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Description

[0001] Articles of apparel, including athletic apparel, may incorporate protective components that are formed from a polymer foam material and impart padding, provide cushioning, or otherwise attenuate impact forces. When the apparel is worn during athletic activities, for example, the protective components may protect an individual or wearer from contact with other athletes, equipment, or the ground. The protective components may be positioned to cover specific portions of the individual, including muscles, bones, joints, and impact areas. Additionally, the shapes, sizes, and other properties of the protective components, as well as the materials utilized in the protective components, may vary significantly to provide a particular level of protection to the specific portions of the individual.

[0002] The body temperature of an individual has an effect upon the athletic performance of the individual when engaging in athletic activities. Components of the body temperature include core temperature and surface temperature, for example. Whereas the core temperature is associated with interior portions of the individual (i.e., the internal organs), the surface temperature is a measure of the temperature associated with the surface of the individual (i.e., the skin). Although the core temperature and surface temperature are discrete measurements and may vary significantly, the core temperature has an effect upon the surface temperature, and the surface temperature has a corresponding effect upon the core temperature.

[0003] As the individual begins engaging in an athletic activity, including either practice sessions or competitions, the core temperature of the individual may rise as the level of athletic activity increases, particularly in relatively hot or humid climates. Although a rise in core temperature is a normal aspect of engaging in athletic activities, the athletic performance of the individual begins to decrease once the core temperature increases above a threshold temperature that may vary for different individuals. For example, the speed of the individual when running, the height of the individual when jumping, the reaction time of the individual when responding to other athletes, and the overall strength of the individual may decrease as the core temperature increases beyond the threshold temperature. Although varying between different individuals, the threshold temperature at which athletic performance decreases may be approximately 39 degrees Celsius (i.e., 102 degrees Fahrenheit). Accordingly, moderating or otherwise delaying a rise in the core temperature during an athletic activity has the potential to reduce heat stress and increase the overall athletic performance of the individual. In this context, WO 2010/035040 A1 discloses a personal ventilation system and heat regulating apparel and is particularly, but not exclusively, applicable to a jacket or vest that is worn to cool its wearer.

[0004] A system includes an article of apparel and a

fluid source configured to join with the fluid connector and supply a fluid to the grooves and voids. The article of apparel incorporates a plurality of fluid channels, and the apparel includes a fluid connector in fluid communication with the fluid channels. A fluid source is configured to join with the fluid connector and supply a fluid to the fluid channels. The article of apparel includes a pad component (430) formed from a polymer foam material and having a first surface (431) and an opposite second surface (432), the pad component (430) defining a plurality of (a) grooves in the second surface (432) that extend through only a portion of the thickness of the pad component (430), and (b) voids that extend through the pad component (430) and from the first surface (431) to the second surface (432); an outer material element (410) secured to the first surface (431) of the pad component (430) and forming at least a portion of an outer surface of the apparel (300), the outer material element (410) being substantially fluid impermeable adjacent to the voids; an inner material element (420) secured to the second surface (432) of the pad component (430) and forming at least a portion of an inner surface of the apparel (300), the inner material element (420) being substantially fluid permeable adjacent to at least the grooves and the voids; and a fluid connector (320) joined with at least the outer material element (410) and providing fluid communication between an exterior of the apparel (300) and both of the grooves and the voids, wherein the grooves and voids extend through a back portion (302) of the article of apparel (300), over a shoulder portion (303) of the article of apparel (300) and also through a front portion (301) of the article of apparel (300).

[0005] The advantages and features of novelty characterizing aspects of the invention are pointed out with particularity in the appended claims. To gain an improved understanding of the advantages and features of novelty, however, reference may be made to the following descriptive matter and accompanying drawings that describe and illustrate various embodiments and concepts related to the invention.

[0006] The foregoing Summary and the following Detailed Description will be better understood when read in conjunction with the accompanying drawings.

Figure 1 is a front elevational view of an individual utilizing a ventilation and protection system.

Figure 2 is a front elevational view of the system.

Figure 3 is a rear elevational view of the system.

Figure 4 is a front elevational view of an article of apparel from the system.

Figure 5 is a rear elevational view of the article of apparel.

Figure 6 is a plan view of the article of apparel.

Figure 7 is a perspective view of a portion of the article of apparel.

Figure 8 is an exploded perspective view of the portion of the article of apparel.

Figures 9A-9C are cross-sectional views of the padded region, as defined by section lines 9A-9C in Figure 7.

Figures 10A and 10B are schematic cross-sectional views respectively corresponding with Figures 9A and 9B and depicting ventilation properties of the article of apparel.

Figure 10C is a schematic cross-sectional view corresponding with Figures 9C and depicting protection properties of the article of apparel.

Figures 11A-11H are cross-sectional views corresponding with Figure 9C and depicting further configurations of the article of apparel.

Figures 12A and 12B are front elevational views of additional configurations of the apparel.

[0007] The following discussion and accompanying figures disclose various configurations of a ventilated and protective article of apparel, as well as a system that includes the apparel. As an example, the apparel is disclosed as having a configuration of a vest, but may also be a short-sleeved shirt, a long-sleeved shirt, or jacket. Concepts associated with the apparel may also be incorporated into a variety of other types of apparel, including headwear, pants, shorts, footwear, and full-body coverings, for example. Accordingly, the configuration disclosed in the following discussion and accompanying figures is intended to provide an example of a ventilated and protective article of apparel.

[0008] A ventilation and protection system 100 is depicted in Figure 1 as being utilized by an individual. System 100 has an advantage of providing both ventilation and protection to the individual or another wearer. The primary elements of system 100 are a fluid source 200 and an article of apparel 300, each of which are depicted separate from the individual in Figures 2 and 3. With regard to ventilation, fluid source 200 joins with apparel 300 and supplies a constant or steady current of fluid (e.g., air, water) to apparel 300, which distributes the flow of fluid to various areas of the individual. As the fluid passes over the surface area or skin of the individual, the fluid cools, heats, or otherwise moderates the body temperature (i.e., at least one of the core temperature and the surface temperature) of the individual. With regard to protection, apparel 300 includes features that impart padding, provide cushioning, or otherwise attenuate impact forces. More particularly, apparel 300 incorporates materials (e.g., polymer foam materials) or struc-

tures that protect the individual from contact with other athletes, equipment, or the ground.

[0009] Fluid source 200 may be any device or fluid delivery system that joins with apparel 300 and supplies a fluid, likely a pressurized fluid, to apparel 300. Examples of a suitable fluid source 200 are an air compressor or any of the various fluid sources disclosed in (a) U.S. Patent Application Publication Number 2006/0003688, entitled Air Delivery Apparatus and Method and (b) U.S. Patent Application Publication Number 2010/0125928, entitled Pneumatic Cooling Apparel System. Fluid source 200 includes a conduit 210, which may be tube, pipe, or other structure that channels the fluid to apparel 300. Although conduit 210 is depicted as being joined with apparel 300, conduit 210 may also be disconnected or detached from apparel 300. As such, apparel 300 may be separated from fluid source 200 and used independent of fluid source 200. Fluid source 200 is depicted as being spaced away from apparel 300 and the individual, but fluid source 200 may also be incorporated into apparel 300 in some configurations. Depending upon the intended purpose and conditions in which system 100 will be utilized, fluid source 200 may include (a) a refrigeration element that cools the fluid, (b), a heating element that heats the fluid (c) a dehumidifying element that removes water vapor, (d) an oxygenation unit that increases oxygen levels in the fluid, or (e) an aromatic element that adds specific aromas or scents to the fluid, for example.

