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(54) **UPPER WITH ZONAL CONTOURING AND FABRICATION OF SAME**

OBERMATERIAL MIT ZONALER KONTURIERUNG UND HERSTELLUNG DESSELBEN

EMPEIGNE ÉPOUSANT UN CONTOUR ZONAL ET SON PROCÉDÉ DE FABRICATION

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Description

BACKGROUND

[0001] It is sometimes desirable to include contoured regions in a footwear upper. In some cases, such contouring may be for aesthetic reasons. For example, a shoe designer might wish to include raised portions on a shoe upper to enhance certain lines, to create a certain look, to emulate a product logo, or for any of various reasons. In other cases, contouring is added for functional reasons. Raised regions might be added to increase padding in certain areas, to stiffen certain areas, to provide increased foot support, or for other purposes. In still other cases, contours may be added for both functional and ornamental purposes.

[0002] Adding contours to a shoe upper can present challenges, particularly when those contours are created by attaching extra elements to the outside of an upper. Such elements may tend to separate from the upper. Although the attachment of such an element can be reinforced with stitching, this can increase manufacturing cost and/or detract from the shoe appearance. Including contours in an athletic shoe upper can be especially challenging, particularly when an upper is to be formed from relatively thin, lightweight material.

[0003] U.S. Patent Application Publication Number 2006/0048413 A1 discloses an article of footwear in which a portion of an upper comprises a backing, a contouring element and an outer panel which form a bonded composite panel, the outer panel conforming to the contouring element and the backing so as to form a raised contour.

SUMMARY

[0004] The above objectives are achieved by a portion of an upper according to appended independent claim 1, and by an article of footwear according to appended claim 8. A method for fabricating a portion of an upper according to the invention is specified in appended independent claim 9. Preferred embodiments are defined in the dependent claims.

[0005] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the invention.

[0006] In at least some embodiments, a composite panel portion of an upper includes a contouring element located between a backing and an outer panel. The outer panel conforms to the contouring element and the backing so as to form a raised contour. The outer panel can be, e.g., a mesh or other flexible porous material and can be bonded to portions of the backing adjacent to the contouring element. The composite panel can include multiple contouring elements and/or may include one or more ventilation windows defined in the backing and spanned

by the outer panel.

[0007] In some embodiments, a composite panel may be formed by assembling a stack comprising a backing, a bonding agent, one or more contouring elements and an outer panel. The assembled stack may then be heated and compressed so as to form a composite panel having a contour corresponding to the contouring element.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Some embodiments are illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements.

FIGS. 1A through 1C are lateral, medial and top views, respectively, of a shoe according to some embodiments.

FIG. 2 is an enlarged, partially schematic area cross-sectional view from the location indicated in FIG. 1A.

FIGS. 3A1-3G show various steps in a process for fabricating a composite panel for the upper of the shoe shown in FIGS. 1A-1C.

DETAILED DESCRIPTION

[0009] FIG. 1A is a lateral side view of a shoe according to one exemplary embodiment. FIG. 1B is a medial side view of shoe 10. FIG. 1C is a top view of shoe 10. Additional embodiments include the upper 11 of shoe 10 and/or portions of upper 11, as well as processes for fabricating upper 11 or portions thereof. Shoe 10 is a running shoe, but other embodiments include shoes intended for wear by participants in other sporting and non-sporting activities, as well as uppers for such shoes and processes for fabrication of such uppers. Although various aspects of shoe 10 are discussed in detail below, the shapes, sizes and locations of various elements of shoe 10, as well as other features of shoe 10, merely represent one embodiment. Other embodiments include uppers with different features and/or different combinations, sizes and arrangements of features, portions of such uppers, shoes incorporating such uppers, and processes for fabricating such uppers.

[0010] To assist and clarify subsequent description of various embodiments, various terms are defined herein. Unless otherwise indicated, the following definitions apply throughout this specification (including the claims). The "interior" of a shoe refers to space that is occupied by a wearer's foot when the shoe is worn. The "interior side" (or surface) of a panel or other shoe element refers to the face of that panel or element that is (or will be) oriented toward the shoe interior in a completed shoe. An "exterior side" (or surface) of an element refers to the face of that element that is (or will be) oriented away from the shoe interior in the completed shoe. In some cases,

the interior side of an element may have other elements between that interior side and the interior in the completed shoe. Similarly, an exterior side of an element may have other elements between that exterior side and the space external to the completed shoe.

[0011] Certain regions of a shoe upper can be defined by reference to the anatomical structures of a human foot wearing that shoe, and by assuming that shoe is properly sized for that wearing foot. One or more of the below-defined regions may overlap. The "forefoot" region of an upper is the portion of the upper that will generally cover the metatarsal and phalangeal bones of the wearer's foot, and which will extend beyond the wearer's toes to the front most portion of the upper. The "midfoot" region of an upper is the portion of the upper that will generally cover the cuboid, navicular, medial cuneiform, intermediate cuneiform and lateral cuneiform bones of the wearer's foot. The "hindfoot" region of an upper extends from the midfoot region to the rearmost portion of the upper and covers the wearer heel. The hindfoot region covers the sides of the calcaneus bone of a wearer and may, depending on a particular shoe configuration, cover some or all of the wearer's talus bone (ankle).

[0012] The top forefoot and top midfoot regions of an upper will generally cover the upper surfaces of a wearer's forefoot and midfoot bones described above. The toe of the upper is the portion that will generally cover the tops and fronts of the toes and that extends from the top forefoot region to the lowest edge of the upper in the direction of the sole. The lateral forefoot region extends between the top forefoot and the lowest edge of the upper in the direction of the sole and between the toe and lateral midfoot regions. The lateral midfoot region extends between the top midfoot region and the lowest edge of the upper in the direction of the sole and between the lateral forefoot and hindfoot regions. In a similar manner, the medial forefoot region extends between the top forefoot region and the lowest edge of the upper in the direction of the sole and between the toe and medial midfoot regions. The medial midfoot region extends between the top midfoot region and the lowest edge of the upper in the direction of the sole and between the medial forefoot and hindfoot regions. The topfoot region includes the top forefoot and top midfoot regions. The lateral side region includes the lateral forefoot and lateral midfoot regions. The medial side region includes the medial forefoot and medial midfoot regions.

[0013] Returning to FIGS. 1A-1C, shoe 10 includes an upper 11 that is attached to a sole structure 12. Embodiments include shoes having sole structures of numerous widely varying types. A sole structure in some embodiments may be, e.g., a single piece molded from synthetic rubber or other material. In other embodiments, a sole structure may include multiple components that have been sequentially molded or otherwise bonded together. For example, a sole structure may include a midsole formed from a first material (e.g., foamed ethylene vinyl acetate) bonded to an outsole formed from different ma-

terials (e.g., synthetic rubber). A sole structure could also include one or more fluid-filled cushions, a stiffening plate or other support element(s), traction elements (e.g., cleats), etc. For convenience, and because of differing internal details of sole structures according to various embodiments, sole structure 12 is treated as a single unitary component in FIGS. 1A-1C.

[0014] Upper 11 includes a zonally-contoured composite panel 15, portions of which are exposed in the fore- and midfoot regions, and a foxing panel 16 in the hindfoot region. Foxing panel 16 includes an ankle collar 17. The hindfoot portion of upper 11 further includes a heel counter (not shown), as well as padding and an inner lining.

[0015] Composite panel 15 includes a mesh outer panel 19 that wraps around the sides and front of a foot of a shoe 10 wearer W. So as to avoid obscuring the drawings, outer panel 19 is represented throughout the drawings as a relatively coarse diagonal grid. In practice, however, the material of outer panel 19 can have a much finer weave (or other pattern) than is represented in the drawings and/or have openings of other shapes. As but one example, the openings in outer panel 19 could be approximately 1 to 2 millimeters in size.

[0016] As seen in FIG. 1A, composite panel 15 covers the lateral sides of the midfoot and forefoot. In particular, composite panel 15 extends from below the top edge 20 of sole structure 12 on the lateral side, over the mid- and forefoot side regions, and under the lateral side of an eyelet reinforcing strip 21. The rear lateral side of composite panel 15 extends under the forward lateral edge 22 of foxing panel 16. As shown in FIG. 1B, composite panel 15 also covers the medial sides of the wearer forefoot and midfoot. Similar to the lateral side, the medial side of composite panel 15 extends from below the top edge 20 of sole structure 12, over the mid- and forefoot side regions, and under reinforcing strip 21. The rear medial side of composite panel 15 extends under the forward medial edge 26 of foxing panel 16. As seen in FIG. 1C, another portion of composite panel 15 covers the tops of the toes. Composite panel 15 extends under toe cap 25 and under the front of reinforcing strip 21.

[0017] In addition to outer panel 19, composite panel 15 includes a backing 29 and contouring elements 31, 32, 33 and 34. As explained in more detail below, composite panel 15 is formed by bonding outer panel 19 and contouring elements 31-34 to backing 29. Contouring elements 31-34 are positioned between outer panel 19 and backing 29 in composite panel 15. As seen in FIGS. 1A-1C, backing 29 only extends over limited regions of composite panel 15. Openings in backing 29 are spanned by portions of outer panel 19 and define numerous ventilation windows in upper 11. Toe vent window 36 generally corresponds to the tops of the 2nd through 5th proximal and middle phalanges, to at least a portion of the top of the 1st proximal phalange, to tops of the distal ends of the 1st through 5th metatarsals, to the medial side of the 1st proximal phalange and first metatarsal distal end, and

to the lateral sides of the 5th metatarsal distal end and 5th proximal phalange. Three vent windows 37-39 are located on the medial side (FIG. 1B) and three more vent windows 40-42 are located on the lateral side.

[0018] Backing 29 further includes an inner border that surrounds a tongue opening 47 and that has an area generally coinciding with the area of eyelet reinforcing strip 21. The inner border of backing 29 is not visible in FIGS. 1A-1C but is shown in FIG. 3A1. Numerous bands bridge the inner border of backing 29 and the bottom regions of composite panel 15, below edges 20 of sole structure 12, joined to a lasting sock (not shown). On the medial side, and as seen in FIG. 1B, bands 51, 52, 53 and 54 form an "M" shape. Similarly, and as seen in FIG. 1A, bands 55, 56, 57 and 58 form another "M" shape on the lateral side. In the embodiment of shoe 10, bands 51-54 and 55-58 provide additional reinforcement in side portions of upper 11 adjacent the shoe laces and limit the stretch of upper 11 in those side portions.

