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Rendone

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(54) **QUICK-DRYING LIGHTWEIGHT BRA**

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(Continued)

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A41C 3/00 (2006.01)
A41C 3/12 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A41C 3/0057*** (2013.01); ***A41C 3/0014*** (2013.01); ***A41C 3/0035*** (2013.01);
(Continued)

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CPC ... A41C 3/0057; A41C 3/0014; A41C 3/0035; A41C 3/0085; A41C 3/12; A41F 15/00; A41B 2400/20; A41B 2400/62
See application file for complete search history.

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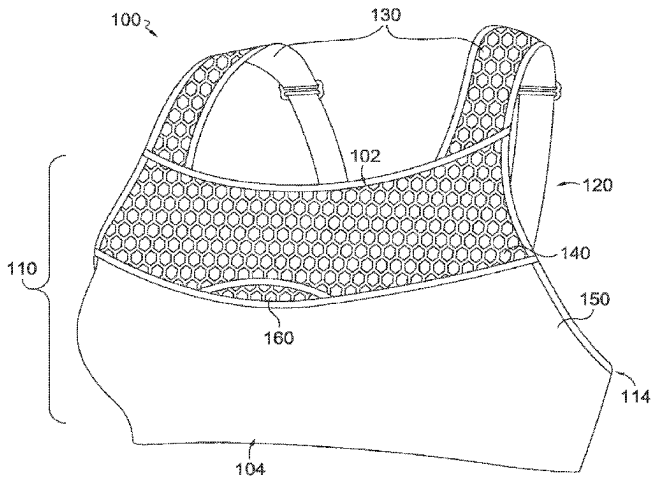
(57) **ABSTRACT**

Aspects herein are directed to a bra having a front portion formed with multiple layers of mesh to provide a supportive, modest bra that is breathable, lightweight, and quick drying. The front portion includes an interior support panel assembly having a first panel made of a mesh material and a second panel made of a spacer mesh material that is adjacent and external to the first panel. The front portion also includes an upper support panel made of a spacer mesh material and a lower support panel made of a mesh material that each are positioned adjacent and external to the interior support panel assembly. The upper support panel and the lower support panel are each defined by a top edge and a bottom edge, and at least a portion of the upper support panel bottom edge may be positioned superior to the lower support panel bottom edge.

20 Claims, 14 Drawing Sheets



Related U.S. Application Data

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(51) **Int. Cl.**
A41F 5/00 (2006.01)
A41F 15/00 (2006.01)

(52) **U.S. Cl.**
CPC ***A41C 3/0085*** (2013.01); ***A41C 3/12*** (2013.01); ***A41F 15/00*** (2013.01); *A41B 2400/20* (2013.01); *A41B 2400/62* (2013.01)

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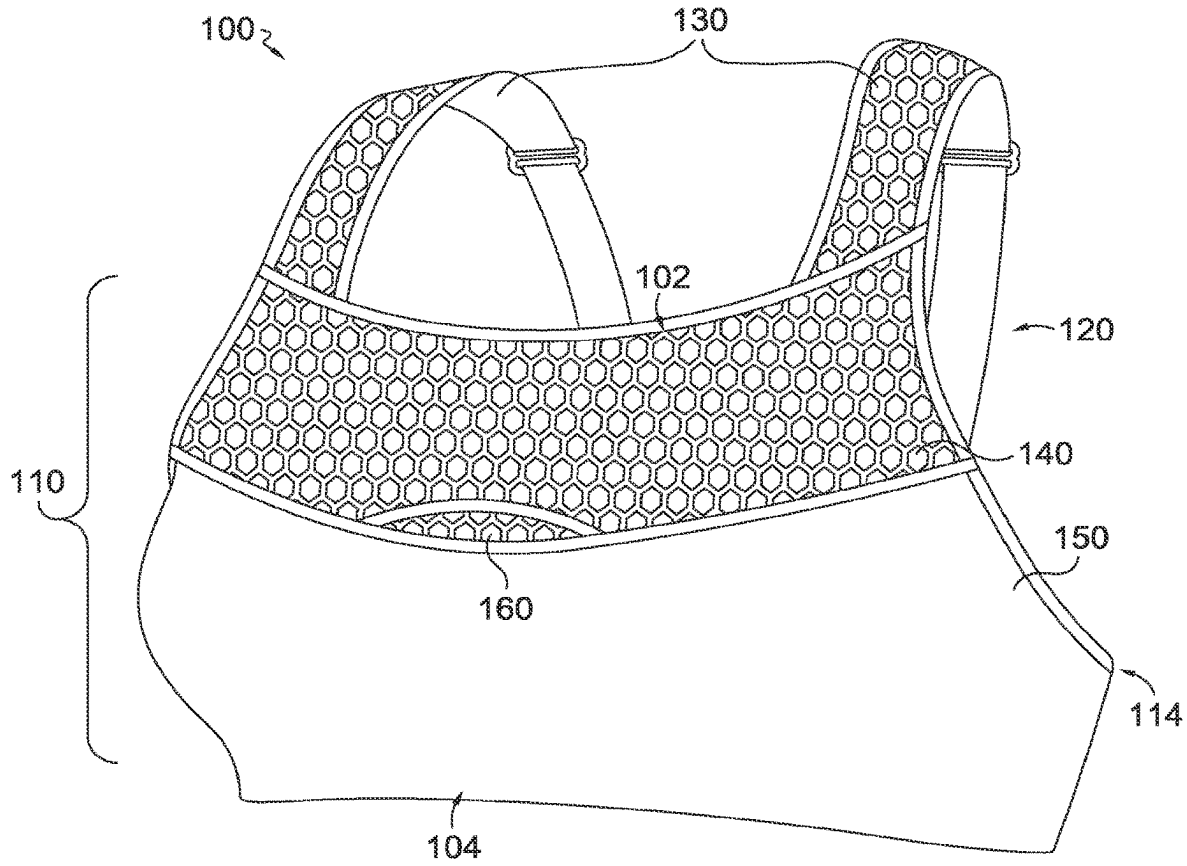

FIG. 1.

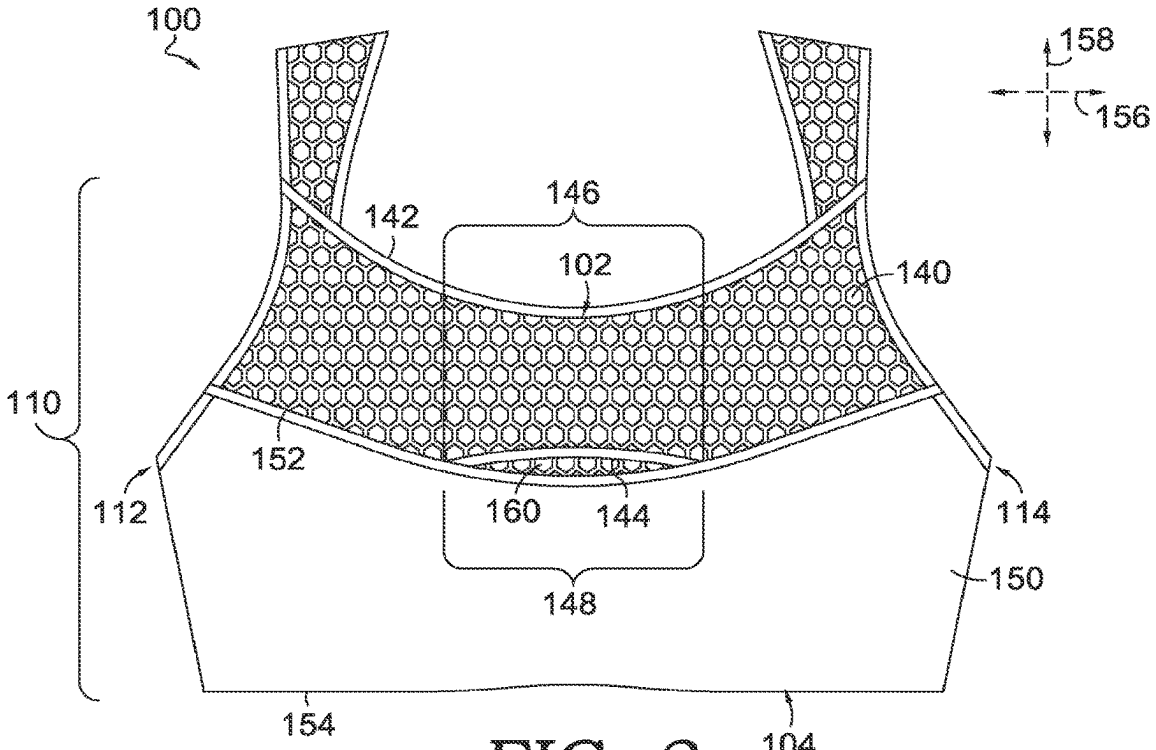
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FIG. 2.

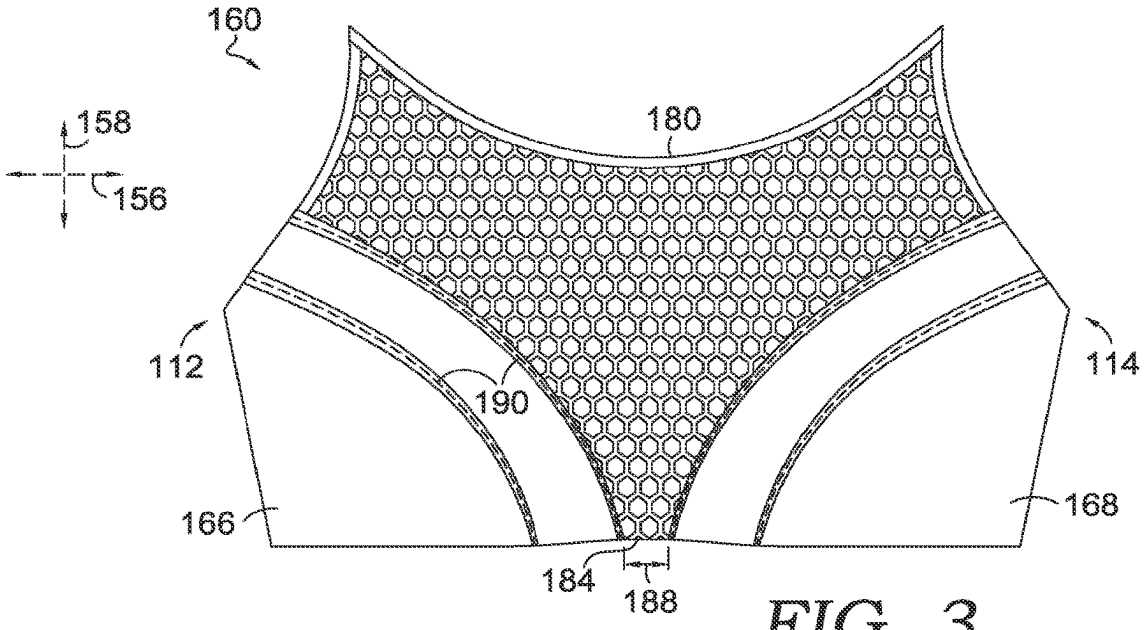
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FIG. 3.

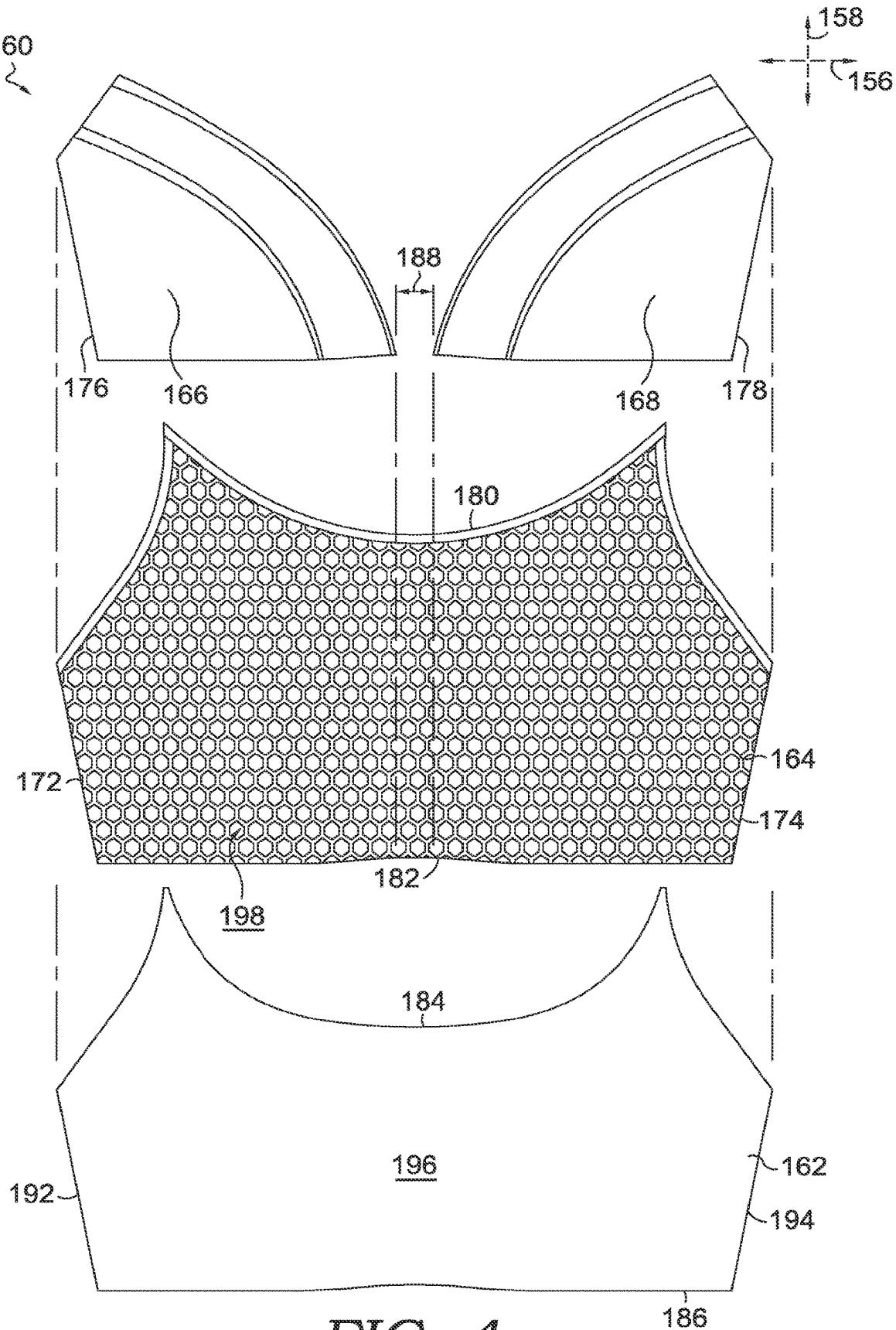
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FIG. 4.

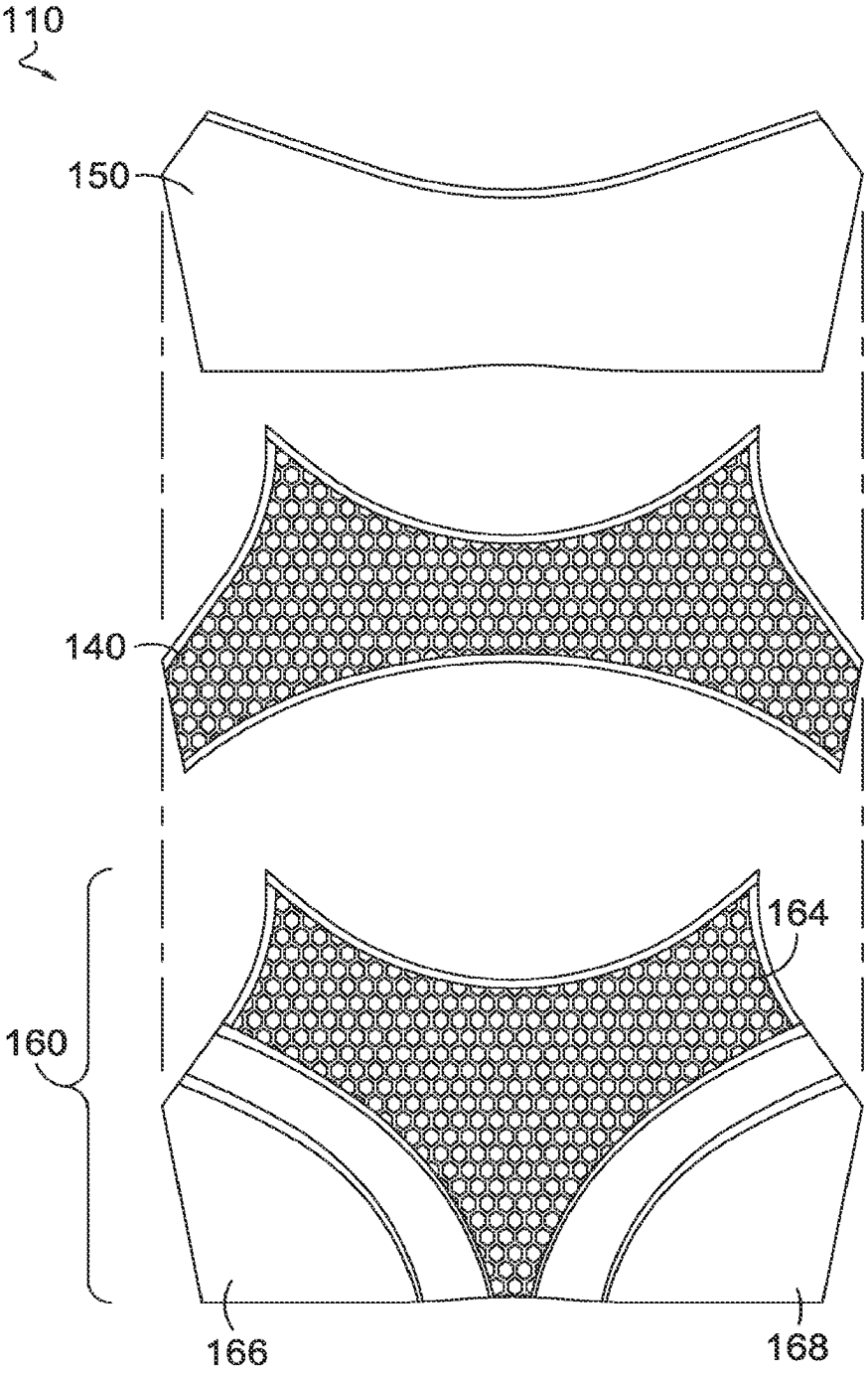

FIG. 5.

