cement may be limited to limit the impact of cement on the breathability of the bootie **228**. It is not necessary to join the ventilated midsole **218** to the bootie **228**, and the cement may be eliminated in some applications, if desired.

[0064] FIG. **19E** illustrates insertion of the extension portion **232** of wing **220** into cavity **230**. As noted above, the cavity **230** may be sized and shaped to closely receive the extension portion **232**. As a result, the extension portion **232** may be retained in the cavity **230** by a frictional fit. The extension portion **232** may be secured in place, if desired. For example, the extension portion **232** may be cemented in the cavity **230** by applying cement between the extension portion **232** and the ventilated midsole **218** and/or lasting board **272**. In this embodiment, the extension portion **232** is fitted into the cavity **230** while the upper **212** is fitted over the last.

[0065] FIG. **19F** shows the upper **212** being closed over the lasting board **272**. As illustrated, the lasting margin of the upper **212** may be pulled over and secured to the lasting board **272**. For example, the lasting margin may be cemented to the undersurface of the lasting board **272**. The upper **212** may be secured to the lasting board **272** using additional or alternative technique and apparatus.

[0066] As noted above, the ventilation system **16**, **216** may be supplemented by a tongue ventilation system **316**. An exemplary tongue ventilation system **318** is shown in FIGS. **21-23**. In the illustrated embodiment, the tongue ventilation system **316** is configured to provide ventilation from inside the upper **12** through the tongue **36**. The tongue ventilation system **316** includes a ventilation insert **318** that is fitted into the tongue **36** of the upper **12**. The ventilation insert **318** includes air flow passages that facilitate the flow of air through the tongue **36**. In this embodiment, the ventilation insert **318** includes a plurality of top channels **350** and bottom channels **352** that define the air flow passages. The ventilation insert **318** may include essentially any alternative ventilating passage arrangement. The ventilation insert **318** may be manufactured from the ventilated sheet material discussed above in connection with the one-piece ventilated midsole **18**/ventilated wing **20** combination of FIGS. **1-6**. Although the ventilated tongue insert **318** of FIGS. **21-23** is die cut from ventilated sheet stock, it may be manufactured using other materials and other manufacturing techniques. For example, the ventilated tongue insert **318** may be compression molded, injection molded or pour molded. In this embodiment, the tongue **36** generally includes an inner layer **330**, an outer layer **332** and a cushioning layer **38** disposed between the inner and outer layers **330**, **332**. The inner layer **330** may be a fabric or other material that is sufficiently open to allow air flow through the inner layer **330**. For example, the inner layer **330** may be manufactured from an open-weave fabric or a mesh fabric. In those embodiments that include a waterproof/breathable bootie, the inner layer **330** may be formed in whole or in part by the bootie **28**. The outer layer **332** may be manufactured from essentially any desired material, such as any of a wide range of conventional tongue materials. The tongue vent **364** is located toward the top of the tongue **36** in this embodiment, but it may vary from application to application. As discussed above, the tongue vent **364** of the illustrated embodiment includes a frame **60** that is secured to the

tongue **36**, for example, to the outer layer **332**, and a cover **62** that is configured to allow air flow. In the illustrated embodiment, the cushioning layer **38** is disposed between the inner layer **330** and the outer layer **332** along substantially the full length and width of the tongue **36**. The cushioning layer **38** may define a slit **334** positioned toward the top end of the tongue **36**. The cushioning layer **38** is not necessary may be eliminated, if desired. In the illustrated embodiment, the ventilation insert **318** is threaded through the slit **334** so that it includes a lower portion **336** that extends between the inner layer **330** and the cushioning layer **38** and an upper portion **338** that extends between the cushioning layer **38** and the outer layer **332**. As a result, the lower portion **336** of the ventilation insert **318** exchanges air with the inside of the upper **12** and the upper portion **338** of the ventilation insert **318** exchanges air with the vent **64**.

[0067] The above description is that of current embodiments of the invention. Various alterations and changes can be made without departing from the spirit and broader aspects of the invention as defined in the appended claims, which are to be interpreted in accordance with the principles of patent law including the doctrine of equivalents. This disclosure is presented for illustrative purposes and should not be interpreted as an exhaustive description of all embodiments of the invention or to limit the scope of the claims to the specific elements illustrated or described in connection with these embodiments. For example, and without limitation, any individual element(s) of the described invention may be replaced by alternative elements that provide substantially similar functionality or otherwise provide adequate operation. This includes, for example, presently known alternative elements, such as those that might be currently known to one skilled in the art, and alternative elements that may be developed in the future, such as those that one skilled in the art might, upon development, recognize as an alternative. Further, the disclosed embodiments include a plurality of features that are described in concert and that might cooperatively provide a collection of benefits. The present invention is not limited to only those embodiments that include all of these features or that provide all of the stated benefits, except to the extent otherwise expressly set forth in the issued claims. Any reference to claim elements in the singular, for example, using the articles "a," "an," "the" or "said," is not to be construed as limiting the element to the singular.