[0019] In the embodiment of shoe 10, each of contouring elements 31-34 has an inverted "V" shape. As shown in FIG. 1B, contouring element 31 is located between the exterior sides of backing element 29 bands 51 and 52 and the interior side of outer panel 19. Contouring element 32 is located between the exterior sides of backing element 29 bands 53 and 54 and the interior side of outer panel 19. As seen in FIG. 1A, contouring element 33 is located between the exterior sides of backing element 29 bands 55 and 56 and the inner side of outer panel 19. Contouring element 34 is located between the exterior sides of backing element 29 bands 57 and 58 and the interior side of outer panel 19.

[0020] In the embodiment of shoe 10, upper 11 does not include a "bootie" or other liner in the region of composite panel 15. Thus, there is nothing separating a socked foot of wearer W and the interior sides of the portions of outer panel 19 spanning windows 36-42. In this manner, greater ventilation can be achieved. In other embodiments, a bootie or other type of liner can be included.

[0021] FIG. 2 is an enlarged, partially schematic area cross-sectional view taken from the location indicated in FIG. 1A and showing the structure of composite panel 15. Backing 29 is located on the interior side of upper 11. Contouring element 33 and outer panel 19 are bonded to the exterior side of backing 29. Outer panel 19 may also be bonded to the exterior surface of contouring element 33 and to exterior surfaces of contouring elements 31, 32 and 34. Alternatively, the interface between outer panel 19 and the exterior surfaces of contouring elements 31-34 may lack glue or other bonding agent.

[0022] Outer panel 19 tightly conforms to contouring element 33. Tension in outer panel 19 causes outer panel 19 to exert inward pressure on contouring element 33. This causes a slight compression of contouring element 33 and a rounding of the contouring element outer edges (e.g., edges e1). Outer panel 19 is bonded to the portions of backing 29 band 55 surrounding contouring element

33, with the bond between panel 19 and band 55 extending to inner edges e2 where contouring element 33 meets band 55. Outer panel 19 is similarly bonded to the portions of band 56 surrounding contouring element 33 and to the portions of the other bands surrounding the other contouring elements. Thus, outer panel 19 tightly conforms to the other portions of contouring element 33 and to contouring elements 31, 32 and 34 in a manner similar to that shown in FIG. 2.

[0023] In the embodiment of shoe 10, contouring elements 31-34 are substantially thicker than backing 29 and outer panel 19. In some embodiments, the thickness TC of contouring elements 31-34 is equal to or greater than the thickness TB of backing 29 and equal to or greater than the thickness TO of outer panel 19. In certain embodiments, the contouring element thickness is equal to or greater than the combined thicknesses of the backing and outer panel (i.e., $TC \geq TB + TO$).

[0024] Although panel 19 of composite panel 15 is referred to as an "outer panel," panel 19 need not be the outermost panel of composite panel 15. In the embodiment of shoe 10, some portions of the outer panel 19 exterior surface are covered by toe cap 25 and by reinforcing strip 21. Other portions are covered by foxing panel 16. Other components could also be attached over other portions of the outer panel 19 exterior surface. Similarly, backing 29 need not be the innermost component of composite panel 15. Moreover, contouring element 33 need not be directly bonded to backing 29. In some embodiments, for example, another panel, a stiffener or some other element could be interposed between the interior face of a contouring element and the exterior face of a backing.

[0025] The construction shown in FIG. 2 offers several advantages. It is often desirable to include raised ridges or other types of surface contours in a footwear upper. Such contours may have aesthetic and/or functional purposes. For example, zones of increased thickness may provide additional support and/or additional cushioning in certain regions. Adding surface contours presents certain challenges when using meshes and other types of lightweight materials, however. Stitching a contouring element to a mesh material can be difficult, particularly with meshes having more open weave patterns. Moreover, stitching operations can be time consuming and expensive, and thus it is often desirable to minimize the amount of stitching needed.

[0026] Bonding or stitching a contour element to the outside of a mesh or other lightweight upper material can also present problems. A contour element that is attached in such a fashion may be prone to separation. If an interface between a contour element and an exterior face of an upper is exposed, that interface might be snagged as a wearer foot brushes against external objects. As a result, the contour element might begin to separate from the upper. With the construction shown in FIG. 2, however, the interface between the contouring element and backing 29 (e.g., edges e2) is protected by

outer panel 29. By locating the contouring elements on the interior side of a lightweight material and tightly conforming that material to those contouring elements, there is less potential for separation. As a result, contouring elements are attached in a more secure manner.

[0027] Simply attaching a contour element to the outer surface of a mesh panel might also have other disadvantages. Such an attachment might be aesthetically unpleasing and result in an upper with an unfinished and/or ragged look. Conforming a mesh or other lightweight panel to a contouring element permits creation of an upper with a more finished overall appearance. For example, a mesh pattern that extends across much of an upper can be overlaid onto the contour element. This helps blend the contour elements with other portions of the upper. Moreover, the tension of the mesh material on the surface of a contour element can help soften the edges of the contour element and give it a more rounded appearance.

[0028] FIGS. 3A1 through 3G show a process, according to at least some embodiments, to fabricate composite panel 15 of upper 11. In a first step shown in FIG. 3A1, backing 29 is placed onto an assembly jig 60. Jig 60 includes a flat surface 61 having multiple pins 62 that extend perpendicularly from surface 61. In the top plan view of FIG. 3A1, pins 62 extend out of the plane of the drawing. So as to distinguish pins 62 from unlabeled eyelet holes shown in backing 29, the tops of pins 62 are represented as filled-in black circles.

[0029] Each of pins 62 is pushed through corresponding holes in one or more components of composite panel 15 as those components are added to a stack of components being assembled on surface 61. This allows proper positioning of those components relative to one another. In FIG. 3A1, backing 29 has been placed by pushing backing 29 onto surface 61 so that pins 62 are pushed through corresponding locating holes in backing 29. FIG. 3A2 is a side view of jig 60 and backing 29 from the location indicated in FIG. 3A1. Backing 29 has been placed onto surface 61 and pins 62 extend upward from surface 61 through backing 29.

[0030] As previously indicated, backing 29 includes an inner border 65 that surrounds tongue opening 47. Also seen in FIG. 3A1 are lateral side bands 55-58 and medial side bands 51-54. Vent windows 36-42 are also visible in FIG. 3A1. Surface 66 of backing 29 will be the exterior surface of backing 29 in the completed upper.

[0031] Numerous types of materials can be used for backing 29. In the embodiment of shoe 10, backing 29 is a polyester knit material having a layer of unactivated hot melt bonding agent pre-applied to surface 66. In other embodiments, a backing material may not include a pre-applied hot melt agent layer. Instead, a separate layer of hot melt bonding agent material having the same shape as backing 29 could be placed over surface 66 after backing 29 has been placed on jig 60. In some embodiments, a backing may have a thickness (TB from FIG. 2) of approximately 0.5 millimeters.

[0032] In a next step, and as shown in FIG. 3B, pre-cut contouring elements 31, 32, 33 and 34 are put into place on portions of backing 29 surface 66. In particular, each of contouring elements 31-34 has been placed by pushing the contouring element onto surface 66 so that appropriate ones of pins 62 are pushed through corresponding locating holes in the contouring element. In the embodiment of shoe 10, each of contouring elements 31-34 is formed from a synthetic leather and has a thickness (TC from FIG. 2) of between approximately 1 millimeter and approximately 3 millimeters. In some embodiments, the exterior surfaces of contouring elements 31-34 may have a pre-applied layer of unactivated hot-melt bonding agent. In other embodiments, separate pieces of hot-melt bonding agent material having the same shape as the contouring elements may be placed onto the exterior surfaces of the contouring elements. In still other embodiments, there is no hot-melting bonding agent between the exterior surface of the contouring elements and portions of the outer panel 19 interior surface that contact those contouring element exterior surfaces.

[0033] In a subsequent step, and as shown in FIG. 3C, outer panel 19 is put into place by pushing outer panel 19 onto jig 60 so that pins 62 are pushed through corresponding holes in outer panel 19. In the embodiment of shoe 10, outer panel 19 is a relatively fine mesh (e.g., having openings of approximately 1 mm or smaller) formed from a woven synthetic material. Other embodiments utilize other types of flexible porous fabrics for outer panel 19. Such other types of flexible porous fabrics can include, e.g., woven and non-woven meshes formed from synthetic and/or nonsynthetic materials and/or having finer or coarser mesh patterns, various types of textile materials, and other porous materials.

[0034] At the conclusion of the step shown in FIG. 3C, backing 29, contouring elements 31-34 and outer panel 19 have been assembled into a stack 70 onto jig 60. At this stage, the individual components of stack 70 are not yet bonded to one another. If stack 70 were to be removed from jig 60 in this unbonded condition, great care would be needed to keep the components in their desired relative positions. In a subsequent step, and as shown in FIG. 3D1, jig 60 is placed under a heated press platen 72 as part of a first pressing operation. As shown in FIG. 3D2, sufficient heat and pressure are applied by platen 72 so as to at least partially activate the hot-melt bonding agent on backing 29. This results in a partial bonding of backing 29, contouring elements 31-34 and outer panel 29 that temporarily allows these components to remain in an assembled configuration when stack 70 is removed from jig 60. Although not shown in FIGS. 3D1 or 3D2, platen 72 may include holes or recesses corresponding to and accommodating pins 61.

[0035] The temperature, pressure and press time for the first pressing operation of FIG. 3D1 will vary based on the type of materials used. In some embodiments utilizing the example materials identified above, the assembled components stack is pressed at 150°C and 100

kg/cm² for approximately for 15 seconds. For different types of materials, appropriate pressing parameters to achieve a partial component bonding is readily determinable by persons of ordinary skill in the art. As but one example, samples of components to be used could be assembled and subjected to the press parameters described above. If insufficient partial bonding results, additional sample assemblies can be prepared and pressed at increasingly higher temperatures (e.g., in 5°C incremental increases) and or pressures (e.g., in 2 kg/cm² incremental increases) until the desired result (partial bonding sufficient to retain component arrangement prior to second pressing) is achieved.