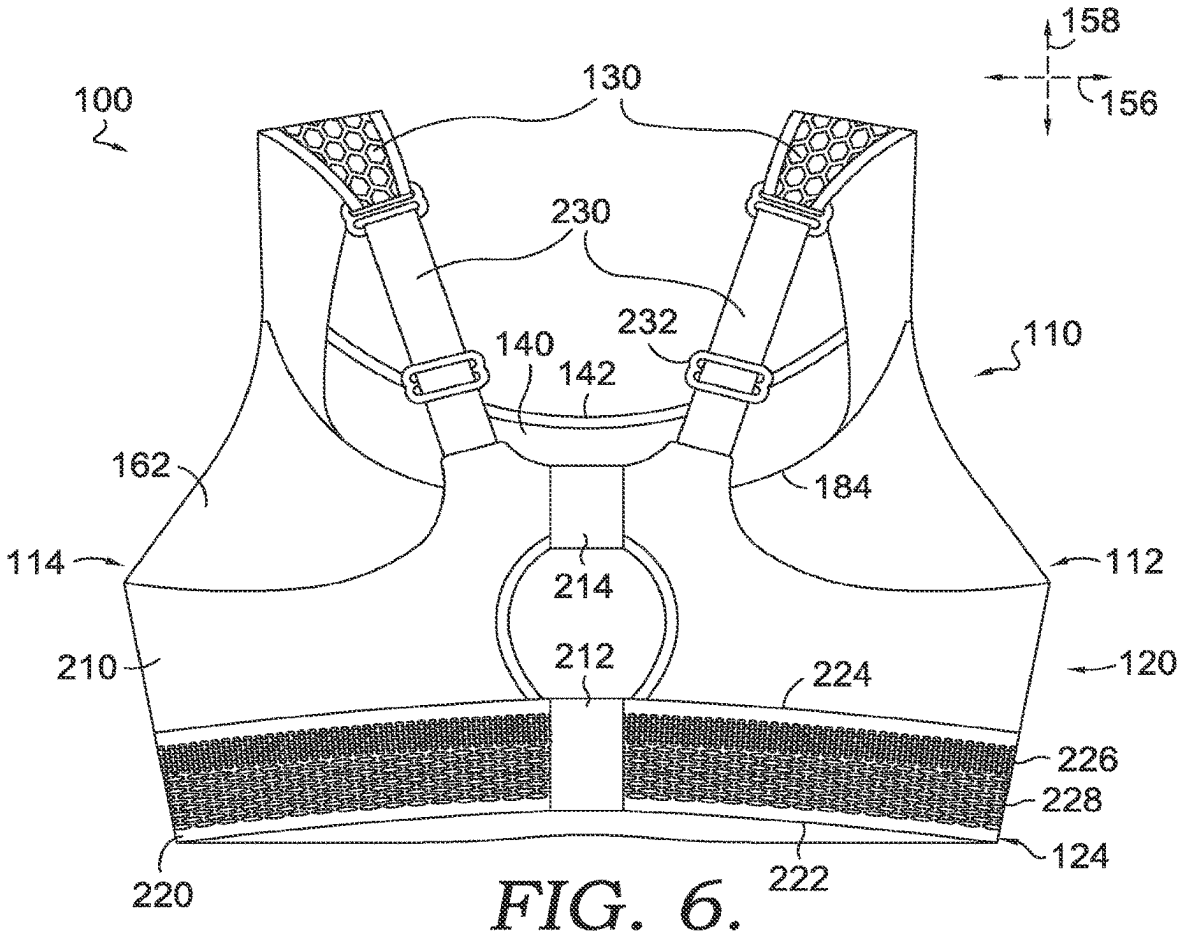
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FIG. 6.

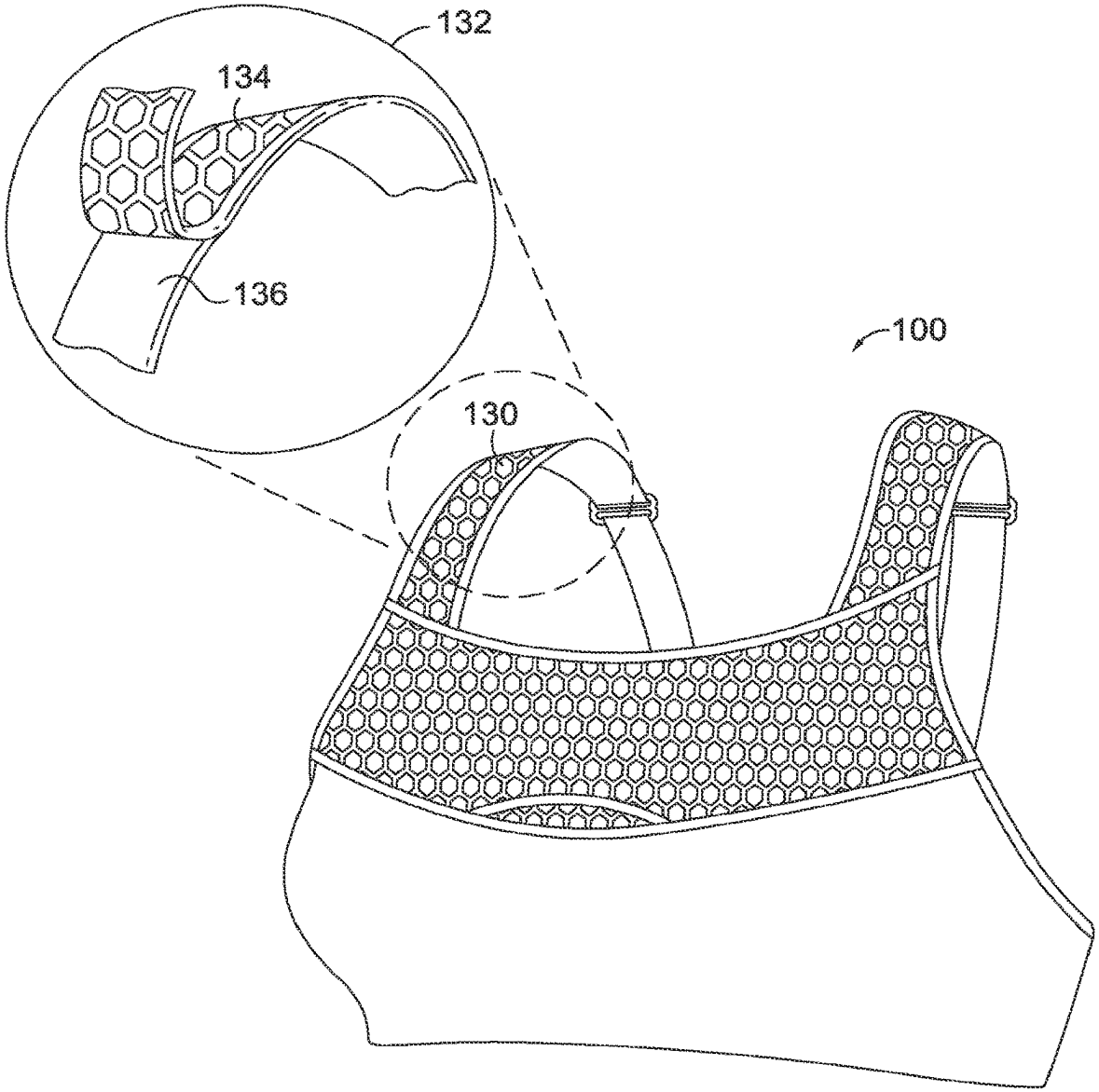


FIG. 7.

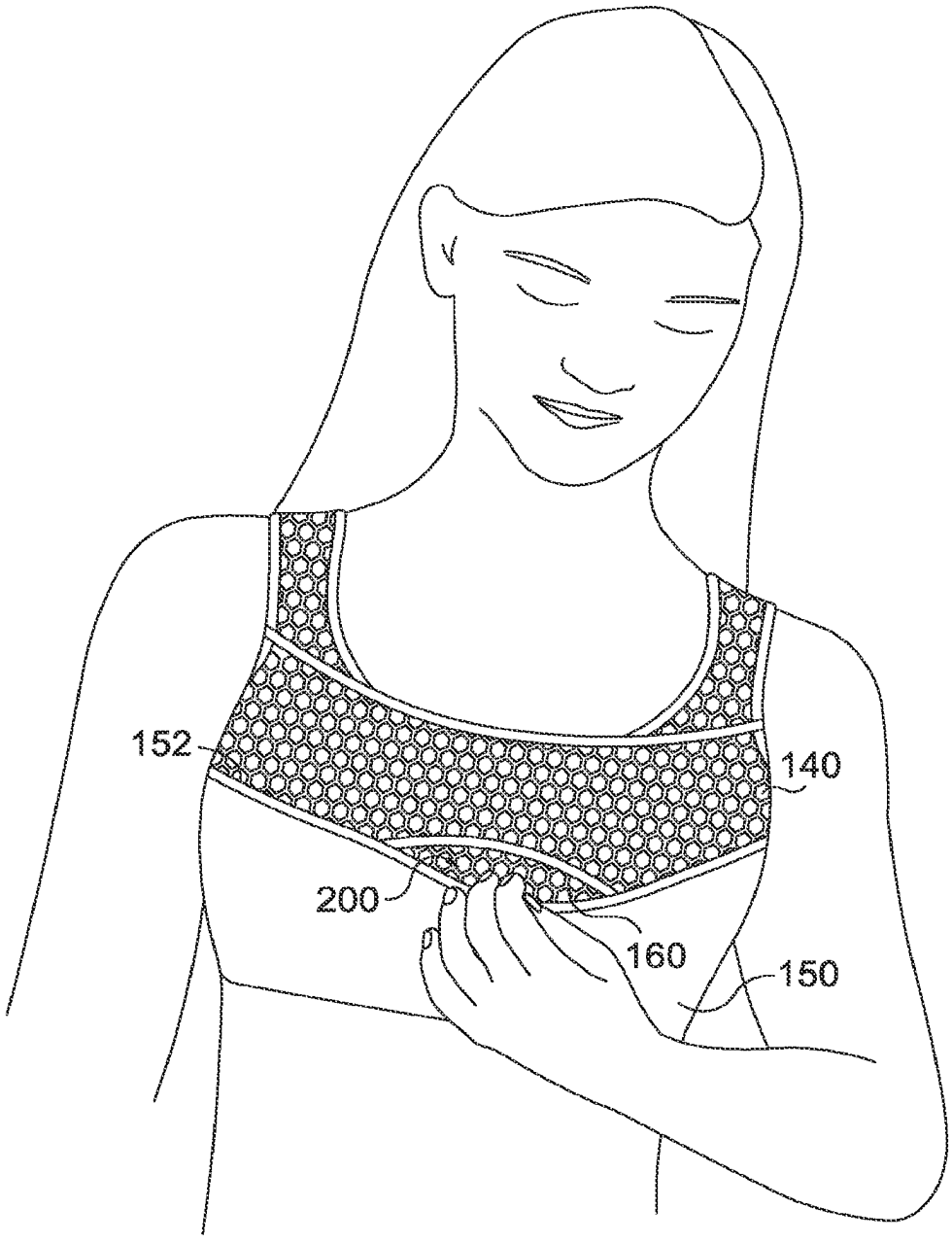
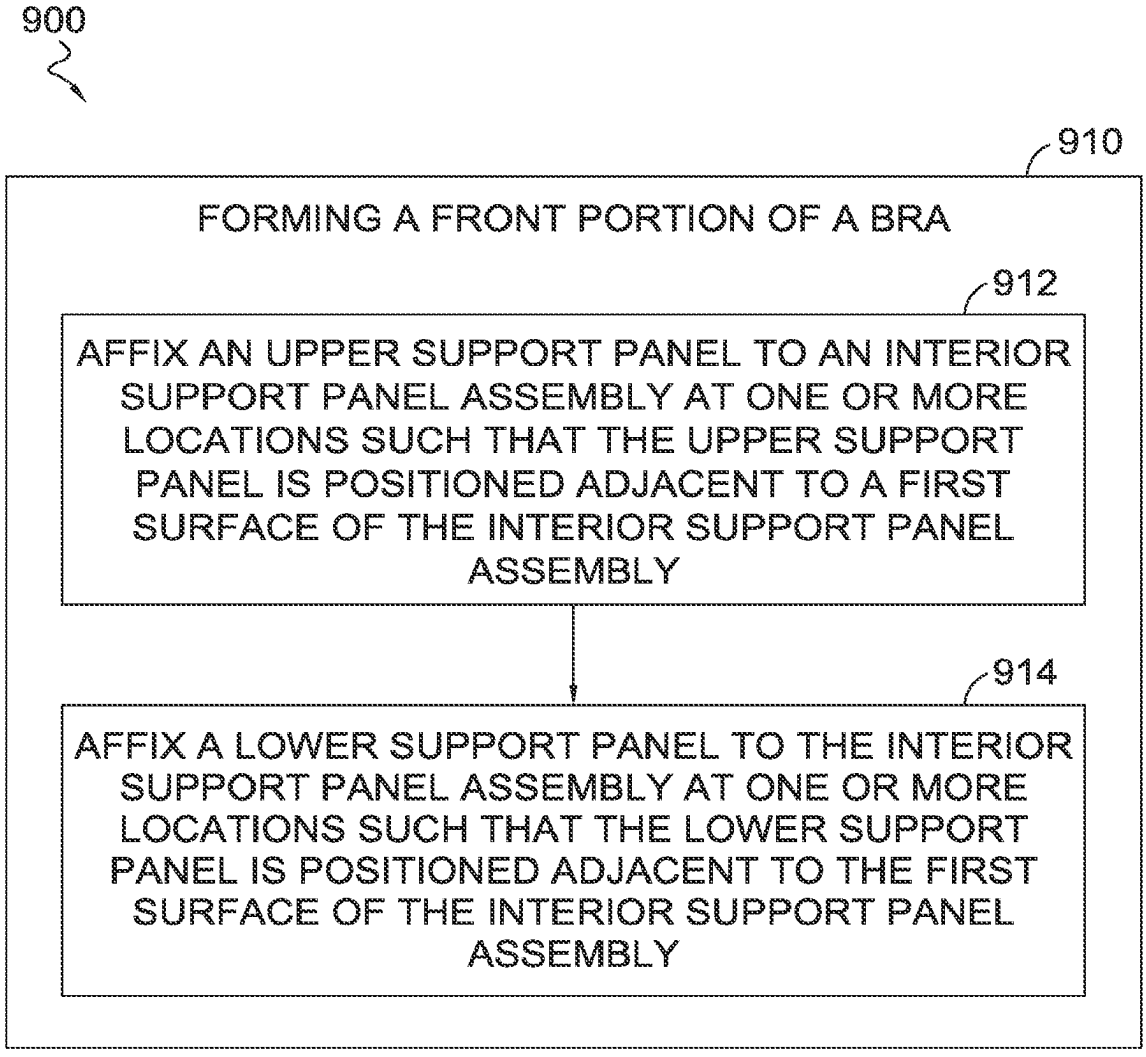


FIG. 8.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FORMING A FRONT PORTION OF A BRA
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AFFIX AN UPPER SUPPORT PANEL TO AN INTERIOR SUPPORT PANEL ASSEMBLY AT ONE OR MORE LOCATIONS SUCH THAT THE UPPER SUPPORT PANEL IS POSITIONED ADJACENT TO A FIRST SURFACE OF THE INTERIOR SUPPORT PANEL ASSEMBLY
914
AFFIX A LOWER SUPPORT PANEL TO THE INTERIOR SUPPORT PANEL ASSEMBLY AT ONE OR MORE LOCATIONS SUCH THAT THE LOWER SUPPORT PANEL IS POSITIONED ADJACENT TO THE FIRST SURFACE OF THE INTERIOR SUPPORT PANEL ASSEMBLY

FIG. 9.

