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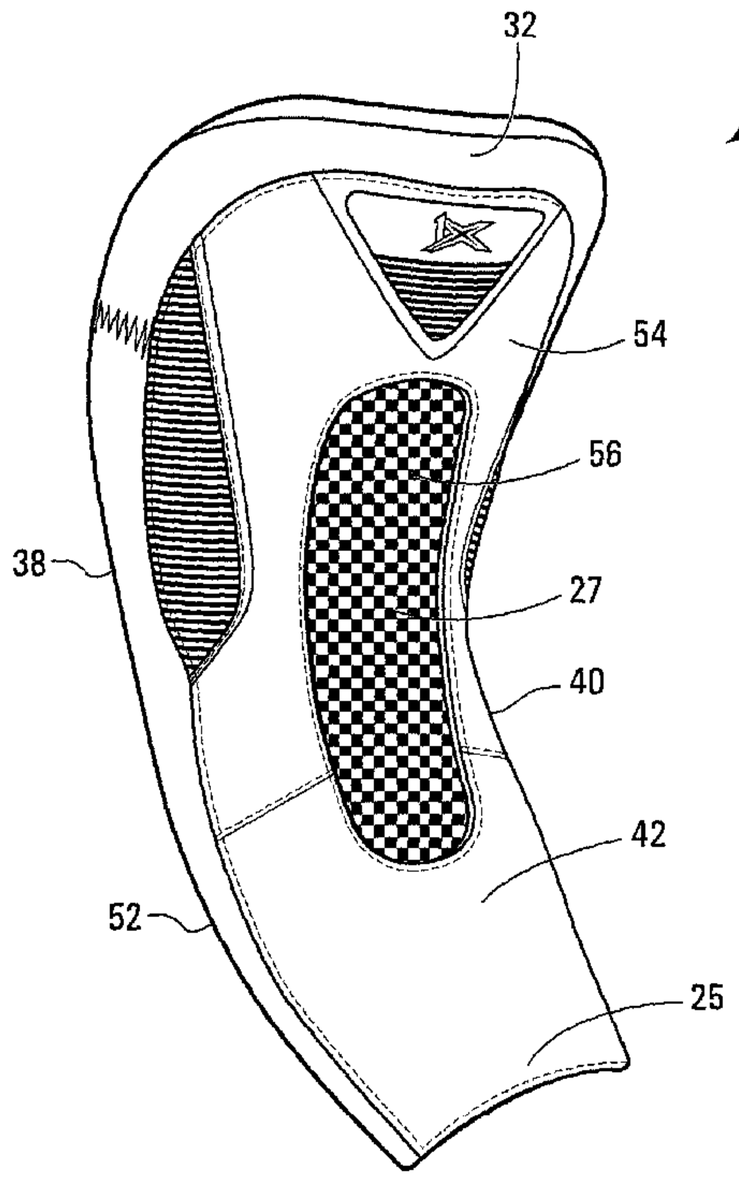


(57) Abrégé/Abstract:
A tongue for a skate boot configured for enclosing a human foot. The tongue has a core for covering at least partially the forefoot and the front ankle portion, the core being made of a first material having a first density. The tongue also has a peripheral section affixed to the core and extending along at least part of the periphery of the core, the peripheral section being made of a second material having a second density, the first density being less than the second density.

ABSTRACT

A tongue for a skate boot configured for enclosing a human foot. The tongue has a core for covering at least partially the forefoot and the front ankle portion, the core being made of a first material having a first density. The tongue also has a peripheral section affixed to the core and extending along at least part of the periphery of the core, the peripheral section being made of a second material having a second density, the first density being less than the second density.

TONGUE FOR A SKATE BOOT

Field of the invention

The present invention relates to a tongue for a skate boot, the tongue comprising a core made of a first material with a first density and a peripheral section affixed to the periphery of the core, the peripheral section being made of a second material with a second density, the first density being less than the second density.

Background

Skate boots having tongues for covering the forefoot and front ankle portion of a wearer are known in the art. These tongues provide protection to the wearer's forefoot and front ankle portion by at least partially absorbing impacts as well as accommodating a skate boot's laces such that they do not apply pressure to the wearer's foot directly.

For many years, felt has been used in the construction of such tongues, particularly as a backing of the tongues. The use of felt, amongst other reasons, is attributed to its good impact protection, its soft texture and the traditional look it provides to skate boots. Recently, tongues made of foam have been introduced into the market. Similarly to felt tongues, foam tongues also offer good impact protection. Foam tongues may be thinner than their felt counterparts and usually weigh less as well. Irrespective of this, many still prefer the felt tongues due to their comfortable texture and the more traditional look they have.

Against this backdrop, there is a need in the industry for a tongue which has the same look and comfortable texture of traditional felt tongues, while also providing a weight reduction with respect to the traditional felt tongues.

Summary of the invention

In accordance with a first broad aspect, the invention provides a tongue for a skate boot configured for enclosing a human foot, the human foot having a forefoot and a front ankle portion, the tongue comprising: a core for covering at least partially the forefoot and the front ankle portion, the core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot, the core comprising distal, middle and proximal portions and left and right portions, the left, proximal and right portions defining a periphery of the core, the core comprising a first material having a first density; and a peripheral section affixed to at least one of the left, proximal and right portions of the core and extending along at least part of the periphery, at least a majority of each of the front and rear surfaces of the core not being covered by the peripheral section, the peripheral section comprising a second material having a second density, the first density being less than the second density.

According to another broad aspect, the invention provides a method of making a tongue for a skate boot configured for enclosing a human foot, the human foot having a forefoot and a front ankle portion, the method comprising: providing a core made of a first material having a first density for covering at least partially the forefoot and the front ankle portion, the core comprising a front surface and a rear surfaces opposite to the front surface, the rear surface being configured to face an interior of the skate boot, the core comprising distal, middle and proximal portions, and left and right portions, the left, proximal and right portions defining a periphery of the core; providing a peripheral section made of a second material having a second density, the first density being less than the second density; affixing the peripheral section to at least one of the left, proximal and right portions of the core such that the peripheral section extends along at least part of the periphery and such that at least a majority of each of the front and rear surfaces of the core is not covered by the peripheral section; providing a layer; and covering the rear surface of the core with the layer.

According to a further broad aspect, the invention provides a tongue for a skate boot, the tongue comprising: a core comprising a front surface, a rear surface opposite to the front surface and configured for facing towards an interior of the skate boot, and a peripheral surface between the front and rear surfaces, the core comprising a first material having a first density; and a peripheral section affixed to the core and extending along at least part of the peripheral surface of the core, at least a majority of each of the front and rear surfaces of the core not being covered by the peripheral section, the peripheral section comprising a second material having a second density greater than the first density.

According to a further broad aspect, the invention provides a tongue for a skate boot, the tongue comprising: a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the boot, the core comprising distal, middle and proximal portions and left and right portions, the left, proximal and right portions defining a periphery of the core, the core comprising a first material having a first density; and a peripheral section extending along at least part of the periphery of the core, at least a majority of each of the front and rear surfaces of the core not being covered by the peripheral section, the peripheral section comprising a second material having a second density, the first density being less than the second density.

According to another broad aspect, the invention provides a tongue for a skate boot, the tongue comprising: a core comprising distal, middle and proximal portions and left and right portions, the left, proximal and right portions defining a periphery of the core, the core comprising a first material having a first density; and a band extending along at least part of the periphery of the core, the band having a dimension measured in a widthwise direction of the core that is less than a dimension of the core measured in the widthwise direction of the core, the band comprising a second material having a second density, the first density being less than the second density.

According to another broad aspect, the invention provides a tongue for a skate boot, the tongue comprising: a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot; and an overlay at least partially covering the front surface of the core, the overlay comprising an opening for insertion of an insert to

According to a further broad aspect, the invention provides a skate boot for enclosing a foot, the skate boot comprising: an outer shell comprising a medial side portion and a lateral side portion for respectively facing a medial side and a lateral side of the foot; and a tongue disposed between the medial and lateral side portions of the outer shell, the tongue comprising: a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot; and an overlay at least partially covering the front surface of the core, the overlay comprising an opening for insertion of an insert to change a rigidity of the tongue.

According to a further broad aspect, the invention provides in combination: a skate boot for enclosing a foot comprising: an outer shell comprising a medial side portion and a lateral side portion for respectively facing a medial side and a lateral side of the foot; a tongue disposed between the medial and lateral side portions of the outer shell, the tongue comprising: a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot; and an overlay at least partially covering the front surface of the core, the overlay comprising an opening; an insert for insertion in the opening of the overlay to change a rigidity of the tongue.

According to a further broad aspect, the invention provides a tongue for a skate boot, the tongue comprising: a front side and a rear side opposite to the front side, the rear side being configured to face an interior of the skate boot; and an opening configured for receiving an insert to definite a rigidity of the tongue.

According to a further broad aspect, the invention provides a tongue for a skate boot, the tongue comprising: a front side and a rear side opposite to the front side, the rear side being configured to face an interior of the skate boot; an opening at the front side of the tongue; and an insert for defining a rigidity of the tongue and received in the opening of the tongue.

According to a further broad aspect, the invention provides in combination: a skate boot for enclosing a foot comprising: an outer shell comprising a medial side portion and a lateral side portion for respectively facing a medial side and a lateral side of the foot; a tongue disposed between the medial and lateral side portions of the outer shell, the tongue comprising: a front side and a rear side opposite to the front side, the rear side being configured to face an interior of the skate boot; and an opening; an insert for insertion in the opening the tongue to define a rigidity of the tongue.

Other aspects and features of the present invention will become apparent to those of ordinary skill in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

Brief description of the drawings

A detailed description of the embodiments of the present invention is provided hereinbelow with reference to the following drawings, in which:

Figure 1 shows a perspective view of a human foot with the integument of the foot shown in stippled lines and the bones of the foot shown in solid lines;

Figure 2 shows a front elevational view of the foot of Figure 1;

Figure 3 shows a front perspective view of a skate boot having a tongue in accordance with an embodiment of the present invention;

Figure 4 shows a front perspective view of the tongue;

Figures 5 and 6 show a front and a rear elevational view of the tongue;

Figure 7 shows an exploded view of the tongue including a layer, a core, a peripheral section made of sections, a rigid insert, and an overlay;

Figure 8 shows a front perspective view of the core of the tongue;

Figure 9 shows a front view of the core and the peripheral sections of the tongue;

Figure 10 shows an example of affixing the layer onto a rear surface of the core;

Figure 11 shows a rear view of the tongue after the layer has been affixed to rear surface of the core;

Figure 12 shows an example of affixing a peripheral strip onto a front surface of the core;

Figure 13 shows an example of affixing the peripheral sections to the core;

Figure 14 shows a rear view of the tongue after the peripheral section has been affixed and stitched to the core;

Figure 15 shows a front view of the rigid insert of the tongue;

Figure 16 shows a front view of the tongue after the rigid insert has been affixed thereto;

Figure 17 shows overlay elements of the overlay of the tongue;

Figure 18 shows the overlay in its assembled state; and

Figure 19 shows another embodiment of the overlay.

In the drawings, embodiments of the invention are illustrated by way of example. It is to be expressly understood that the description and drawings are only for the purposes of illustration and as an aid to understanding, and are not intended to be a definition of the limits of the invention.

Detailed description of the embodiments of the invention

To facilitate the description, any reference numeral designating an element in one figure will designate the same element if used in any other figures. In describing the embodiments, specific terminology is resorted to for the sake of clarity but the invention is not intended to be limited to the specific terms so selected, and it is understood that each specific term comprises all equivalents.

Unless otherwise indicated, the drawings are intended to be read together with the specification, and are to be considered a portion of the entire written description of this invention. As used in the following description, the terms "horizontal", "vertical", "left", "right", "up", "down" and the like, as well as adjectival and adverbial derivatives thereof (e.g., "horizontally", "rightwardly", "upwardly", "radially", etc.), simply refer to the orientation of the illustrated structure. Similarly, the terms "inwardly," "outwardly" and "radially" generally refer to the orientation of a surface relative to its axis of elongation, or axis of rotation, as appropriate.

Shown in Figures 1 and 2 is a typical right human foot F that includes toes T, a plantar surface PS, a top surface TS, a medial side MS and a lateral side LS. In addition, the human foot includes a forefoot FF, a heel H, an Achilles tendon, and an ankle A. The ankle A defines a front ankle portion FAP. Additionally, the ankle A has a medial side with a medial malleolus MM, a rear side RS and a lateral side with a lateral malleolus LM, the lateral malleolus LM being at a lower position than the medial malleolus MM. The rear side RS has an upper part UP and a lower part LP projecting outwardly with relation to the upper part UP, the lower part merging with the heel H.

Shown in Figures 3 to 5 is an ice skate 2 that comprises a skate boot 10 suitable for enclosing the foot of a hockey player. Although the skate boot 10 shown in the figures is being used for an ice skate, it is understood that the skate boot 10 could also be used for a roller hockey skate.

The skate boot 10 has an outer shell 12 for receiving the player's foot, the outer shell 12 having an outer surface and an inner surface, a toe cap 14 made of a rigid material for protecting the player's toes, a tongue 20 extending upwardly and rearwardly from the toe cap 14 for covering a forefoot of the player's foot, an inner liner (not shown) having an outer surface mounted to the inner surface of the outer shell 12 and an inner surface adapted to contact the player's foot or a sock covering the player's foot, a footbed, an insole, an outsole, an ice skate blade holder 16 and an ice skate blade 18. The footbed has an upper surface for facing the plantar surface of the player's foot. The outsole has an upper surface on which the sole portion of the outer shell 12 (e.g. the insole) may be affixed and a lower surface on which the blade holder 16 is mounted.

The outer shell 12 may be made of a thermoformable material. As used herein, the expression "thermoformable material" refers to a material that is capable of softening when heated and of hardening again when cooled. Some non-limiting examples of different types of thermoformable material comprise ethylene vinyl acetate (EVA) foam, polyethylene foam, polystyrene foam, polypropylene foam and thermoformable materials sold under the trade-marks MEGABIX®, SURLYN®, SONTARA®, FORMO500®, BYLON®, MOSOCA® and NYLON® 66.

The outer shell 12 is thermoformed such that it comprises a heel portion 26 for receiving the heel of the player's foot, an ankle portion 28 for receiving the ankle of the player's foot, the ankle portion 28 comprising a medial side having a medial upper edge and a medial upper region, a lateral side having a lateral upper edge and a lateral upper region, and a rear portion 30 for receiving the rear side of the ankle, and a medial side portion (not shown) opposite a lateral side portion 24 for receiving the medial and lateral sides of the player's foot respectively, the medial and lateral side portions having medial and lateral upper edges. The medial and lateral side portions of the outer shell 12 extend forwardly from the heel and ankle portions 26, 28. The heel portion 26, ankle portion 28 and medial and lateral side portions form a foot-receiving cavity that conforms to the general shape of the player's foot.

The heel portion 26 of the outer shell 12 may be thermoformed such that it is substantially cup-shaped for following the contour of the player's heel.

The medial side of the ankle portion 28 of the outer shell 12 may have a medial cup-shaped depression for receiving the medial malleolus and the lateral side of the ankle portion 32 of the outer shell 12 may have a lateral cup-shaped depression for receiving the lateral malleolus. The lateral depression is located slightly lower than the medial depression for conforming to the morphology of the player's foot.

The rear portion 30 of the ankle portion 28 may be thermoformed such that it follows the lower part of the rear side of the player's foot.

The medial and lateral side portions of the outer shell 12 may be thermoformed such that they each define an inner surface that generally follows the contour of the side of the player's foot.