[0036] In a subsequent step shown in FIG. 3E1, the partially bonded stack 70 is removed from jig 60 and placed onto a heat-transferring silicone pad 73 on a heated lower platen 74 of a second press. Another heat-transferring silicone pad 75 is attached to a heated upper platen 76 of that press. Sheets of release paper (not shown) could be placed between partially bonded stack 70 and pads 73 and 75. The partially bonded stack 70 is then pressed between platens 74 and 76 (FIG. 3E2). Heat from platens 74 and 76 is transferred to stack 70 through pads 73 and 75. Because pads 73 and 75 are partially compressible, however, outer panel 19 can be pressed into close conformance to backing element 29 and contouring elements 31-34 (e.g., as shown in FIG. 2).

[0037] The temperature, pressure and press time for the second pressing operation of FIG. 3E2 will also vary based on the type of materials used. In some embodiments utilizing the example backing, contouring element and outer panel materials identified above, partially-bonded stack 70 is pressed at 150°C and 35 to 40 kg/cm² for approximately for 30 seconds. For different types of materials, appropriate pressing parameters to achieve a complete component bonding (as shown in FIG. 2) is readily determinable by persons of ordinary skill in the art. As but one example, after determining process parameters for a first pressing as described above, a sample of partially bonded components could be created and subjected to the second pressing parameters described above (e.g., 150°C, 35-40 kg/cm², approximately 30 seconds). If insufficient bonding or insufficient conformance of the mesh to the backing and contouring elements occurs, additional samples of the partially-bonded components can be prepared and pressed at increasingly higher temperatures (e.g., in 5°C incremental increases) and/or pressures (e.g., in 2 kg/cm² incremental increases) and/or for increased time periods (e.g., in 5 second incremental increases) until the desired result (complete conformal bonding of mesh to backing and contouring elements) is achieved.

[0038] At the conclusion of the second pressing operation, stack 70 has been transformed into composite panel 15. Outer panel 19 is bonded to backing 29 and tightly conforms to contouring elements 31-34. FIG. 3F shows composite panel 15 after removal from the press of FIGS. 3E1 and 3E2. Although not visible in the view of FIG. 3F,

composite panel 15 has contours corresponding to contouring elements 31-34. Specifically, outer panel 19 is bonded to backing 29 and conforms to the exterior surfaces of each of contouring elements 31-34 in a manner similar to that shown in FIG. 2, thereby creating raised elements that will be located on the exterior surface of a completed upper.

[0039] Subsequently, and as shown in FIG. 3G, toe cap 25 and reinforcing panel 21 are attached to composite panel 15. In some embodiments, toe cap 25 and reinforcing panel 21 are stitched in place. Eyelet holes in panel 21 align with corresponding eyelet holes in backing 29. Portions of mesh 19 covering eyelet holes in backing 29 can be cleared in a punching operation (not shown). In some embodiments, panel 21 and toe cap 25 could be glued or otherwise bonded to composite panel 15. For example, panel 21 and toe cap 25 could include a layer of unactivated hot-melt adhesive material on their interior surfaces and be bonded to composite panel 15 in a heated press. In still other embodiments, panel 21 and/or toe cap 25 could be assembled with the components of composite panel 15 (e.g., in a step between the steps shown in FIGS. 3C and 3D1) and then bonded in the first and second pressing steps. In the embodiment of shoe 10, panel 21 and toe cap 25 are formed from synthetic leather. In at some embodiments, panel 21 and/or toe cap 25 could be formed of one or more other materials (e.g., natural leather, polyurethane (PU), thermoplastic polyurethane (TPU), a mesh material, etc.).

[0040] After attachment of reinforcing panel 21 and toe cap 25, rear edge 75 of composite panel 15 is joined (e.g., by stitching) to rear edge 76 so as to form a shell of upper 11. Foxing panel 16 (with attached collar 17), padding and a heel counter are then joined to the shell by stitching and/or bonding. Foxing panel 16 can be formed in a separate operation in a manner known in the art. Tongue 13 is then attached to the shell and the shell placed on a last. A lasting sock (or Strobel) can then be attached to the lasted shell to complete upper 11, and sole structure 12 attached.

[0041] As can be appreciated from the foregoing, techniques described herein permit simple fabrication of an upper (or portion of an upper) with zonally-specific contours. The resulting upper (or upper portion) can include one or more contouring elements that are securely located on the interior side of a lightweight panel and that lack exposed interfaces that promote separation of the contouring element.

[0042] Shoe 10 and the fabrication operations described above are merely examples of products and processes according to some embodiments. Other embodiments include numerous other materials and material combinations. For example, a backing could be formed from synthetic leather or from some other material different from polyester knit material. Instead of synthetic leather, strips of EVA (ethylene vinyl acetate) foam, TPU foam, other types of foam, non-foamed materials, natural leather, or other materials could be used for contouring

elements. As indicated above, various types of meshes and other porous fabrics could be employed. A single upper might also include combinations of multiple backing materials, combinations of multiple contouring element materials and/or combinations of multiple mesh (or other porous fabric) materials. Additional layers and/or components could also be added. For example additional PU or TPU coated panels similar to toe cap 25 and/or reinforcing panel 21 could be attached to an upper in other locations.

[0043] Other embodiments may also include different shapes and/or arrangements of various components. Ventilation windows could be larger or smaller, fewer or more numerous, have different shapes and locations, etc. Contouring elements could also have different shapes, thicknesses, locations, etc. Other embodiments may have a foxing panel with a different shape and/or having different internal padding. In some embodiments, a separate foxing panel might be omitted.

[0044] Additional fabrication techniques can also be employed. In some embodiments, only a single pressing operation is performed. As one example thereof, a first pressing operation to temporarily bond components is omitted. Instead, a dual pan assembly jig such as is described in commonly-owned U.S. Patent Application Ser. No. 12/603,494 is employed.

[0045] The foregoing description of embodiments has been presented for purposes of illustration and description. The foregoing description is not intended to be exhaustive or to limit embodiments of the present invention to the precise form disclosed, and modifications and variations are possible within the scope of the invention as defined by the appended claims. Not in accordance with the invention, techniques such as are described herein can be used to fabricate articles other than footwear uppers.

Claims

1. A portion of an upper (11), comprising:

a backing (29);
a contouring element (31, 32, 33, 34), wherein the contouring element is a material selected from synthetic leather, a foam or a natural leather; and
a mesh outer panel (19), wherein

the contouring element has a thickness (TC) greater than the combined thicknesses (TO, TB) of the outer panel and of the backing,
the backing and the mesh outer panel each has an interior side configured to face toward an interior space of an article of footwear (11), and an exterior side configured to face away from the interior space, when

the upper is incorporated into the article of footwear,

the contouring element is located between the exterior side of the backing and the interior side of the mesh outer panel, the backing, the contouring element and the mesh outer panel form a bonded composite panel (15) in which the mesh outer panel conforms to the contouring element and the backing so as to form a raised contour, wherein

a bond between the mesh outer panel and the backing extends to inner edges (e2) at which the contouring element meets the backing, and wherein regions of the mesh outer panel (19) overlaying the contouring element are under tension and deform the contouring element so as to round outer edges (e1) of the contouring element.

2. The upper portion of claim 1, wherein the contouring element (31, 32, 33, 34) comprises strips of the material selected from synthetic leather, a foam or a natural leather.

3. The upper portion of claim 2, wherein the backing includes at least one opening defining a ventilation window (36-42), and wherein a portion of the mesh outer panel spans the ventilation window and is bonded to regions of the backing exterior side at an edge of the ventilation window.

4. The upper portion of claim 2, wherein the backing (29) includes openings defining a plurality of ventilation windows (36-42), each of the ventilation windows is spanned by a corresponding portion of the mesh outer panel (19), and each of the window spanning mesh outer panel portions is bonded to regions of the backing exterior side at edges of the corresponding ventilation window.

5. The upper portion of claim 3 or claim 4, further comprising a second contouring element (31, 32, 33, 34) located between the exterior side of backing (29) and the interior side of the mesh outer panel (19), wherein the second contouring element is surrounded by adjacent regions of the backing exterior side not contacting the second contouring element, and the adjacent backing regions surrounding the second contouring element are bonded to the interior side of the mesh outer panel.

6. The upper portion of claim 1, wherein the contouring element (31, 32, 33, 34) is surrounded by adjacent regions of the backing (29) exterior side not contacting the contouring element, and wherein the surrounding adjacent regions are bonded to the interior side of the mesh outer panel (19).