[0010] Although the individual is depicted as only wearing apparel 300 in Figure, 1, apparel 300 may be worn under other articles of apparel. As an example, a shirt may be worn over apparel 300. In some athletic activities, such as American football, shoulder pads or other protective elements, as well as a shirt, may be worn over apparel 300. Accordingly, apparel 300 may be worn alone or in conjunction with various other types of apparel.

[0011] Apparel 300 is depicted in Figures 4-6 as having the configuration of a vest, which is worn upon a torso of the individual or another wearer. In this configuration, apparel 300 covers at least an upper area of the torso, as depicted in Figure 1. Apparel 300 includes a front region 301, a back region 302, and a pair of shoulder regions 303. Front region 301 covers and generally corresponds with a chest area of the individual when apparel 300 is worn. Back region 302 covers and generally corresponds with a back area of the individual when apparel 300 is worn. Shoulder regions 303 are located between regions 301 and 302 and extend over shoulders of the individual when apparel 300 is worn. Regions 301-303 are not intended to be precise areas of apparel 300. Rather, regions 301-303 are intended to represent general areas of apparel 300 that provide a frame of reference in the following discussion. In order to secure apparel 300 to the individual, apparel 300 also incorporates a pair of straps 310.

[0012] Apparel 300 includes a fluid connector 320,

which provides a connection point for conduit 210 or another structure that supplies the fluid from fluid source 200. Although the configuration may vary considerably, fluid connector 320 may be a tube, valve, threaded pipe, or any other structure that couples with and provides fluid communication with fluid source 200. In this configuration of apparel 300, fluid connector 320 is located in back portion 302 and positioned proximal to a neck opening of apparel 300. When utilized during American football, for example, this location for fluid connector 320 corresponds with a space or gap in shoulder pads that may be worn over apparel 300. In addition to obtaining protection from the shoulder pads, an advantage of positioning fluid connector 320 in back portion 302 and adjacent to the neck opening relates to access by the individual. More particularly, this position for fluid connector 320 provides the individual with access to freely (a) connect apparel 300 to fluid source 200 and (b) disconnect apparel 300 from fluid source 200. In further configurations of apparel 300, fluid connector 320 may be located in various other portions of apparel 300, including front region 301.

[0013] A plurality of fluid channels 330 extend outward from fluid connector 320 and provide pathways for the fluid that is supplied by fluid source 200. Fluid channels 330 extend throughout apparel 300. More particularly, fluid channels 330 extend through back portion 302, over shoulder portions 303, and also through front portion 301. Although the fluid supplied by fluid source 200 enters apparel 300 at the position of fluid connector 320, the fluid is distributed throughout each of regions 301-303 by fluid channels 330. That is, the fluid passes through fluid channels 330 and is directed to various areas of apparel 300. The specific locations of fluid channels 330 may vary significantly and may be selected to distribute the fluid to particular areas of the individual.

[0014] The structure of apparel 300 will now be discussed in greater detail. Referring to Figures 7-9C, portions of apparel 300 includes a first or outer material element 410, a second or inner material element 420, and a pad component 430. Outer material element 410 is located to form at least a portion of an outer surface of apparel 300, which faces away from the individual when apparel 300 is worn. Inner material element 420 is located to form at least a portion of an inner surface of apparel 300, which faces toward and may contact the individual when apparel 300 is worn. Material elements 410 and 420 are spaced from each other, and pad component 430 is located between and secured to each of material elements 410 and 420. That is, pad component 430 is located within a space between outer material element 410 and the inner material element 420. Moreover, fluid connector 320 is secured to and extends through outer material element 420.

[0015] Each of material elements 410 and 420 may be formed from a variety of materials, including various textiles, polymer sheets, leather, or synthetic leather, for example. Combinations of these materials (e.g., a polymer

sheet bonded to a textile) may also be utilized for each of material elements 410 and 420. Although material elements 410 and 420 may be formed from the same material, each of material elements 410 and 420 may also be formed from different materials. Moreover, each of material elements 410 and 420 may have a multi-layer structure that includes multiple layers of material, such as three overlapping layers of a textile, a polymer sheet, and synthetic leather. Material elements 410 and 420 may be non-stretch, may exhibit stretch in one direction, or may exhibit multi-directional stretch.

[0016] Although a variety of materials are suitable for outer material element 410 and inner material element 420, the fluid permeability of outer material elements 410 is less than the fluid permeability of inner material element 420. That is, the fluid supplied by fluid source 200 may readily pass through areas of inner material element 420, while outer material element 410 prevents or limits the degree to which the fluid may exit pad region 401. In some configurations, inner material element 420 may be formed from a perforated or mesh material to readily permit the fluid to pass through inner material element 420. This configuration permits the fluid within fluid channels 330 to exit apparel 300 through inner material element 420 or otherwise pass over the surface area or skin of the individual. Although outer material element 410 is substantially impermeable to the fluid adjacent to the voids, outer material element 410 may also allow the fluid to pass through in some configurations or in some locations. In general, however, the fluid permeability of outer material element 410 is less than the fluid permeability of inner material element 420, and the fluid may readily pass through areas of inner material element 420.

[0017] Pad component 430 has a first surface 431 and an opposite second surface 432. Whereas first surface 431 is secured to outer material element 410, second surface 432 is secured to inner material element 420. As such, pad component 430 is located within a space between material elements 410 and 420 and secured to each of material elements 410 and 420. Pad component 430 is primarily responsible for forming the various fluid channels 330. More particularly, fluid channels 330 are formed as various elongate grooves and elongate voids in pad component 430. When fluid channels 330 are formed as grooves, fluid channels 330 are indentations or depressions in pad component 430 that extend through a portion of a thickness of pad component 430. Although the grooves are depicted as being formed in second surface 432, grooves may also be formed in first surface 431. When fluid channels 330 are formed as voids, fluid channels 330 extend through the entire thickness of pad component 430 and from first surface 431 to second surface 432. The various fluid channels 330 may, therefore, be formed as grooves, voids, or combinations of grooves and voids. Additional details relating to forming fluid channels 330, the configuration of pad component 430, and other apparel configurations may be found with reference to U.S. Patent Application Serial

Number 13/485,739, which is entitled Articles Of Apparel Incorporating Cushioning Elements and was filed in the U.S. Patent and Trademark Office on 31 May 2012.

[0018] The manner in which the fluid passes through fluid channels 330 and provides ventilation will now be discussed. Referring to schematic illustrations in Figures 10A and 10B, various arrows are depicted to show the path of fluid flow. The fluid is supplied to apparel 300 by fluid source 200, specifically conduit 210 that is connected to fluid connector 320. The fluid flows through fluid connector 320 and into the space between material elements 410 and 420, thereby passing into fluid channels 330. Given that inner material element 420 is permeable to the fluid, a portion of the fluid passes through inner material element 420 to provide ventilation. That is, the surface area or skin of the individual generally lays against inner material element 420, and fluid that passes through inner material element 420 also passes over the surface area or skin of the individual. Given that outer material element 410 is impermeable to the fluid, however, outer material element 410 traps the fluid within fluid channels 330.