The outer shell 12 also comprises a tendon guard 33 for facing at least partially the upper part of the rear side of the ankle. The tendon guard 33 allows backwards flexion of the ankle when the player's foot moves towards full extension. The tendon guard 33 may be made of silicone or may be made by injection molding using polyester, polyurethane, polyamide, or other suitable thermoplastics. The selected material may have enough flexibility to allow the tendon guard 33 to flex rearwardly when pressure is applied on it while it should also have enough resiliency to allow the tendon guard 33 to return to its initial position when pressure is no longer applied on it.

The skate boot 10 may also comprise medial and lateral lace members 35, 37 mounted to the medial and lateral upper edges of the medial and lateral side portions of the outer shell 12. The medial and lateral lace members 35, 37 may be made of fabric, textile, leather or plastic and comprise a series of medial and lateral apertures for receiving a lace. Eyelets 36 may be punched into the lace apertures of lace members 35, 37.

The lace members 35, 37 can be mounted to the medial and lateral upper edges of the medial or lateral side portions of the outer shell 12 via any method known in the art such as stitching, overmolding, thermal bonding, high-frequency bonding, vibration bonding, piping, adhesive, or any combination thereof. In yet other embodiments, the lace members can form an integral part of the outer shell 12. In another embodiment, the lace members may be omitted and lace apertures and eyelets may be rather provided along the medial and lateral upper edges of the medial and lateral side portions of the outer shell. Medial and lateral bands or overlays may then be added to the outer shell in order to add rigidity to the skate boot in the lace regions.

It should be understood that the outer shell 12 of the skate boot 10 is not a limiting feature of the present invention, and that the outer shell 12 can be formed of a single integral piece, or can be made of multiple pieces that are connected together to form the overall shape of the outer shell 12. In addition, the outer shell 12 can be formed of foam, plastic, leather, or any other suitable material or combination of materials known in the art, without departing from the spirit of the invention.

Similarly, the toe-cap 14, blade holder 16 and blade 18 are not limiting features of the present invention. In addition, any suitable form of blade holder 16 and blade 18 can be used with the skate boot 10 without departing from the spirit of the invention. Blade holders 16 and blades 18 are known in the art, and as such will not be described in further detail herein.

The tongue 20 of the skate boot 10 can be seen in more detail in Figures 4 to 7. The tongue 20 comprises a distal portion 25, a middle portion 27, a proximal portion 32 and side portions 38, 40. In addition, the tongue 20 comprises an outer facing surface 42 and an inner facing surface 44. The inner facing surface 44 faces the forefoot FF and the front ankle portion FAP of the foot F.

As shown in Figure 3, the tongue 20 is adapted to fit between the medial and later side portions of the outer shell 12, such that the tongue 20 covers the forefoot FF and

the front ankle portion FAP. In the embodiment shown, the skate boot 10 includes a lace 34 (shown in dotted lines) that extends through the lateral apertures 36 of the medial and lateral lace members 35, 37 in a crisscrossing pattern. As such, when the lace 34 is tightened, the lace 34 acts to keep the tongue 20 in place.

As shown in Figure 4, the tongue 20 may be arched or may follow a curvature between the side portions 38, 40 for enabling the tongue 20 to better conform to the forefoot FF and the front ankle portion FAP. In addition, the tongue 20 may be arched or may follow a curvature as it extends from the proximal portion 32 to the distal portion 25 for following the profile of the forefoot FF and the front ankle portion FAP.

The distal portion 25 is adapted for being positioned in proximity to the toes T. As such, as shown in Figure 3, the distal portion 25 is connected to the toe-cap 14. This can be achieved via stitching, adhesive or any other type of mechanical fastener known in the art.

The tongue 20 comprises a core 46 for absorbing impacts to the tongue 20, a layer 48 at least partially defining the inner facing surface 44 of the tongue 20, a peripheral section 50 at least partially defining a periphery 52 of the tongue 20, an overlay 54 at least partially defining the outer facing surface 42 of the tongue 20, and a rigid insert 56 defining a section of the tongue 20 with increased rigidity.

The core 46 is configured for absorbing impacts to the tongue 20 such as to protect the foot of the player wearing the skate boot 10. To this end, the core 46 at least partially covers the forefoot FF and the front ankle portion FAP. As best shown in Figure 8, the core 46 comprises a distal portion 60, a middle portion 62, a proximal portion 64 and left and right portions 66, 68. The core 46 also defines a front surface 70 and a rear surface 72. Together, the proximal portion 64 and the left and right portions 66, 68 define a periphery 74 of the core 46.

The core 46 may be arched or may follow a curvature for following the profile of the forefoot FF and the front ankle portion FAP. As such, the core 46 may be arched as it extends from the distal portion 60 to the proximal portion 64. In addition, the core 46 may also be arched or may follow a curvature between the left and right portions 66, 68 to better conform to the forefoot FF and the front ankle portion FAP. In order to accommodate the tongue 20 with the toe-cap 14 of the skate boot 10, the distal portion 60 of the core 46 defines an extension 76. The extension 76 is thinner than the remainder of the core 46, i.e., defines a reduced thickness of a material 78 of the core 46, such that an extended portion of the toe-cap 14 may be fitted over the extension 76 and affixed thereto (e.g., via stitching or gluing).

The peripheral section 50 of the tongue 20 is configured for being affixed to at least one of the proximal portion 64, the left portion 66 and the right portion 68 of the core 46 such that the peripheral section 50 extends along at least part of the periphery 74 of the core 46.

As best shown in Figures 9 and 13, the peripheral section 50 defines a front surface 85 and a rear surface 87, and comprises peripheral sections 82_1-82_3 which are shaped to generally match the periphery 74 of the core 46 at respective portions thereof. More particularly, the peripheral sections 82_1-82_3 include left and right peripheral sections 82_1, 82_2 for affixing to the left and right portions 66, 68 of the core 46 and a proximal peripheral section 82_3 for affixing to the proximal portion 64 of the core 46. In this embodiment, the left and right peripheral sections 82_1, 82_2 extend along a majority of the periphery 74 of the core 46 at the left and right portions 66, 68, while the proximal peripheral section 82_3 extends along a majority of the periphery 74 of the core 46 at the proximal portion 64.

In this embodiment, the left and right peripheral sections 82_1, 82_2 are elongated to match the elongated shape of the left and right portions 66, 68 of the core 46, whereas the proximal peripheral section 82_3 has a U-shape similar to that of the proximal portion 64 of the core 46. Moreover, the respective shapes of each of the

peripheral sections 82_1-82_3 may vary. For example, as shown in Figure 7 showing the peripheral section 50 in its final form, the peripheral sections 82_1-82_3 may undergo a shaping procedure (e.g., cutting) before or after being affixed to the periphery 74 of the core 46. In some embodiments, the peripheral sections 82_1-82_3 may instead remain in the form shown in Figures 9 and 13 without undergoing any shaping procedure.

In one embodiment, the core 46 comprises a first material 78 having a first density and the peripheral section 50 comprises a second material 83 having a second density, the first density being less than the second density. For example, the first density may be in the range of 0.015 to 0.05 g/cm^3, 0.050 to 0.1 g/cm^3, 0.1 to 0.15 g/cm^3, or even 0.15 to 0.2 g/cm^3. The second density may be in the range of 0.1 to 0.15 g/cm^3, 0.15 to 0.2 g/cm^3, 0.2 to 0.25 g/cm^3, or even 0.25 to 0.3 g/cm^3. It is however understood that the materials of the core and peripheral section are selected such that the density of the core material is less than the density of the peripheral section material. For example, the density of the core material may be around 0.15 g/cm^3 and the density of the peripheral section material may be around 0.2 g/cm^3. In another example, the density of the core material may be around 0.05 g/cm^3 and the density of the peripheral section material may be around 0.15 g/cm^3.

The material 78 of the core 46 may comprise foam material. For example, the foam material may comprise ethylene vinyl acetate foam, polyethylene foam, ethylene polypropylene foam, polyurethane foam, expanded foam (e.g., expanded polypropylene (EPP), expanded polyethylene (EPE), expanded polystyrene (EPS), engineering thermoplastic polyurethane (ETPU)), polyvinyl chloride (PVC) foam, silicone foam, epoxy foam, polyamide foam (e.g., nylon foam), polyethylene terephthalate (PET) foam, or any combination thereof. In other embodiments, the foam material may be foam made of consolidated microspheres. For example, the microspheres may be thermoplastic microspheres which can be hollow, i.e., empty,

or alternatively can be filled with gas. In some embodiments, the microspheres may be glass microspheres.

In a variant, the core 46 may comprise a pocket (e.g., a bag) within which the material 78 may be placed). In one example of implementation, the material 78 may comprise non consolidated microspheres. For example, the material 78 may comprise microspheres placed in the pocket of the core 46 with a substance (e.g., oil) for linking the microspheres to one another. In some embodiments, the material 78 may comprise non expanded foam beads which may be placed in the pocket of the core 46. In other embodiments, the pocket of the 46 may be filled with air or any other suitable gas.

The material 83 of the peripheral section 50 may comprise felt. In other embodiments, the material 83 may comprise a mesh material, a fibrous material, a non-woven material, a laminate material (e.g., foam "sandwiched" between layers of textile) or any other suitable material.

The layer 48 is configured for covering the rear surface 72 of the core 46 and as such constitutes at least in part the inner facing surface 44 of the tongue 20.

As best shown in Figure 11, the layer 48 has a shape generally similar to that of the core 46 but is bigger than the core 46. That is, when the layer 48 is placed on top of the rear surface 72 of the core 46, a portion of the layer 48 exceeds the periphery 74 of the core 46 (i.e., the proximal portion 64 and the left and right portions 66, 68 of the core 46).

The layer 48 comprises a backing material 80 having a soft texture in order to provide a soft texture to the inner facing surface 44 of the tongue 20. The backing material 80 may comprise felt. However, in other embodiments, the backing material 80 may comprise any other type of soft-textured material, including fibrous material, non-

woven material, mesh material, a laminate material (e.g., foam "sandwiched" between layers of textile) or any other suitable material.

The peripheral section 50 may be configured in any other suitable way. For instance, although in this embodiment the peripheral section 50 is described as comprising three peripheral sections, i.e., peripheral sections 82_1-82_3, in other embodiments, the peripheral section may comprise any number of peripheral sections. For instance, in some embodiments, the peripheral section may be divided into two sections (e.g., left and right sections), four sections, or even more sections. Furthermore, in some embodiments, the peripheral section may simply extend along a majority of the periphery 74 at the left, proximal and right portions 66, 64, 68 of the core 46 and not necessarily an entirety of the periphery 74 at the left, proximal and right portions 66, 64, 68 of the core 46.

The overlay 54 is configured to at least partially cover the front surface 70 of the core 46 and, as such, at least partially defines the outer facing surface 42 of the tongue 20.

With additional reference to Figures 17 and 18, the overlay 54 comprises a plurality of overlay elements 84_1-84_4 which together constitute an esthetic appearance of the outer facing surface 42 of the tongue 20. As such, the overlay elements 84_1-84_4 may comprise a variety of decorative features. For instance, in this embodiment, the overlay elements 84_2, 84_3 comprise a textured surface 88 (e.g., ridges, grooves, etc.). The overlay elements 84_1-84_4 may comprise other decorative features or adornments. For example, the overlay element 84_1 may comprise a trademark or logo 90 stitched thereto or a section defining a different color. In some embodiments, the decorative features such as the logo may be printed or formed (e.g., embossed) on the overlay 54. The overlay elements 84_1-84_4 are affixed to one another (e.g., via stitching or gluing) in order to form the overlay 54 as shown in Figure 18. In this embodiment, in an assembled state of the overlay 54, i.e., when the overlay elements

84_1-84_4 have been affixed to one another, the overlay 54 defines an opening 94 for exposing the rigid insert 56.

The overlay elements 84_1-84_4 comprise an overlay material 86. In this embodiment, the overlay material 86 comprises polyurethane. In other embodiments, the overlay material 86 may comprise leather, denier nylon, denier cordura, ballistic nylon, mesh material, non woven material, or a film of thermoplastic material.

The overlay 54 may be configured in any other suitable way. For instance, although in this embodiment the overlay 54 is described as comprising four overlay elements, i.e., overlay elements 84_1-84_4, in other embodiments, the overlay may comprise any other number of overlay elements. For instance, in some embodiments, the overlay may be divided into two elements (e.g., left and right elements), three elements, five elements, or even more elements. In another embodiment, as shown in Figure 19, the overlay may be an overlay 154 that is a single component.

The rigid insert 56 is configured to define the rigid section of the tongue 20, i.e., a section with increased rigidity, such as to provide additional protection to the wearer's foot. In this embodiment, with additional reference to Figure 15, the rigid insert 56 has a shape generally matching that of the opening 94 defined by the overlay 54 such that, when the tongue 20 is assembled, a majority of the rigid insert 56 is visible through the opening 94. The rigid insert 56 defines a distal portion 98, a proximal portion 100 and left and right portions 102, 104. The rigid insert 56 may be arched or may follow a curvature between the left and right portions 102, 104 to better conform to the forefoot FF and the front ankle portion FAP. In addition, the rigid insert 56 may be arched or may followed a curvature as it extends from the proximal portion 100 to the distal portion 98 for following the profile of the forefoot FF and the front ankle portion FAP.

The rigid insert 56 comprises a rigid material 96. The rigid material 96 may comprise plastic, a carbon fiber laminate molded in epoxy, thermoplastic material such as

polyethylene, polyamide (nylon), or polycarbonate, thermosetting resin, or any other suitable material.

The rigid insert 56 covers a part of the front surface 70 of the core 46. More particularly, in this embodiment, the rigid insert 56 covers the front surface 70 at the middle portion 62 of the core 46.

The rigid insert 56 may be manufactured in a variety of ways. For instance, in this embodiment, the rigid insert 56 is made via a thermoforming process. The thermoforming process uses a mold which defines therein the final shape of the rigid insert 56 (e.g., a curved shape as describe above). Any underlying structure of the rigid insert 56 is placed into the mold prior to initiating the molding procedure. The epoxy is then placed into the mold and the mold is subsequently placed into an oven for heating thereof. Once heated for an appropriate amount of time and the epoxy has reached an appropriate temperature, the mold is placed in a press which presses the shape of the rigid insert 56 on the heated material (e.g., epoxy) by applying a negative mold thereon. In other embodiments, the insert 56 may be manufactured in any other suitable way.

A method for making the tongue 20 will be described below with additional reference to Figures 10 to 18, with the assumption that the core 46, the layer 48, the peripheral section 50, the overlay 54 and the rigid insert 56 are all in their finished state, i.e., they do not require further modifying. However, as discussed previously, the peripheral sections 82_1-82_3 or other tongue components may undergo a shaping procedure (e.g., cutting) before or after being assembled to other components of the tongue 20.

Starting with Figure 10, first the layer 48 is affixed to the rear surface 72 of the core 46. This may be achieved by gluing, stitching or laminating the layer 48 to the rear surface 72. For example, an adhesive 106 may be applied onto the rear surface 72 of the core 46 and the layer 48 is subsequently superimposed thereon. Any suitable

adhesive 106 may be used (e.g. adhesive film layers formed from ethylene vinyl acetate thermoplastic or polyurethane, glue, epoxy, etc.). As described above and shown in Figure 11, a peripheral portion of the layer 48 exceeds the periphery 74 of the core 46. In one embodiment, the portion of the layer 48 that exceeds the periphery 74 of the core 46 may be removed (e.g., cut away) such that a periphery of the layer 48 coincides with the periphery 74 of the core 46. In another embodiment, this exceeding portion of the layer 48 covers at least partially the rear surface 87 of the peripheral section 50 such that this exceeding portion covers any gap or space between the core 46 and the peripheral section 50 and offers an additional surface for affixing the layer 48 to the peripheral section 50, which may increase the structural integrity of the layer/core/peripheral section construction.