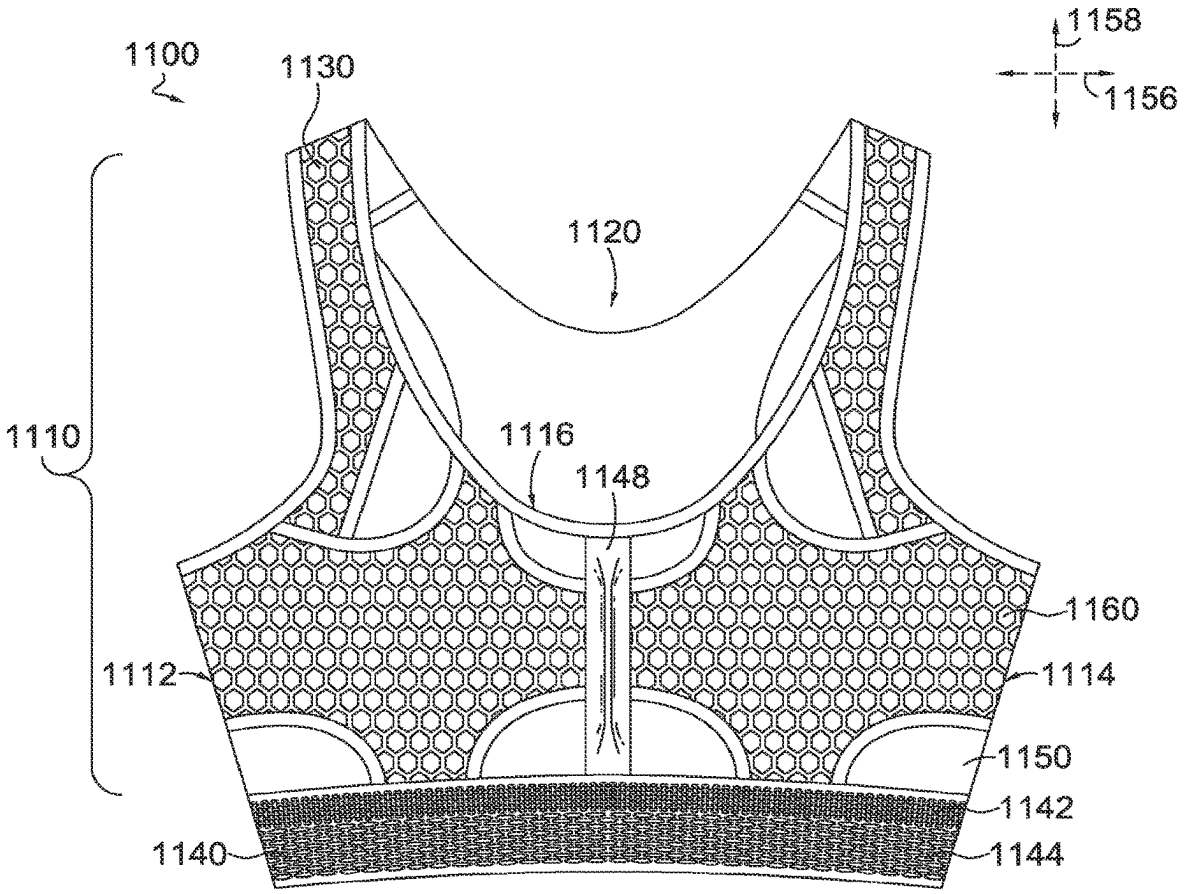
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FIG. 10.

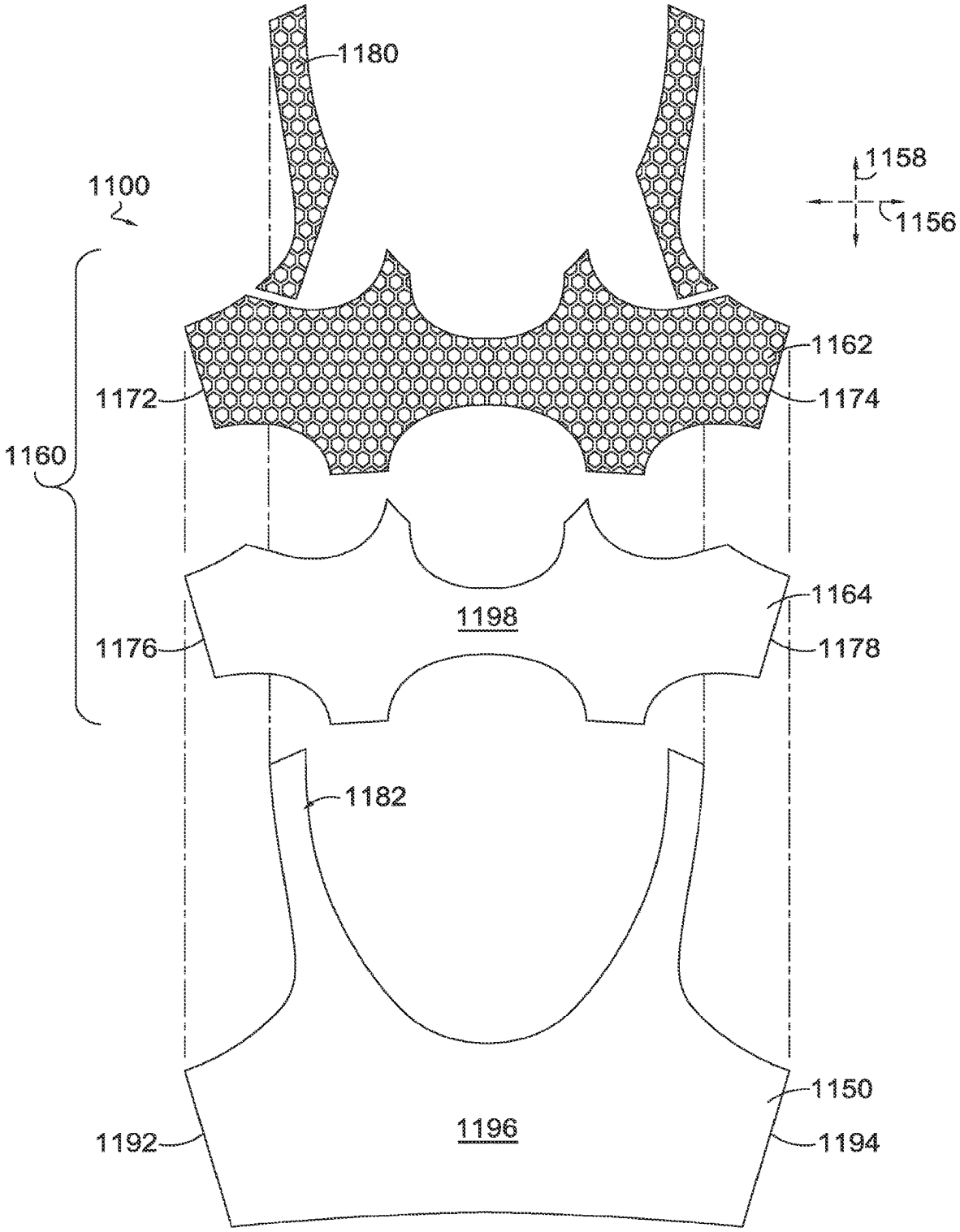
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FIG. 11.

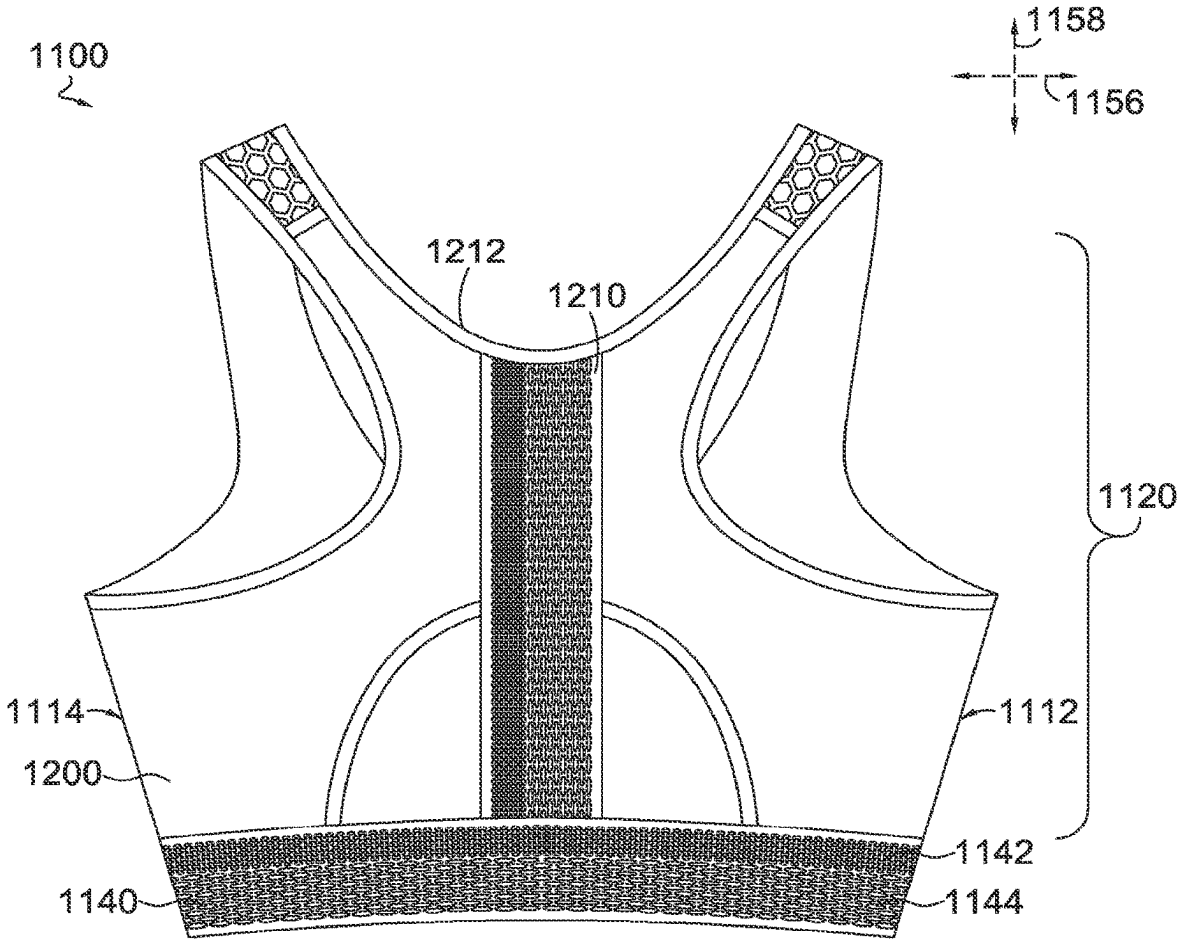

FIG. 12.

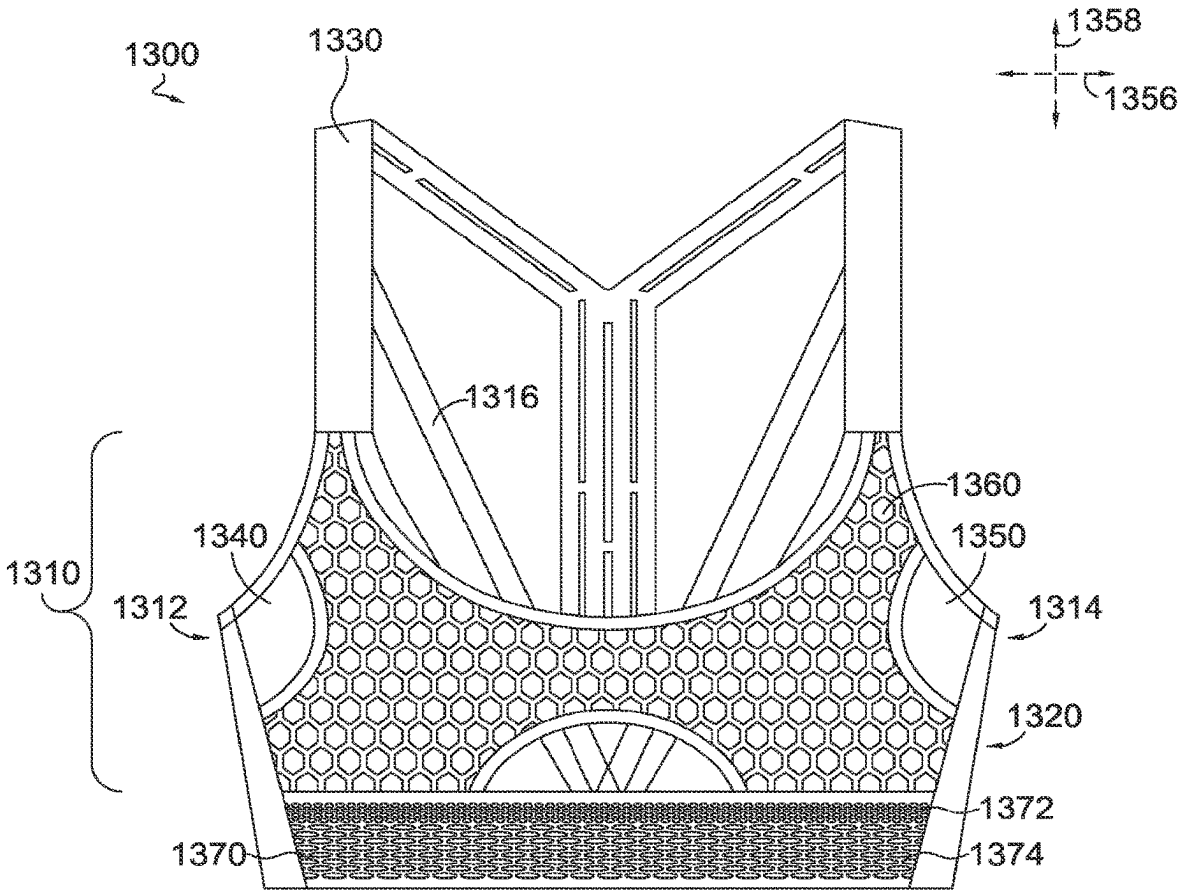
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FIG. 13.

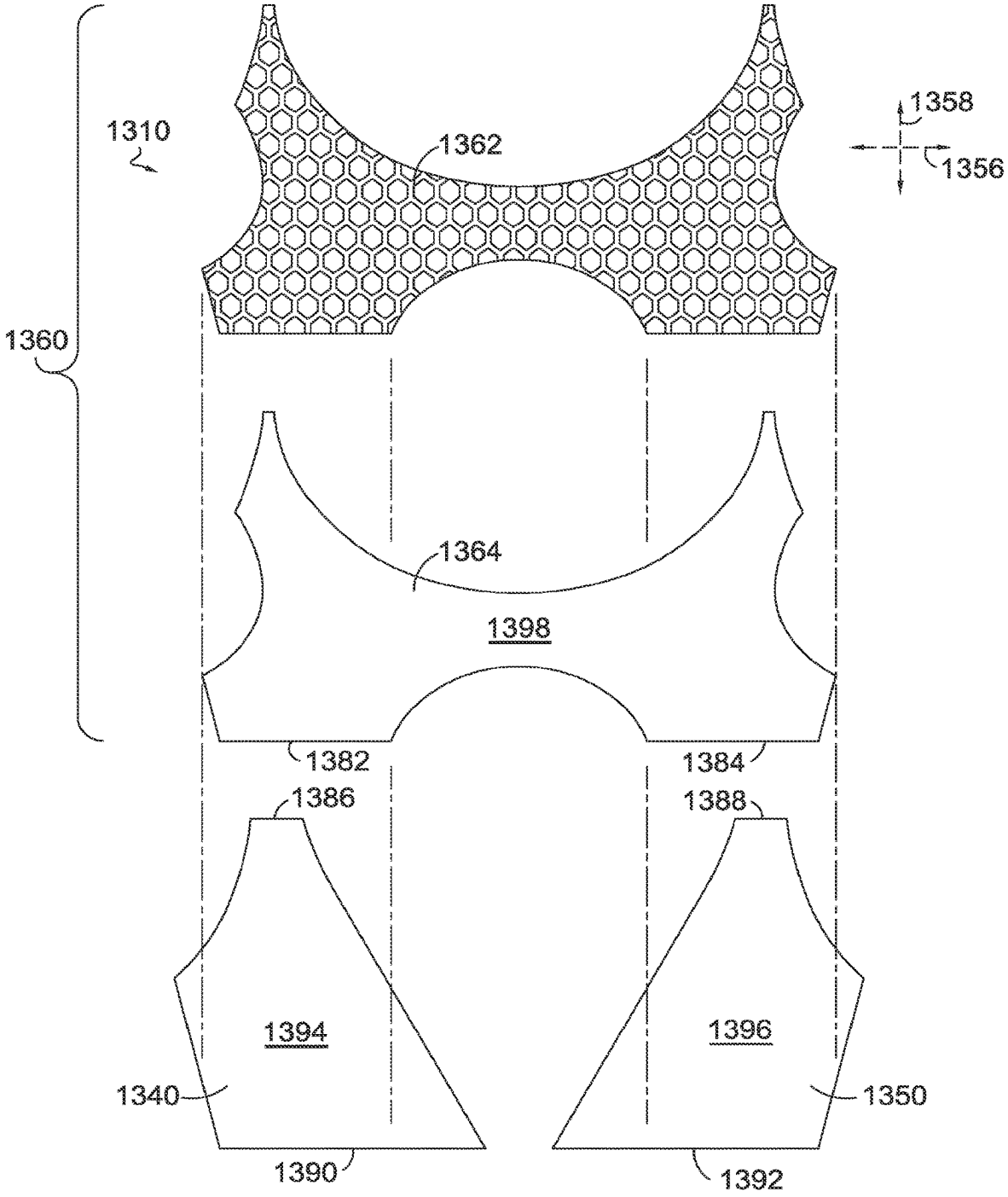
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FIG. 14.