[0019] Fluid channels 330, whether formed as grooves or voids, distribute the fluid to various areas of the individual. By selecting the overall configuration for fluid channels 330, the quantity of air delivered to areas of the individual may be varied. Whereas grooves are indentations or depressions in pad component 430, voids extend through the entire thickness of pad component 430. As such, voids may carry a greater flow rate of the fluid than grooves when both have comparable widths. By increasing the width or changing the shape of the grooves, however, the grooves may carry a greater flow rate of the fluid. Referring again to Figure 7, for example, fluid channels 330 formed as grooves and voids extending outward from fluid connector 320. In order to provide sufficient ventilation in front region 301, the voids may carry the fluid that is distributed to front region 301. The grooves, however, may be utilized to distribute the fluid to areas that are proximal to fluid connector 320, such as back portion 302. Accordingly, by configuring fluid channels 330 to be either voids or grooves, and by varying other properties of fluid channels 320, the volume of fluid that is distributed to different areas of the individual may be varied.

[0020] The manner in which apparel 300 provides protection will now be discussed. A variety of materials may be utilized for pad component 430, including various polymer foam materials that compress and return to an original shape after being compressed. Referring to Figure 10C, an object 500 is depicted as pressing into outer material element 410, which compresses pad component 430. The polymer foam material forming pad component 430 attenuates impact forces, thereby providing protection. By selecting from various thicknesses, materials, and densities for pad component 430, the degree of impact force attenuation may be varied to impart a desired degree of protection from contact with other ath-

letes, equipment, or the ground. Examples of suitable polymer foam materials for pad component 430 include polyurethane, ethylvinylacetate, polyester, polypropylene, and polyethylene foams. Moreover, both thermoplastic and thermoset polymer foam materials may be utilized. In some configurations, pad component 430 may be formed from a polymer foam material with a varying density, or solid polymer or rubber materials may be utilized. Fluid-filled chambers may also be utilized as pad component 430. Also, different pad components 430 may be formed from different materials, or may be formed from similar materials with different densities.

[0021] Various features of apparel 300 may vary from the configuration discussed above. As an example, Figure 11A depicts fluid channels 330 as being formed as grooves in first surface 431. Although fluid channels 330 may have the same dimensions, Figure 11B depicts a configuration wherein grooves extend to different depths in pad component 430. The shape of fluid channels 330 may also vary to include square, triangular, or various other shapes, as depicted in Figures 11C and 11D. In some configurations, as depicted in Figures 11E, one or both of material elements 410 and 420 may have a layered structure formed from different materials. Moreover, outer material element 410 may be absent in some configurations, as depicted in Figure 11F. Pad component 430 may also have a non-uniform or tapered thickness, as depicted in Figure 11G, or pad component 430 may have a layered structure incorporating multiple materials, as depicted in Figure 11H. Accordingly, numerous aspects of apparel 300 may vary considerably.

[0022] An example of manner in which system 100 may be utilized by the individual will now be discussed. Prior to engaging in an athletic activity, the individual may perform a warm-up routine that involves running, stretching, and other activities. Purposes of the warm-up routine may be to elevate body temperature and ensure that the individual is prepared for the athletic activity. Frequently, a period of time passes between the end of the warm-up routine and the start of the athletic activity. In order to ensure that the body temperature of the individual remains elevated during this period of time, system 100 may be employed. More particularly, the individual may connect fluid source 200 to apparel 300 using fluid connector 330, and a heated fluid (e.g., heated air) may pass into fluid channels 330. Accordingly, ventilation aspects of system 100 may be utilized to ensure that the body temperature of the individual remains at a proper level following the warm-up routine.

[0023] Immediately prior to engaging in the athletic activity, the individual may disconnect fluid source 200 from apparel 300. During the athletic activity, apparel 300 is used independent of fluid source 200 and imparts padding, provides cushioning, or otherwise attenuates impact forces. That is, pad component 430 protects the individual from contact with other athletes, equipment, or the ground. Accordingly, protective aspects of system 100 may be utilized to provide protection to the individual

during the athletic activity.

[0024] At various points during the athletic activity, the individual may have an opportunity to recover and cool down from the physical activity. For example, the athletic activity may stop during time-outs, between quarters, and at half-time. In order to assist with recovery and cool down, system 100 may be employed. More particularly, the individual may connect fluid source 200 to apparel 300, and a cooled fluid (e.g., refrigerated air) may pass into fluid channels 330. As noted in the Background section above, the athletic performance of the individual begins to decrease once the core temperature increases above a threshold temperature. Utilizing system 100 at various times during the athletic activity may assist with lowering the body temperature below the threshold temperature. Accordingly, ventilation aspects of system 100 may be utilized to lower the body temperature of the individual.

[0025] In various team sports, a limited number of athletes are competing at any given time. When engaging in one of these sports or similar athletic activities, the individual may spend relatively long periods of time waiting for an opportunity to compete. During relatively cold weather, for example, the individual may utilize system 100 to supply a heated fluid and remain warm while waiting for an opportunity to compete. Similarly, during relatively hot weather, the individual may utilize system 100 to supply a cooled fluid and remain cool while waiting for an opportunity to compete.

[0026] Based upon the above discussion, the individual may utilize system 100 multiple times during an athletic activity. At some points, the individual may take advantage of ventilation aspects to raise, lower, or maintain body temperature. At other points, the individual may take advantage of protection aspects to guard against contact with other athletes, equipment, or the ground.

[0027] Various articles of apparel (e.g., a shirt) or pieces of equipment (e.g., shoulder pads) may be worn over apparel 300. In some configurations, protective plates, electronic devices, or other attachment elements may be secured to apparel 300. Referring to Figure 12A, for example, two attachment elements 440, which have the configuration of plates, are joined with outer material element 410 and form a portion of an exterior surface of apparel 300 in shoulder regions 303. A similar configuration is depicted in Figure 12B where attachment elements 440 are detachable from apparel 300. More particularly, a hook and loop fastener system may be utilized to secure attachment elements 440 to any area of apparel 300. In this configuration, outer material element 410 may include a first part 411 of a hook and loop fastener (e.g., VELCRO), and attachment elements 440 may include a second part 412 of the hook and loop fastener. First part 411 may be joined to second part 412, thereby detachably-securing attachment element 440 to outer material element 410.

[0028] The invention is disclosed above and in the accompanying drawings with reference to a variety of em-

bodiments. The purpose served by the disclosure, however, is to provide an example of the various features and concepts related to the invention, not to limit the scope of the invention. One skilled in the relevant art will recognize that numerous variations and modifications may be made to the embodiments described above without departing from the scope of the present invention, as defined by the appended claims.

Claims

1. An article of apparel (300) comprising:

a pad component (430) formed from a polymer foam material and having a first surface (431) and an opposite second surface (432), the pad component (430) defining a plurality of (a) grooves in the second surface (432) that extend through only a portion of the thickness of the pad component (430), and (b) voids that extend through the pad component (430) and from the first surface (431) to the second surface (432); an outer material element (410) secured to the first surface (431) of the pad component (430) and forming at least a portion of an outer surface of the apparel (300), the outer material element (410) being substantially fluid impermeable adjacent to the voids; an inner material element (420) secured to the second surface (432) of the pad component (430) and forming at least a portion of an inner surface of the apparel (300), the inner material element (420) being substantially fluid permeable adjacent to at least the grooves and the voids; and

a fluid connector (320) joined with at least the outer material element (410) and providing fluid communication between an exterior of the apparel (300) and both of the grooves and the voids, wherein the grooves and voids extend through a back portion (302) of the article of apparel (300), over a shoulder portion (303) of the article of apparel (300) and also through a front portion (301) of the article of apparel (300).

2. The article of apparel (300) recited in claim 1, wherein a fluid flows (a) through the fluid connector (320), (b) into the grooves and the voids, and (c) through the inner material element (420) when the fluid connector (320) is joined with a fluid source (200).