Next, with additional reference to Figure 12, a strip 108 is affixed to a peripheral portion 109 of the front surface 70 of the core 46. The peripheral portion 109 comprises respective peripheries of the front surface 70 of the proximal, left and right portions 64, 66, 68 of the core 46 and has a generally thin width (e.g., 10 mm). In this embodiment, the adhesive 106 is applied onto the peripheral portion 109 of the front surface 70 of the core 46 and the strip 108 is subsequently superimposed thereon. As indicated previously, any suitable adhesive 106 may be used (e.g. adhesive film layers formed from ethylene vinyl acetate thermoplastic or polyurethane, glue, epoxy, etc.). In other embodiments, the strip 108 may be stitched or laminated to the peripheral portion 109 of the front surface 70 of the core 46. The strip 108 may comprise felt or any other suitable material. Although the strip 108 has been described as a single strip, the strip may comprise a number of strips (e.g., two, three or more strips). In one embodiment, a peripheral portion of the strip may exceed the periphery 74 of the core 46 in order to cover at least partially the front surface 85 of the peripheral section 50 such that this exceeding portion covers any gap or space between the core 46 and peripheral section 50. In another embodiment, the strip may be omitted.

With additional reference to Figure 13, the peripheral section 50 is then affixed to the core 46. To this end, the adhesive 106 may be applied to the periphery 74 of the core 46 and the peripheral sections 82_1-82_3 may then be superimposed thereon adjacent respective peripheral, left and right portions 64, 66, 68 of the core 46. As indicated previously, any suitable adhesive 106 may be used (e.g. adhesive film layers formed from ethylene vinyl acetate thermoplastic or polyurethane, glue, epoxy, etc.).

Next, as best shown in Figure 14, the layer 48 is affixed to the peripheral section 50 such that the layer 48 covers at least partially the rear surface 87 of the peripheral section 50. More specifically, in this embodiment, the layer 48 is stitched to the peripheral section 50 through a stitching 112. In other embodiments, the layer 48 may be glued or laminated to the rear surface 87 of the peripheral section 50. The layer 48 may also be glued or laminated to the rear surface 87 of the peripheral section 50 and be stitched to the peripheral section 50. Moreover, as seen in Figures 14 and 16, stitching 114 may be used to affix the left and right peripheral sections 82_1, 82_2 to the proximal peripheral section 82_3. Also, as seen in Figure 16, the stitching 112 may pass through the peripheral strip 108 to increase rigidity.

Next, with additional reference to Figure 16, the rigid insert 56 is affixed (e.g. glued or laminated) to the outer facing surface 70 of the core 46 at the middle portion 62 thereof.

Figure 17 shows overlay elements of the overlay 54 before being affixed to one another.

Figures 7 and 18 show the overlay 54 in its assembled state i.e., with the overlay elements 84_1-84_4 being affixed to one another via stitching.

As best seen in Figures 4 and 5, the overlay 54 is superimposed onto the core 46 and the rigid insert 56 such that the opening 94 of the overlay 54 is concentrically positioned relative to the rigid insert 56. The overlay 54 is affixed to portions of the

core 46 and portions of the peripheral section 50 such that the overlay 54 at least partially covers the front surface 70 of the core 46 and front surface 85 of the peripheral section 50. This may be achieved by stitching, gluing or laminating the overlay 54 to the core 46 and peripheral section 50.

The core 46 may be entirely covered on its front and rear surfaces 70, 72. More specifically, on its front surface 70, the core 46 may be covered by the overlay 54 and the rigid insert 56, while on its rear surface 72, the core 46 may be covered by the layer 48. Moreover, as described above, the periphery 74 of the core 46 may also be entirely covered by the peripheral section 50.

The construction of the tongue 20 allows maintaining the look and feeling of a traditional felt tongue while at the same time allowing a reduction in weight relative to a traditional felt tongue. For example, for a North American size 8 skate, a traditional felt tongue may weigh about 105 grams to about 110 grams. On the other hand, for a North American size 8 skate, a tongue according to the present invention may weigh about 75 grams to about 80 grams if all the other components to the exception of the core remain the same and about 50 grams to about 60 grams if the weight of the other components is also reduced. This translates to about 42% to about 55% reduction in weight from a traditional felt tongue to the tongue of the present invention (for a North American size 8 skate).

Any feature of any embodiment discussed herein may be combined with any feature of any other embodiment discussed herein in some examples of implementation.

Certain additional elements that may be needed for operation of certain embodiments have not been described or illustrated as they are assumed to be within the purview of those of ordinary skill in the art. Moreover, certain embodiments may be free of, may lack and/or may function without any element that is not specifically disclosed herein.

Although various embodiments and examples have been presented, this was for the purpose of describing, but not limiting, the invention. Various modifications and enhancements will become apparent to those of ordinary skill in the art and are within the scope of the invention, which is defined by the appended claims.

CLAIMS

1. A tongue for a skate boot configured for enclosing a human foot, the human foot having a forefoot and a front ankle portion, the tongue comprising:

- a core for covering at least partially the forefoot and the front ankle portion, the core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot, the core comprising distal, middle and proximal portions and left and right portions, the left, proximal and right portions defining a periphery of the core, the core comprising a first material having a first density; and
- a peripheral section affixed to at least one of the left, proximal and right portions of the core and extending along at least part of the periphery, at least a majority of each of the front and rear surfaces of the core not being covered by the peripheral section, the peripheral section comprising a second material having a second density, the first density being less than the second density.

2. The tongue of claim 1, wherein the peripheral section comprises a proximal peripheral section affixed to the proximal portion of the core and extending along a majority of the periphery at the proximal portion of the core.

3. The tongue of claim 1, wherein the peripheral section comprises a proximal peripheral section affixed to the proximal portion of the core and extending along a majority of the periphery at the proximal portion of the core and left and right peripheral sections affixed to the left and right portions of the core and extending along a majority of the periphery at the left and right portions of the core.

4. The tongue of claim 1, wherein the peripheral section extends along a majority of the periphery at the left, proximal and right portions of the core.

5. The tongue of any one of claims 1 to 4, wherein the first material comprises foam and the second material comprises felt.

6. The tongue of claim 5, wherein the foam comprises ethylene vinyl acetate foam, polyethylene foam, ethylene polypropylene foam, polyurethane foam, expanded foam, expanded polystyrene, engineering thermoplastic polyurethane, polyvinyl chloride foam, silicone foam, epoxy foam, polyamide foam or polyethylene terephthalate foam.

7. The tongue of any one of claims 1 to 6, further comprising a layer covering the rear surface of the core.

8. The tongue of claim 7, wherein the layer comprises felt.

9. The tongue of any one of claims 7 and 8, wherein the peripheral section comprises a front surface and a rear surface and the layer covers at least partially the rear surface of the peripheral section.

10. The tongue of any one of claims 7 to 9, wherein the layer is glued, stitched or laminated to the core.

11. The tongue of any one of claims 7 to 10, wherein the layer is glued, stitched or laminated to the peripheral section.

12. The tongue of any one of claims 1 to 8, wherein the tongue comprises an overlay at least partially covering the front surface of the core.

13. The tongue of claim 12, wherein the overlay at least partially covers a front surface of the peripheral section.

14. The tongue of claim 13, wherein the tongue comprises a rigid insert covering the front surface of the core at the middle portion.

15. The tongue of any one of claims 1 to 14, wherein, for a North American size 8 skate, the tongue weighs about 50 grams to about 60 grams.

16. A method of making a tongue for a skate boot configured for enclosing a human foot, the human foot having a forefoot and a front ankle portion, the method comprising:

- providing a core made of a first material having a first density for covering at least partially the forefoot and the front ankle portion, the core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured to face an interior of the skate boot, the core comprising distal, middle and proximal portions, and left and right portions, the left, proximal and right portions defining a periphery of the core;
- providing a peripheral section made of a second material having a second density, the first density being less than the second density;
- affixing the peripheral section to at least one of the left, proximal and right portions of the core such that the peripheral section extends along at least part of the periphery and such that at least a majority of each of the front and rear surfaces of the core is not covered by the peripheral section;
- providing a layer; and
- covering the rear surface of the core with the layer.

17. The method of claim 16, wherein the first material comprises foam, the second material comprises felt, and the layer comprises felt.

18. The method of claim 16 or 17, wherein said covering comprises gluing, stitching or laminating the layer to the core.

19. The method of claim 18, wherein the peripheral section comprises front and rear surfaces and the method comprises at least partially covering the rear surface of the peripheral section with the layer.

20. The method of claim 19, wherein the layer is glued, stitched or laminated to the peripheral section.

21. The method of any one of claims 16 to 20, wherein the peripheral section is affixed to the left, proximal and right portions of the core such that the peripheral section extends along a majority of the periphery.

22. The method of any one of claims 16 to 20, wherein the peripheral section comprises a proximal peripheral section affixed to the proximal portion of the core such that the proximal peripheral section extends along a majority of the periphery at the proximal portion of the core and left and right peripheral sections affixed to the left and right portions of the core such that the left and right peripheral sections extend along a majority of the periphery at the left and right portions of the core.

23. A tongue for a skate boot, the tongue comprising:

- a core comprising a front surface, a rear surface opposite to the front surface and configured for facing towards an interior of the skate boot, and a peripheral surface between the front and rear surfaces, the core comprising a first material having a first density; and
- a peripheral section affixed to the core and extending along at least part of the peripheral surface of the core, at least a majority of each of the front and rear surfaces of the core not being covered by the peripheral section, the peripheral section comprising a second material having a second density greater than the first density.

24. The tongue of claim 23, wherein the core comprises left, proximal and right portions defining the peripheral surface of the core, the peripheral section

comprising a proximal peripheral section affixed to the proximal portion of the core and extending along a majority of the peripheral surface at the proximal portion of the core.

25. The tongue of claim 24, wherein the peripheral section comprises left and right peripheral sections affixed to the left and right portions of the core and extending along a majority of the peripheral surface at the left and right portions of the core.

26. The tongue of any one of claims 23 to 25, wherein the core comprises foam and the peripheral section comprises felt.

27. The tongue of any of claims 23 to 26, wherein the tongue comprises a layer covering the rear surface of the core.

28. The tongue of any one of claims 23 to 27, wherein, for a North American size 8 skate, the tongue weighs about 50 grams to 60 grams.

29. A tongue for a skate boot, the tongue comprising:

- a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the boot, the core comprising distal, middle and proximal portions and left and right portions, the left, proximal and right portions defining a periphery of the core, the core comprising a first material having a first density; and
- a peripheral section extending along at least part of the periphery of the core, at least a majority of each of the front and rear surfaces of the core not being covered by the peripheral section, the peripheral section comprising a second material having a second density, the first density being less than the second density.

30. The tongue of claim 29, wherein the peripheral section extends along a majority of the periphery at the left, proximal and right portions of the core.

31. The tongue of any one of claims 29 and 30, wherein the first material comprises foam and the second material comprises felt.

32. The tongue of any one of claims 29 to 31, comprising a layer covering the rear surface of the core.

33. The tongue of any one of claims 29 to 32, comprising a rigid overlay covering the front surface of the core at the middle portion of the core.

34. The tongue of any one of claims 29 to 33, wherein, for a North American size 8 skate, the tongue weighs about 50 grams to about 60 grams.

35. A tongue for a skate boot, the tongue comprising:

- a core comprising distal, middle and proximal portions and left and right portions, the left, proximal and right portions defining a periphery of the core, the core comprising a first material having a first density; and
- a band extending along at least part of the periphery of the core, the band having a dimension measured in a widthwise direction of the core that is less than a dimension of the core measured in the widthwise direction of the core, the band comprising a second material having a second density, the first density being less than the second density.

36. The tongue of claim 35, wherein the band extends along a majority of the periphery at the left, proximal and right portions of the core.

37. The tongue of any one of claims 35 and 36, wherein the first material comprises foam and the second material comprises felt.

38. The tongue of any one of claims 35 to 37, wherein the core comprises a front surface and a rear surface opposite to the front surface, the rear surface being

configured for facing towards an interior of the skate boot, the tongue comprising a layer covering the rear surface of the core.

39. The tongue of any one of claims 35 to 37, wherein the core comprises a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the boot, the tongue comprising a rigid insert covering the front surface of the core at the middle portion of the core.

40. The tongue of any one of claims 35 to 39, wherein, for a North American size 8 skate, the tongue weighs about 50 grams to about 60 grams.

41. A tongue for a skate boot, the tongue comprising:

- a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot; and
- an overlay at least partially covering the front surface of the core, the overlay comprising an opening for insertion of an insert to change a rigidity of the tongue.

42. The tongue of claim 41, wherein the opening of the overlay is disposed at a middle portion of the tongue.

43. The tongue of claim 41 or 42, wherein the opening is configured for at least partially exposing the insert.

44. The tongue of claim 43, wherein the opening is configured for exposing a majority of the insert.

45. The tongue of any one of claims 41 to 44, wherein the insert comprises an insert material that is more rigid than a material of the core.

46. The tongue of claim 45, wherein the insert material comprises a plastic, a carbon fiber laminate, or a thermosetting resin.

47. The tongue of claim 45, wherein the insert material comprises a thermoplastic material.

48. The tongue of claim 47, wherein the thermoplastic material comprises polyethylene, polyamide or polycarbonate.

49. The tongue of any one of claims 41 to 48, wherein the insert is curved from a left portion of the insert to a right portion of the insert.

50. The tongue of any one of claims 41 to 49, wherein the insert is curved from a proximal portion of the insert to a distal portion of the insert.

51. A skate boot for enclosing a foot, the skate boot comprising:

- an outer shell comprising a medial side portion and a lateral side portion for respectively facing a medial side and a lateral side of the foot; and
- a tongue disposed between the medial and lateral side portions of the outer shell, the tongue comprising:
    - a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot; and
    - an overlay at least partially covering the front surface of the core, the overlay comprising an opening for insertion of an insert to change a rigidity of the tongue.

52. In combination:

- a skate boot for enclosing a foot comprising:
    - an outer shell comprising a medial side portion and a lateral side portion for respectively facing a medial side and a lateral side of the foot;
    - a tongue disposed between the medial and lateral side portions of the outer shell, the tongue comprising:

- a core comprising a front surface and a rear surface opposite to the front surface, the rear surface being configured for facing towards an interior of the skate boot; and
- an overlay at least partially covering the front surface of the core, the overlay comprising an opening;

- an insert for insertion in the opening of the overlay to change a rigidity of the tongue.

53. The combination of claim 52, wherein a majority of the insert is exposed through the opening of the overlay.

54. The combination of claim 52 or 53, wherein the insert has a shape generally matching a shape of the opening.

55. The combination of any one of claims 52 to 54, wherein a material of the insert is more rigid than a material of the core.

56. The combination of any one of claims 52 to 55, wherein the insert covers the front surface of the core at a middle portion of the core.

57. The combination of any one of claims 52 to 56, wherein the insert is made via a thermoforming process.

58. A tongue for a skate boot, the tongue comprising:

- a front side and a rear side opposite to the front side, the rear side being configured to face an interior of the skate boot; and
- an opening configured for receiving an insert to define a rigidity of the tongue.

59. The tongue of claim 58, wherein the opening is configured such that the insert is at least partially exposed when the insert is received in the opening.