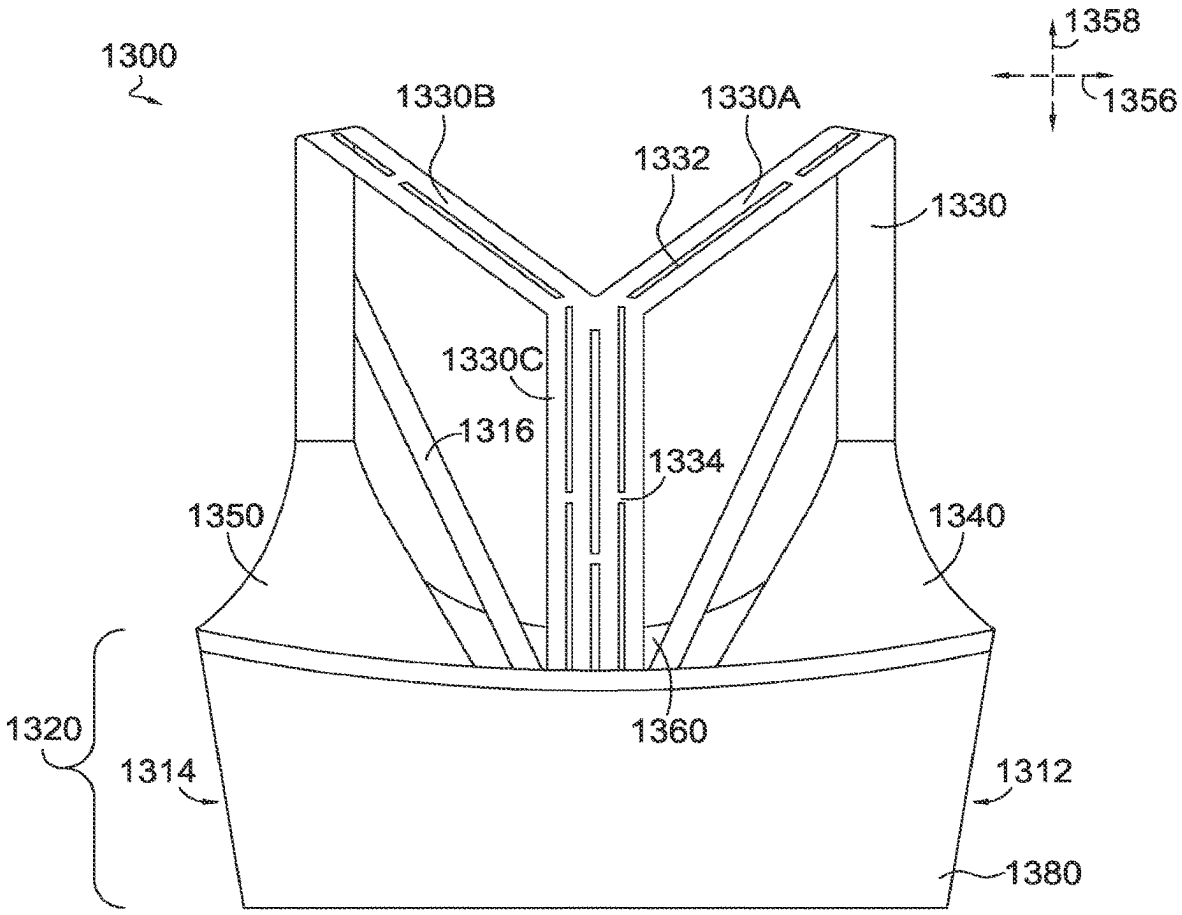
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FIG. 15.

QUICK-DRYING LIGHTWEIGHT BRA

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional application of U.S. application Ser. No. 17/152,206 (filed Jan. 19, 2021), which claims the benefit of priority of U.S. Prov. App. No. 62/963,809 (filed Jan. 21, 2020). The entirety of each of the aforementioned applications is incorporated by reference herein.

TECHNICAL FIELD

Aspects herein relate to a quick-drying, lightweight bra formed with different mesh materials in a layered construction.

BACKGROUND

Conventional materials used for bras, particularly sports bras, typically offer support through heavy-weight materials that are not breathable and are not quick drying. Conversely, conventional bras constructed of lighter-weight, breathable fabrics do not typically offer sufficient support for many activities.

BRIEF DESCRIPTION OF THE DRAWINGS

Examples of aspects herein are described in detail below with reference to the attached drawings figures, wherein:

FIG. **1** illustrates a front perspective view of an example quick-drying, lightweight bra in accordance with aspects herein;

FIG. **2** illustrates a front view of the bra of FIG. **1** in accordance with aspects herein;

FIG. **3** illustrates a front view of an interior support panel assembly of the bra of FIG. **1** in accordance with aspects herein;

FIG. **4** illustrates an exploded view of the interior support panel assembly of FIG. **3**, in accordance with aspects herein;

FIG. **5** illustrates a partially exploded view of a front portion of the bra of FIG. **1**, in accordance with aspects herein;

FIG. **6** illustrates a back view of the bra of FIG. **1** in accordance with aspects herein;

FIG. **7** illustrates a front perspective view of the bra of FIG. **1** with a partially deconstructed view of a front shoulder strap in accordance with aspects herein;

FIG. **8** illustrates a front perspective view of the bra of FIG. **1** with a pocket in an open configuration in accordance with aspects herein;

FIG. **9** illustrates a flow diagram of an example method for manufacturing a quick-drying, lightweight bra in accordance with aspects herein;

FIG. **10** illustrates a front view of an example quick-drying, lightweight bra in accordance with aspects herein;

FIG. **11** illustrates an exploded view of a front portion of bra of FIG. **10** in accordance with aspects herein;

FIG. **12** illustrates a back view of the bra of FIG. **10** in accordance with aspects herein;

FIG. **13** illustrates a front view of an example quick-drying, lightweight bra in accordance with aspects herein;

FIG. **14** illustrates an exploded view of a front portion of the bra of FIG. **13** in accordance with aspects herein; and

FIG. **15** illustrates a back view of the bra of FIG. **13** in accordance with aspects herein.

DETAILED DESCRIPTION

The subject matter of the present invention is described with specificity herein to meet statutory requirements. However, the description itself is not intended to limit the scope of this disclosure. Rather, the inventors have contemplated that the claimed or disclosed subject matter might also be embodied in other ways, to include different steps or combinations of steps similar to the ones described in this document, in conjunction with other present or future technologies. Moreover, although the terms "step" and/or "block" might be used herein to identify different elements of methods employed, the terms should not be interpreted as implying any particular order among or between various steps herein disclosed unless and except when the order of individual steps is explicitly stated.

Bras that are worn during athletic activities, such as sport bras, generally need to provide sufficient support for the wearer's breasts. At the same time, because physical activity often causes a wearer's body temperature to rise and the wearer to perspire, it may be desirable for a bra to be breathable and dry quickly. Support is conventionally provided through the use of heavier fabrics that tend to not be very breathable or quick drying. As such, conventional bras often lack either sufficient support or sufficient breathability and the ability to dry quickly. Aspects herein provide for a bra constructed from multiple layers of different materials, such as mesh materials. The mesh materials help provide a lightweight bra with breathability and quick drying properties, while layering mesh materials with different properties, including different stretch properties, provides coverage and support that is desired during physical activity.

At a high level, aspects herein are directed to a bra that includes an interior support panel assembly, an upper support panel, and a lower support panel that collectively form at least a front portion of the bra. The upper support panel and the lower support panel may each be positioned adjacent and external to the interior support panel assembly, creating a multi-layered construction in at least some areas of the front portion of the bra. In various aspects, a combination of spacer mesh material and mesh material (which may also be referred to herein as non-spacer mesh material) forms different panels of the front portion of the bra. For example, the upper support panel may be formed of a spacer mesh material while the lower support panel may be formed of a mesh material.

In example aspects, the upper support panel includes an upper support panel top edge and an upper support panel bottom edge while the lower support panel includes a lower support panel top edge and a lower support panel bottom edge. The upper support panel is arranged generally superior to the lower support panel on the external side of the interior support panel assembly. As such, the upper support panel top edge may form an upper margin of the front portion of the bra while the lower support panel bottom edge may form the lower margin of the front portion. Additionally, at least a portion of the upper support panel bottom edge may be positioned superior to at least a portion of the lower support panel top edge.

In example aspects, at least a portion of the lower support panel top edge is unaffixed from the interior support panel assembly. A pocket opening may be formed from the unaffixed lower support panel top edge, where the pocket

opening is in communication with a pocket space formed between the lower support panel and the interior support panel assembly.

In example aspects, the interior support panel assembly includes a first panel and a second panel each extending between a right side and a left side of the front portion. The second panel may be positioned adjacent and external to the first panel. Further, the second panel may include a third panel affixed to a right side of the second panel and configured to at least partially cover a wearer's right breast and a fourth panel affixed to a left side of the second panel and configured to at least partially cover the wearer's left breast. In example aspects, the first panel is formed from a mesh material while the second panel is formed from a spacer mesh material. The spacer mesh material may exhibit less stretch than the mesh material of the first panel in at least the vertical direction. Additionally, in example aspects, the third panel and the fourth panel are formed from material having less stretch relative to the first and second panels.

In example aspects, the bra includes a back portion also formed from at least one panel of mesh material. A pair of shoulder straps may extend between the front and back portions, and each shoulder strap may be at least partially formed of a spacer mesh material.

Example aspects of the present disclosure also include a method of manufacturing a multi-layered bra that includes a front portion having an upper support panel, a lower support panel, and an interior support panel assembly. The method may include forming the front portion of the bra by affixing the upper support panel to the interior support panel assembly at one or more locations such that the upper support panel is positioned adjacent to a first surface of the interior support panel assembly. The front portion of the bra may also be formed by affixing the lower support panel to the interior support panel assembly at one or more locations such that the lower support panel is also positioned adjacent to the first surface of the interior support panel assembly. Additionally, when the upper support panel and the lower support panel are affixed to the interior support panel assembly, at least a portion of a lower support panel top edge may be positioned inferior to at least a portion of the upper support panel bottom edge. Further, in some aspects, the upper support panel may include an upper support panel top edge that forms an upper margin of the front portion of the bra, and the lower support panel may include a lower support panel bottom edge that forms a lower margin of the front portion.

Layering both the upper support panel and the lower support panel over the interior support panel assembly creates additional support to the wearer in the front portion of the bra, at least partly, due to increased layers. The additional layers also provide coverage by decreasing transparency. The front portion of the bra, however, remains breathable and quick drying due to the open structure of the mesh and spacer mesh materials used to form the upper support panel, the lower support panel, and the interior support panel assembly. Additionally, by utilizing different types of mesh material with differing properties, including varying stretch properties, different levels of support may be achieved in the upper portion and the lower portion of the bra. For example, in aspects having the third and fourth panels of a lower stretch material secured to the interior support panel assembly, additional support is provided to particular breast-covering portions of the front portion of the bra.

As used herein, the term "bra" encompasses any structure configured to be worn around a wearer's torso and at least partially cover the wearer's breasts. Although aspects herein are discussed with respect to a bra, it is understood that the disclosed technology is not limited to a bra and may be applied to any upper-torso garment used to support breast tissue, such as camisoles, swimwear, tank tops, or other garments with built-in breast support.

Positional terms used when describing the bra, such as front, sides, back, interior-facing surface, exterior-facing surface, superior, inferior, interior exterior, and the like, are used with respect to the bra being worn as intended with the wearer standing upright such that the lower portion of the bra extends around the wearer's torso and the upper portion of the bra is positioned generally over the wear's chest. As such, the interior-facing surface of the bra is configured to be positioned adjacent to a skin surface of the wearer, and the exterior-facing surface faces away from the skin surface. Additionally, the front portion of the bra is configured to at least partially cover the wearer's breasts while the back portion is configured to at least partially cover the wearer's back. Additionally, shoulder straps are configured to extend over the wearer's shoulder from the front portion to the back portion and at least partly define openings through which the wearer's arms extend and an opening through which the wearer's head and neck extend. It should be understood, however, that use of positional terms do not depend on the actual presence of a human being for interpretative purposes.

The term "mesh" refers to a textile material with a plurality of closely-spaced openings. The mesh material may be knitted (warp knitted or weft knitted) or woven. In example aspects, the term mesh refers to a loosely knit or woven material such that the openings are integrally knit or woven into the material. In other aspects, the openings may be formed in a post-knitting or post-weaving step using, for example, laser cutting, water jet cutting, die cutting, and the like after the textile is knitted or woven.

The term "spacer" mesh refers to a spacer textile formed of a mesh material. Spacer textiles are generally formed by utilizing at least one tie yarn (also known as a spacer yarn) to interconnect first and second layers of textile. Thus, a spacer mesh, as used herein, includes a first textile layer and a second textile layer with at least one of the layers having a mesh construction and also includes a third layer that interconnects the first and second layers. The third layer may include one or more monofilament or multifilament yarns that interknit or interweave the first and second layers. In some aspects, the first layer and the second layer of the spacer mesh each have a mesh construction. In other aspects, only one of the first layer or the second layer have the mesh construction. In knitted spacer mesh textiles, spacer yarns have "loop" portions that extend into each of the first layer and the second layer where the loop portions are interlooped with yarns in the first layer and the second layer to connect the two layers. In general, the longitudinal length of the spacer yarn is oriented perpendicular, or near perpendicular, to the planar surfaces of both the first and second layers for knitted or woven spacer mesh textiles.

The term "stretch property", as used herein, refers to a characteristic of a panel of material relating to the ability to stretch in response to a force. A stretch property may refer to a material's capability of stretching under force generally or to a material's capability of stretching so as to return to an original shape or size when the force is released, which may be also referred to as elasticity. A measure of a stretch property herein may be a modulus of elasticity, which is a measure of a material's resistance to being deformed elastically when stress is applied. A modulus of elasticity may be determined in various manners. In some aspects, the modu-

lus of elasticity values described herein were determined according to a test methodology specified by ASTM D 4964. Further, other material properties are described herein that may also be determined in various manners. For example, air permeability scores provided herein may be determined according to a test methodology specified by ASTM D 737, and drying times may be determined according to a test methodology specified by AATCC 201.

Additionally, there are various numerical measurements provided herein. Unless indicated otherwise, the term "about" with respect to a measurement means within ±10% of the indicated value. Further, unless indicated otherwise, all measurements provided herein are with respect to the bra being in a resting state (i.e., a non-stretched) at standard ambient temperature and pressure (298.15 K and 100 kPa).

FIGS. **1-2** depict a front perspective view and a front view of an example bra **100**, respectively. In various aspects, the bra **100** may be targeted toward a wearer desiring a high amount of support. The bra **100** includes a front portion **110** that typically covers at least a portion of the wearer's chest when the bra **100** is in an as-worn configuration and a back portion **120** that typically covers at least a portion of the wearer's back when the bra **100** is in the as-worn configuration. The bra **100** may also include a pair of front shoulder straps **130**, each extending between the front portion **110** and the back portion **120**.

The front portion **110** of the bra **100** includes an upper margin **102** including a superior edge that at least partially defines a neck opening and a lower margin **104** including an inferior edge that at least partially defines a torso opening of the bra **100**. Additionally, the front portion **110** has a width extending between a right side **112** and a left side **114** of the bra **100**. In some aspects, the width of the front portion **110** extends across the wearer's breasts when the bra **100** is in the as-worn configuration. Thus, the front portion **110** may also be referred to, for example, as a breast-covering portion.