7. The upper portion of claim 6, wherein the backing (29) includes at least one ventilation window (36-42), and wherein a portion of the mesh outer panel (19) spans the ventilation window and is bonded to regions of the backing exterior side at an edge of the ventilation window. 5
8. An article of footwear (10) incorporating an upper portion according to any of claims 1 through 7. 10
9. A method for fabricating a portion of an upper comprising:
- assembling a stack (70) of components comprising a backing (29), a bonding agent, at least one contouring element (31, 32, 33, 34) and a porous outer panel (19), wherein the contouring element is a material selected from synthetic leather, a foam or a natural leather, and wherein the contouring element is located between the backing and the porous outer panel; and heating and compressing the assembled stack so as to bond the backing, contouring element and outer panel and form a composite panel (15) having a contour corresponding to the contouring element, wherein the contouring element in the composite panel has a thickness (TC) greater than the combined thicknesses (TO, TB) of the outer panel and of the backing, wherein a bond between the outer panel and the backing extends to inner edges (e2) at which the contouring element meets the backing, and wherein regions of the mesh outer panel (19) overlaying the contouring element are under tension and deform the contouring element so as to round outer edges (e1) of the contouring element. 15 20 25 30 35
10. The method of claim 9, wherein the porous outer panel is a mesh. 40

Patentansprüche

1. Abschnitt eines Schuhoberteils (11), aufweisend:
- eine Trägerschicht (29);
ein Profilierungselement (31, 32, 33, 34), wobei das Profilierungselement aus einem Material besteht, das aus Kunstleder, einem Schaumstoff oder einem Naturleder ausgewählt ist; und eine äußere Netzfläche (19), wobei
- das Profilierungselement eine Dicke (TC) hat, die größer als die kombinierten Dicken (TO, TB) der äußeren Fläche und der Trägerschicht ist,
die Trägerschicht und die äußere Netzfläche jeweils eine Innenseite, die dazu aus-

gebildet ist, zu einem inneren Raum eines Schuhwerkartikels (11) gewandt zu sein, und eine Außenseite, die dazu ausgebildet ist, von dem inneren Raum abgewandt zu sein, wenn das Schuhoberteil in den Schuhwerkartikel eingearbeitet ist, haben, das Profilierungselement zwischen der Außenseite der Trägerschicht und der Innenseite der äußeren Netzfläche angeordnet ist, die Trägerschicht, das Profilierungselement und die äußere Netzfläche eine gebundene Verbundfläche (15) bilden, in der die äußere Netzfläche an das Profilierungselement und die Trägerschicht angepasst ist, um ein erhöhtes Profil zu bilden, wobei eine Bindung zwischen der äußeren Netzfläche und der Trägerschicht sich zu inneren Rändern (e2) erstreckt, an denen das Profilierungselement mit der Trägerschicht zusammentrifft, und wobei Bereiche der äußeren Netzfläche (19), die das Profilierungselement überlagern, unter Spannung stehen und das Profilierungselement verformen, um äußere Ränder (e1) des Profilierungselements abzurunden.

2. Schuhoberteilabschnitt nach Anspruch 1, wobei das Profilierungselement (31, 32, 33, 34) Streifen des Materials aufweist, das aus Kunstleder, einem Schaumstoff oder einem Naturleder ausgewählt ist.
3. Schuhoberteilabschnitt nach Anspruch 2, wobei die Trägerschicht mindestens eine Öffnung umfasst, die ein Belüftungsfenster (36 - 42) bestimmt, und wobei ein Abschnitt der äußeren Netzfläche das Belüftungsfenster überspannt und an Bereiche der Trägerschichtaußenseite an einem Rand des Belüftungsfensters gebunden ist.
4. Schuhoberteilabschnitt nach Anspruch 2, wobei die Trägerschicht (29) Öffnungen umfasst, die eine Vielzahl von Belüftungsfenstern (36 - 42) bestimmen, wobei jedes der Belüftungsfenster durch einen entsprechenden Abschnitt der äußeren Netzfläche (19) überspannt ist und jeder der fensterüberspannenden äußeren Netzflächenabschnitte an Bereiche der Trägerschichtaußenseite an Rändern des entsprechenden Belüftungsfensters gebunden ist.
5. Schuhoberteilabschnitt nach Anspruch 3 oder Anspruch 4, der ferner ein zweites Profilierungselement (31, 32, 33, 34) aufweist, das zwischen der Außenseite der Trägerschicht (29) und der Innenseite der äußeren Netzfläche (19) angeordnet ist, wobei
- das zweite Profilierungselement von angrenzenden Bereichen der Trägerschichtaußenseite

umgeben ist, die das zweite Profilierungselement nicht berühren, und die angrenzenden Trägerschichtbereiche, die das zweite Profilierungselement umgeben, an die Innenseite der äußeren Netzfläche gebunden sind.

6. Schuhoberteilabschnitt nach Anspruch 1, wobei das Profilierungselement (31, 32, 33, 34) von angrenzenden Bereichen der Außenseite der Trägerschicht (29) umgeben ist, die das Profilierungselement nicht berühren, und wobei die umgebenden angrenzenden Bereiche an die Innenseite der äußeren Netzfläche (19) gebunden sind.
7. Schuhoberteilabschnitt nach Anspruch 6, wobei die Trägerschicht (29) mindestens ein Belüftungsfenster (36 - 42) umfasst und wobei ein Abschnitt der äußeren Netzfläche (19) das Belüftungsfenster überspannt und an Bereiche der Trägerschichtaußenseite an einem Rand des Belüftungsfensters gebunden ist.
8. Schuhwerkartikel (10), der einen Schuhoberteilabschnitt gemäß einem der Ansprüche 1 bis 7 enthält.
9. Verfahren zur Herstellung eines Abschnitts eines Schuhoberteils, aufweisend:

Zusammensetzen eines Stapels (70) von Komponenten, der eine Trägerschicht (29), ein Bindemittel, mindestens ein Profilierungselement (31, 32, 33, 34) und eine poröse äußere Fläche (19) aufweist, wobei das Profilierungselement aus einem Material besteht, das aus Kunstleder, einem Schaumstoff oder einem Naturlleder ausgewählt ist, und wobei das Profilierungselement zwischen der Trägerschicht und der porösen äußeren Fläche angeordnet ist; und Erhitzen und Zusammendrücken des zusammengesetzten Stapels, um die Trägerschicht, das Profilierungselement und die äußere Fläche zu binden und eine Verbundfläche (15) mit einem Profil zu bilden, das dem Profilierungselement entspricht, wobei das Profilierungselement in der Verbundfläche eine Dicke (TC) hat, die größer als die kombinierten Dicken (TO, TB) der äußeren Fläche und der Trägerschicht ist, wobei eine Bindung zwischen der äußeren Fläche und der Trägerschicht sich zu inneren Rändern (e2) erstreckt, an denen das Profilierungselement mit der Trägerschicht zusammentrifft, und wobei Bereiche der äußeren Netzfläche (19), die das Profilierungselement überlagern, unter Spannung stehen und das Profilierungselement verformen, um äußere Ränder (e1) des Profilierungselements abzurunden.

10. Verfahren nach Anspruch 9, wobei die poröse äußere Fläche ein Netz ist.

5 Revendications

1. Partie de tige (11) comprenant :

un renfort (29),
un élément définissant un contour (31, 32, 33, 34), réalisé en un matériau choisi parmi les matériaux suivants : cuir synthétique, mousse et cuir naturel, et
un panneau externe en un tissu à mailles (19), l'élément définissant un contour ayant une épaisseur (TC) supérieure aux épaisseurs combinées (TO, TB) du panneau externe et du renfort,
le renfort et le panneau externe en un tissu à mailles ayant chacun un côté interne tourné vers le volume interne d'un article chaussant (11) et un côté externe tourné à l'opposé du volume interne lorsque la tige est incorporée dans l'article chaussant,
l'élément définissant un contour étant situé entre le côté externe du renfort et le côté interne du panneau externe en un tissu à mailles,
le renfort, l'élément définissant un contour et le panneau externe en un tissu à mailles formant un panneau composite lié (15) dans lequel le panneau externe en un tissu à mailles épouse l'élément définissant un contour et le renfort de façon à former un contour en relief,
la liaison entre le panneau externe en un tissu à mailles et le renfort s'étendant jusqu'aux bords internes (e2) au niveau desquels l'élément définissant un contour rencontre le renfort, et des régions du panneau interne en un tissu à mailles (19) recouvrant l'élément définissant un contour étant sous tension et déformant l'élément définissant un contour de façon à arrondir les bords externes (e1) de l'élément définissant un contour.

2. Partie de tige conforme à la revendication 1, dans laquelle l'élément définissant un contour (31, 32, 33, 34) comporte des bandes du matériau choisi parmi les matériaux suivants : cuir synthétique, mousse et cuir naturel.

3. Partie de tige conforme à la revendication 2, dans laquelle le renfort comporte au moins une ouverture définissant une fenêtre d'aération (36-42) et une partie du panneau externe en un tissu à mailles couvre la fenêtre d'aération et est lié à des régions du côté externe du renfort au niveau d'un bord de la fenêtre d'aération.

4. Partie de tige conforme à la revendication 2, dans laquelle le renfort (29) comporte des ouvertures définissant un ensemble de fenêtres d'aération (36-42), chacune des fenêtres d'aération étant couvertes par une partie correspondante du panneau externe en un tissu à mailles (19) et chacune des parties du panneau externe en un tissu à mailles couvrant la fenêtre étant liée à des régions du côté externe du renfort au niveau d'un bord de la fenêtre d'aération correspondante. 5
10
5. Partie de tige conforme à la revendication 3 ou 4, comprenant en outre un second élément définissant un contour (31, 32, 33, 34) situé entre le côté externe du renfort (29) et le côté interne du panneau externe en un tissu à mailles (19), le second élément définissant un contour étant entouré par des régions adjacentes du côté externe du renfort ne venant pas en contact avec le second élément définissant un contour, et les régions de renfort adjacentes entourant le second élément définissant un contour étant liées au côté interne du panneau externe en un tissu à mailles. 15
20
25
6. Partie de tige conforme à la revendication 1, dans laquelle l'élément définissant un contour (31, 32, 33, 34) est entouré par des régions adjacentes du côté extérieur du renfort (29) ne venant pas en contact avec l'élément définissant un contour, et les régions d'entourage étant liées au côté interne du panneau externe en un tissu à mailles (19). 30
7. Partie de tige conforme à la revendication 6, dans laquelle le renfort (29) comporte au moins une ouverture d'aération (36-42) et une partie du panneau externe en un tissu à mailles (19) couvre la fenêtre d'aération et est liée à des régions du côté externe du renfort au niveau d'un bord de la fenêtre d'aération. 35
40
8. Article chaussant (10) comprenant une partie de tige conforme à l'une quelconque des revendications 1 à 7. 45
9. Procédé de fabrication d'une partie d'une tige comprenant des étapes consistant à :

assembler une pile (70) de composants comprenant un renfort (29), un agent de liaison, au moins un élément définissant un contour (31, 32, 33, 34) et un panneau externe poreux (19), l'élément définissant un contour étant réalisé en un matériaux choisi parmi les matériaux suivants : cuir synthétique, mousse ou cuir naturel et étant positionné entre le renfort et le panneau externe poreux, et chauffer et comprimer la pile assemblée pour 50
55

lier le renfort, l'élément définissant un contour et le panneau externe et former un panneau composite (15) ayant un contour correspondant à celui de l'élément définissant un contour, l'élément définissant un contour ayant, dans le panneau composite, une épaisseur (TC) supérieure aux épaisseurs combinées (TO, TB) du panneau externe et du renfort, la liaison entre le panneau externe et le renfort s'étendant jusqu'au bord interne (e2) au niveau desquels l'élément définissant un contour rencontre le renfort et les régions du panneau externe en un tissu à mailles (19) recouvrant l'élément définissant un contour étant sous tension et déformant l'élément définissant un contour de façon à arrondir les bords externes (e1) de l'élément définissant un contour.