60. The tongue of claim 59, wherein the insert is exposed at the front side of the tongue.

61. The tongue of any one of claims 58 to 60, comprising an overlay disposed on the front side of the tongue.

62. The tongue of claim 61, wherein the overlay defines the opening of the tongue.

63. A tongue for a skate boot, the tongue comprising:

- a front side and a rear side opposite to the front side, the rear side being configured to face an interior of the skate boot;
- an opening at the front side of the tongue; and
- an insert for defining a rigidity of the tongue and received in the opening of the tongue.

64. The tongue of claim 63, wherein the insert is at least partially exposed.

65. The tongue of claim 64, wherein at least majority of the insert is exposed.

66. The tongue of any one of claims 63 to 65, comprising an overlay disposed on the front side of the tongue.

67. The tongue of claim 66, wherein the overlay defines the opening of the tongue.

68. The tongue of any one of claims 63 to 67, wherein the opening is disposed at a middle portion of the tongue.

69. The tongue of any one of claims 63 to 68, wherein a material of the insert comprises a plastic, a carbon fiber laminate, or a thermosetting resin.

70. The tongue of claim 69, wherein the material of the insert comprises a thermoplastic material.

71. The tongue of claim 70, wherein the thermoplastic material comprises polyethylene, polyamide or polycarbonate.

72. The tongue of any one of claims 63 to 71, wherein the insert is curved from a left portion of the insert to a right portion of the insert.

73. The tongue of any one of claims 63 to 72, wherein the insert is curved from a proximal portion of the insert to a distal portion of the insert.

74. A skate boot comprising the tongue of any one of claims 63 to 73.

75. In combination:

- a skate boot for enclosing a foot comprising:
    - an outer shell comprising a medial side portion and a lateral side portion for respectively facing a medial side and a lateral side of the foot;
    - a tongue disposed between the medial and lateral side portions of the outer shell, the tongue comprising:
        - a front side and a rear side opposite to the front side, the rear side being configured to face an interior of the skate boot; and
        - an opening;
- an insert for insertion in the opening the tongue to define a rigidity of the tongue.

76. The combination of claim 75, wherein the insert is at least partially exposed when the insert is received in the opening of the tongue.

77. The combination of claim 76, wherein at least majority of the insert is exposed when the insert is received in the opening of the tongue.

78. The combination of claim 76 or 77, wherein the insert is exposed at the front side of the tongue when it is received in the opening of the tongue.

79. The combination of any one of claims 75 to 78, wherein the opening is disposed at the front side of the tongue.

80. The combination of any one of claims 75 to 79, wherein the tongue comprises an overlay disposed on the front side of the tongue.

81. The combination of claim 80, wherein the overlay defines the opening of the tongue.

82. The combination of any one of claims 75 to 81, wherein the opening is disposed at a middle portion of the tongue.

83. The combination of any one of claims 75 to 82, wherein a material of the insert comprises a plastic, a carbon fiber laminate, or a thermosetting resin.

84. The combination of claim 83, wherein the material of the insert comprises a thermoplastic material.

85. The combination of claim 84, wherein the thermoplastic material comprises polyethylene, polyamide or polycarbonate.

86. The combination of any one of claims 75 to 85, wherein the insert is curved from a left portion of the insert to a right portion of the insert.

87. The combination of any one of claims 75 to 86, wherein the insert is curved from a proximal portion of the insert to a distal portion of the insert.