In various aspects, the front portion **110** includes a plurality of mesh panels. For example, FIG. **1** depicts the front portion **110** including an upper support panel **140** and a lower support panel **150**. The upper support panel **140** and the lower support panel **150** collectively form an exterior assembly of the front portion **110** of the bra **100**.

The upper support panel **140** extends from the right side **112** to the left side **114** of the front portion **110** and is defined, at least partially, by an upper support panel top edge **142** and an upper support panel bottom edge **144**. Similarly, the lower support panel **150** extends from the right side **112** to the left side **114** of the front portion **110** and is defined, at least partially, by a lower support panel top edge **152** and a lower support panel bottom edge **154**. Both the upper support panel **140** and the lower support panel **150** may extend seamlessly from the right side **112** to the left side **114**. As referred to herein, the term "seamlessly" means extending continuously and without interruption. A panel that extends seamlessly between two reference areas is formed of a single panel piece as opposed to multiple panel pieces joined along their edges by seams.

In various aspects, the upper support panel top edge **142** forms the upper margin **102** of the front portion **110**. Similarly, the lower support panel bottom edge **154** forms the lower margin **104** of the front portion **110**. As illustrated in FIGS. **1-2**, the lower margin **104** of the front portion **110** may also be the lower margin of the bra **100**. However, it is contemplated that one or more additional panels of material (e.g., underband panels, for example) may be secured to the front portion **110** such that the additional panels form the lower margin of the bra **100**.

Although the upper support panel **140** is generally positioned superior to the lower support panel **150**, there may be some overlap between the upper support panel **140** and the lower support panel **150**. In some aspects, at least about 50% of the upper support panel **140** is superior to the lower support panel **150**. In some aspects, at least about 75% to about 95% of the upper support panel **140** is superior to the lower support panel **150**. Partially overlapping the upper support panel **140** and the lower support panel **150** provides additional layers and, therefore, additional coverage in breast-covering regions when the bra **100** is in the as-worn configuration.

As shown in FIGS. **1-2**, where the upper support panel **140** and the lower support panel **150** overlap, at least a portion of the upper support panel bottom edge **144** is positioned inferior to the lower support panel top edge **152**. Additionally, in some aspects, another portion of the upper support panel bottom edge **144** is positioned superior to the lower support panel top edge **152**. For example, a middle portion **146** of the upper support panel bottom edge **144** between the right side **112** and the left side **114** is positioned superior to a middle portion **148** of the lower support panel top edge **152** in FIGS. **1-2**. Lateral portions of the lower support panel top edge **152** proximate to the right side **112** and left side **114** are positioned superior to respective lateral portions of the upper support panel bottom edge **144**. In some aspects, at least a portion of the lower support panel **150** may be positioned external to the upper support panel **140**. For example, at least a portion of the lower support panel top edge **152** may be positioned external to the upper support panel **140**. However, it is contemplated that, in alternative aspects, the entirety of the lower support panel top edge **152** may be positioned superior to the upper support panel bottom edge **144**. In other alternative aspects, the entirety of the upper support panel bottom edge **144** may be superior to the lower support panel top edge **152** such that the upper support panel **140** and the lower support panel **150** do not overlap.

The upper support panel **140** and the lower support panel **150** are both formed from mesh materials. In various aspects, the upper support panel **140** and the lower support panel **150** are formed from mesh materials having different properties. For example, the upper support panel **140** may be constructed from a spacer mesh while the lower support panel **150** may be constructed from a non-spacer mesh. The spacer mesh of the upper support panel **140** and the non-spacer mesh of the lower support panel **150** may have different stretch properties.

In various aspects, the upper support panel **140** is formed from a spacer mesh having a first modulus of elasticity. For example, the first modulus of elasticity may be within a range from about 0.1 lb. forces to about 0.5 lb. forces at a width loop tension of 40% or from about 0.1 lb. forces to about 0.3 lb. forces at a width loop tension of 40%. In some aspects, the first modulus of elasticity is about 0.3 lb. forces at a width loop tension of 40%.

In various aspects, the spacer mesh forming the upper support panel **140** may have anisotropic stretch properties such that the amount of stretch differs along different axes. For example, the amount of stretch along the widthwise direction corresponding to axis **156** is different than the amount of stretch along the lengthwise direction corresponding to axis **158**. As used herein, "widthwise direction" refers to the direction parallel to the width of the bra **100** from the right side **112** to the left side **114**, while "lengthwise direction" refers to the direction parallel to the length of the bra **100** from the upper margin **102** to the lower margin **104**. In

example aspects in which a material disclosed herein, such as the spacer mesh material of the upper support panel **140**, is knitted, widthwise direction may correspond to a course-wise direction parallel to the knit courses, and lengthwise direction may correspond to a wale-wise direction parallel to the knit wales. In various aspects, the upper support panel **140** may have more stretch in the widthwise direction compared to the lengthwise direction. For instance, the amount of stretch of the upper support panel **140** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction.

In one example, the first modulus of elasticity is in the widthwise direction, and a second modulus of elasticity may be in the lengthwise direction. In some aspects, the first modulus of elasticity may be within a range from about 0.1 lb. forces to about 0.5 lb. forces at a width loop tension of 40% or from about 0.1 lb. forces to about 0.3 lb. forces at a width loop tension of 40%, while the second modulus of elasticity may be within a range of about 0.5 lb. forces to about 1.5 lb. forces at a width loop tension of 40% or from about 0.8 lb. forces to about 1.3 lb. forces at a width loop tension of 40%. In one example aspect, the first modulus of elasticity in the widthwise direction may be about 0.3 lb. forces with a width loop tension of 40% while the second modulus of elasticity in the lengthwise direction may be greater than 0.3 lb. forces with a width loop tension of 40%, thus limiting the stretch in the lengthwise direction.

The open mesh structure of the spacer mesh material also allows for breathability and quick drying properties of the upper support panel **140**, which may provide increased comfort to the wearer. For example, in one aspect, the spacer mesh forming the upper support panel **140** may have an air permeability score, after three washes, within a range from about 200 $cm^3/s/cm^2$ to about 240 $cm^3/s/cm^2$, within a range from about 210 $cm^3/s/cm^2$ to about 230 $cm^3/s/cm^2$, within a range from about 215 $cm^3/s/cm^2$ to about 225 $cm^3/s/cm^2$, or about 221 $cm^3/s/cm^2$. Further, the spacer mesh material forming the upper support panel **140** may have an example dry time, after washes, within a range from about 10 minutes to about 15 minutes, within a range from about 11.5 minutes to 13.5 minutes, or about 12.46 minutes.

In contrast to the upper support panel **140**, the lower support panel **150** includes a non-spacer mesh material having different stretch properties than the spacer mesh material. In some aspects, the lower support panel **150** has a third modulus of elasticity within a range from about 1.5 lb. forces to about 3 lb. forces at a width loop tension of 40% or from about 1.5 lb. forces to about 2.2 lb. forces at a width loop tension of 40%. In some examples, the third modulus of elasticity may be about 2.2 lb. forces at a width loop tension of 40%.

In various aspects, the non-spacer mesh forming the lower support panel **150** includes anisotropic stretch properties such that the amount of stretch along the widthwise direction corresponding to axis **156** is different than the amount of stretch along the lengthwise direction corresponding to axis **158**. As such, the third modulus of elasticity of the lower support panel **150** may be in the widthwise direction is about 2.2 lb. forces at a width loop tension of 40%, while a fourth modulus of elasticity of the lower support panel **150** may be in the lengthwise direction. While the spacer material of the upper support panel **140** may have more stretch in the widthwise direction compared to the lengthwise direction, examples of the non-spacer material of the lower support panel **150** may have more stretch in the lengthwise direction than in the widthwise direction.

Additionally, in some aspects, the difference between the amount of stretch of the lower support panel **150** in the widthwise and lengthwise directions is less than the difference between the amount of stretch of the upper support panel **140** in the two directions. For example, the amount of stretch of the lower support panel **150** within the lengthwise direction may be within a range from about 1.1 to about 2.5 times, within a range from about 1.5 to about 2 times, or about 1.65 times the amount of stretch within the widthwise direction. In contrast, as previously stated, the amount of stretch of the upper support panel **140** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction.

The different mesh materials of the upper support panel **140** and the lower support panel **150** may be used to create increased support while still allowing for a bra that is breathable, lightweight, and quick drying. For example, the upper support panel **140** being formed from a material with less stretch in the lengthwise direction allows the upper support panel **140** to reduce vertical upward movement of the wearer's breasts during physical activity. At the same time, more stretch in the widthwise direction can provide for increased comfort and ease when donning and doffing the bra **100**.

Additionally, the open mesh structures of both the spacer mesh material of the upper support panel **140** and the non-spacer mesh material of the lower support panel **150** help to maintain the lightweight characteristic of the bra **100**. For example, in one aspect, the material of the lower support panel **150** has a weight from about 15 grams per square meter to about 200 grams per square meter. In another aspect, the material has a weight within a range from about 25 grams per square meter to about 180 grams per square meter. In one example aspect, the non-spacer mesh material of the lower support panel **150** may have a weight from about 25 grams per square meter to about 150 grams per square meter, or about 100 grams per square meter. In some aspects, the spacer mesh material of the upper support panel **140** may have a greater weight than the non-spacer mesh material of the lower support panel **150**. For example, the upper support panel **140** may have a weight within a range from about 100 grams per square meter to about 450 grams per square meter, within a range from about 200 grams to about 375 grams per square meter, or about 300 grams per square meter.

In some aspects, the front portion **110** of the bra **100** may include one or more additional layers to provide support and coverage. While the upper support panel **140** and the lower support panel **150** form an exterior portion of the front portion **110**, the front portion **110** may also include an interior support panel assembly **160** positioned interior to the upper support panel **140** and the lower support panel **150**.

FIGS. **3-4** depict a front view and an exploded view, respectively, of an example interior support panel assembly **160**. The interior support panel assembly **160** includes a plurality of panels of mesh materials, including a first panel **162** extending seamlessly from the right side **112** to the left side **114** of the front portion **110**. Adjacent to and external to the first panel **162** is a second panel **164** that also extends from the right side **112** to the left side **114** of the front portion **110**. Specifically, the second panel **164** may be positioned adjacent to and external to at least a portion of the exterior-

facing surface **196** of the first panel **162** such that the second panel **164** overlays at least a portion of the first panel **162**.

The first panel **162** and the second panel **164** each extend from the right side **112** to the left side **114** of the front portion **110** of the bra **100**. Thus, the first and second panels **162** and **164** may have the same or substantially the same width. The first panel **162** and the second panel **164** may also each extend from a top edge **184** to a bottom edge **186** of the front portion **110** of the bra **100**. Thus, the first and second panels **162** and **164** may have the same or substantially the same length. In other words, the first panel **162** and the second panel **164** may have substantially the same size and shape. As used herein, "substantially" refers to ±0.5 inch with reference to length, width, and size.

In various aspects, all or at least most of the first panel **162** is positioned underneath or interior to the second panel **164**. A right-side lateral edge **172** of the second panel **164** may align with a right-side lateral edge **192** of the first panel **162**, and a left-side lateral edge **174** of the second panel **164** may align with a left-side lateral edge **194** of the first panel **162** when the bra **100** is assembled. Further, the top edge **180** of the second panel **164** may align with the top edge **184** of the first panel **162** while the bottom edge **182** of the second panel **164** may align with the bottom edge **186** of the first panel **162** when the bra **100** is assembled. The first panel **162** and the second panel **164** may be joined together while maintaining their seamless constructions. For example, in some aspects, the first panel **162** and the second panel **164** are affixed along their respective perimeters while the surfaces of the panels **162** and **164** remain uncoupled. In this way, the first panel **162** and the second panel **164** have a greater range of motion relative to each other, providing more comfort to the wearer.

The first panel **162** and the second panel **164** of the interior support panel assembly **160** are both formed from mesh materials. In various aspects, the first panel **162** and the second panel **164** may be formed from mesh materials having different properties. For example, the first panel **162** may be formed from a non-spacer mesh material while the second panel **164** may be formed from a spacer mesh material having different properties, including different stretch properties, compared to the first panel **162**.

In various aspects, the non-spacer mesh material of the first panel **162** has anisotropic stretch properties such that the amount of stretch along the widthwise direction corresponding to axis **156** is different than the amount of stretch along the lengthwise direction corresponding to axis **158**. In other words, the first panel **162** may have a fifth modulus of elasticity in the widthwise direction and a sixth modulus of elasticity in the lengthwise direction that is less than the fifth modulus of elasticity. In example aspects, the first panel **162** includes the same non-spacer mesh material as the lower support panel **150** such that the first panel **162** may have the same stretch and weight properties describes with respect to the lower support panel **150**.

In other aspects, the first panel **162** may include a non-spacer mesh that has a lesser amount of stretch than the lower support panel **150**. For example, the non-spacer mesh material may include a warp knit mesh formed with polyester yarns and elastomeric yarns such as, for example SPANDEX® or elastane. In various aspects, the non-spacer mesh may include a combination of polyester and elastane. The amount of polyester forming the non-spacer mesh may be within a range from about 70% to about 85% or within a range from about 75% to about 80%, while the amount of elastane may be within a range from about 30% to about 15% or within a range from about 25% to about 20%. For example, in one aspect, the non-spacer mesh has a composition of about 78% polyester and about 22% elastane.

In contrast to the first panel **162**, the second panel **164** may be formed from a spacer mesh that may also have different amounts of stretch along different axes. For example, the second panel **164** may have more stretch in the widthwise direction corresponding to axis **156** compared to the lengthwise direction corresponding to axis **158**. In an example aspect, the spacer mesh forming the second panel **164** is the same material used to form the upper support panel **140** such that a seventh modulus of elasticity of the second panel **164** along the widthwise direction may be the same as the first modulus of elasticity of the upper support panel **140**. In some example aspects, the seventh modulus of elasticity along the widthwise direction may be within a range from about 0.1 lb. forces to about 0.5 lb. forces at a width loop tension of 40% or from about 0.1 lb. forces to about 0.3 lb. forces at a width loop tension of 40%, while an eighth modulus of elasticity along the lengthwise direction may be within a range of about 0.5 lb. forces to about 1.5 lb. forces at a width loop tension of 40% or from about 0.8 lb. forces to about 1.3 lb. forces at a width loop tension of 40%. In one aspect, the seventh modulus of elasticity along the widthwise direction may be about 0.3 lb. forces at a width loop tension at 40%, while the eighth modulus of elasticity along the lengthwise direction may be greater than 0.3 lb. forces with a width loop tension of 40%, thus limiting the stretch in the lengthwise direction. Additional properties, including stretch and weight, described with respect to the spacer mesh material of the upper support panel **140** may be applicable to the second panel **164**.

Layering the first panel **162** and the second panel **164** provides additional support and coverage of the wearer's breasts while still allowing the interior support panel assembly **160** to be breathable and quick drying due to the open mesh structures of the first panel **162** and the second panel **164**.

In various aspects, the interior support panel assembly **160** also includes a third panel **166** and a fourth panel **168** that are positioned adjacent to and external to the second panel **164**. Specifically, each of the third panel **166** and the fourth panel **168** may be positioned adjacent to at least a portion of the exterior-facing surface **198** of the second panel **164** such that the third panel **166** and the fourth panel **168** each overlay at least a portion of the second panel **164**.

In example aspects, the third panel **166** and the fourth panel **168** each include a warp-knit tricot material. In one aspect, the tricot material is formed of nylon yarns. The tricot material of the third panel **166** and the fourth panel **168** may include a low stretch characteristic. For example, the tricot material may have minimal to zero stretch in at least one direction. As such, the third panel **166** and the fourth panel **168** each have a ninth modulus of elasticity that is greater than at least the seventh modulus of elasticity of the second panel **164**. The higher modulus of elasticity (and, thus, less stretch) of the third panel **166** and the fourth panel **168** provides additional support and durability to breast-covering regions of the front portion **110** of the bra **100**.

The third panel **166** and the fourth panel **168** may be configured to cover a majority of or all of the wearer's breast tissue such that the decreased stretch provided by the third panel **166** and the fourth panel **168** provides additional support directly to the wearer's breasts. For example, the third panel **166** may be positioned towards the right side **112** of the front portion **110** to cover a wearer's right breast while the fourth panel **168** may be positioned towards the left side **114** to cover a wearer's left breast. In various aspects, the

third panel **166** includes a right-side lateral edge **176** that aligns with the right-side lateral edge **172** of the second panel **164**, and the fourth panel **168** includes a left-side lateral edge **178** that aligns with the left-side lateral edge **174** of the second panel **164**.