10. Procédé conforme à la revendication 9, selon lequel le panneau externe poreux est un tissu à mailles.

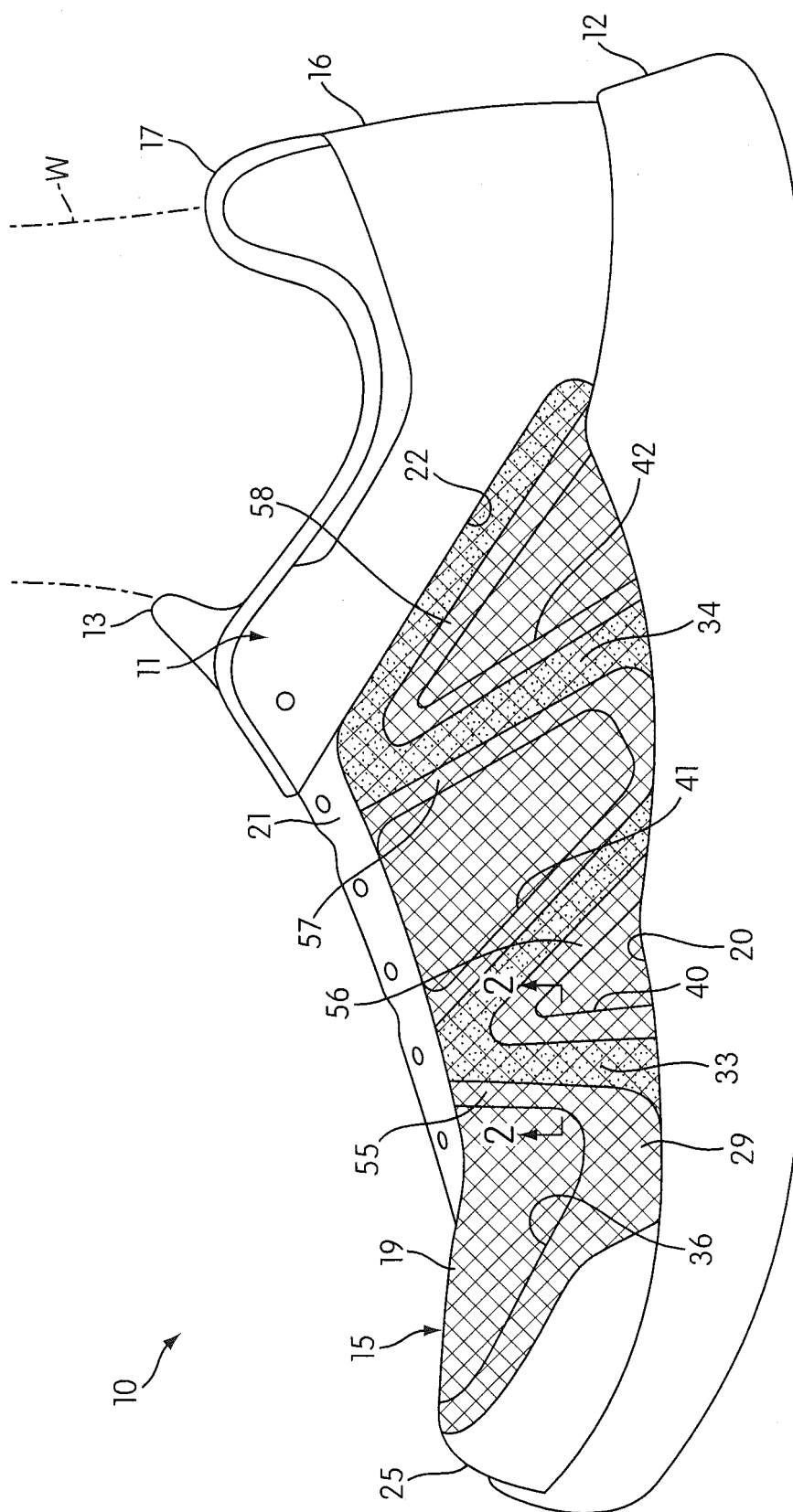


FIG. 1A