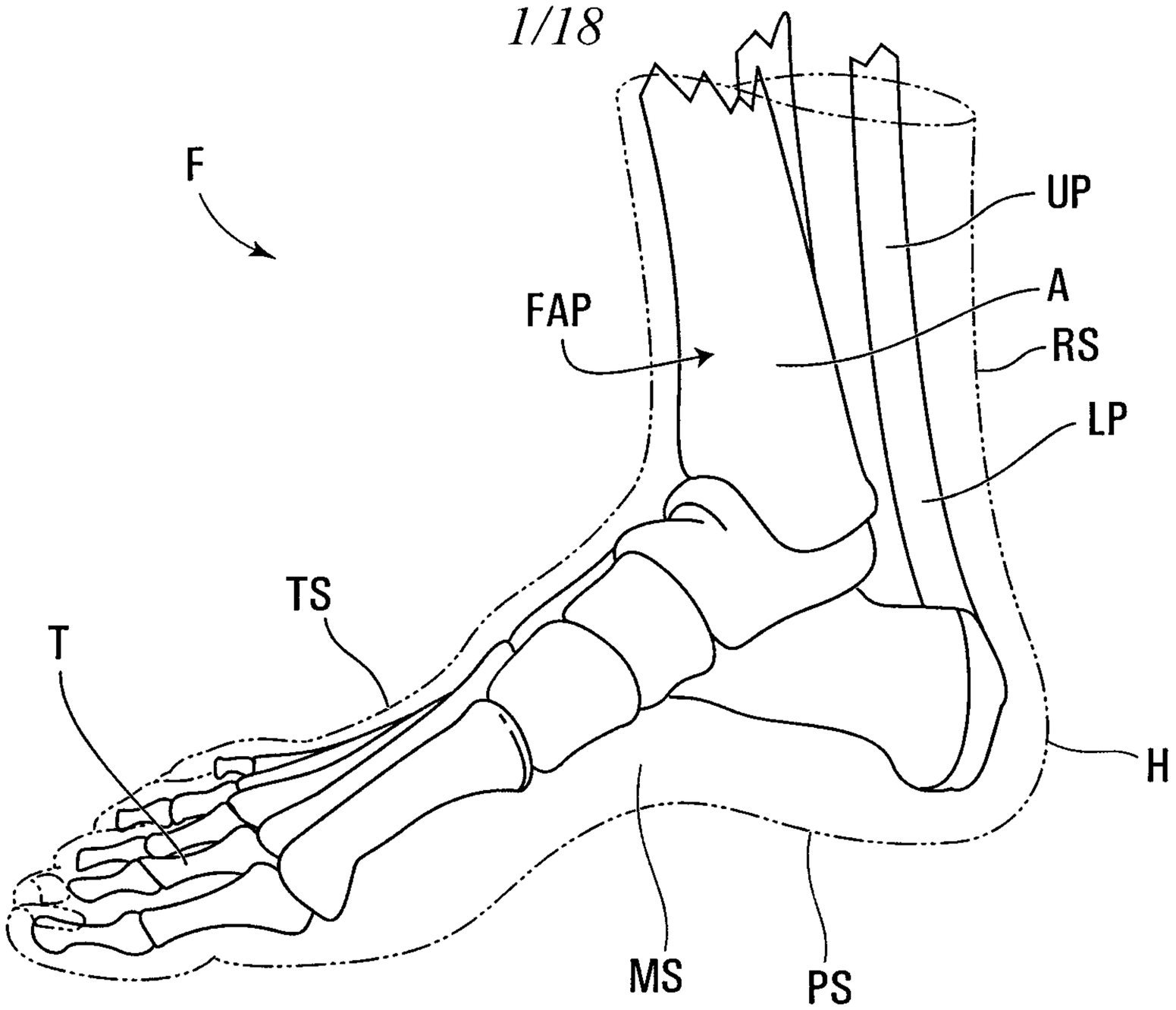


FIG. 1

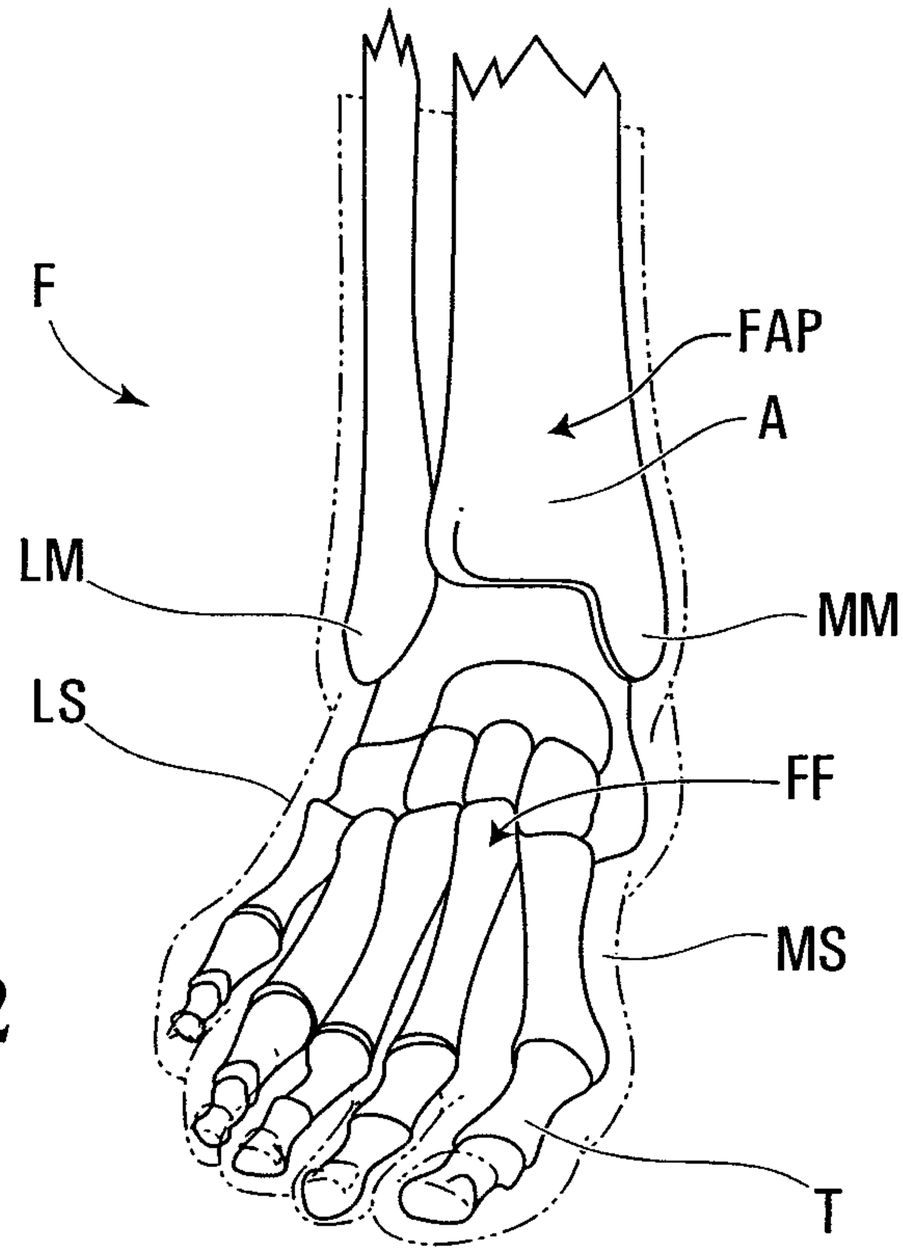


FIG. 2

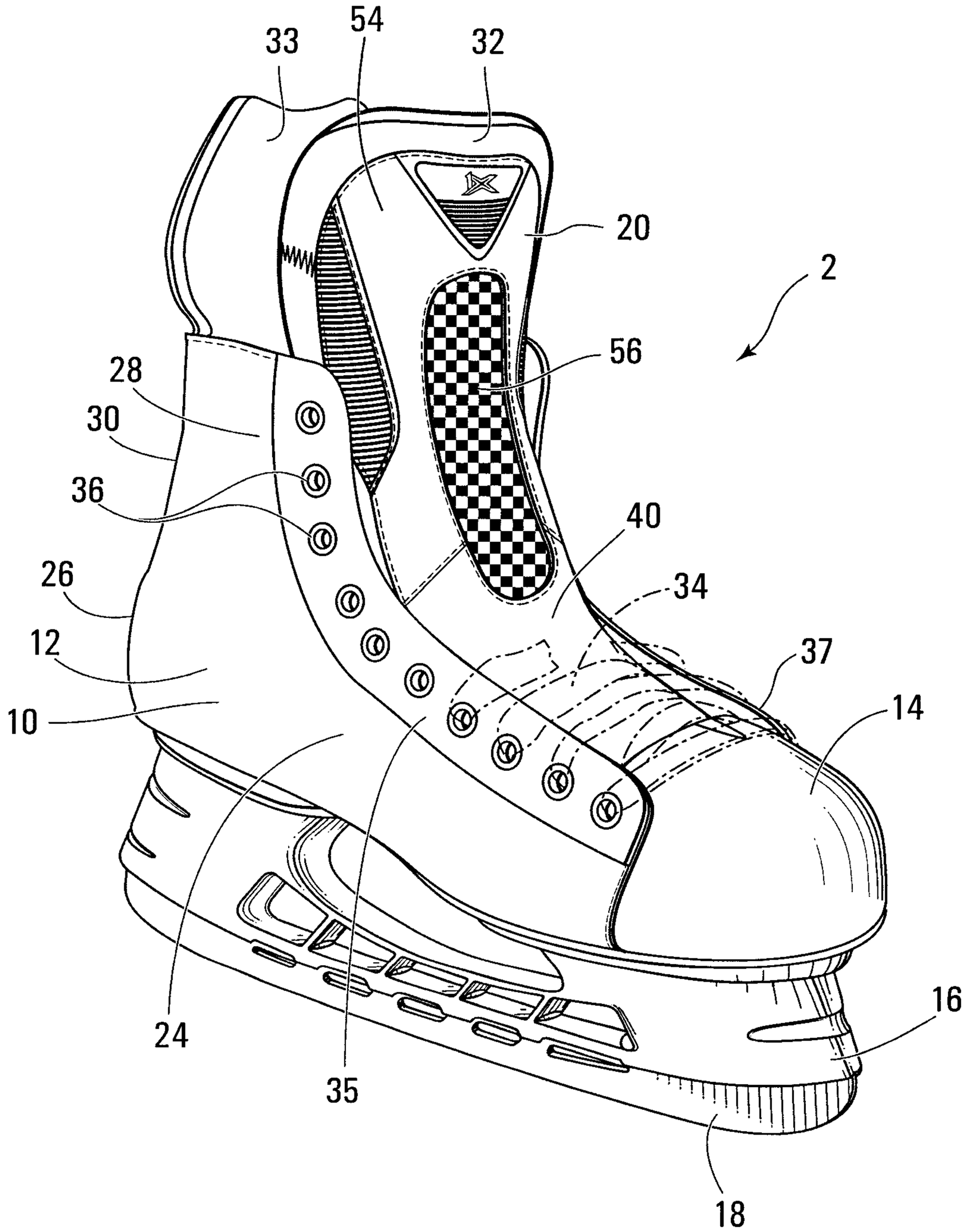


FIG. 3

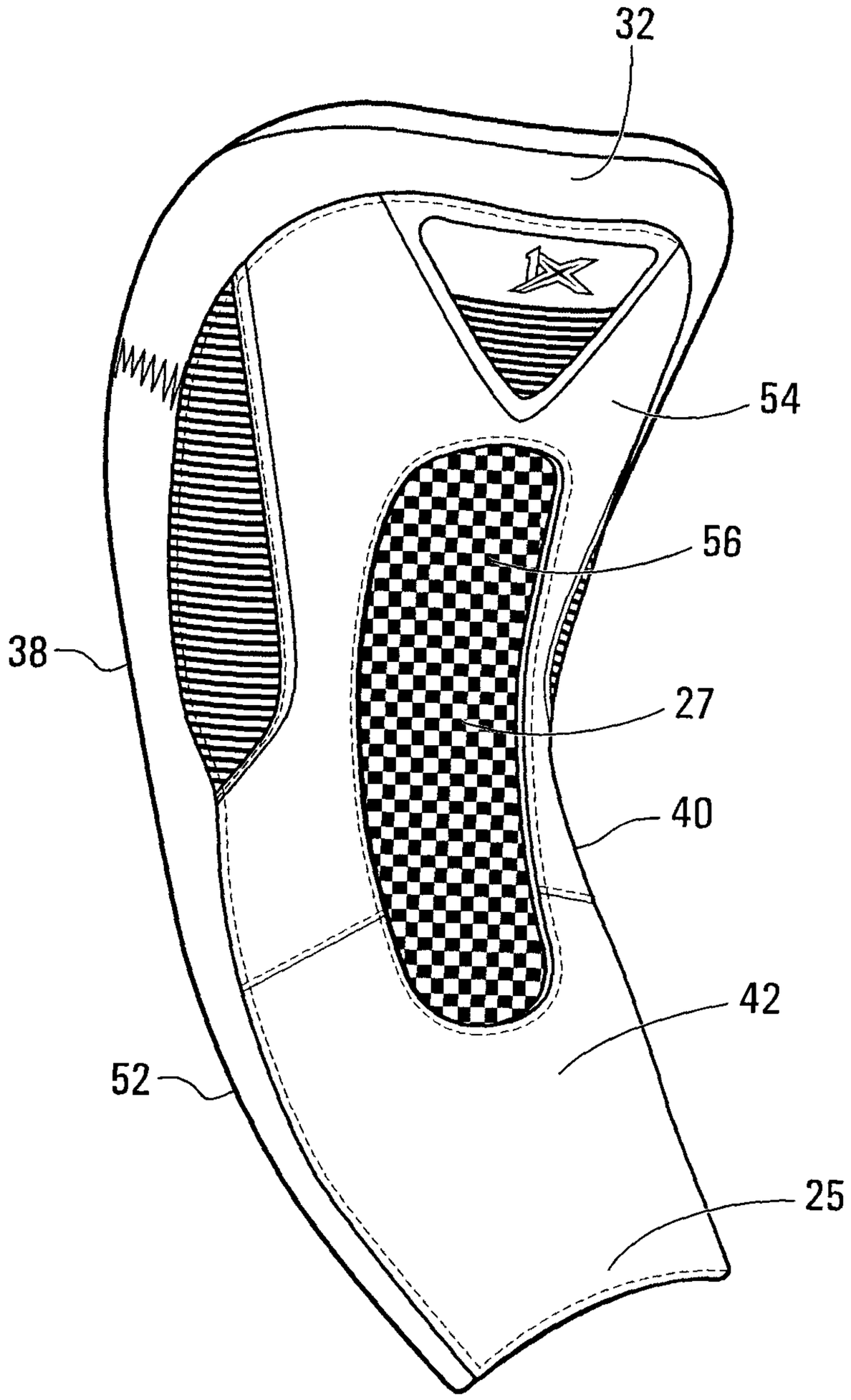


FIG. 4

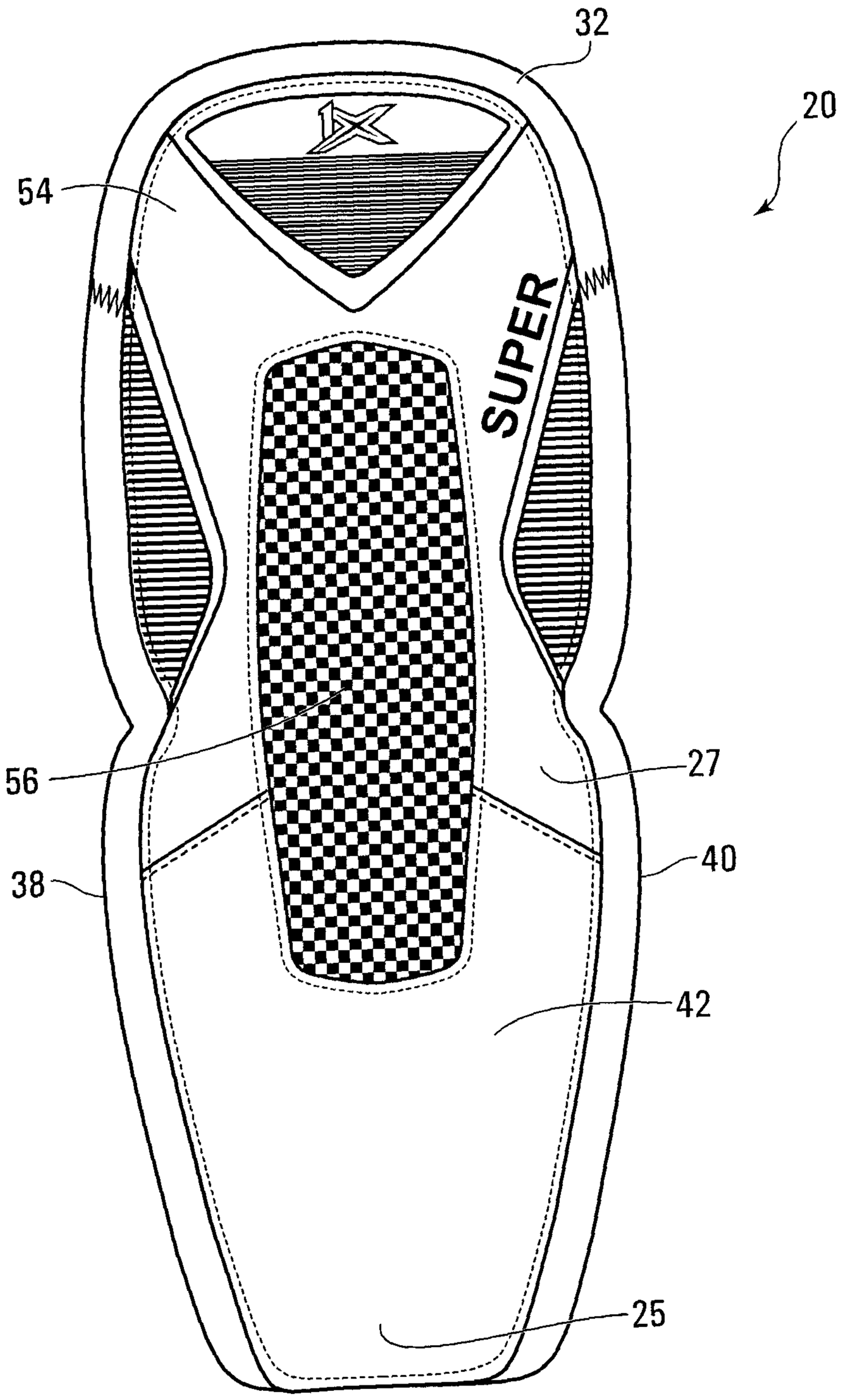


FIG. 5