The third panel **166** and the fourth panel **168** may be the same or substantially the same size and shape. For example, the third panel **166** and the fourth panel **168** may be mirror-images of each other. In aspects where the third panel **166** and the fourth panel **168** are secured to the second panel **164**, the third panel **166** and the fourth panel **168** may be spaced apart so they do not directly contact one another. As such, there may be a minimum spacing **188** between the third panel **166** and the fourth panel **168** to allow for space between the low stretch material in a medial area of the interior support panel assembly **160**. This medial area may align with an area between the wearer's breasts in which undesirable perspiration may collect during physical activity. The minimum spacing **188** at this medial area allows for easier donning and doffing of the bra **100**, as well as increased breathability between the breasts.

In various aspects, the third panel **166** and the fourth panel **168** are coupled to the second panel **164** by stitching. For example, the third panel **166** and the fourth panel **168** each may be coupled to the second panel **164** with one or more lines of interlocking stitches **190** that also add support within a breast-contacting region by limiting stretch at the seam lines.

FIG. **5** depicts a partially exploded view of the front portion **110** of the bra **100**. The interior support panel assembly **160** (as depicted in the view in FIG. **5**) is positioned interior to the upper support panel **140** and the lower support panel **150**. In aspects in which the upper support panel **140** and the lower support panel **150** overlap, at least a portion of the upper support panel **140** may be positioned interior to the lower support panel **150**.

FIG. **6** depicts a back view of the bra **100**. As illustrated in this back view, the first panel **162** of the interior support panel assembly **160** forms the innermost layer of the front portion **110** of the bra **100**. Additionally, when the interior support panel assembly **160** is coupled to the upper support panel **140**, the upper support panel top edge **142** may be positioned superior to the top edge **184** of the first panel **162** of the interior support panel assembly **160**. Although not visible in the view depicted in FIG. **6**, in aspects in which the second panel **164** of the interior support panel assembly **160** aligns with the first panel **162**, the upper support panel top edge **142** may similarly be positioned superior to the top edge **180** of the second panel **164**. This arrangement permits additional coverage of a wearer's upper breasts by the upper support panel **140** while limiting the number of panels of material over the wearer's upper breasts, thereby increasing breathability and comfort.

FIG. **6** also depicts a back portion **120** of the bra **100**. The back portion **120** may include a back panel **210**, a lower band **220**, and a pair of back shoulder straps **230**. The back panel **210** may extend from the right side **112** of the bra **100** to the left side **114** of the bra **100** and be configured to cover at least a portion of a wearer's back. In various aspects, the back panel **210** is joined to one or more panels of the front portion **110** along seams at the right side **112** and the left side **114**. In alternative aspects, the back panel **210** is continuous with one or more panels of the front portion **110**, such as, for example, the first panel **162** of the interior support panel assembly **160**.

In various aspects, the back panel **210** includes a mesh material. Specifically, the back panel **210** may be formed from a non-spacer mesh material. In various aspects, the back panel **210** is formed with a different non-spacer mesh material than the non-spacer mesh material forming the lower support panel **150**. In some aspects, the non-spacer mesh material forming the back panel **210** has less stretch than the non-spacer mesh material forming the lower support panel **150**. The back panel **210** may have different amounts of stretch along the widthwise axis **156** and the lengthwise axis **158**. In some aspects, the back panel **210** has a greater amount of stretch (and thus a lower modulus of elasticity) along the lengthwise direction compared to the widthwise direction.

In example aspects, the back panel **210** may include a warp knit mesh. Further, the back panel **210** may be formed with polyester yarns and elastomeric yarns such as, for example SPANDEX® or elastane. In various aspects, the non-spacer mesh of the back panel **210** may include a combination of polyester and elastane. The amount of polyester forming the non-spacer mesh may be within a range from about 70% to about 85% or within a range from about 75% to about 80%, while the amount of elastane may be within a range from about 30% to about 15% or within a range from about 25% to about 20%. For example, in one aspect, the non-spacer mesh has a composition of about 78% polyester and about 22% elastane. Additionally, non-spacer mesh of the back panel **210** may be heavier than the non-spacer mesh of the lower support panel **150**. In some aspects, the mesh forming the back panel **210** may have a weight within a range from about 190 grams per square meter to about 240 grams per square meter or from about 105 grams per square meter to about 225 grams per square meter. For example, in one aspect, the weight is about 216 grams per square meter. Although heavier in weight, the back panel **210** may be breathable and dry quickly due to the open mesh structure.

The back panel **210** may be coupled to or at least proximate to a top edge **224** of the lower band **220**. The lower band **220** may include an elastic band that at least partially encircles the wearer's torso. The lower band **220** may make up at least a portion of an underband of the bra **100** such that the bottom edge **222** of the lower band **220** may form a lower margin **124** of the back portion **120** of the bra **100**. In various aspects, the lower band **220** is omitted on the front portion **110** of the bra **100**, extending across only the back portion **120** of the bra **100** and joining one or more panels of the front portion **110** at the right side **112** and the left side **114**. Alternatively, the lower band **220** may extend across the front portion **110** as well so that the lower band **220** may be configured to completely encircle the torso of the wearer when the bra **100** is in an as-worn configuration. In this example, the lower band **220** may be positioned between the lower support panel **150** and the second panel **164** of the interior support panel assembly **160** or may be positioned between the second panel **164** and the first panel **162** of the interior support panel assembly **160**.

In various aspects, the lower band **220** includes a plurality of apertures to increase air flow to the wearer's skin. In some aspects, different size apertures are positioned throughout the lower band **220**. For example, in FIG. **6**, a top portion of the lower band **220** includes apertures **226** of a first size and the bottom portion of the lower band **220** includes apertures **228** of a second size that is larger than the first size.

The back panel **210** may also be coupled to the back shoulder straps **230**, which may each include an elastic strap with an adjustment mechanism **232**, such as the strap slides depicted in FIG. **6**. The back shoulder straps **230** may be coupled to the front shoulder straps **130** of the front portion

110. In some aspects, when the bra **100** is worn, the front shoulder straps **130** each extend over the apex of a wearer's shoulder such that the front shoulder straps **130** extend at least partly down the wearer's back before coupling with the back shoulder straps **230**.

The back portion **120** may also include one or more closure mechanisms. For example, the back portion **120** in FIG. **6** includes a first clasp **212** for releasably coupling two ends of the lower band **220** and a second clasp **214** for releasably coupling two portions of the back panel **210**. It is contemplated, however, that bra **100** may have more, may have less, or may have no releasable closure mechanisms.

FIG. **7** depicts a front perspective view of the bra **100** with a partially exploded view **132** of one of the front shoulder straps **130**. As illustrated, in example aspects, the front shoulder straps **130** may have a two-layered construction. A first strap panel **134** of the front shoulder strap **130** may be exterior to and overlay a second strap panel **136** of the front shoulder strap **130**. The first strap panel **134** and the second strap panel **136** may be formed with different types of mesh materials. For example, the first strap panel **134** may include a spacer mesh material while the second strap panel **136** may include a non-spacer mesh material. In various aspects, the first strap panel **134** is formed with the same spacer mesh material as the upper support panel **140** while the second strap panel **136** may be formed from the same non-spacer mesh material as the first panel **162** of the interior support panel assembly **160** or as the lower support panel **150**. Because the spacer mesh material may have less stretch in the lengthwise direction, forming the first strap panel **134** from the spacer mesh material reduces stretch in the lengthwise direction, which helps maintain support to the wearer's breasts, while still providing comfort and ease in donning and doffing due to more stretch in the widthwise direction.

FIG. **8** depicts a front view of the bra **100** in the as-worn configuration. In some aspects in which there is overlap between the upper support panel **140** and the lower support panel **150**, the lower support panel **150** may be positioned external to the upper support panel **140**, and at least a portion of the lower support panel top edge **152** may remain unsecured from the upper support panel **140**. For example, in FIG. **8**, at least a portion of the lower support panel top edge **152** is not secured to the upper support panel **140**, allowing the wearer to access a pocket space **200** between the lower support panel **150** and the interior support panel assembly **160** by pulling down on the unsecured portion of the lower support panel top edge **152**, which acts as a pocket opening. The pocket space **200** between the lower support panel **150** and the interior support panel assembly **160** may be used by the wearer to store items, such as a mobile phone, a key, or an identification card.

FIG. **9** depicts a flow diagram of an example method **900** of manufacturing a bra, such as the bra **100**. The bra manufactured in accordance with method **900** includes a right side, a left side, an upper margin, and a lower margin. At step **910**, a front portion of the bra is formed. Forming a front portion, such as the front portion **110**, of the bra may include steps **912** and **914**. At step **912**, an upper support panel, such as the upper support panel **140**, may be affixed at one or more locations to an interior support panel assembly, such as the interior support panel assembly **160**. The upper support panel may be affixed to the interior support panel assembly such that the upper support panel is positioned adjacent to a first surface, such as the exterior-facing surface **198**, of the interior support panel assembly. At step **914**, a lower support panel, such as the lower support panel **150**, may be affixed at one or more locations to the interior support panel assembly. The lower support panel may be affixed to the interior support panel assembly such that the lower support panel is also positioned adjacent to the first surface of the interior support panel assembly. Affixing the lower support panel and the upper support panel to the interior support panel assembly may include stitching each of the lower support panel and the upper support panel to the interior support panel assembly along the perimeter edges of the respective panels; however, it is contemplated that other means of affixing the panels may be used, such as tacking, adhesive, or bonding.

The upper support panel may include an upper support panel bottom edge, such as the upper support panel bottom edge **144**, while the lower support panel may include a lower support panel top edge, such as the lower support panel top edge **152**. Affixing the lower support panel to the interior support panel assembly at step **914** may include positioning the lower support panel such that the lower support panel top edge is positioned inferior to at least a portion, such as the middle portion **146**, of the upper support panel bottom edge. Additionally, in various aspects, the upper support panel also includes an upper support panel top edge, such as the upper support panel top edge **142**, that forms an upper margin of the front portion of the bra while the lower support panel also includes a lower support panel bottom edge, such as the lower support panel bottom edge **154**, that forms a lower margin of the front portion. In some aspects, the one or more locations for affixing the upper support panel to the interior support panel assembly are along the left side, the right side, and the upper support panel top edge while the upper support panel bottom edge may remain unsecured to the interior support panel assembly. Alternatively, the upper support panel bottom edge may also be affixed to the interior support panel assembly. Additionally, the one or more locations for affixing the lower support panel to the interior support panel assembly are along the left side, the right side, and the lower support panel bottom edge while the lower support panel top edge may remain unsecured to the interior support panel assembly. Alternatively, the lower support panel top edge may also be affixed to the interior support panel assembly.

In some aspects, the method **900** also includes forming the interior support panel assembly by affixing a first panel, such as the first panel **162**, at one or more locations to a second panel, such as the second panel **164**, such that the second panel is positioned adjacent to a second surface, such as the exterior-facing surface **196**, of the first panel. In various aspects, the first panel and the second panel are substantially the same shape and size, and they may be affixed together only along their perimeters. Forming the interior support panel assembly may occur prior to steps **912** and **914**, and the first surface to which the upper support panel and the lower support panel are adjacent may be a surface, such as the exterior-facing surface **198**, of the second panel.

In some aspects, forming the interior support panel assembly may also include affixing a third panel, such as the third panel **166**, and a fourth panel, such as the fourth panel **168**, at one or more locations to the second panel such that the third panel and the fourth panel are each positioned adjacent to a third surface, such as the exterior-facing surface **198**, of the second panel. Affixing the third panel and the fourth panel may include forming one or more sets of interlocking stitches, such as the interlocking stitches **190**, between the third panel and the second panel and forming one or more sets of interlocking stitches between the fourth panel and the second panel. Additionally, at least one set of interlocking stitches may extend within the middle of the third panel such that the stiches are not limited to the

perimeter of the third panel and at least one set of interlocking stitches may extend within the middle of the fourth panel such that stitches are not limited to the perimeter of the fourth panel.

In various aspects, the method **900** also includes a step for affixing the front portion to a back portion, such as the back portion **120**, of the bra. The method **900** also includes affixing the front portion to one or more shoulder straps, such as the front shoulder straps **130**. The method **900** may include additional steps further contemplated within the present disclosure.

FIG. **10** depicts a front view of a bra **1100**. In various aspects, the bra **1100** may be targeted to a wearer desiring a medium level support as opposed to the bra **100** shown in FIGS. **1-8**, which may be targeted to a wearer desiring a high level of support. The bra **1100** includes a front portion **1110** that generally covers at least a portion of the wearer's chest when the bra **1100** is in an as-worn configuration and a back portion **1120** that generally covers at least a portion of the wearer's back when the bra **1100** is in the as-worn configuration. The front portion **1110** of the bra **1100** may also include a pair of front shoulder straps **1130** each extending from the front portion **1110** towards the back portion **1120**. Additionally, the front portion **1110** may be secured to a lower band **1140** configured to extend around at least a portion of the wearer's torso. In some aspects, the front portion **1110** also includes an elastic textile strip **1148** extending vertically between a neckline **1116** of the bra **1100** and the lower band **1140**.

The front portion **1110** has a width extending between a right side **1112** and a left side **1114** of the bra **1100**. The width of the front portion **1110** between the right side **1112** and the left side **1114** may extend across the wearer's breasts when the bra **1100** is in the as-worn configuration. Thus, the front portion **1110** may be referred to as a breast-covering portion.

In various aspects, the front portion **1110** includes a plurality of mesh panels that at least partially overlap each other. For example, FIG. **10** depicts the front portion **1110** including an exterior panel **1160** and an interior panel **1150**. The exterior panel **1160** extends adjacent and external to the interior panel **1150**. The exterior panel **1160** and the interior panel **1150** may both extend from the right side **1112** to the left side **1114** of the front portion **1110**, and in example aspects, the exterior panel **1160** and the interior panel **1150** each extend seamlessly between the two sides **1112** and **1114**.

FIG. **11** depicts an exploded view of the front portion **1110** of the bra **1100**. The exterior panel **1160** may include a first exterior panel **1162** and a second exterior panel **1164**. The first exterior panel **1162** may be positioned adjacent and external to at least a portion of an exterior-facing surface **1198** of the second exterior panel **1164**. Additionally, the first exterior panel **1162** and the second exterior panel **1164** may have the same or substantially the same width. For example, both panels may extend seamlessly from the right side **1112** to the left side **1114** of the bra **1100** such that a right-side lateral edge **1172** of the first exterior panel **1162** aligns with a right-side lateral edge **1176** of the second exterior panel **1164** and a left-side lateral edge **1174** of the first exterior panel **1162** aligns with a left-side lateral edge **1178** of the second exterior panel **1164**. Further, in some aspects, the first exterior panel **1162** and the second exterior panel **1164** may be of the same shape and size. Additionally, in example aspects, the entire first exterior panel **1162** may overlay the entire second exterior panel **1164**. In this way, the second exterior panel **1164** may act as a lining to the first exterior panel **1162** in forming the exterior panel **1160**. The first exterior panel **1162** and the second exterior panel **1164** may be joined while maintaining their seamless constructions to provide a greater range of movement with respect to the adjacent surfaces of the panels **1162** and **1164**. For example, the first exterior panel **1162** and the second exterior panel **1164** may be affixed together along the perimeters of the respective panels while the surfaces are otherwise decoupled from each other. Alternatively, the first exterior panel **1162** may be bonded to the second exterior panel **1164**.

Similarly, the interior panel **1150** and the exterior panel **1160** may be joined by affixing the interior panel **1150** and the exterior panel **1160** together along their perimeters while surfaces are otherwise decoupled from each other, providing a greater range a movement within the front portion **1110** of the bra **1100**. When the interior panel **1150** and the exterior panel **1160** are joined, the second exterior panel **1164** may be positioned adjacent and external to at least a portion of an exterior-facing surface **1196** of the interior panel **1150**. Additionally, the exterior panel **1160** and the interior panel **1150** may have the same or substantially the same width. For example, as each panel extends seamlessly from the right side **1112** to the left side **1114** of the bra **1100**, a right-side lateral edge **1192** of the interior panel **1150** may align with the right-side lateral edge **1172** of the first exterior panel **1162** and the right-side lateral edge **1176** of the second exterior panel **1164** while the left-side lateral edge **1194** of the interior panel **1150** may align with the left-side lateral edge **1174** of the first exterior panel **1162** and the left-side lateral edge **1178** of the second exterior panel **1164**. In various aspects, the entire exterior panel **1160** overlays the interior panel **1150**. As depicted in FIG. **11**, the shape of the exterior panel **1160** may be different than the shape of the interior panel **1150**. Thus, one or more portions of the exterior-facing surface **1196** of the interior panel **1150** may be visible when the exterior panel **1160** is positioned over the interior panel **1150**.

In various aspects, one or more panels of the front portion **1110** may be formed from a mesh material. Further, different mesh materials may be utilized to form different panels of the front portion **1110**. For example, the exterior panel **1160** may include a spacer mesh material and a non-spacer mesh material while the interior panel **1150** may include a non-spacer mesh material having different properties, including differing stretch properties, as the spacer mesh material used to at least partially form the exterior panel **1160**. In various aspects, the first exterior panel **1162** may include the spacer mesh material, while the second exterior panel **1164** may also be formed from a non-spacer mesh material having different stretch properties.