3. The article of apparel (300) recited in claim 1, wherein the apparel (300) has a configuration for covering at least a portion of a torso of a wearer, the outer material element (410), the inner material element (420), and the pad component (430) being located

in a front region (301) and a back region (302) of the apparel (300).

4. The article of apparel (300) recited in claim 3, wherein the fluid connector (320) is located in the back region (302). 5
5. The article of apparel (300) recited in claim 1, wherein at least a portion of the outer material element (410) is a first part (411) of a hook and loop fastener, and wherein the apparel (300) further includes an attachment element (440) with a second part (412) of the hook and loop fastener, the second part (412) being joinable to the first part (411) to detachably-secure the attachment element (440) to the outer material element (410). 10 15
6. A system comprising:
 - an article of apparel (300) according to any of claims 1 to 5; and 20
 - a fluid source (200) configured to join with the fluid connector (320) and supply a fluid to the grooves and voids. 25

Patentansprüche

1. Bekleidungsartikel (300) umfassend:
 - eine Polsterkomponente (430), die aus einem Polymerschäummaterial gebildet ist und eine erste Oberfläche (431) und eine gegenüberstehende zweite Oberfläche (432) aufweist, wobei die Polsterkomponente (430) eine Mehrzahl von (a) Rillen in der zweiten Oberfläche (432), die sich nur durch einen Abschnitt der Dicke der Polsterkomponente (430) erstrecken, und (b) Hohlräume, die sich durch die Polsterkomponente (430) und von der ersten Oberfläche (431) zu der zweiten Oberfläche (432) erstrecken, definiert; 35
 - ein Außenmaterialelement (410), das an der ersten Oberfläche (431) der Polsterkomponente (430) befestigt ist und mindestens einen Abschnitt der Außenfläche der Bekleidung (300) bildet, wobei das Außenmaterialelement (410) im Wesentlichen angrenzend an die Hohlräume flüssigkeitsundurchlässig ist; 40
 - ein Innenmaterialelement (420), das an der zweiten Oberfläche (432) der Polsterkomponente (430) befestigt ist und mindestens einen Abschnitt der Innenfläche der Bekleidung (300) bildet, wobei das Innenmaterialelement (420) im Wesentlichen mindestens angrenzend an die Rillen und die Hohlräume flüssigkeitsdurchlässig ist; und 45
 - ein Fluidanschluss (320), der mindestens mit 50

dem Außenmaterialelement (410) verbunden ist, und eine Flüssigkeitsverbindung zwischen einem Äußeren der Bekleidung (300) und sowohl den Rillen als auch den Hohlräumen bereitstellt, wobei sich die Rillen und Hohlräume durch einen hinteren Abschnitt (302) des Bekleidungsartikels (300), über einen Schulterteil (303) des Bekleidungsartikels (300) und auch durch einen vorderen Abschnitt (301) des Bekleidungsartikels (300) erstrecken.

2. Bekleidungsartikel (300) nach Anspruch 1, wobei eine Flüssigkeit (a) durch den Flüssigkeitsanschluss (320), (b) in die Rillen und die Hohlräume, und (c) durch das Innenmaterialelement (420) fließt, wenn der Flüssigkeitsanschluss (320) mit einer Flüssigkeitsquelle (200) verbunden ist.
3. Bekleidungsartikel (300) nach Anspruch 1, wobei die Bekleidung (300) eine Konfiguration zum Bedecken mindestens eines Abschnittes eines Torsos eines Trägers aufweist, wobei sich das Außenmaterialelement (410), das Innenmaterialelement (420) und die Polsterkomponente (430) in einem vorderen Bereich (301) und einem hinteren Bereich (302) der Bekleidung (300) befinden.
4. Bekleidungsartikel (300) nach Anspruch 3, wobei der Flüssigkeitsanschluss (320) sich in dem hinteren Bereich (302) befindet. 30
5. Bekleidungsartikel (300) nach Anspruch 1, wobei mindestens ein Abschnitt des Außenmaterialelements (410) ein erster Teil (411) eines Klettverschlusses ist, und wobei die Bekleidung (300) weiter ein Befestigungselement (440) mit einem zweiten Teil (412) des Klettverschlusses beinhaltet, wobei der zweite Teil (412) mit dem ersten Teil (411) verbindbar ist, um das Befestigungselement (440) lösbar an das Außenmaterialelement (410) zu befestigen. 35 40
6. System, umfassend:
 - einen Bekleidungsartikel (300) nach einem der Ansprüche 1 bis 5; und 45
 - eine Flüssigkeitsquelle (200), eingerichtet, um sich mit dem Flüssigkeitsanschluss (320) zu verbinden und eine Flüssigkeit den Rillen und Hohlräumen zuzuführen. 50

Revendications

1. Article d'habillement (300) comprenant : 55
 - un composant de rembourrage (430) formé d'un matériau de mousse polymère et ayant une pre-

- mière surface (431) et une seconde surface opposée (432), le composant de rembourrage (430) définissant une pluralité de (a) rainures dans la seconde surface (432) qui s'étendent à travers uniquement une portion de l'épaisseur du composant de rembourrage (430), et (b) des vides qui s'étendent à travers le composant de rembourrage (430) et de la première surface (431) à la seconde surface (432) ;
 un élément de matière externe (410) fixé à la première surface (431) du composant de rembourrage (430) et formant au moins une portion d'une surface externe de l'habillement (300), l'élément de matière externe (410) étant essentiellement imperméable au fluide de manière adjacente aux vides ;
 un élément de matière interne (420) fixé à la seconde surface (432) du composant de rembourrage (430) et formant au moins une portion d'une surface interne de l'habillement (300), l'élément de matière interne (420) étant essentiellement perméable au fluide de manière adjacente au moins aux rainures et aux vides ; et
 un connecteur de fluide (320) relié à au moins l'élément de matière externe (410) et fournissant une communication fluidique entre un extérieur de l'habillement (300) et à la fois les rainures et les vides, dans lequel les rainures et vides s'étendent à travers une portion arrière (302) de l'article d'habillement (300), sur une portion d'épaule (303) de l'article d'habillement (300) et également à travers une portion avant (301) de l'article d'habillement (300).
2. Article d'habillement (300) selon la revendication 1, dans lequel un fluide s'écoule (a) à travers le connecteur de fluide (320), (b) dans les rainures et les vides, et (c) à travers l'élément de matière interne (420) lorsque le connecteur de fluide (320) est relié à une source de fluide (200).
3. Article d'habillement (300) selon la revendication 1, dans lequel l'habillement (300) a une configuration pour recouvrir au moins une portion d'un torse d'un porteur, l'élément de matière externe (410), l'élément de matière interne (420) et le composant de rembourrage (430) étant situés dans une région avant (301) et une région arrière (302) de l'habillement (300).
4. Article d'habillement (300) selon la revendication 3, dans lequel le connecteur de fluide (320) est situé dans la région arrière (302).
5. Article d'habillement (300) selon la revendication 1, dans lequel au moins une portion de l'élément de matière externe (410) est une première partie (411) d'une fermeture autoagrippante, et dans lequel l'ha-

billement (300) inclut en outre un élément de connexion (440) à une seconde partie (412) de la fermeture autoagrippante, la seconde partie (412) pouvant être reliée à la première partie (411) pour fixer de manière amovible l'élément de connexion (440) à l'élément de matière externe (410).