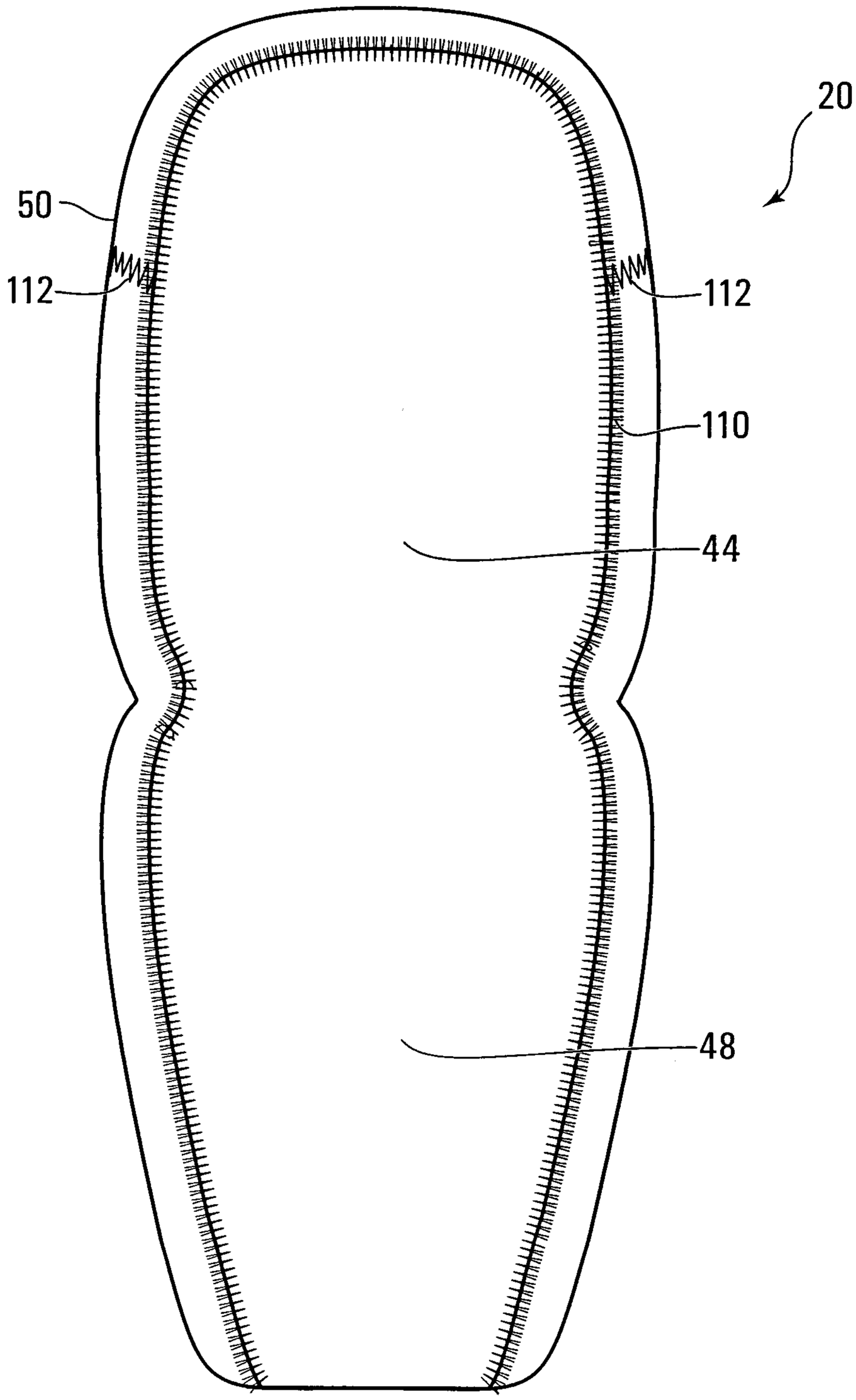


FIG. 6

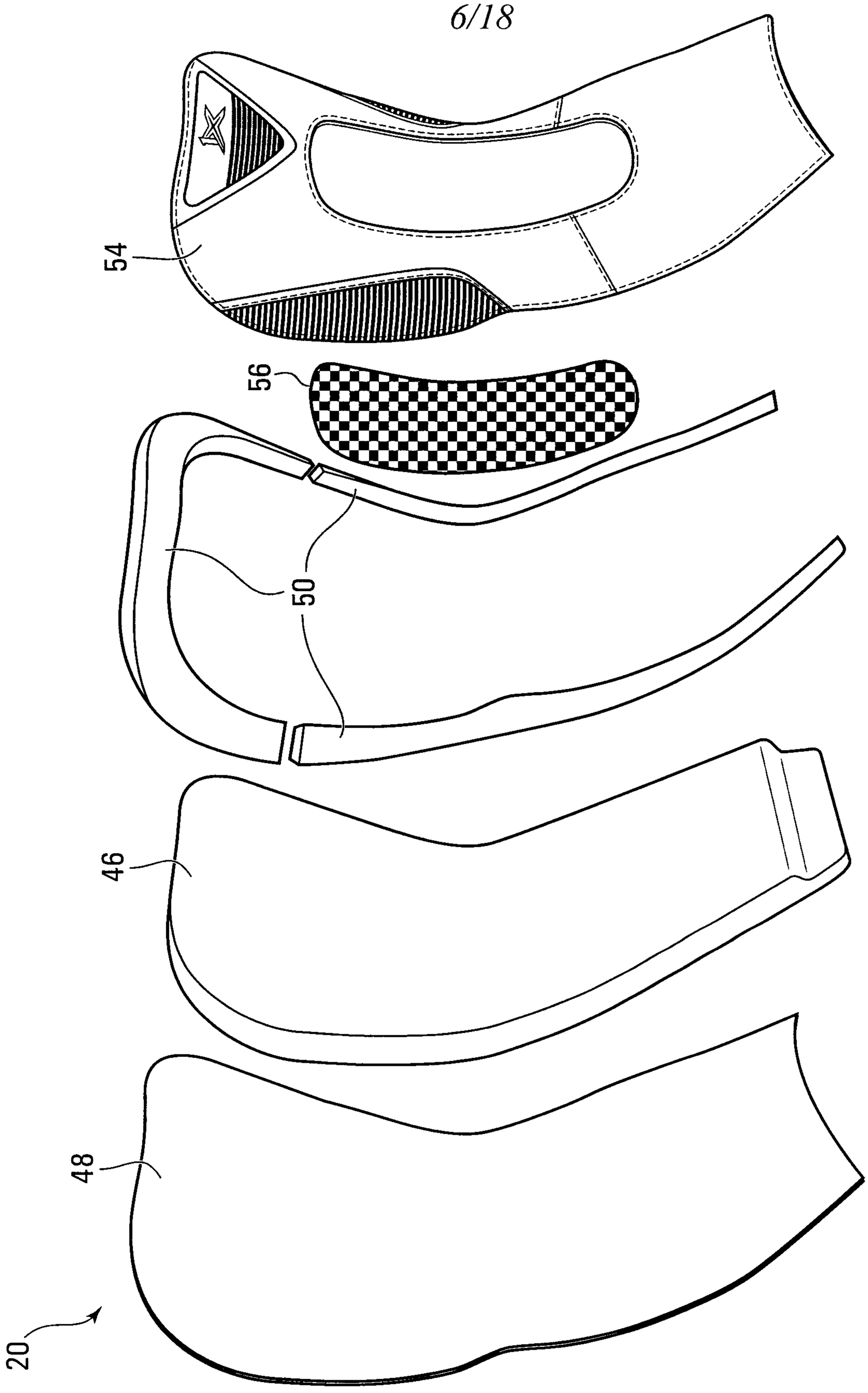


FIG. 7

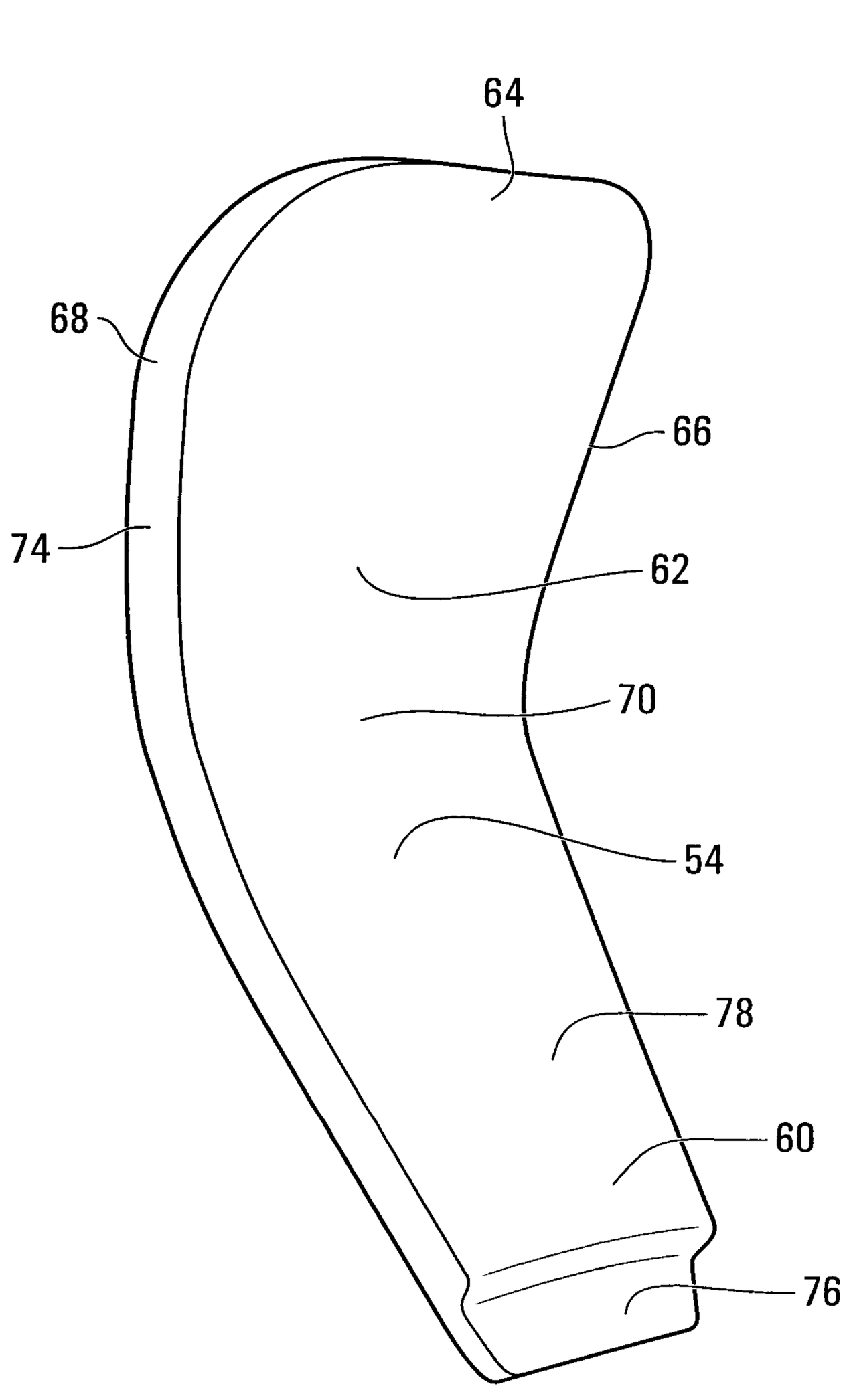


FIG. 8

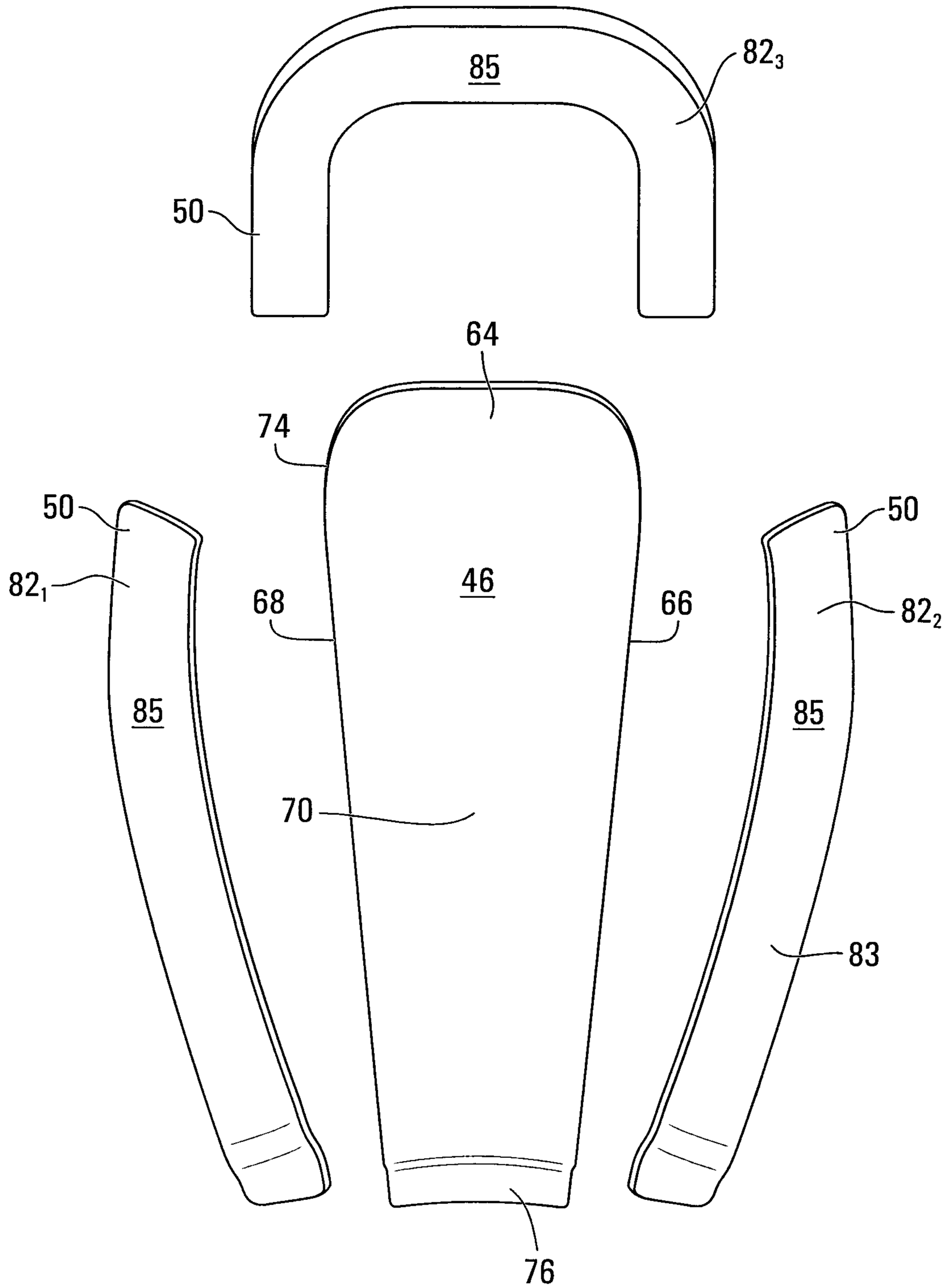


FIG. 9

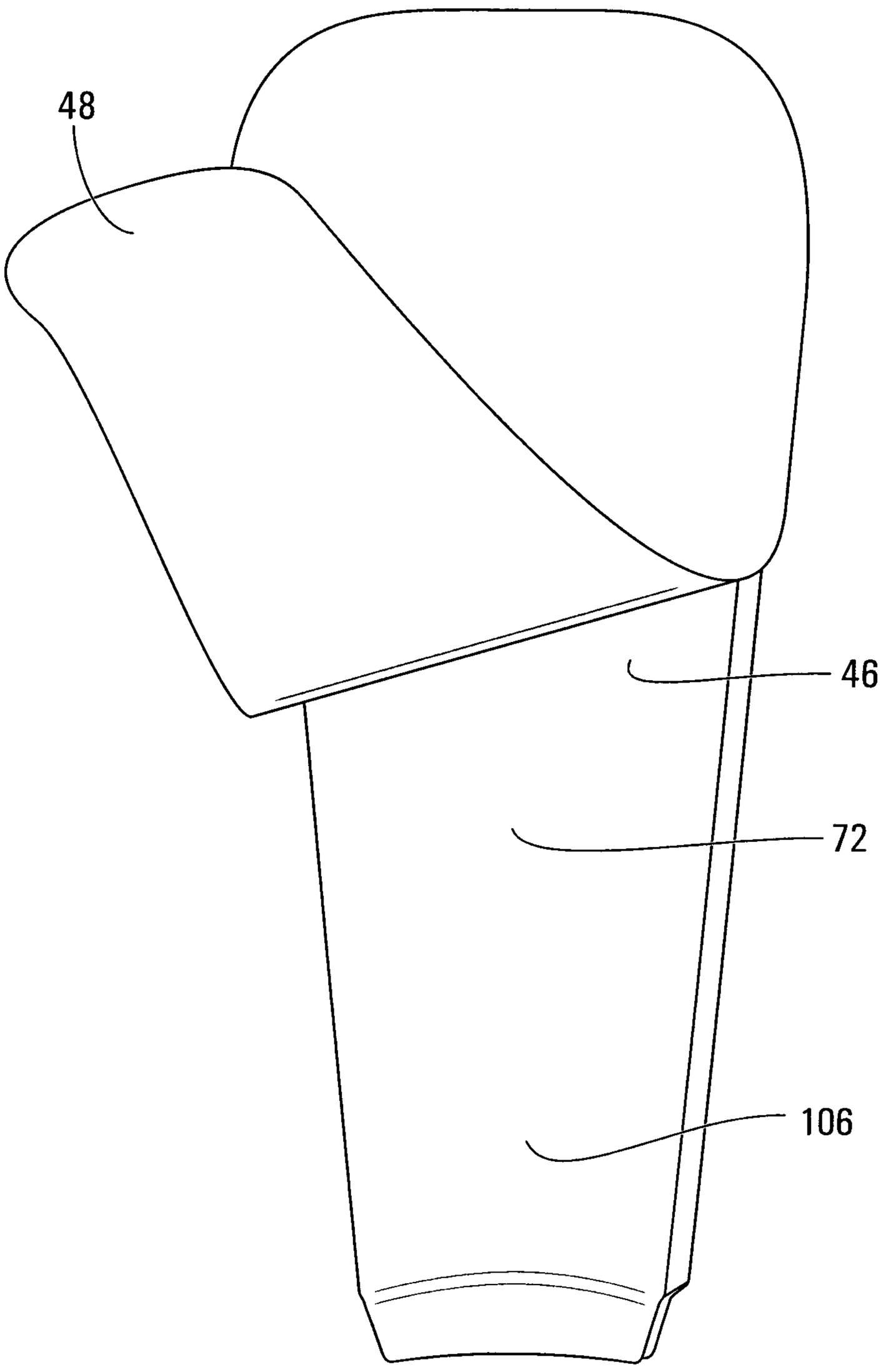


FIG. 10

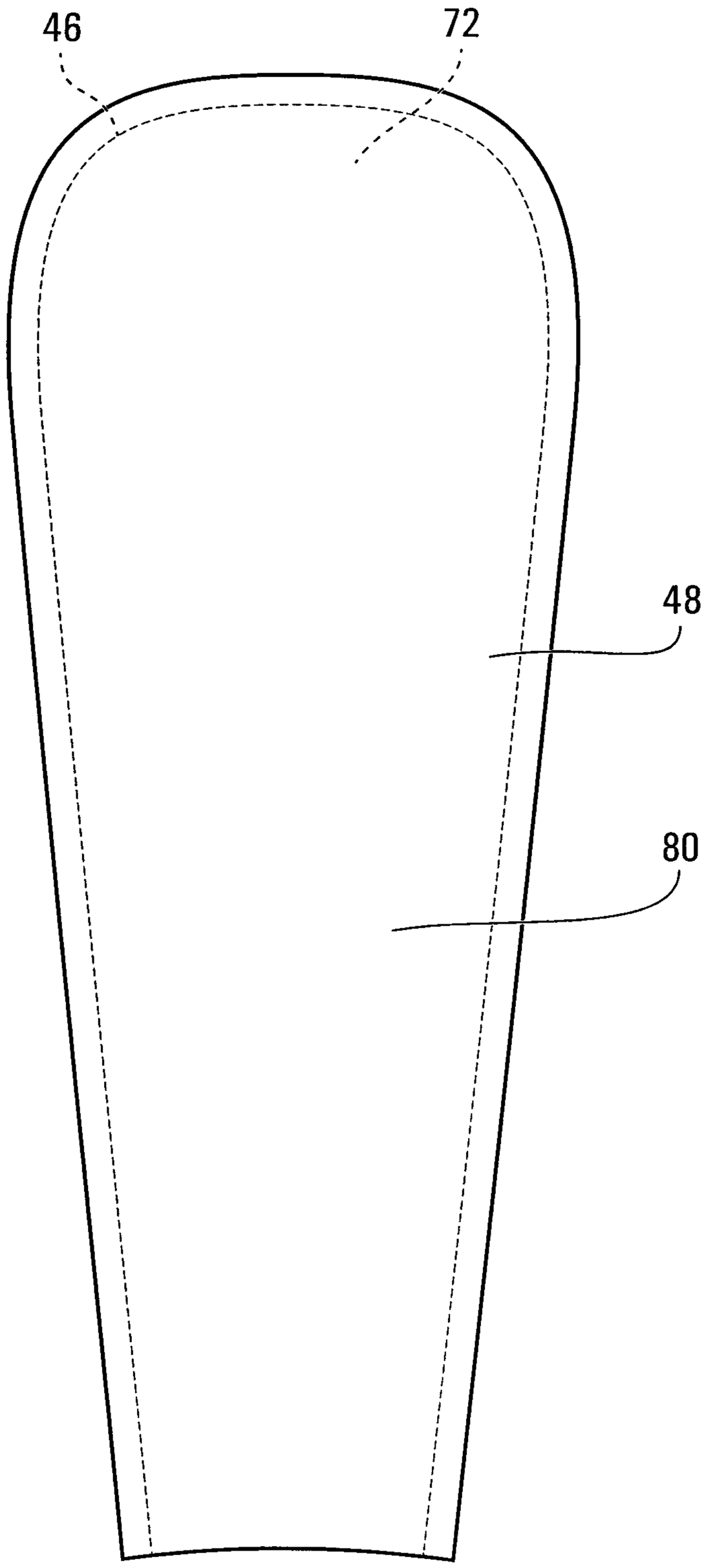