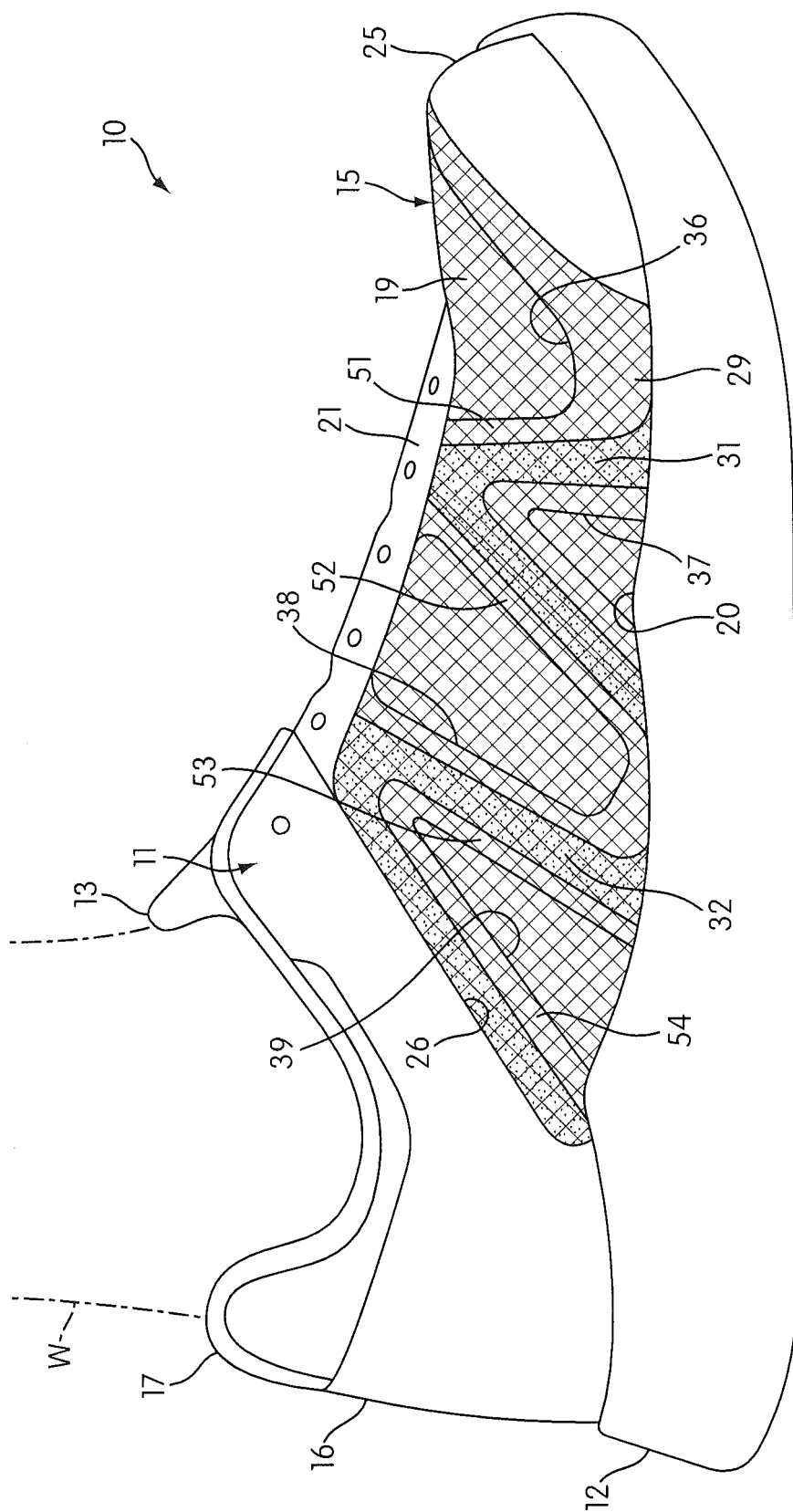


FIG. 1B

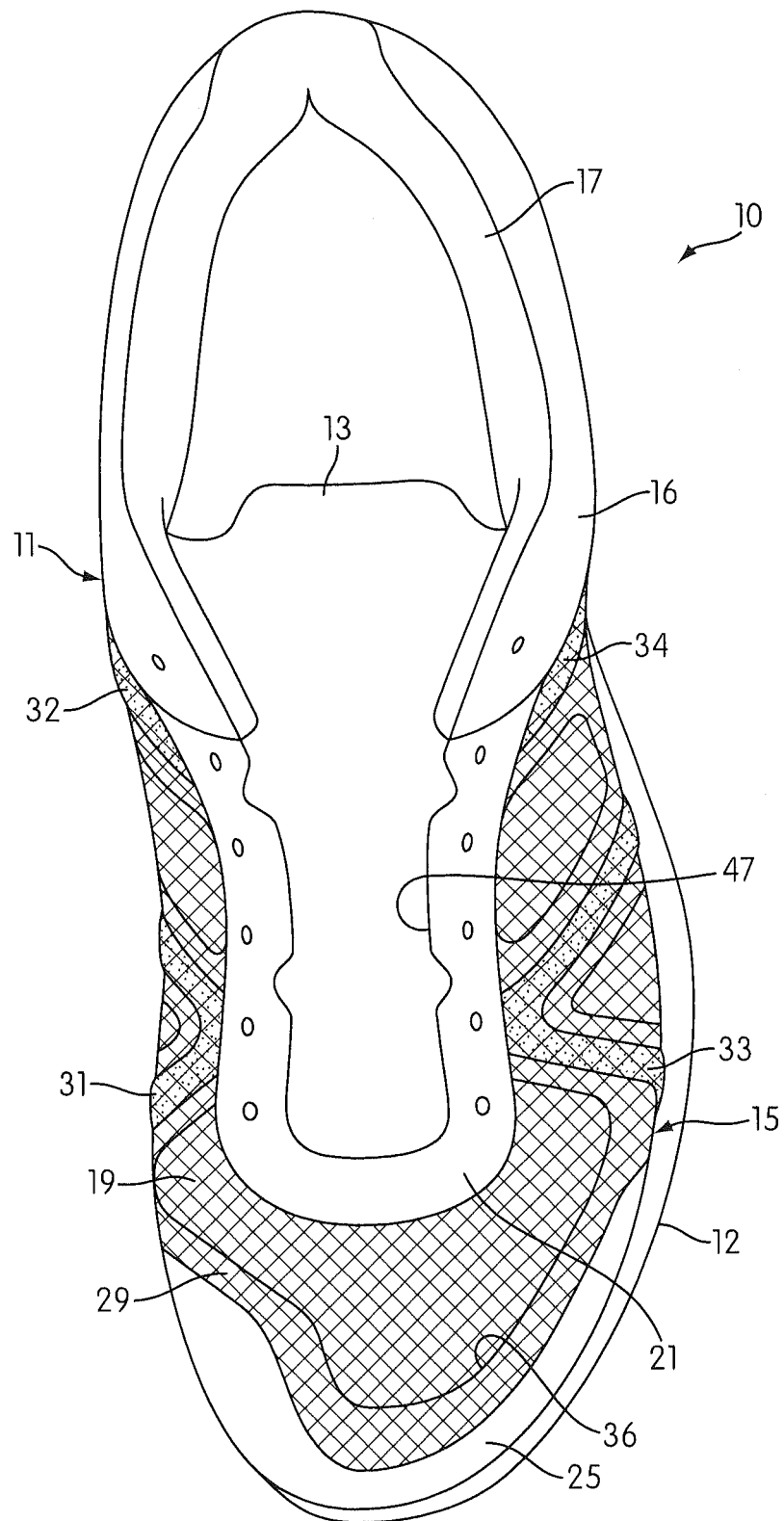


FIG. 1C

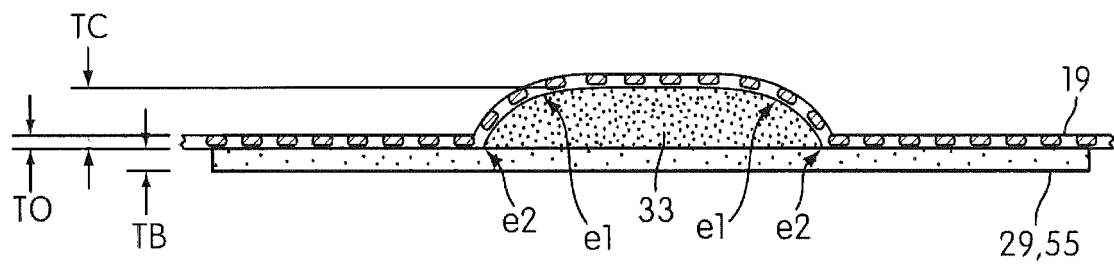
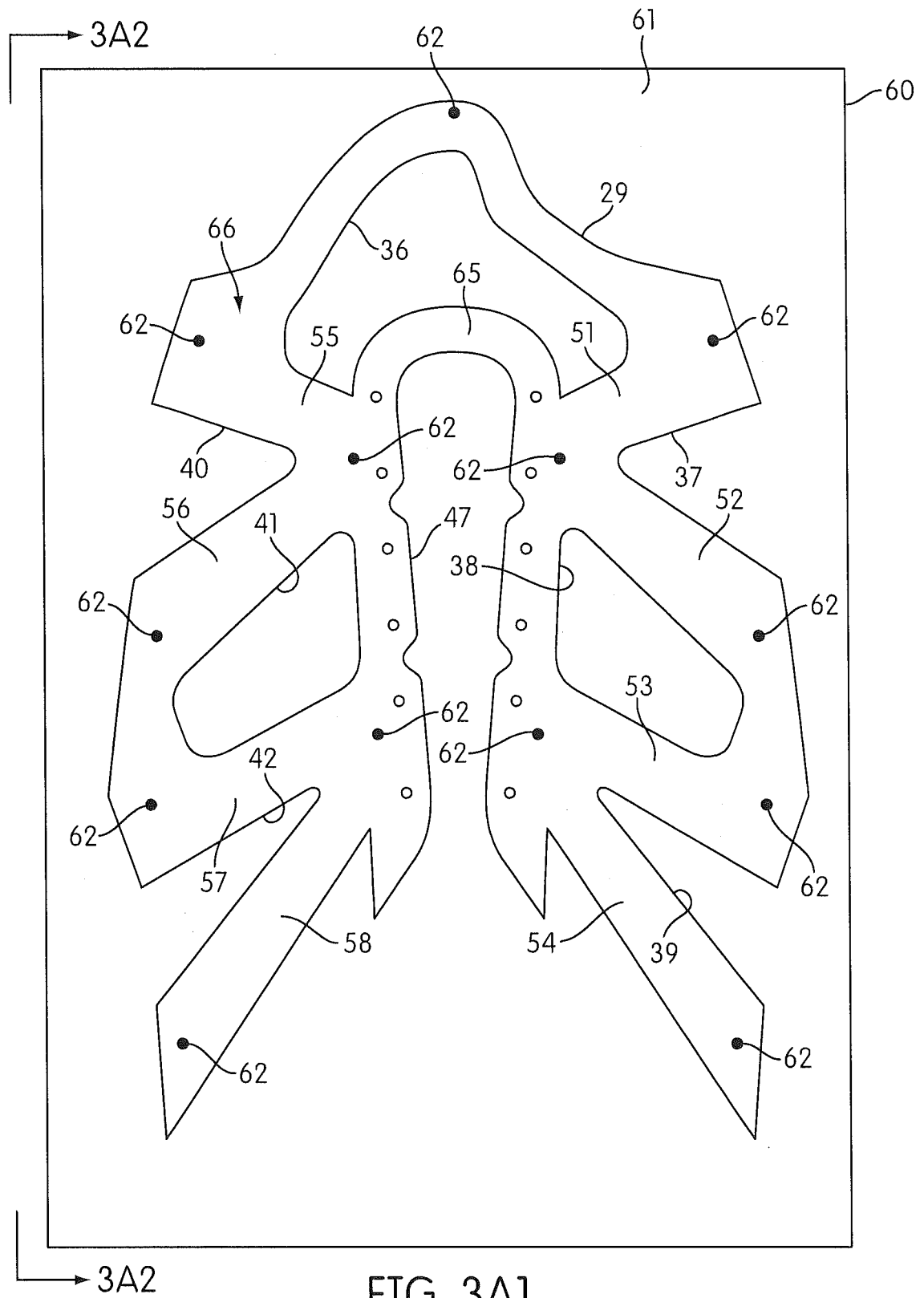