6. Système comprenant :

un article d'habillement (300) selon l'une quelconque des revendications 1 à 5 ; et
 une source de fluide (200) configurée pour se relier au connecteur de fluide (320) et fournir un fluide aux rainures et vides.

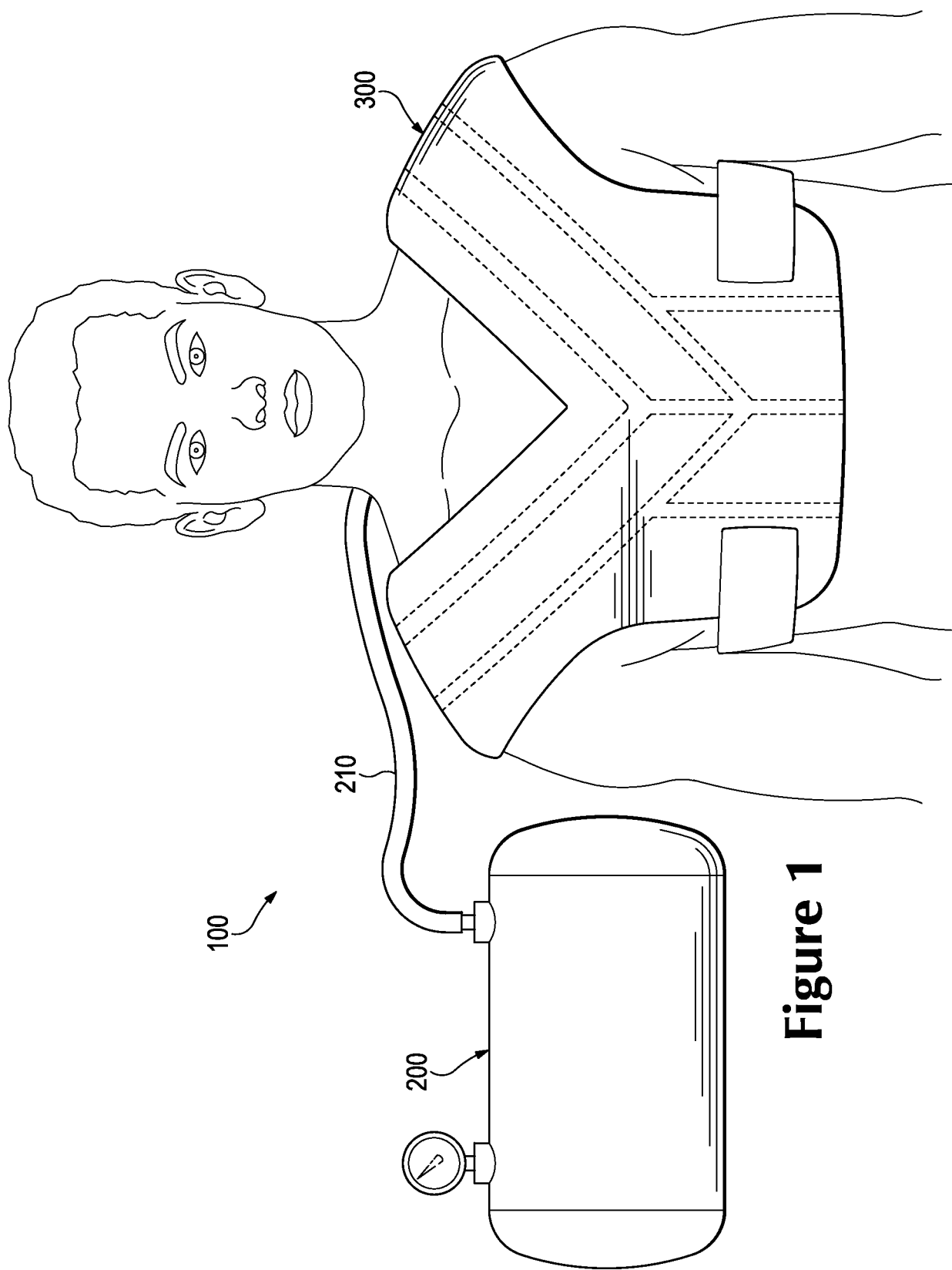


Figure 1

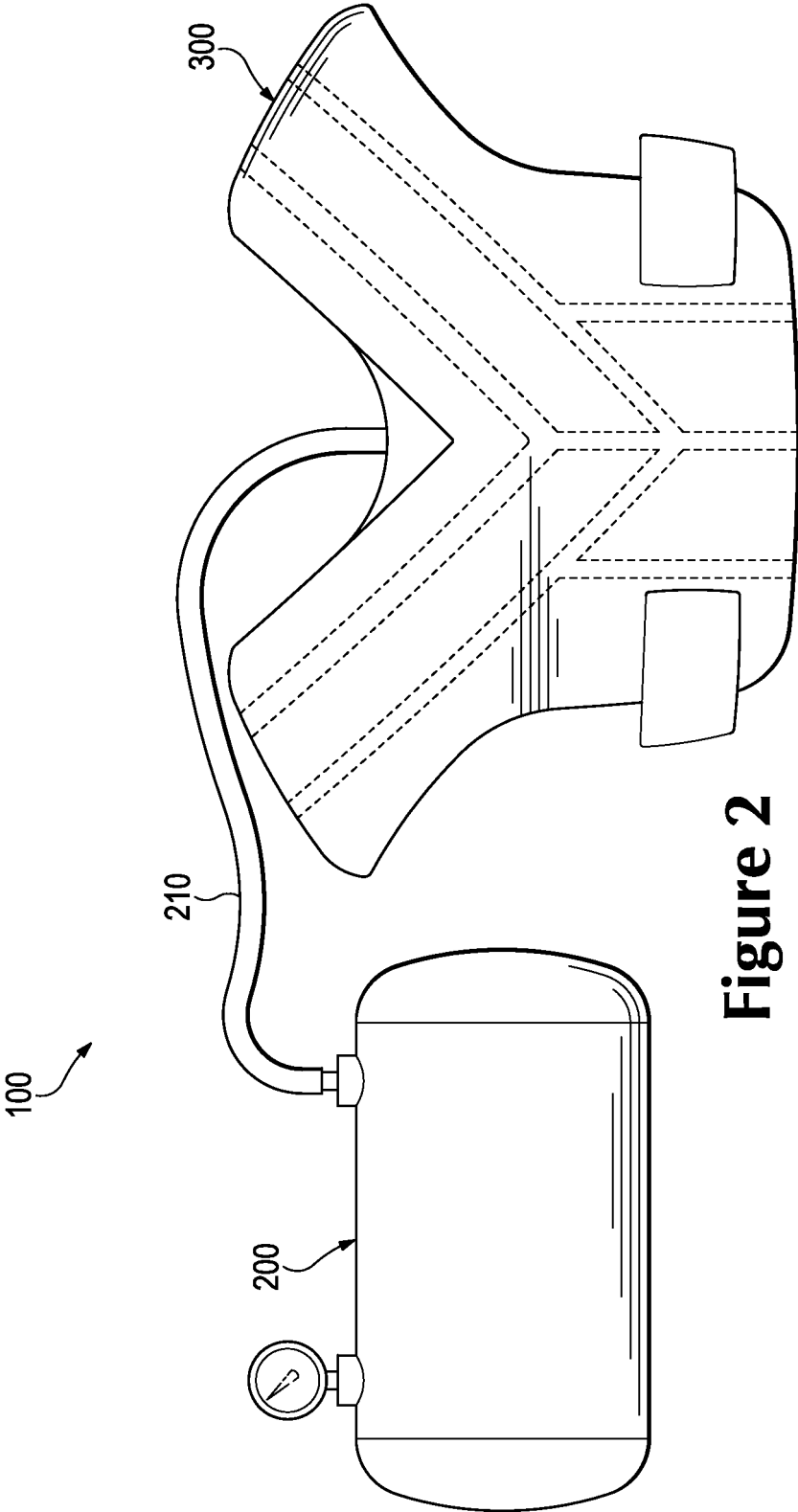


Figure 2