FIG. 11

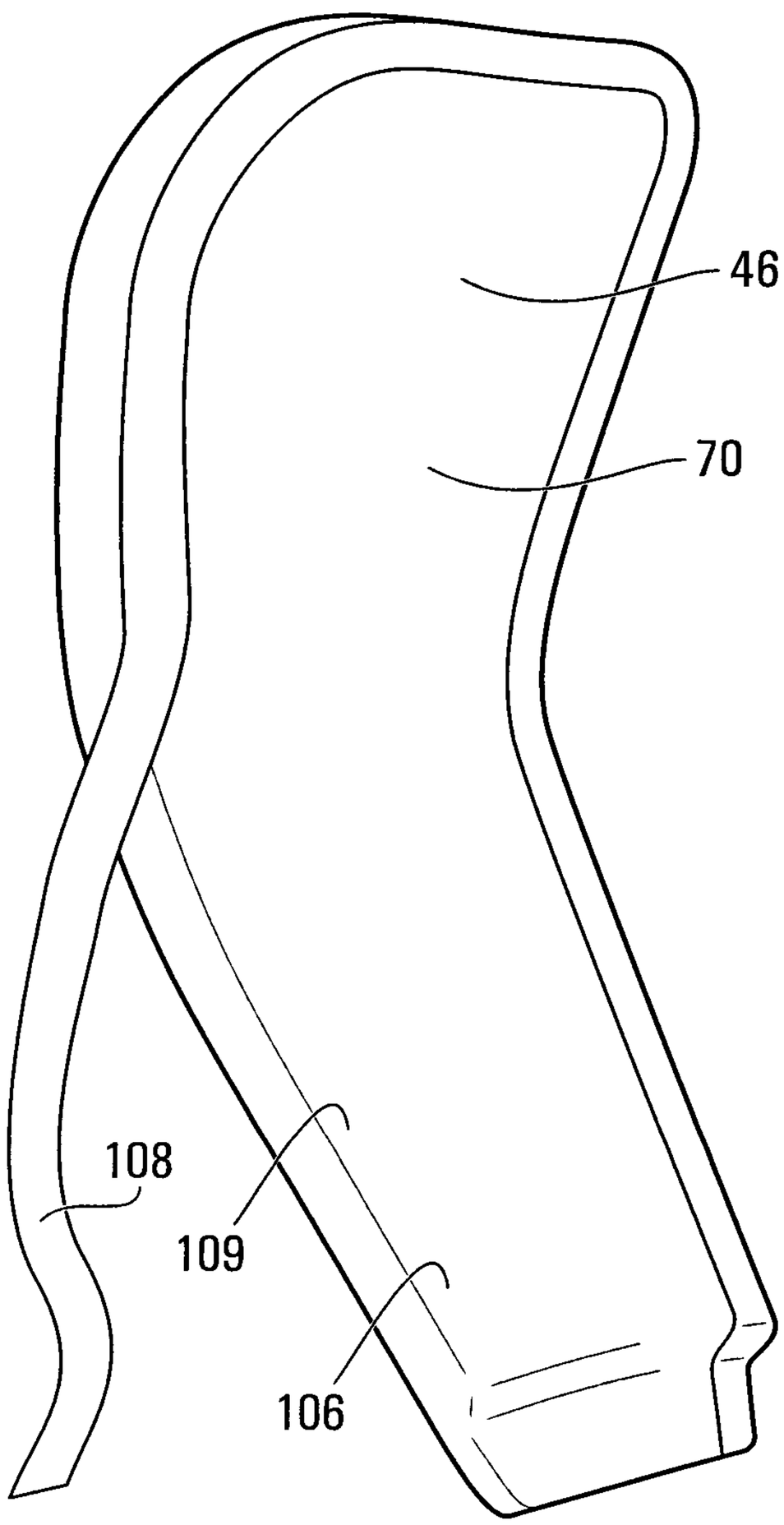


FIG. 12

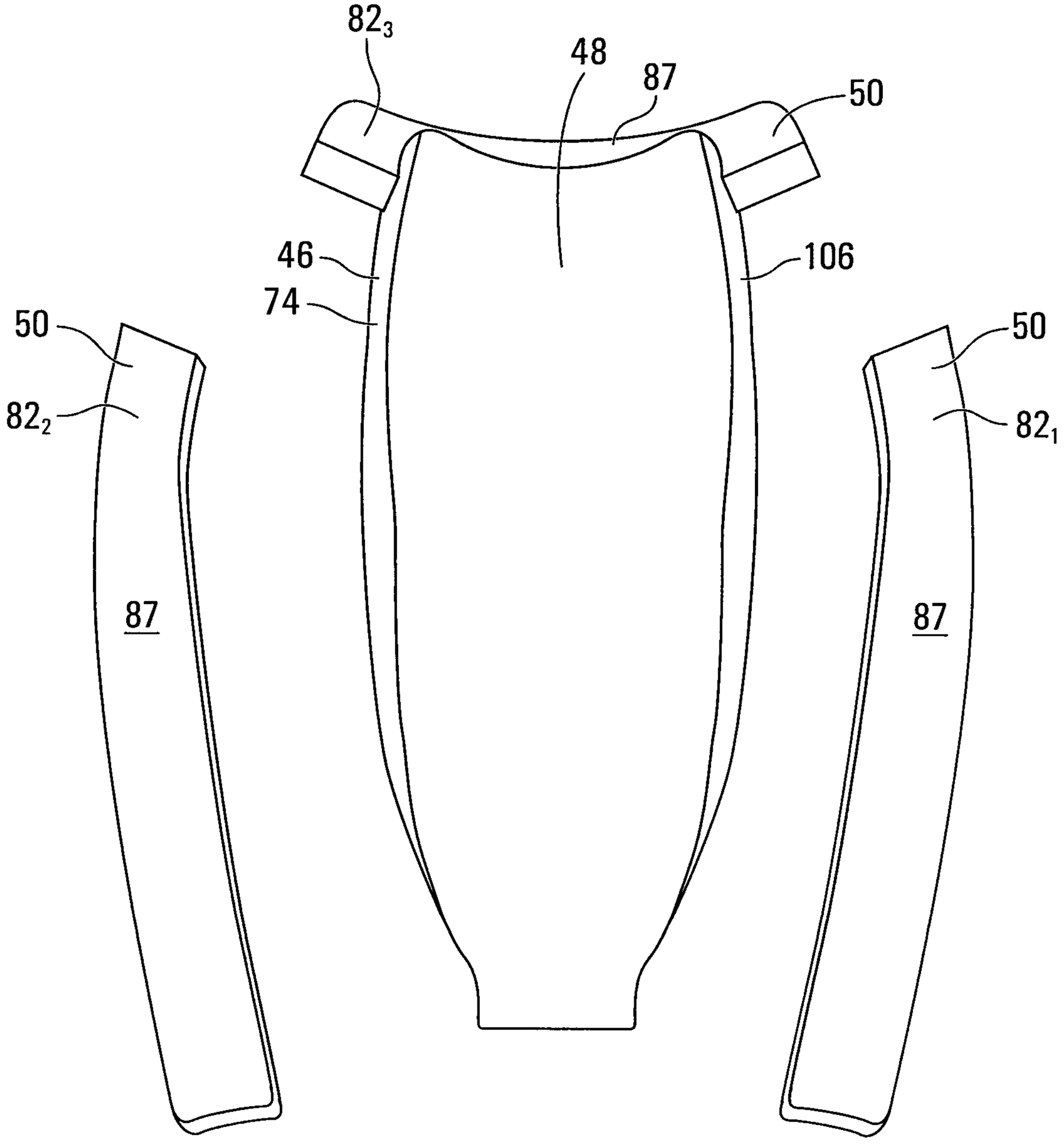


FIG. 13

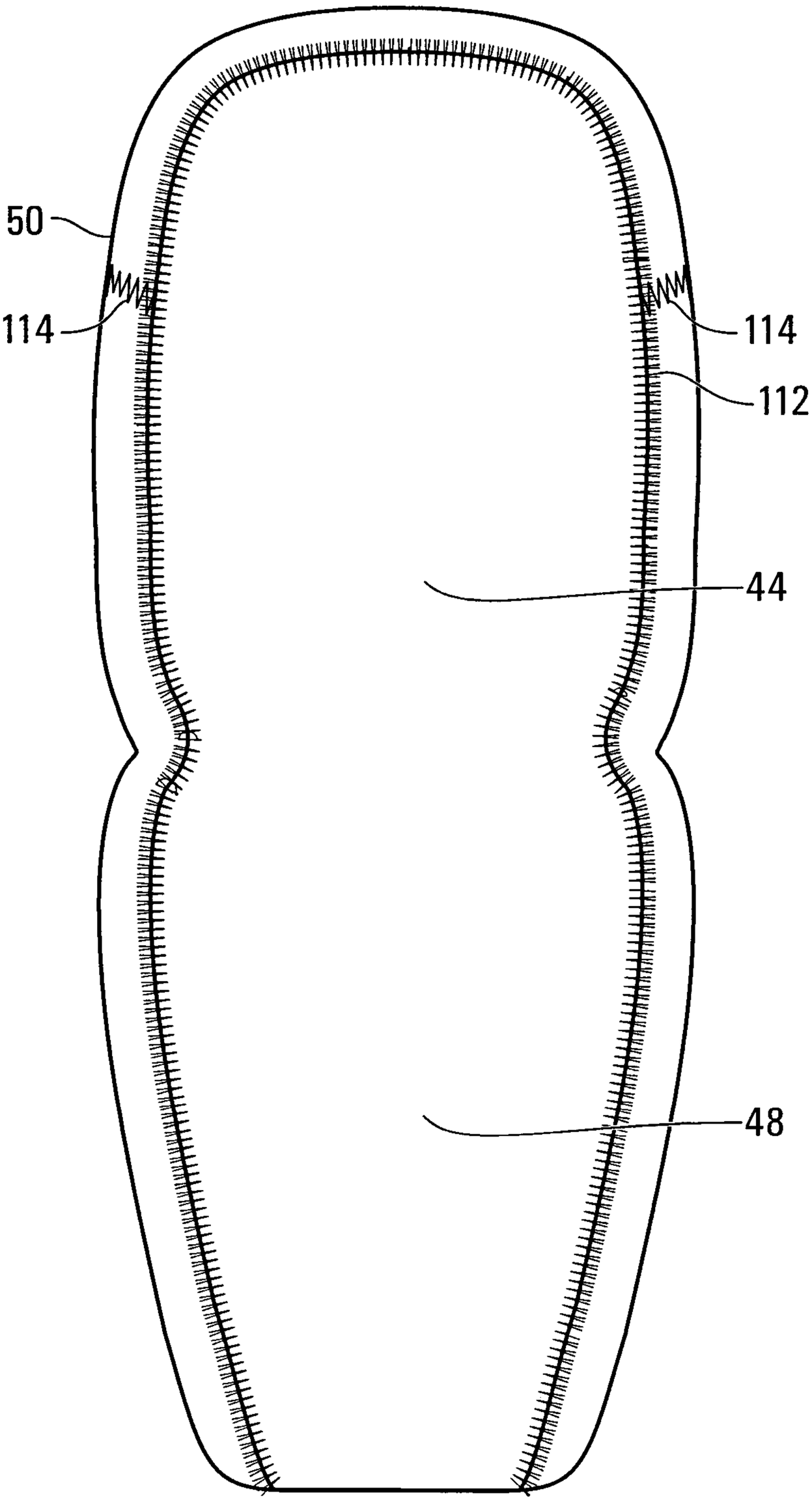


FIG. 14

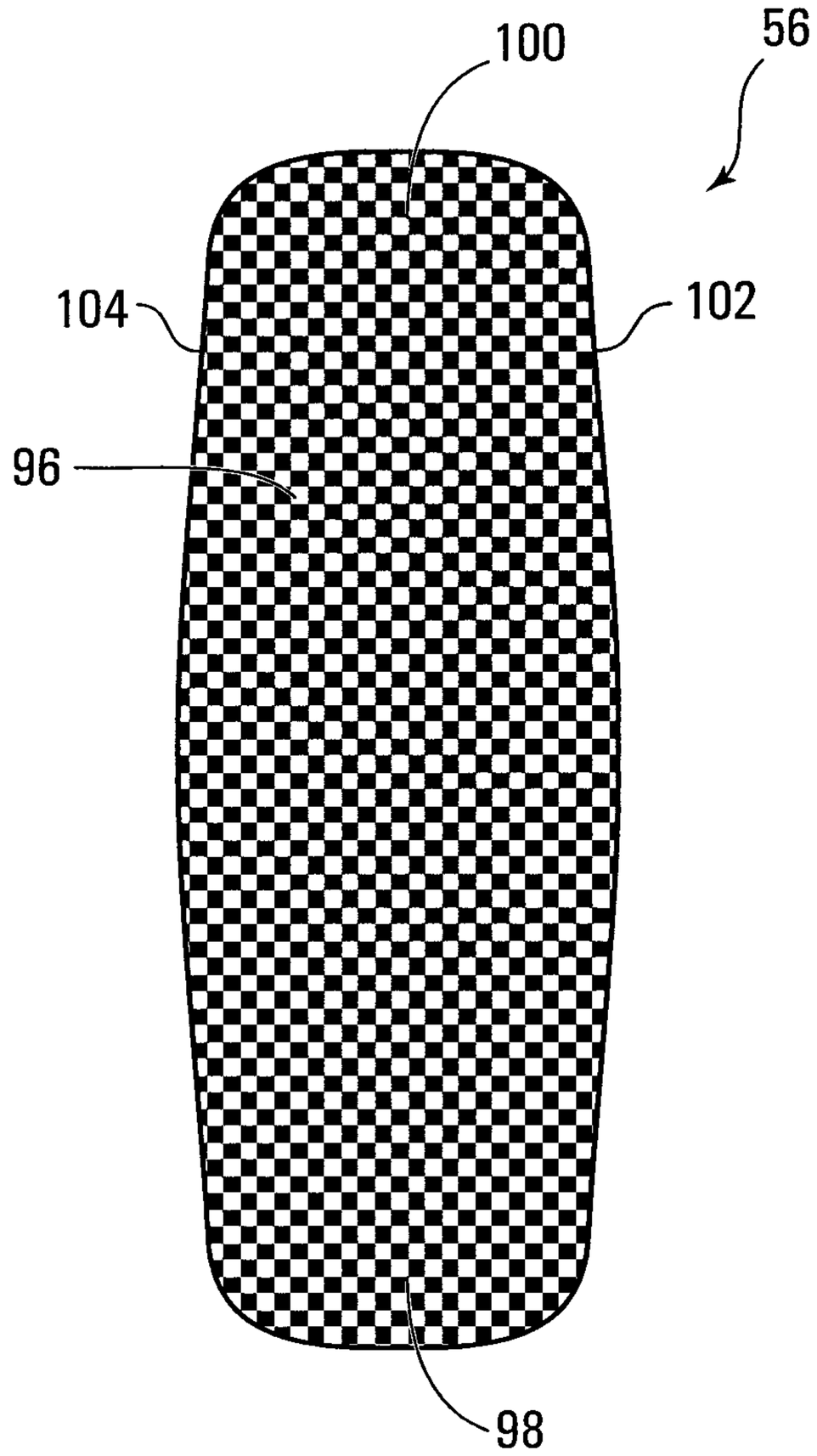


FIG. 15

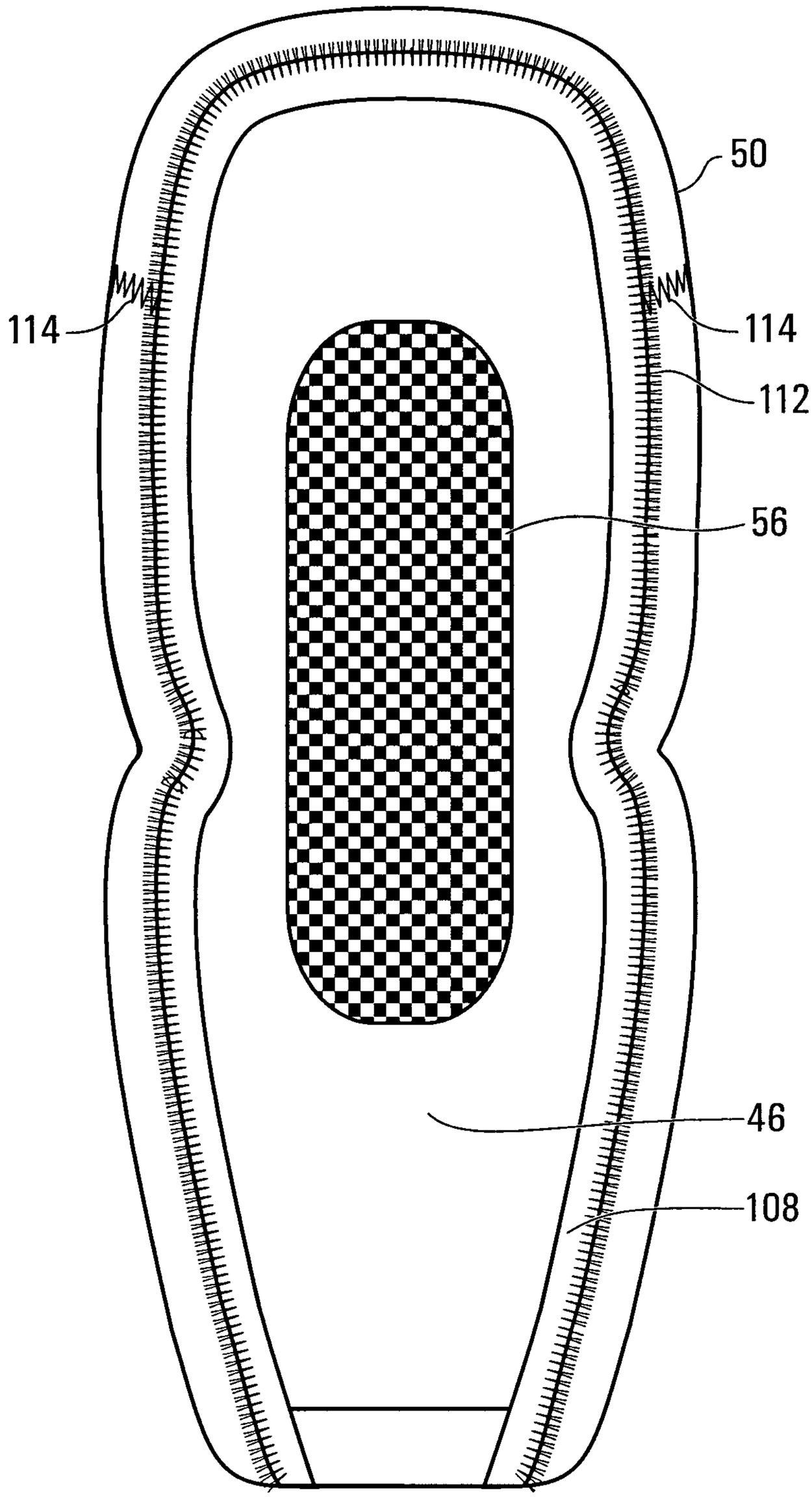