For example, in various aspects, the first exterior panel **1162** may be formed from a spacer mesh material similar to the spacer mesh material forming the upper support panel **140** and/or the second panel **164** of the bra **100**. As such, the first exterior panel **1162** may have anisotropic stretch properties such that the amount of stretch differs along different axes. For example, the first exterior panel **1162** may have more stretch in the widthwise direction corresponding to axis **1156** compared to the lengthwise direction corresponding to axis **1158**. For instance, the amount of stretch of the first exterior panel **1162** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction.

In example aspects, the first exterior panel **1162** has a first modulus of elasticity along the widthwise direction that is within a range from about 0.1 lb. forces to about 0.5 lb.

forces with a width loop tension at 40% or from about 0.1 lb. forces to about 0.3 lb. forces at a width loop tension of 40%, and a second modulus of elasticity along the lengthwise direction that is within a range of about 0.5 lb. forces to about 1.5 lb. forces at a width loop tension of 40% or from about 0.8 lb. forces to about 1.3 lb. forces at a width loop tension of 40%. For example, the first modulus of elasticity may be about 0.3 lb. forces with a width loop tension at 40%, while the second modulus of elasticity in the lengthwise direction may be a greater than 0.3 lb. forces with a width loop tension of 40%, thus limiting the stretch in the lengthwise direction.

In contrast to the first exterior panel **1162**, the second exterior panel **1164** may include a non-spacer mesh, which may have less stretch than the spacer mesh material forming the first exterior panel **1162**. For example, the second exterior panel **1164** may have a third modulus of elasticity in at least one direction that is within a range from about 2.5 lb. forces to about 5.0 lb. forces at a width loop tension of 40%.

The non-spacer mesh of the second exterior panel **1164** may have different amounts of stretch along the widthwise direction corresponding to axis **1156** and the lengthwise direction corresponding to axis **1158**. For example, the third modulus of elasticity of the second exterior panel **1164** may be in the widthwise direction, and a fourth modulus of elasticity may be in the lengthwise direction. While the spacer material of the first exterior panel **1162** may have more stretch in the widthwise direction compared to the lengthwise direction, examples of the non-spacer material of the second exterior panel **1164** may have more stretch in the lengthwise direction than in the widthwise direction. Additionally, in some aspects, the difference between the amount of stretch of the second exterior panel **1164** in the widthwise and lengthwise directions is less than the difference between the amount of stretch of the first exterior panel **1162** in the two directions. For example, the amount of stretch of the second exterior panel **1164** within the lengthwise direction may be within a range from about 1.1 to about 2.5 times, within a range from about 1.5 to about 2 times, or about 1.65 times the amount of stretch within the widthwise direction. In contrast, the amount of stretch of the first exterior panel **1162** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction.

In other aspects, the non-spacer mesh is a warp-knit material. For example, the non-spacer mesh may include a combination of polyester yarns and elastomeric yarns such as, for example SPANDEX® or elastane. The amount of polyester forming the non-spacer mesh may be within a range from about 70% to about 85% or within a range from about 75% to about 80%, while the amount of elastane may be within a range from about 30% to about 15% or within a range from about 25% to about 20%. For example, in one aspect, the non-spacer mesh has a composition of about 78% polyester and about 22% elastane.

Additionally, the mesh forming the second exterior panel **1164** may have a weight within a range from about 190 grams per square meter to about 240 grams per square meter or from about 105 grams per square meter to about 225 grams per square meter. For example, in one aspect, the weight is about 216 grams per square meter. The weight of the material forming the second exterior panel **1164** may help provide coverage of and support within a breast-contacting region while the open mesh structure creates a highly breathable and quick drying panel.

Further, the interior panel **1150** may include a non-spacer mesh material that has less stretch than the spacer mesh material forming the first exterior panel **1162**. For example, the interior panel **1150** may have a fifth modulus of elasticity in at least one direction that is within a range from about 1.5 lb. forces to about 3 lb. forces at a width loop tension of 40% or from about 1.5 lb. forces to about 2.2 lb. forces at a width loop tension of 40%.

The non-spacer mesh of the interior panel **1150** may have different amounts of stretch along the widthwise direction corresponding to axis **1156** and the lengthwise direction corresponding to axis **1158**. In some aspects, the fifth modulus of elasticity of the interior panel **1150** is in the widthwise direction, and the interior panel **1150** includes a sixth modulus of elasticity in the lengthwise direction. While the spacer material of the first exterior panel **1162** may have more stretch in the widthwise direction compared to the lengthwise direction, examples of the non-spacer material of the interior panel **1150** may have more stretch in the lengthwise direction than in the widthwise direction. Additionally, in some aspects, the difference between the amount of stretch of the interior panel **1150** in the widthwise and lengthwise directions is less than the difference between the amount of stretch of the first exterior panel **1162** in the two directions. For example, the amount of stretch of the interior panel **1150** within the lengthwise direction may be within a range from about 1.1 to about 2.5 times, within a range from about 1.5 to about 2 times, or about 1.65 times the amount of stretch within the widthwise direction. In contrast, as previously stated, the amount of stretch of the first exterior panel **1162** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction.

In example aspects, the non-spacer mesh material of the interior panel **1150** may be different than the non-spacer mesh material of the second exterior panel **1164**. For example, the weight (in grams per square meter) of the non-spacer mesh material of the interior panel **1150** may be less than the weight of the non-spacer mesh of the second exterior panel **1164**. In some aspects, the non-spacer mesh of the interior panel **1150** has a weight within a range from about 15 grams per square meter to about 200 grams per square meter or from 25 grams per square meter to about 180 grams per square meter. For instance, the interior panel **1150** may have a weight of 100 grams per square meter. Utilizing a lighter weight material for the interior panel **1150** helps maintain a lightweight characteristic of the bra **1100** overall. Similar to the first exterior panel **1162** and the second exterior panel **1164**, the open mesh structure of the interior panel **1150** may create a highly breathable and quick drying panel.

Additionally, FIG. **11** depicts exterior strap panels **1180**, which may be formed from a spacer mesh material similar to the material forming the first exterior panel **1162**. Because the spacer mesh material may have less stretch in the lengthwise direction, forming the exterior strap panels **1180** from the spacer mesh material reduces stretch in the lengthwise direction, which maintains support to the wearer's breasts while still providing stretch in the widthwise direction to allow for increased comfort and ease when donning and doffing the bra **1100**.

The exterior strap panels **1180** may form an exterior layer of the front shoulder straps **1130** of the bra **1100**. Where the breast-contacting region of the front portion **1110** may have a three-layered construction that aids in the increased support and desired coverage, the front shoulder straps **1130**

may have a two-layered construction. For example, the two exterior strap panels **1180** in FIG. **11** may each overlay a strap portion **1182** of the interior panel **1150** to form the front shoulder straps **1130**. This two-layered construction aids in breathability and allows for a quick drying time, while maintaining lightweight characteristics of the bra.

FIG. **12** depicts a back view of the bra **1100**. The back portion **1120** of the bra **1100** includes a back panel **1200**, which may extend seamlessly from the right side **1112** to the left side **1114** of the bra **1100**. In example aspects, the back panel **1200** includes a non-spacer mesh material, which allows for breathability and quick drying. In various aspects, the back panel **1200** includes the same non-spacer mesh material as the second exterior panel **1164** of the exterior panel **1160**. In alternative aspects, the back panel **1200** includes the same non-spacer mesh material as the interior panel **1150**.

The back panel **1200** is secured to each of the front shoulder straps **1130** and the lower band **1140**. The lower band **1140** may be secured to the back panel **1200** and one or more panels of the front portion **1110** of the bra **1100** and may comprise an elastic textile material that encircles the wearer's torso. The lower band **1140** may extend continuously along the back portion **1120** from at least the right side **1112** to the left side **1114** of the bra **1100** such that the bra **1100** may be donned and doffed by pulling the bra **1100** over the wearer's head. It is contemplated, however, that alternative configurations of the bra **1100** include one or more releasable coupling mechanisms attached to ends of the lower band **1140**.

In various aspects, the lower band **1140** includes a plurality of apertures to increase air flow to the wearer's skin. In some aspects, different sized apertures are positioned throughout the lower band **1140**. For example, in FIG. **12**, a top portion of lower band **1140** includes apertures **1142** of a first size, and a bottom portion of the lower band **1140** includes apertures **1144** of a second size that is larger than the first size. In some aspects, the back portion **1120** of the bra **1100** also includes an elastic band **1210** extending vertically from a top edge **1212** of the back panel **1200** to the lower band **1140** and positioned external to the back panel **1200**. The elastic band **1210** may also include a plurality of apertures of the same or varying sizes, which increase breathability and allow for a lightweight construction and quick drying time.

FIG. **13** depicts a front view of a bra **1300**. In various aspects, the bra **1300** may be targeted toward a wearer desiring a light level support, as opposed to the bra **100** of FIGS. **1-8** and bra **1100** of FIGS. **10-12**, which may be targeted toward a wearer desiring high and medium levels of support, respectively. The bra **1300** includes a front portion **1310** that typically covers at least a portion of the wearer's chest when the bra **1300** is in an as-worn configuration and a back portion **1320** that typically covers at least a portion of the wearer's back when the bra **1300** is in the as-worn configuration. The front portion **1310** of the bra **1300** may also include a pair of shoulder straps **1330** that each extend from the front portion **1310** towards the back portion **1320**.

In some aspects, the front portion **1310** is secured to a lower band **1370**. The lower band **1370** may include an elastic textile material that is configured to at least partially encircle the wearer's torso when the bra **1300** is in the as-worn configuration. As such, the lower band **1370** may be secured to one or more panels of the front portion **1310** of the bra **1300**. In various aspects, the lower band **1370** includes a plurality of apertures, which increases breathability and allows for a lightweight construction and quick drying time. In some aspects, the lower band **1370** includes apertures of varying sizes. For example, in FIG. **13**, a top portion of the lower band **1370** includes apertures **1372** of a first size, and a bottom portion of the lower band **1370** includes apertures **1374** of a second size that is larger than the first size. Varying the size of apertures in the lower band **1370** may, for example, direct airflow toward areas of the wearer in which increased airflow is desired.

The front portion **1310** of the bra **1300** has a width extending between a right side **1312** and a left side **1314** of the bra **1300**. The width of the front portion **1310** between the right side **1312** and the left side **1314** may extend across the wearer's breasts when the bra **1300** is in the as-worn configuration. Thus, the front portion **1310** may be referred to as a breast-covering portion.

In some aspects, the front portion **1310** includes a plurality of mesh panels that at least partially overlap each other. For example, FIG. **13** depicts the front portion **1310** including an exterior panel **1360** extending seamlessly from the right side **1312** to the left side **1314** of the front portion **1310**. The front portion **1310** also includes a first interior panel **1340** and a second interior panel **1350**. The exterior panel **1360** may extend adjacent and external to both the first interior panel **1340** and the second interior panel **1350**. The first interior panel **1340** may be adjacent the right side **1312** of the front portion **1310** and generally configured to cover a wearer's right breast, while the second interior panel **1350** may be adjacent the left side **1314** of the front portion **1310** and generally configured to cover a wearer's left breast. In some aspects, the first interior panel **1340** and the second interior panel **1350** may be generally the same size and shape such that they are mirror images of each other when incorporated into the front portion **1310** of the bra **1300**.

FIG. **14** depicts an exploded view of the front portion **1310** of the bra **1300**. The exterior panel **1360** includes a first exterior panel **1362** and a second exterior panel **1364**. The first exterior panel **1362** is adjacent and external to at least a portion of an exterior-facing surface **1398** of the second exterior panel **1364**. In some aspects, the first exterior panel **1362** and the second exterior panel **1364** have the same or substantially the same width. For example, both panels may extend seamlessly from the right side **1312** to the left side **1314** of the bra **1300**. Further, in some aspects, the first exterior panel **1362** and the second exterior panel **1364** may have the same size and shape. However, panels having different sizes and shapes are also contemplated herein. In various aspects, the entire first exterior panel **1362** overlays the entire second exterior panel **1364**. In this way, the second exterior panel **1364** may act as a lining to the first exterior panel **1362** to form the exterior panel **1360**. The first exterior panel **1362** and the second exterior panel **1364** may be joined while maintaining their seamless constructions to provide a greater range of movement. For example, the first exterior panel **1362** and the second exterior panel **1364** may be affixed together along the perimeters of the respective panels while the surfaces are otherwise decoupled from each other. Alternatively, the first exterior panel **1362** may be bonded to the second exterior panel **1364**.

In some aspects, the exterior panel **1360** is positioned adjacent and external to the interior panels **1340** and **1350**. More specifically, a first portion of the second exterior panel **1364** is positioned adjacent and external to at least a portion of an exterior-facing surface **1394** of the first interior panel **1340**, and a second portion of the second exterior panel **1364** is positioned adjacent and external to at least a portion of an exterior-facing surface **1396** of the second interior panel **1350**. As such, the second exterior panel **1364** is positioned

between the first exterior panel **1362** and the first and second interior panels **1340** and **1350**, respectively.

In various aspects, the first and second interior panels **1340** and **1350** are joined to the exterior panel **1360** along a portion of the perimeter of the first and second interior panels **1340** and **1350**. For example, an area immediately adjacent the bottom edge **1390** of the first interior panel **1340** may be joined to an area immediately adjacent a bottom edge **1382** of the second exterior panel **1364**, while the exterior-facing surface **1394** and side edges of the first interior panel **1340** may be otherwise decoupled from the second exterior panel **1364**. Similarly, an area immediately adjacent the bottom edge **1392** of the second interior panel **1350** may be joined to an area immediately adjacent a bottom edge **1384** of the second exterior panel **1364**, while the exterior-facing surface **1396** and side edges of the second interior panel **1350** may be otherwise decoupled from the second exterior panel **1364**. In some aspects, the top edges **1386** and **1388** of first exterior panel **1362** and the second exterior panel **1364** are also decoupled from the second exterior panel **1364** but may each be secured to a shoulder strap **1330**. This arrangement, for example, permits a greater range of movement. In alternative aspects, the top edges **1386** and **1388** may be affixed to a portion of the second exterior panel **1364**.

In various aspects, one or more panels of the front portion **1310** may be formed from a mesh material. Further, different mesh materials may be utilized to form different panels of the front portion **1310**. For example, the exterior panel **1360** may include a spacer mesh material and a non-spacer mesh material, while the first interior panel **1340** and the second interior panel **1350** may include a non-spacer mesh material having different properties (e.g., differing stretch properties) than the spacer mesh material. Similarly, the first exterior panel **1362** may include the spacer mesh material while the second exterior panel **1364** may include a non-spacer mesh material having different stretch properties.

For example, the first exterior panel **1362** may be formed from a spacer mesh material similar to the spacer mesh material forming the upper support panel **140** and/or the second panel **164** of the bra **100**. As such, the first exterior panel **1362** may have anisotropic stretch properties such that the amount of stretch differs along different axes. For example, the first exterior panel **1362** may have more stretch (and thus, a lower modulus of elasticity) in the widthwise direction corresponding to axis **1356** compared to the lengthwise direction corresponding to axis **1358**. The amount of stretch of the first exterior panel **1362** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction. In an example aspect, the first exterior panel **1362** has a first modulus of elasticity along the widthwise direction that is within a range from about 0.1 lb. forces to about 0.5 lb. forces at a width loop tension of 40% or from 0.1 lb. forces to about 0.3 lb. forces at a width loop tension of 40%, and a second modulus of elasticity along the lengthwise direction within a range from about 0.5 lb. forces to 1.5 lb. forces at a width loop tension of 40% or from about 0.8 lb. forces to about 1.3 lb. forces at a width loop tension of 40%. For example, the first modulus of elasticity in the widthwise direction may be about 0.3 lb. forces at a width loop tension of 40%, while the second modulus of elasticity in the lengthwise direction may be greater than 0.3 lb. forces with a width loop tension of 40%, thus limiting stretch in the lengthwise direction.

In contrast to the first exterior panel **1362**, the second exterior panel **1364** may be formed of a non-spacer mesh material having less stretch than the first exterior panel **1362** in at least one direction. For example, a third modulus of elasticity of the second exterior panel **1364** may be within a range from about 2.5 lb. forces to about 5.0 lb. forces at a width loop tension of 40%. In various aspects, the second exterior panel **1364** has different amounts of stretch along the widthwise direction corresponding to axis **1356** and the lengthwise direction corresponding to axis **1358**. For example, the third modulus of elasticity of the second exterior panel **1364** may be along the widthwise direction, and the second exterior panel **1364** may have a fourth modulus of elasticity the lengthwise direction. While the spacer material of the first exterior panel **1362** may have more stretch in the widthwise direction compared to the lengthwise direction, examples of the non-spacer material of the second exterior panel **1364** may have more stretch in the lengthwise direction than in the widthwise direction.