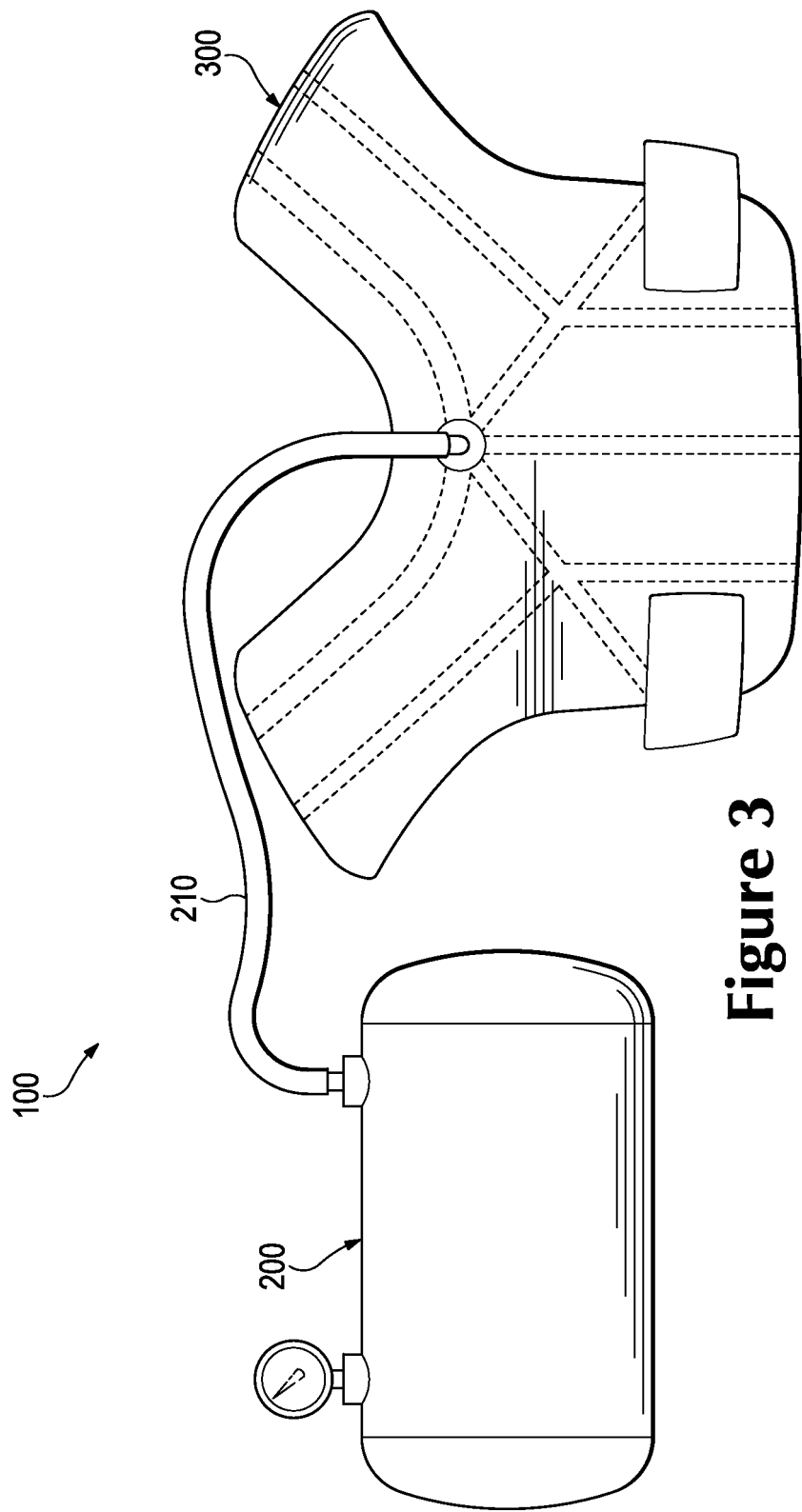


Figure 3

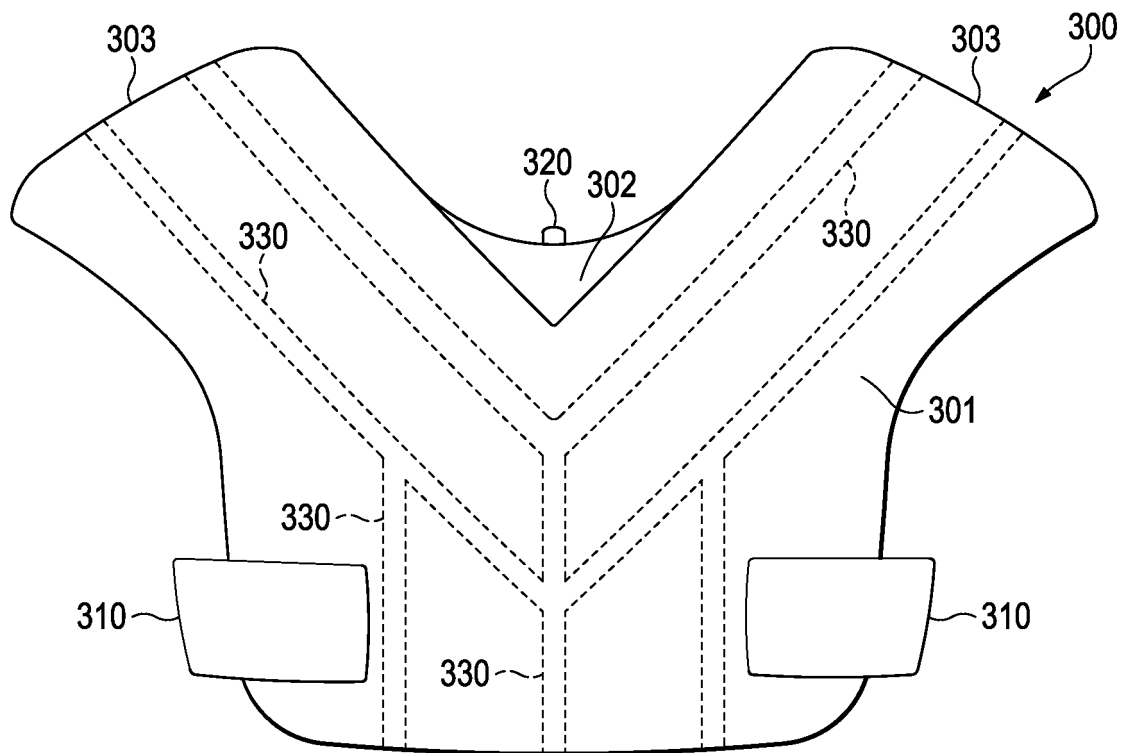


Figure 4

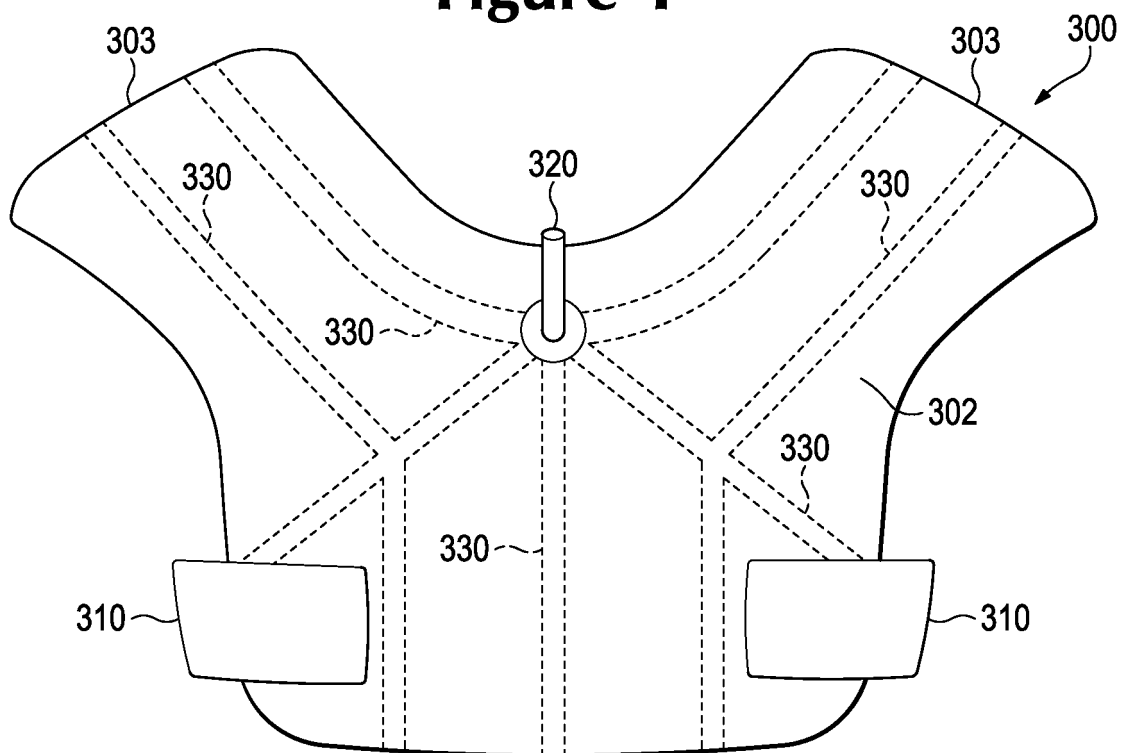


Figure 5

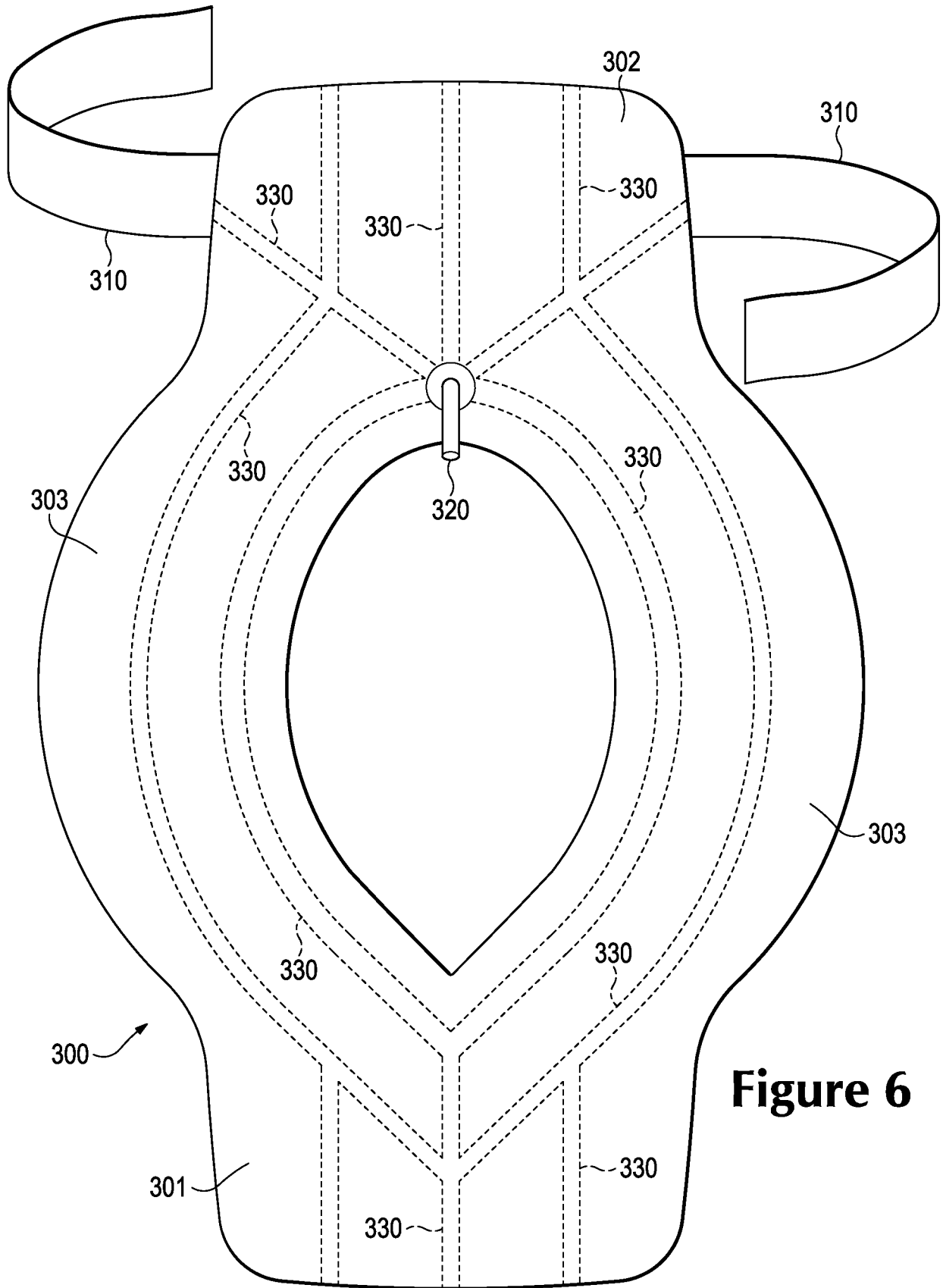