FIG. 2



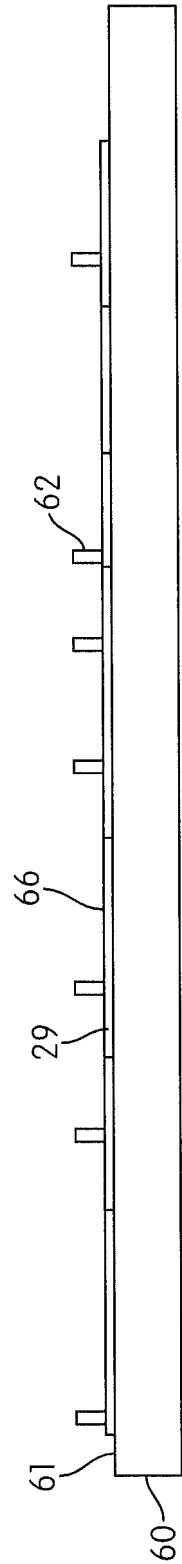


FIG. 3A2

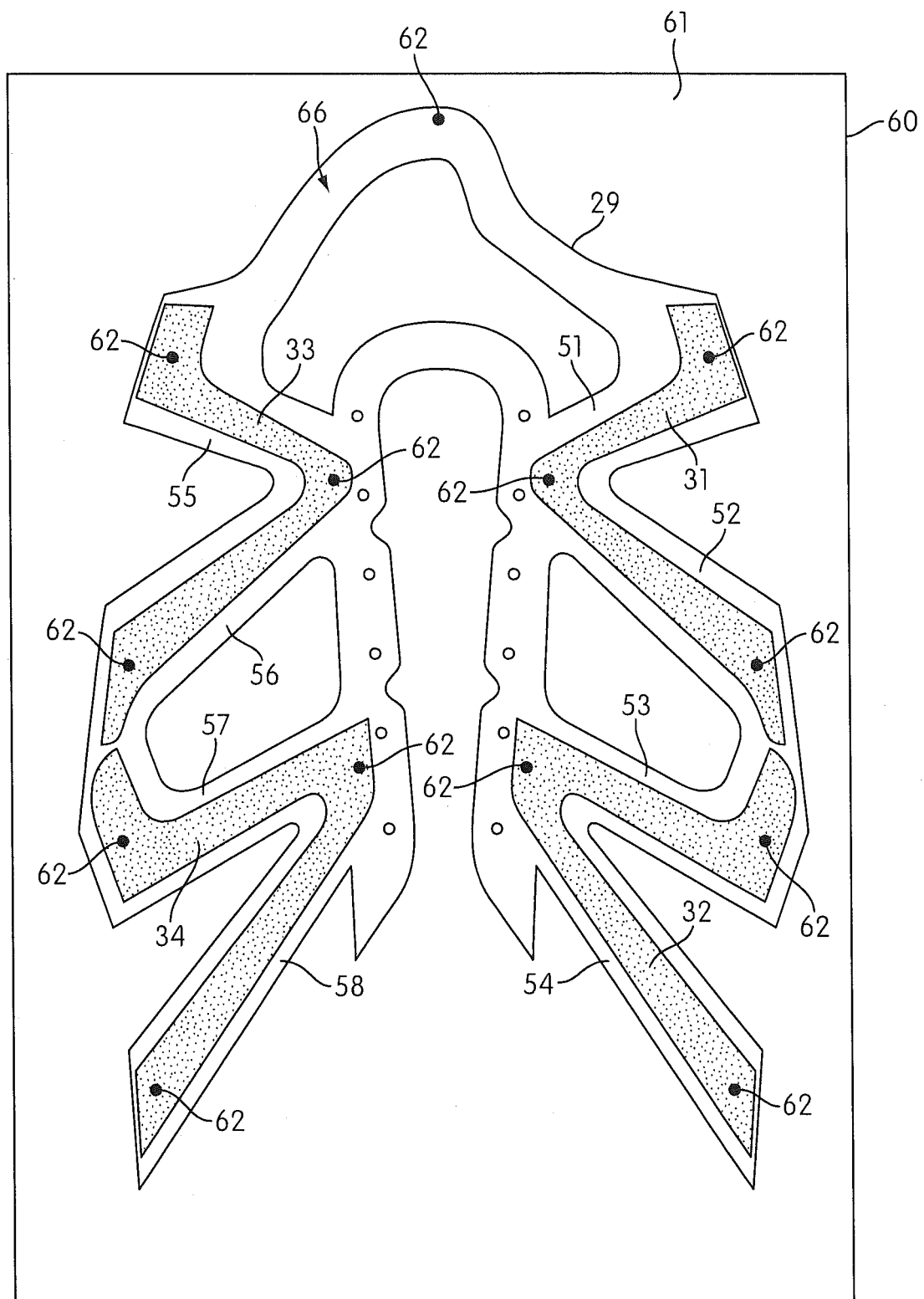


FIG. 3B

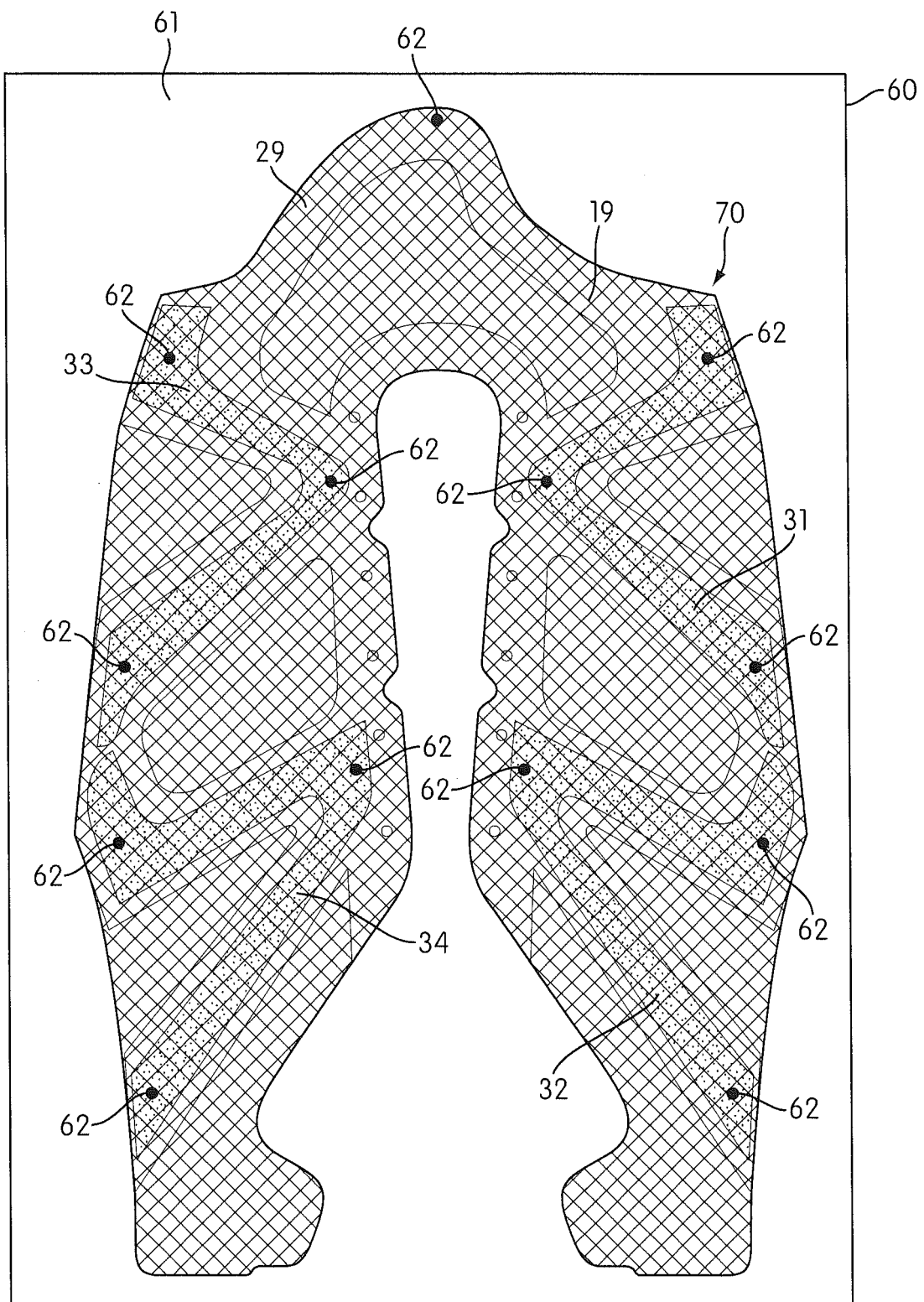


FIG. 3C

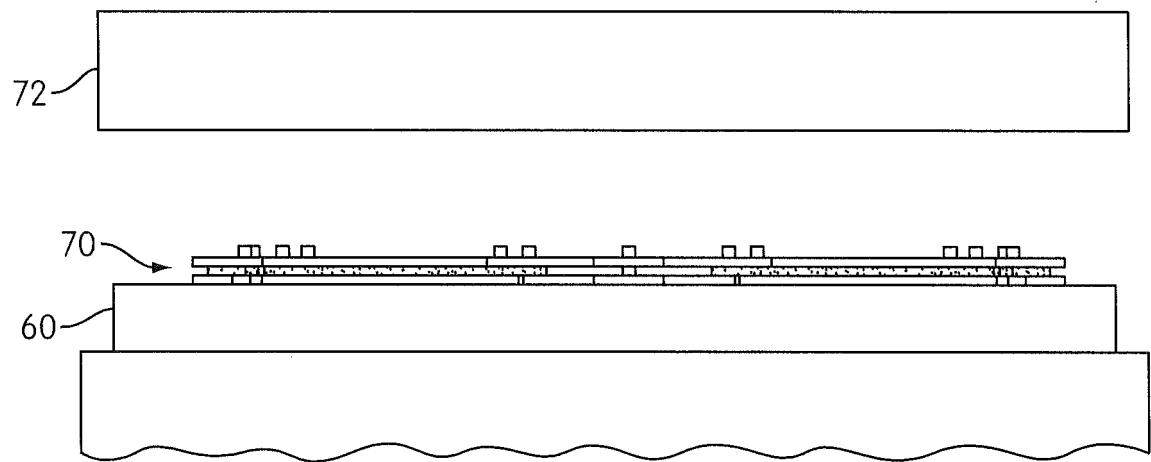


FIG. 3D1

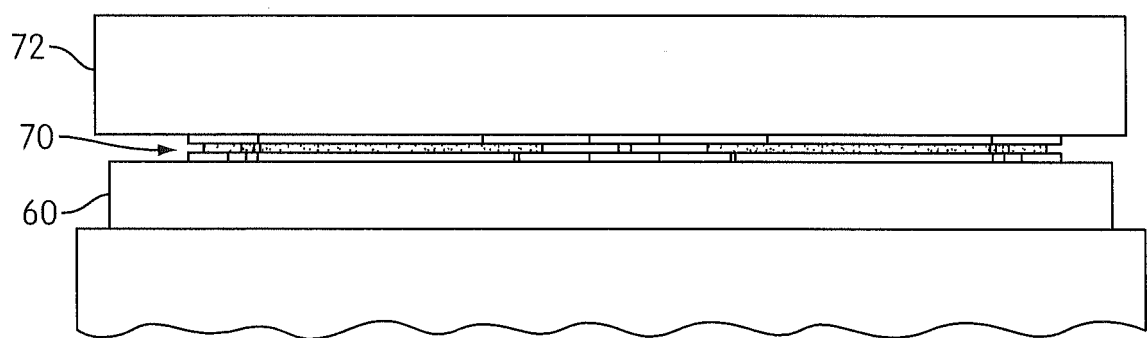


FIG. 3D2