1. An article of footwear comprising:

an upper defining an interior and at least one vent;

a sole secured to said upper;

a ventilation system fitted within said interior of said upper, said ventilation system including a ventilation insert having a ventilated midsole and at least one ventilated wing, said ventilated midsole and said ventilated wing being one piece and defining air flow passages that provide fluid communication between said ventilated midsole and said ventilated wing.

2. The article of footwear of claim 1 wherein said upper includes an outer layer and a waterproof/breathable bootie, said bootie fitted into said outer layer.

3. The article of footwear of claim 2 wherein said ventilation insert is disposed between said bootie and said outer layer.

4. The article of footwear of claim 3 wherein said ventilation insert is further defined as including at least two ventilated wings and at least two vents.

5. The article of footwear of claim 4 wherein one of said ventilated wings extends from a lateral side of said ventilated midsole and another of said ventilated wings extends from a medial side of said ventilated midsole.

6. The article of footwear of claim 5 wherein one of said vents is disposed on a lateral side of said upper and another of said vents is disposed on a medial side of said upper.

7. The article of footwear of claim 6 wherein at least one of said vent includes a frame and a cover, said frame secured to said upper and defining a central opening, said cover secured to said frame over said central opening.

8. The article of footwear of claim 6 wherein said upper includes a tongue including an inner layer and an outer layer; and

further including a tongue ventilation system fitted into said tongue, said tongue ventilation system including a ventilated tongue insert and a tongue vent, said ventilated tongue insert disposed between said inner layer and said outer layer, said tongue vent secured to said outer layer.

9. The article of footwear of claim 8 wherein said tongue include a cushioning layer disposed between said inner layer of said tongue and said outer layer of said tongue, said ventilated tongue insert having a lower portion disposed between said cushioning layer and said inner layer, said ventilated tongue insert having an upper portion disposed between said cushioning layer and said outer layer.

10. An article of footwear comprising:

an upper defining an interior foot-receiving space and at least one vent;

a sole secured to said upper; and

a ventilation system having a ventilated midsole and a ventilated wing, said ventilated midsole defining a cavity, said wing having a first portion fitted into said cavity and a second portion extending upwardly from said first portion to said vent.

11. The article of footwear of claim 10 wherein said ventilated midsole includes longitudinal top channels and lateral bottom channels, said top channels and said bottom channel intersecting to define openings providing fluid communication between said top channels and said bottom channels.

12. The article of footwear of claim 11 wherein said top channels are in direct fluid communication with said cavity.

13. The article of footwear of claim 12 wherein said upper includes an outer layer and a waterproof/breathable bootie, said bootie fitted into said outer layer.

14. The article of footwear of claim 13 wherein said ventilated midsole is disposed between said bootie and said sole.

15. The article of footwear of claim 14 wherein said ventilated wing is disposed between said bootie and said outer layer, said ventilated wing providing fluid communication between said ventilated midsole and said vent.

16. The article of footwear of claim 15 wherein said vent includes a frame and a cover, said frame secured to said outer layer and defining a central opening, said cover secured to said frame and filling said central opening.

17. The article of footwear of claim 16 wherein said upper includes a tongue including an inner layer and an outer layer; and

further including a tongue ventilation system fitted into said tongue, said tongue ventilation system including a ventilated tongue insert and a tongue vent, said ventilated tongue insert disposed between said inner layer and said outer layer, said tongue vent secured to said outer layer.

18. The article of footwear of claim 17 wherein said tongue include a cushioning layer disposed between said inner layer of said tongue and said outer layer of said tongue, said ventilated tongue insert having a lower portion disposed between said cushioning layer and said inner layer, said ventilated tongue insert having an upper portion disposed between said cushioning layer and said outer layer.

19. An article of footwear comprising:

an upper having a tongue, said tongue having an inner layer and outer layer;

a sole secured to said upper; and

a tongue ventilation system fitted into said tongue, said tongue ventilation system including a ventilated tongue insert and a tongue vent, said ventilated tongue insert disposed between said inner layer and said outer layer, said tongue vent secured to and defining an opening through said outer layer.

20. The article of footwear of claim 19 wherein said ventilated tongue insert having an inner surface and an outer surface, said ventilated tongue insert defining a plurality of flow passages providing fluid communication between said inner surface and said outer surface.

21. The article of claim 19 wherein said ventilated tongue insert having an inner surface and an outer surface, said ventilated tongue insert defining a plurality of inner channels in said inner surface and a plurality of outer channels in said outer surface, said inner channels and said outer channels intersecting to define a plurality of openings providing fluid communication between said inner surface and said outer surface.

22. The article of claim 21 wherein said tongue include a cushioning layer disposed between said inner layer of said tongue and said outer layer of said tongue, said ventilated tongue insert having a lower portion disposed between said cushioning layer and said inner layer of said tongue, said ventilated tongue insert having an upper portion disposed between said cushioning layer and said outer layer of said tongue.

23. The article of claim 22 wherein said upper includes a waterproof/breathable bootie disposed within said interior, said inner layer of said tongue being defined by a portion of said bootie.

24. The article of claim 22 wherein said cushioning layer defines a slit, said ventilation insert fitted through said slit.

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