Additionally, in some aspects, the difference between the amount of stretch of the second exterior panel **1364** in the widthwise direction and lengthwise direction is less than the difference between the amount of stretch of the first exterior panel **1362** in the two directions. For example, the amount of stretch of the second exterior panel **1364** within the lengthwise direction may be within a range from about 1.1 to about 2.5 times, within a range from about 1.5 to about 2 times, or about 1.65 times the amount of stretch within the widthwise direction. In contrast, the amount of stretch of the first exterior panel **1362** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction.

In other aspects, the non-spacer mesh is a warp-knit material. For example, the non-spacer mesh may include a combination of polyester yarns and elastomeric yarns such as SPANDEX® or elastane. For example, in one aspect, the non-spacer mesh has a composition of approximately 78% polyester and approximately 22% elastane.

Additionally, the mesh forming the second exterior panel **1364** may have a weight within a range from about 190 grams per square meter to about 240 grams per square meter or from about 105 grams per square meter to about 225 grams per square meter. For example, in one aspect, the weight is approximately 216 grams per square meter. The weight of the material forming the second exterior panel **1364** may help provide support within a breast-contacting region while the open mesh structure increases breathability and allows for a quick drying panel.

Further, each of the first interior panel **1340** and the second interior panel **1350** may also include a non-spacer mesh material that has less stretch than the spacer mesh material forming the first exterior panel **1362**. For example, the first interior panel **1340** and the second interior panel **1350** each may have a fifth modulus of elasticity in at least one direction that is within a range from about 1.5 lb. forces to about 3 lb. forces at a width loop tension of 40% or from about 1.5 lb. forces to about 2.2 lb. forces at a width loop tension of 40%.

The non-spacer mesh material of the first interior panel **1340** and the second interior panel **1350** may have different amounts of stretch along the widthwise direction corresponding to axis **1356** and the lengthwise direction corresponding to axis **1358**. In some aspects, the fifth modulus of elasticity of the first interior panel **1340** and the second interior panel **1350** is in the widthwise direction, and the first interior panel **1340** and the second interior panel **1350** may

each have a sixth modulus of elasticity in the lengthwise direction. While the spacer material of the first exterior panel **1362** may have more stretch in the widthwise direction compared to the lengthwise direction, examples of the non-spacer material of the first interior panel **1340** and the second interior panel **1350** may have more stretch in the lengthwise direction than in the widthwise direction. Additionally, in some aspects, the difference between the amount of stretch of the first interior panel **1340** and the second interior panel **1350** in the widthwise direction and the lengthwise direction is less than the difference between the amount of stretch of the first exterior panel **1362** in the two directions. For example, the amount of stretch of in each of the first interior panel **1340** and the second interior panel **1350** within the lengthwise direction may be within a range from about 1.1 to about 2.5 times, within a range from about 1.5 to about 2 times, or about 1.65 times the amount of stretch within the widthwise direction of the respective panel. In contrast, as previously stated, the amount of stretch of the first exterior panel **1362** within the widthwise direction may be within a range from about 1.5 to about 3.5 times, within a range from about 2 to about 3 times, or about 2.67 times the amount of stretch within the lengthwise direction.

In some aspects, the non-spacer mesh of the first interior panel **1340** and the second interior panel **1350** may be different than the non-spacer mesh of the second exterior panel **1364**. For example, the weight (in grams per square meter) of the non-spacer mesh of the first interior panel **1340** and the second interior panel **1350** may be less than the weight of the non-spacer mesh of the second exterior panel **1364**. In some aspects, the non-spacer mesh of the first interior panel **1340** and the second interior panel **1350** has a weight within a range from about 15 grams per square meter to about 200 grams per square meter or from 25 grams per square meter to about 180 grams per square meter. For instance, the first interior panel **1340** and the second interior panel **1350** may each have a weight of 100 grams per square meter. Utilizing a lighter weight material for the first interior panel **1340** and the second interior panel **1350** helps maintain a lightweight characteristic of the bra **1300** overall.

Further, in some aspects, the bra **1300** also includes one or more elastic straps **1316** that each extend diagonally between a top margin of the lower band **1370** and one of the shoulder straps **1330**. Each elastic strap **1316** may be partially positioned adjacent and interior to the exterior panel **1360** and may be positioned medial to the first and second interior panels **1340** and **1350**, respectively. These elastic straps **1316** may, for example, provide additional support to the wearer while eliminating the need for an additional layer of material, which allows for the increased breathability, quick dry time, and lightweight construction.

FIG. **15** depicts a back view of the bra **1300**. The back portion **1320** of the bra **1300** includes a back panel **1380**, which may extend seamlessly from the right side **1312** to the left side **1314** of the bra **1300**. The back panel **1380** may include a non-spacer mesh material such that the back panel **1380** remains breathable and quick drying. In various aspects, the back panel **1380** includes the same non-spacer mesh material as the second exterior panel **1364**. In alternative aspects, the back panel **1380** includes the same non-spacer mesh material as the first and second interior panels **1340** and **1350**.

The back panel **1380** is secured to the shoulder straps **1330**. In some aspects, the shoulder straps **1330** include a right shoulder strap portion **1330**A and a left shoulder strap portion **1330**B that are joined to form a back shoulder strap portion **1330**C, which is secured to the back panel **1380**. The shoulder straps **1330** may include a plurality of apertures **1332**. In some aspects, the right shoulder strap portion **1330**A, the left shoulder strap portion **1330**B, and the back shoulder strap portion **1330**C each includes multiple elastics straps that are intermittently connected at connection points **1334** such that the apertures **1332** are the spaces between unconnected portions of the individual straps. However, it is contemplated that, in alternative configurations, each shoulder strap portion may be formed from a single strap and the apertures **1332** may be integrally formed with the single strap or created in a post-production process such as through cutting, slicing, lasering, and the like. The apertures **1332** within the shoulder straps **1330** help maintain the increased breathability, quick drying time, and lightweight characteristics of the bra **1300**.

The following clauses represent example aspects of concepts contemplated herein. Any one of the following clauses may be combined in a multiple dependent manner to depend from one or more other clauses. Further, any combination of dependent clauses (clauses that explicitly depend from a previous clause) may be combined while staying within the scope of aspects contemplated herein. The following clauses are illustrative in nature and are not limiting.

Clause 1: A bra with a front portion having a right side and a left side, the bra comprising:

an interior support panel assembly having a first panel formed from a mesh material and extending between the right side and the left side of the front portion, and a second panel formed from a spacer mesh material and extending between the right side and the left side of the front portion, wherein the second panel is positioned adjacent and external to the first panel;

an upper support panel formed from a spacer mesh material and extending between the right side and the left side of an upper part of the front portion, wherein the upper support panel is positioned adjacent and external to the interior support panel assembly; and

a lower support panel formed from a mesh material and extending between the right side and the left side of a lower part of the front portion, wherein the lower support panel is positioned adjacent and external to the interior support panel assembly.

Clause 2: The bra according to clause 1, wherein the upper support panel includes an upper support panel top edge and an upper support panel bottom edge, and wherein the upper support panel top edge forms an upper margin of the front portion of the bra.

Clause 3: The bra according to any of clauses 1 through 2, wherein the lower support panel includes a lower support panel top edge and a lower support panel bottom edge, and wherein the lower support panel bottom edge forms a lower margin of the front portion of the bra.

Clause 4: The bra according to any of clauses 1 through 3, wherein at least a portion of the upper support panel bottom edge is positioned superior to at least a portion of the lower support panel top edge.

Clause 5: The bra according to any of clauses 1 through 4, wherein the first panel of the interior support panel assembly extends seamlessly between the right side and the left side of the front portion of the bra.

Clause 6: The bra according to any of clauses 1 through 5, wherein the second panel of the interior support panel assembly includes a third panel affixed to a right side of the second panel and configured to at least partially cover a right breast of a wearer, and a fourth panel affixed to a left side of the second panel and configured to at least partially cover a

left breast of the wearer, wherein the third panel and the fourth panel are formed from a low stretch material.

Clause 7: The bra according to any of clauses 1 through 6, wherein each of the third panel and the fourth panel are affixed to an exterior-facing surface of the second panel.

Clause 8: The bra according to any of clauses 1 through 7, further comprising a back portion extending from the front portion, the back portion formed from a mesh material.

Clause 9: The bra according to any of clauses 1 through 8, further comprising a pair of shoulder straps extending between the front portion and the back portion, the pair of shoulder straps formed from a spacer mesh material.

Clause 10: A bra with a front portion having a right side, a left side, an upper margin, and a lower margin, the bra comprising:

an interior support panel assembly extending between the right side and the left side of the front portion;

an upper support panel positioned adjacent and external to the interior support panel assembly, the upper support panel having an upper support panel top edge that forms at least a portion of the upper margin of the front portion and an upper support panel bottom edge that is positioned superior to the lower margin of the front portion; and

a lower support panel positioned adjacent and external to the interior support panel assembly, the lower support panel including a lower support panel top edge that is positioned inferior to the upper margin of the front portion and a lower support panel bottom edge that forms the lower margin of the front portion.

Clause 11: The bra according to clause 10, wherein at least a portion of the upper support panel bottom edge is positioned superior to at least a portion of the lower support panel top edge.

Clause 12: The bra according to any of clauses 10 through 11, wherein at least a portion of the lower support panel top edge is unaffixed from the interior support panel assembly to form a pocket opening in communication with a pocket space formed between the lower support panel and the interior support panel assembly.

Clause 13: The bra according to any of clauses 10 through 12, wherein the interior support panel assembly includes a first panel extending between the right side and the left side of the front portion, and a second panel extending between the right side and the left side of the front portion, wherein the second panel is positioned adjacent and external to the first panel.

Clause 14: The bra according to any of clauses 10 through 13, wherein the second panel of the interior support panel assembly includes a third panel affixed to a right side of the second panel and configured to at least partially cover a right breast of a wearer, and a fourth panel affixed to a left side of the second panel and configured to at least partially cover a left breast of the wearer.

Clause 15: The bra according to any of clauses 10 through 14, wherein the third panel and the fourth panel are formed from a low stretch material.

Clause 16: The bra according to any of clauses 10 through 15, wherein the first panel is formed from a mesh material, the second panel is formed from a spacer mesh material, the upper support panel is formed from a spacer mesh material, and the lower support panel is formed from a mesh material.

Clause 17: The bra according to any of clauses 10 through 16, wherein the first panel has a greater modulus of elasticity than the second panel, and wherein the lower support panel has a greater modulus of elasticity than the upper support panel.

Clause 18: The bra according to any of clauses 10 through 17, further comprising a back portion extending from the front portion, the back portion formed from a mesh material.

Clause 19: A method of manufacturing a bra comprising:

forming a front portion of the bra by:

affixing at one or more locations an upper support panel to an interior support panel assembly such that the upper support panel is positioned adjacent to a first surface of the interior support panel assembly, the upper support panel including an upper support panel bottom edge; and

affixing at one or more locations a lower support panel to the interior support panel assembly such that the lower support panel is positioned adjacent to the first surface of the interior support panel assembly, the lower support panel including a lower support panel top edge that is positioned inferior to at least a portion of the upper support panel bottom edge.

Clause 20: The method of manufacturing the bra according to clause 19, wherein the upper support panel further includes an upper support panel top edge that forms an upper margin of the front portion, and wherein the lower support panel further includes a lower support panel bottom edge that forms a lower margin of the front portion.

Aspects of the present disclosure have been described with the intent to be illustrative rather than restrictive. Alternative aspects will become apparent to those skilled in the art that do not depart from its scope. A skilled artisan may develop alternative means of implementing the aforementioned improvements without departing from the scope of the present disclosure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations and are contemplated within the scope of the claims. Not all steps listed in the various figures need be carried out in the specific order described.

What is claimed is:

1. An upper-body support garment comprising:

a front portion that includes a lower support panel and an upper support panel;

the lower support panel comprising:

a first left side edge and a first right side edge;

a first breast covering portion and a second breast covering portion, each positioned between the first left side edge and the first right side edge;

a lower middle portion positioned between the first breast covering portion and the second breast covering portion; and

a top edge of the lower middle portion that comprises a first concave contour;

the upper support panel comprising:

a second left side edge and a second right side edge;

an upper middle portion positioned between the second left side edge and the second right side edge; and

a bottom edge of the upper middle portion that comprises a second concave contour, wherein the bottom edge is positioned superior to the lower support panel,

wherein the top edge and the bottom edge overlap to form a central opening defined by the first concave contour and the second concave contour.

2. The upper-body support garment of claim **1**, wherein the lower support panel extends seamlessly between a right side and a left side of the front portion.

3. The upper-body support garment of claim 1, wherein the lower support panel is affixed to a first shoulder strap and a second shoulder strap.

4. The upper-body support garment of claim 1, wherein the front portion further comprises an interior support assembly comprising a third panel affixed to a right side of the lower support panel and configured to at least partially cover a right breast of a wearer, and a fourth panel affixed to a left side of the lower support panel and configured to at least partially cover a left breast of the wearer.

5. The upper-body support garment of claim 1, further comprising a back portion extending from the front portion, the back portion formed from a mesh material.

6. The upper-body support garment of claim 5, further comprising a pair of shoulder straps extending between the front portion and the back portion, the pair of shoulder straps comprising the mesh material.

7. The upper-body support garment of claim 1, wherein the upper support panel extends from a right side to a left side of the front portion and forms an upper margin of the front portion.

8. The upper-body support garment of claim 7, wherein the upper support panel is formed from a spacer mesh material, the spacer mesh material having anisotropic stretch properties.

9. The upper-body support garment of claim 8, wherein the spacer mesh material of the upper support panel has a first modulus of elasticity in a widthwise direction, and a second modulus of elasticity in a lengthwise direction, wherein the first modulus of elasticity is greater than the second modulus of elasticity.

10. The upper-body support garment of claim 1, wherein the lower support panel extends from a right side to a left side of the front portion and forms a lower margin of the front portion.

11. The upper-body support garment of claim 1, wherein the lower support panel comprises a non-spacer mesh material, the non-spacer mesh material comprising a modulus of elasticity greater than that of the upper support panel.

12. The upper-body support garment of claim 11, wherein the non-spacer mesh material of the lower support panel has a third modulus of elasticity in a widthwise direction and a fourth modulus of elasticity in a lengthwise direction, wherein the third modulus of elasticity is greater than the fourth modulus of elasticity.

13. The upper-body support garment of claim 1, wherein the lower support panel overlaps with the upper support panel, with at least about 50% of the lower support panel positioned superior to the upper support panel.

14. An upper-body support garment comprising:

a front portion that includes a lower support panel and an upper support panel, wherein the lower support panel comprises a mesh material and the upper support panel comprises a spacer mesh material;

the lower support panel comprising:

a first left side edge and a first right side edge;

a first breast covering portion and a second breast covering portion, each positioned between the first left side edge and the first right side edge;

a lower middle portion positioned between the first breast covering portion and the second breast covering portion; and

a top edge of the lower middle portion that comprises a first concave contour;

the upper support panel comprising:

a second left side edge and a second right side edge;

an upper middle portion positioned between the second left side edge and the second right side edge; and

a bottom edge that comprises a second concave contour, wherein the bottom edge is positioned superior to the lower support panel,

wherein the top edge and the bottom edge overlap to form a central opening defined by the first concave contour and the second concave contour.

15. The upper-body support garment of claim 14, wherein the lower support panel extends seamlessly between a right side and a left side of the front portion.

16. The upper-body support garment of claim 14, wherein the lower support panel is affixed to a first shoulder strap and a second shoulder strap.

17. The upper-body support garment of claim 14, wherein the front portion further comprises an interior support assembly comprising a third panel affixed to a right side of the lower support panel and configured to at least partially cover a right breast of a wearer, and a fourth panel affixed to a left side of the lower support panel and configured to at least partially cover a left breast of the wearer.

18. The upper-body support garment of claim 14, further comprising a back portion extending from the front portion, the back portion formed from the mesh material.

19. The upper-body support garment of claim 18, further comprising a pair of shoulder straps extending between the front portion and the back portion, the pair of shoulder straps comprising the mesh material.

20. An upper-body support garment comprising:

a front portion that includes a lower support panel and an upper support panel, wherein the lower support panel and the upper support panel define a central opening;

wherein the lower support panel comprises:

a first left side edge and a first right side edge;

a first breast covering portion and a second breast covering portion, each positioned between the first left side edge and the first right side edge;

a lower middle portion positioned between the first breast covering portion and the second breast covering portion; and

a top edge;

wherein the upper support panel comprises:

a second left side edge and a second right side edge;

an upper middle portion positioned between the second left side edge and the second right side edge; and

a bottom edge;

wherein the central opening is defined by:

the top edge of the lower support panel comprising a first concave contour; and

the bottom edge of the upper support panel comprising a second concave contour;

wherein the bottom edge of the upper support panel is positioned superior to the top edge of the lower support panel, and the first concave contour and the second concave contour are shaped to define a perimeter of the central opening.

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