FIG. 16

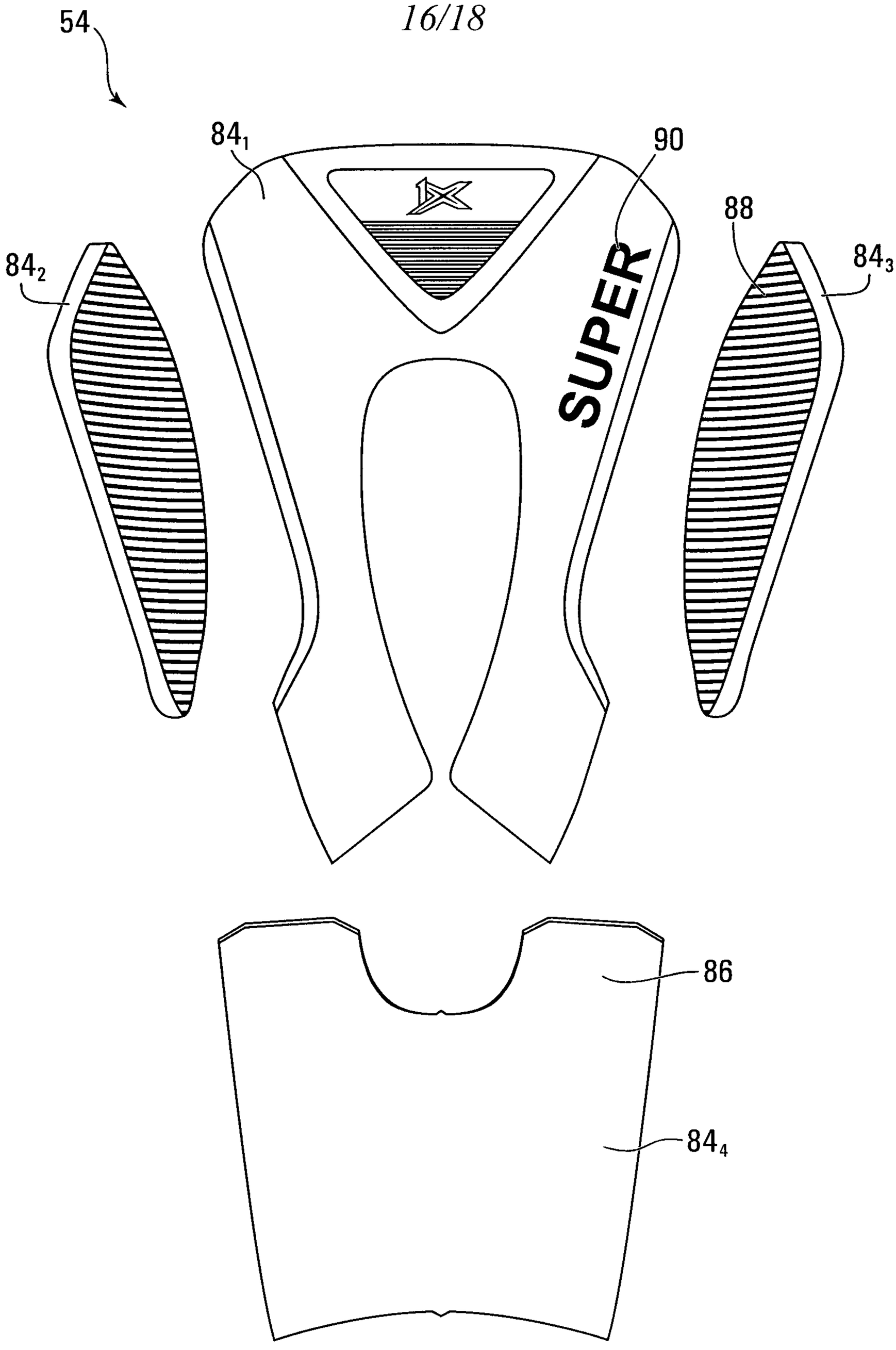


FIG. 17

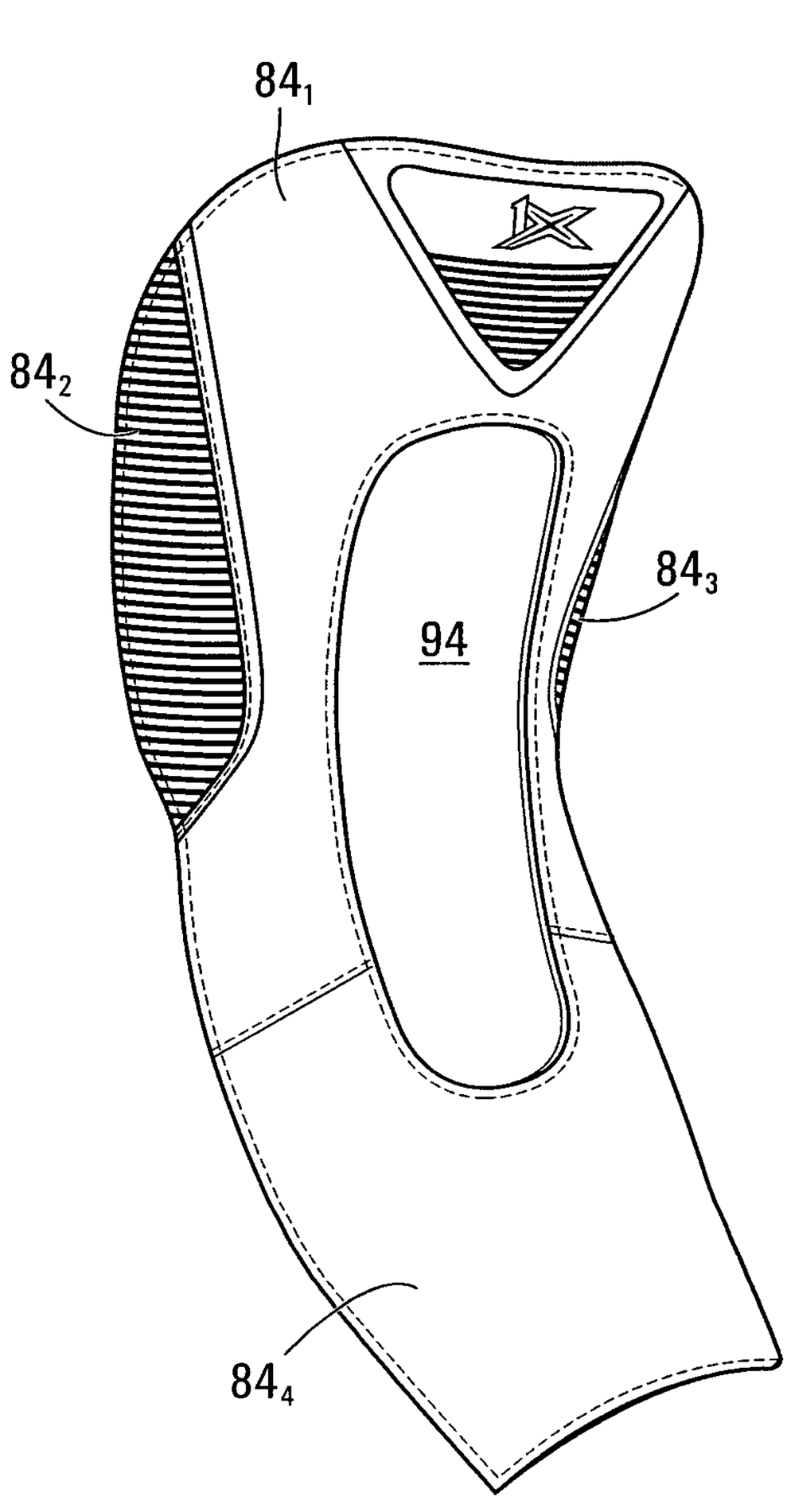


FIG. 18

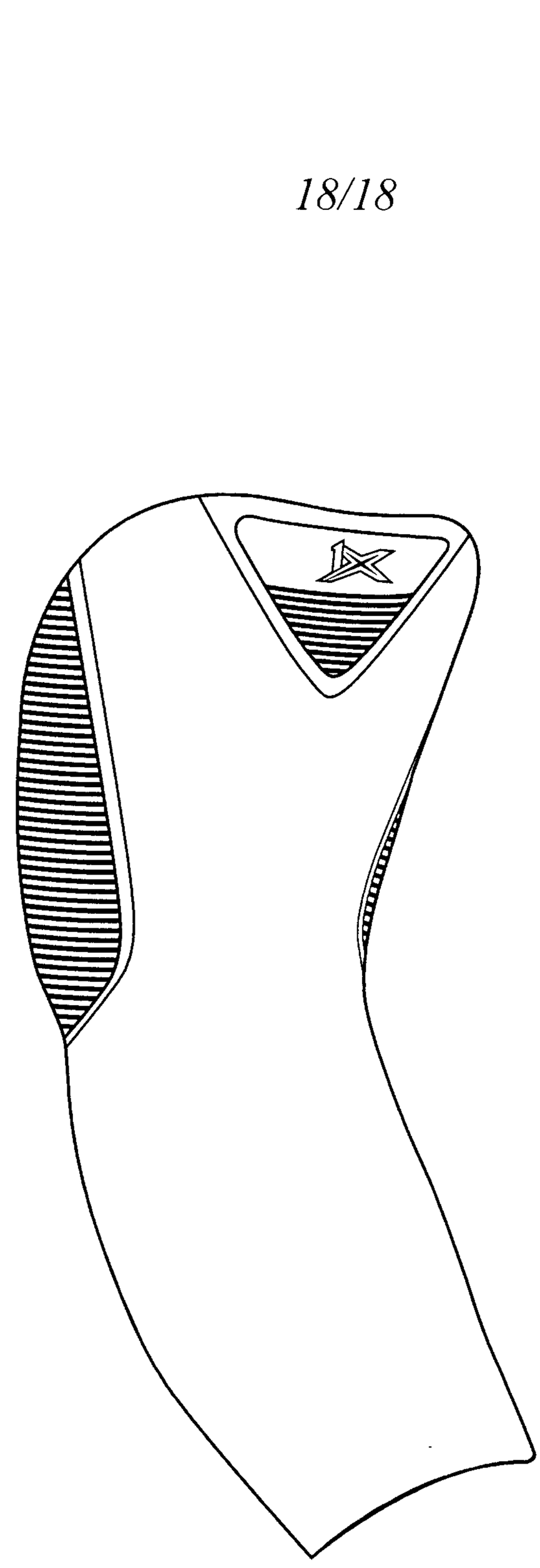
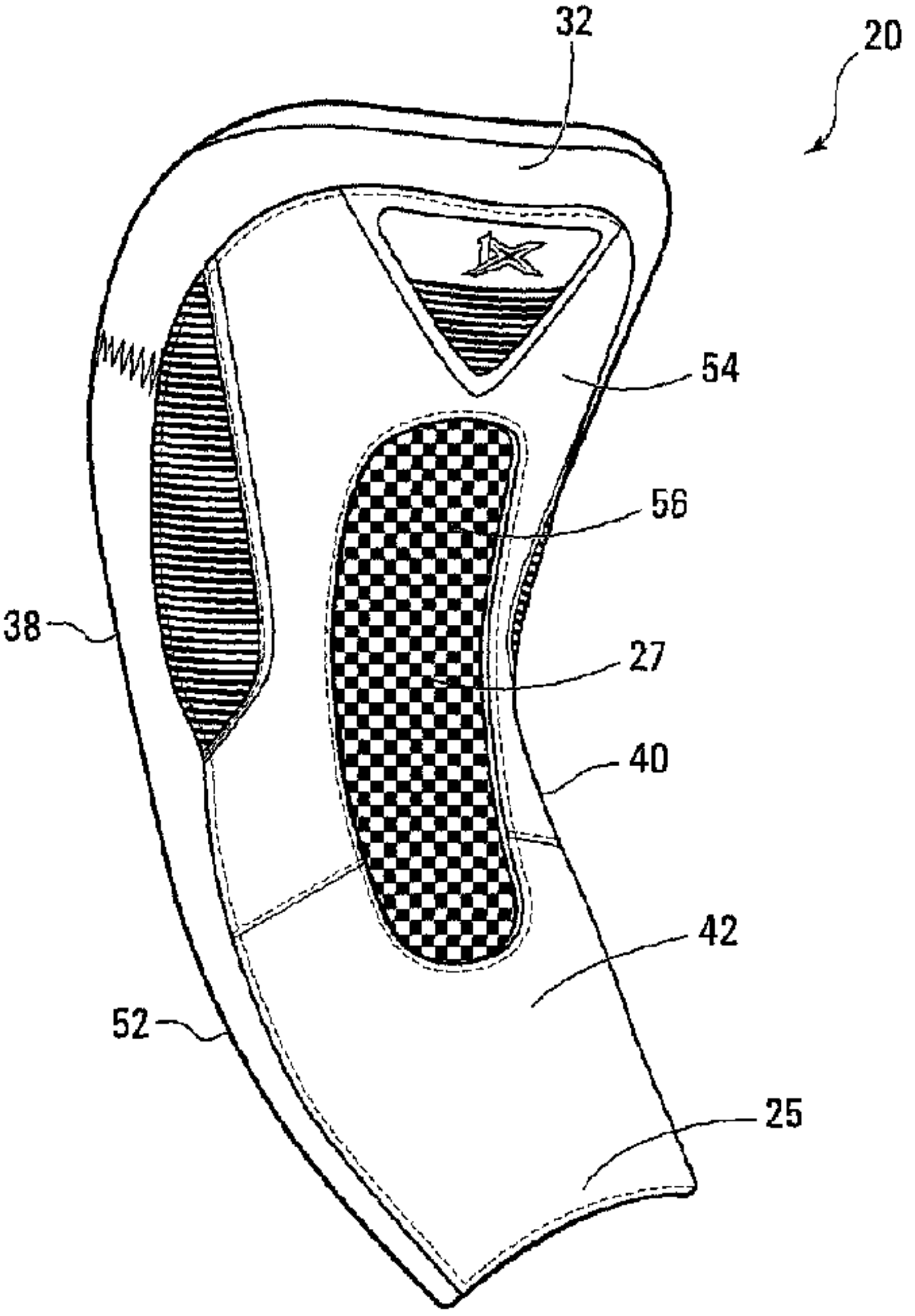


FIG. 19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