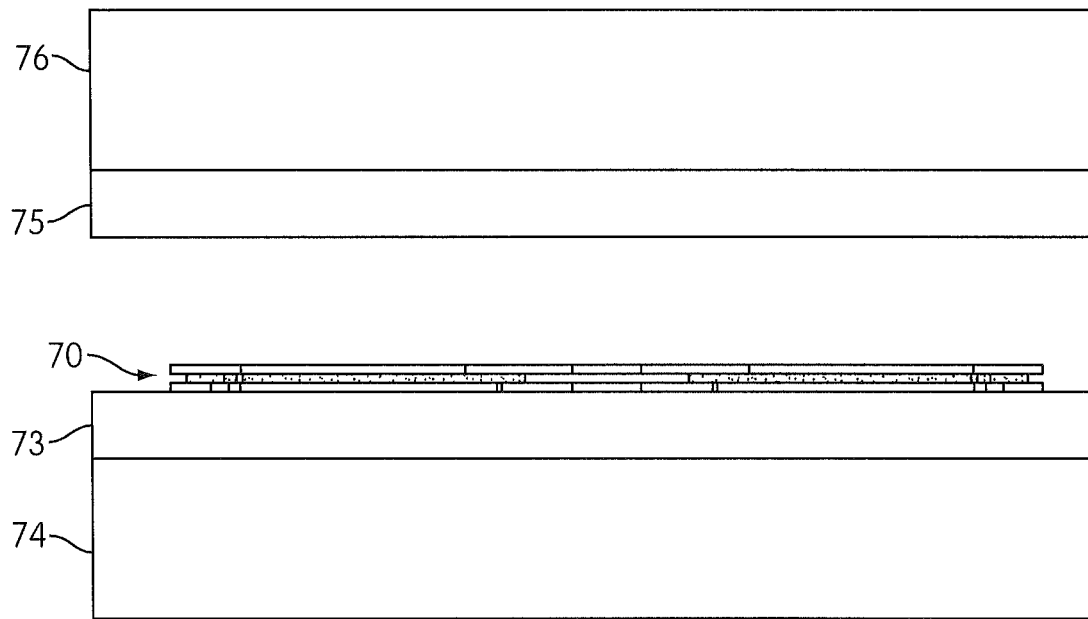


FIG. 3E1

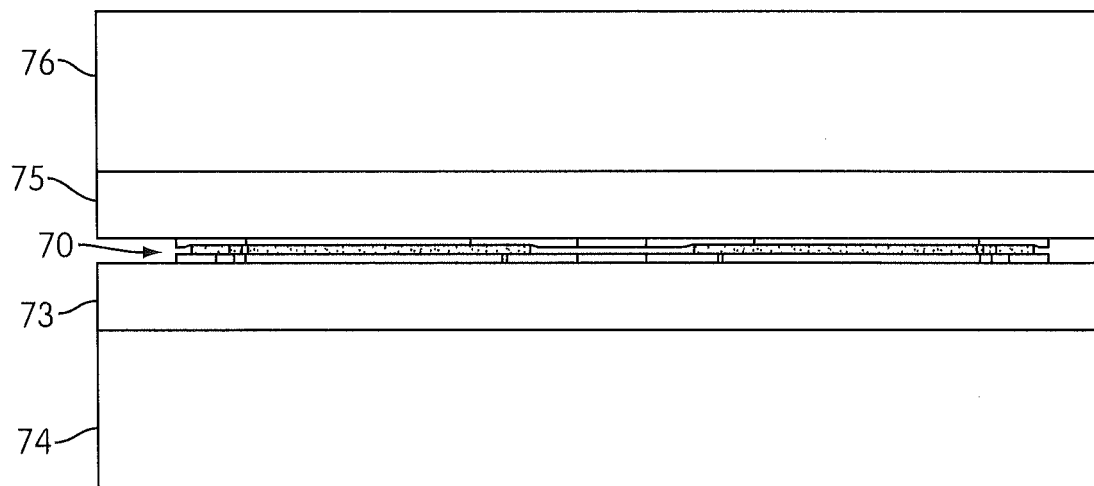


FIG. 3E2

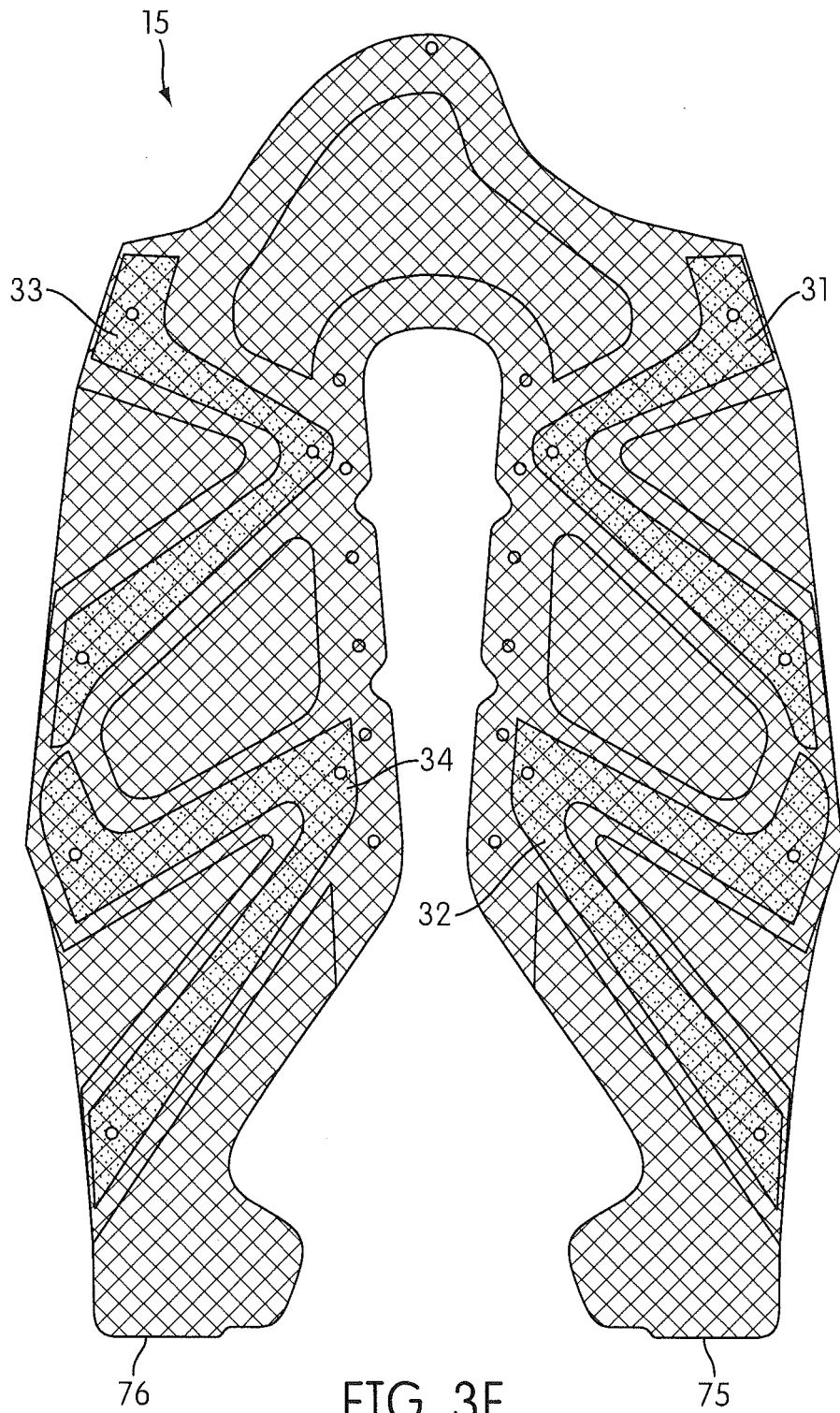
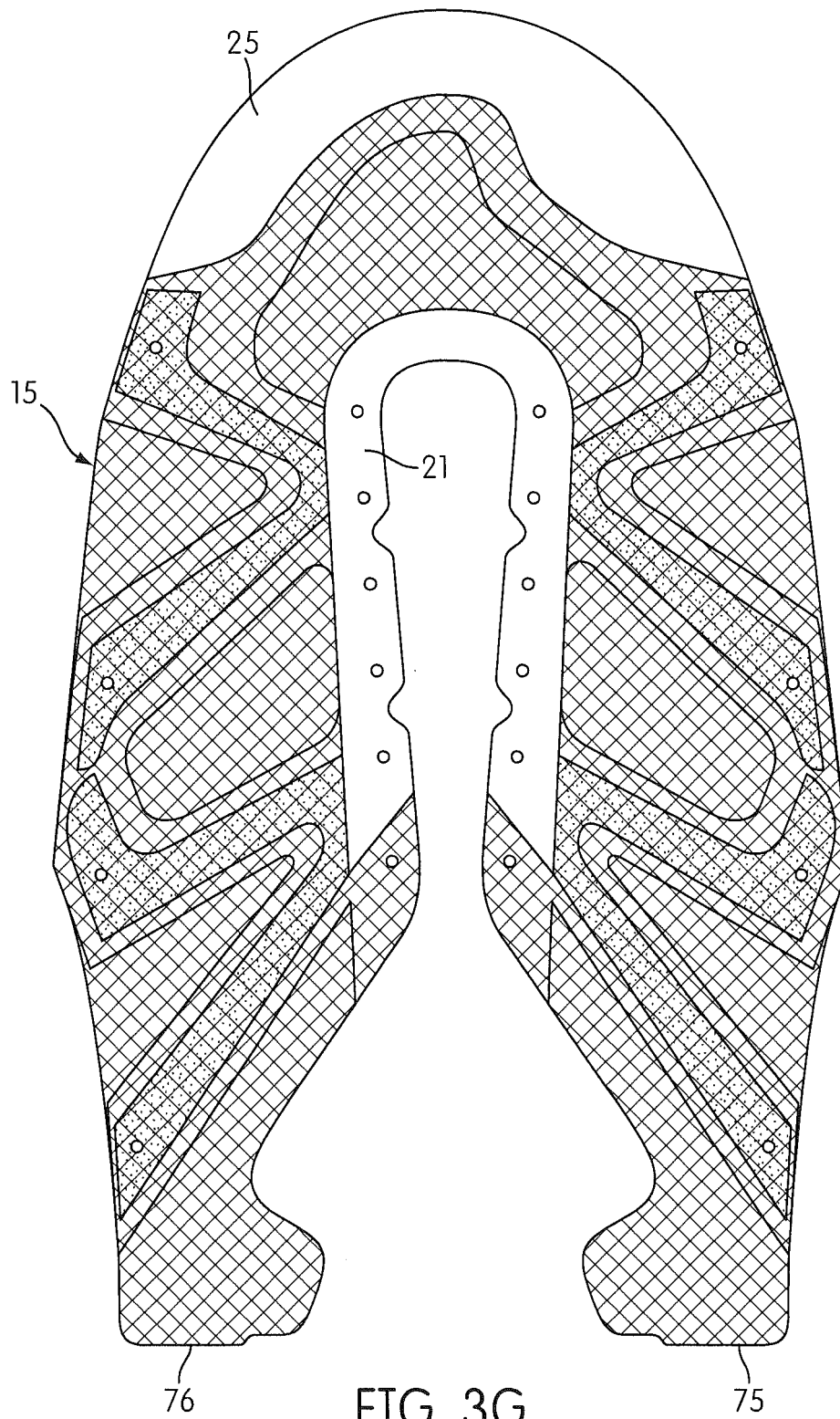


FIG. 3F



REFERENCES CITED IN THE DESCRIPTION

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