Figure 6

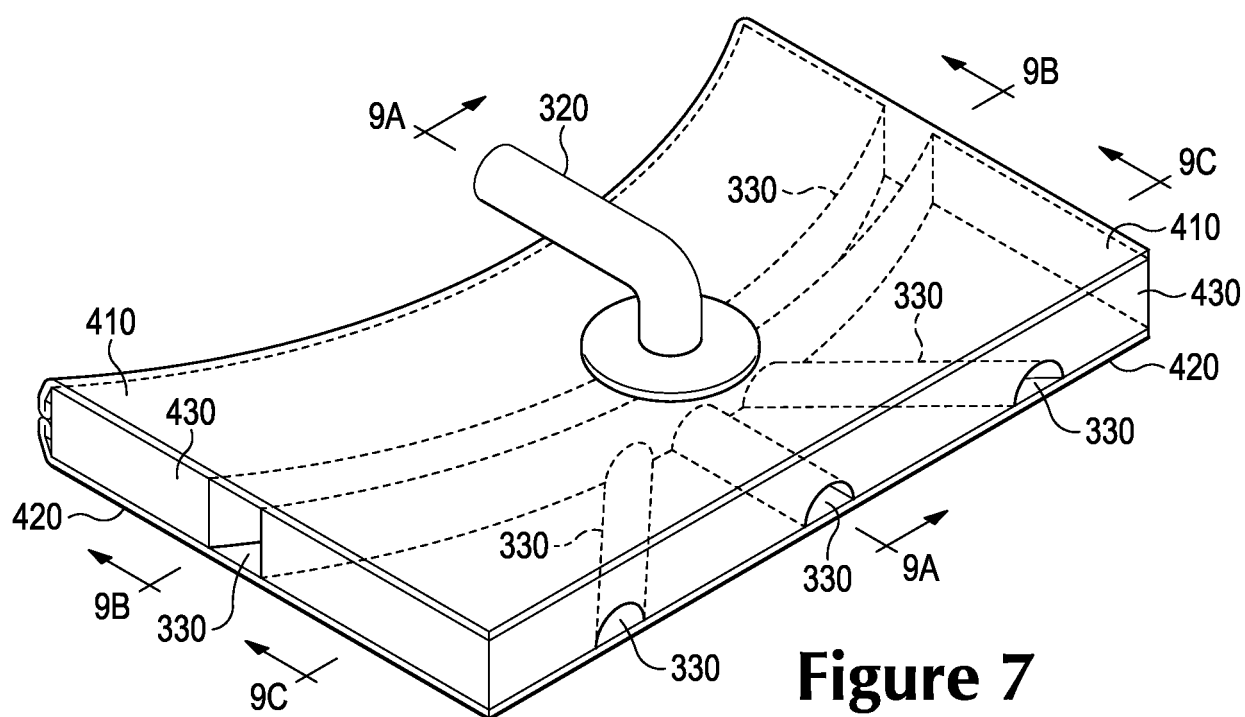


Figure 7

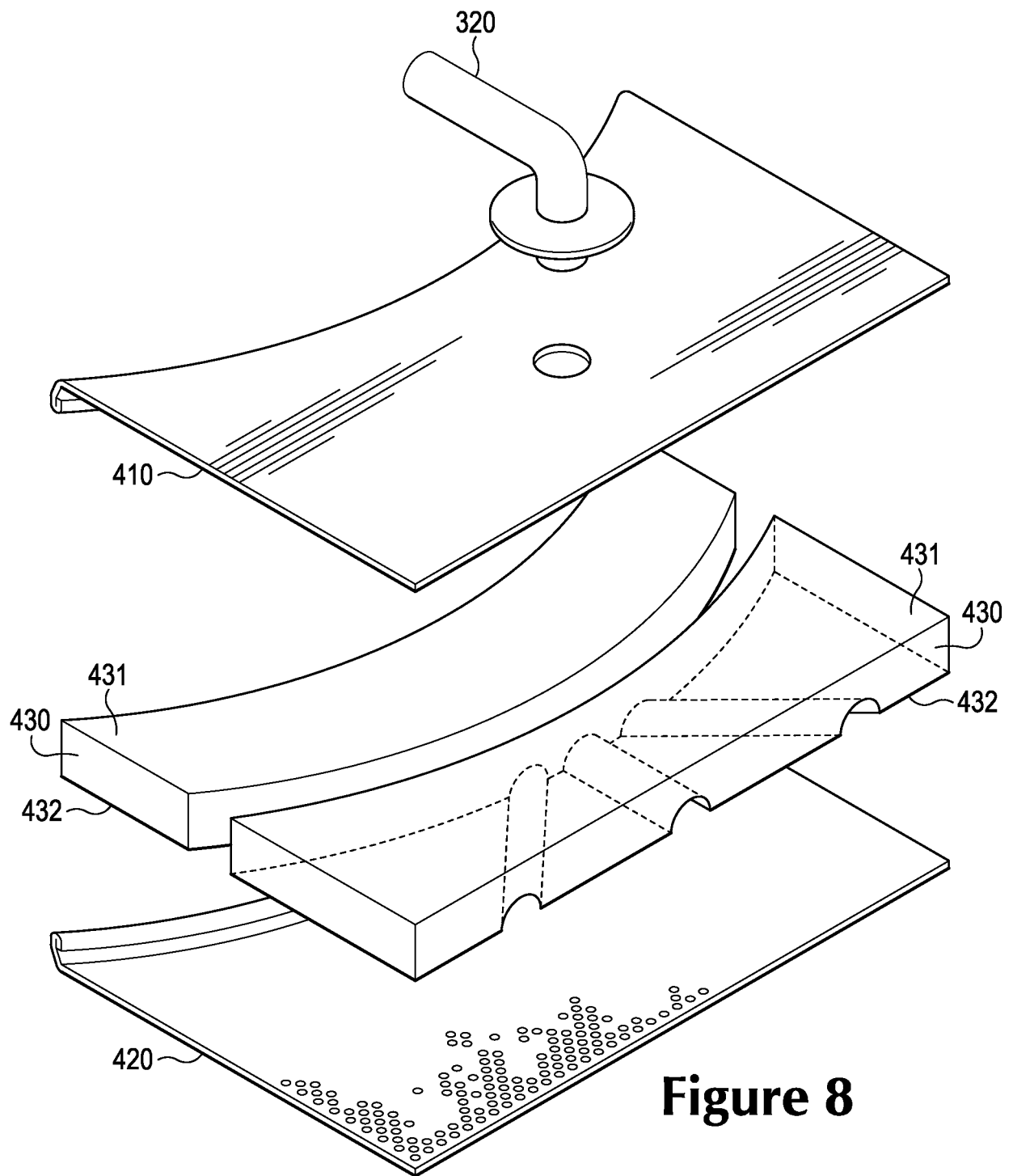


Figure 8

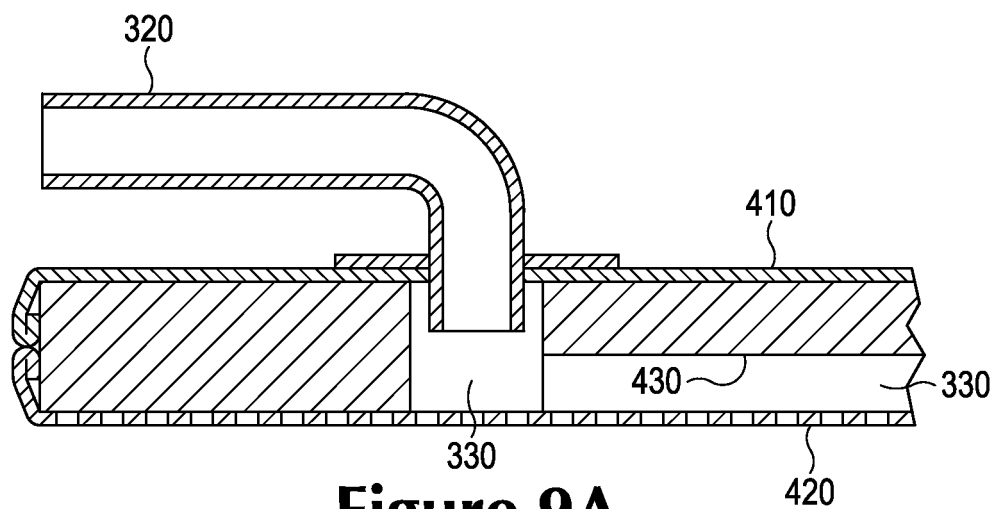


Figure 9A

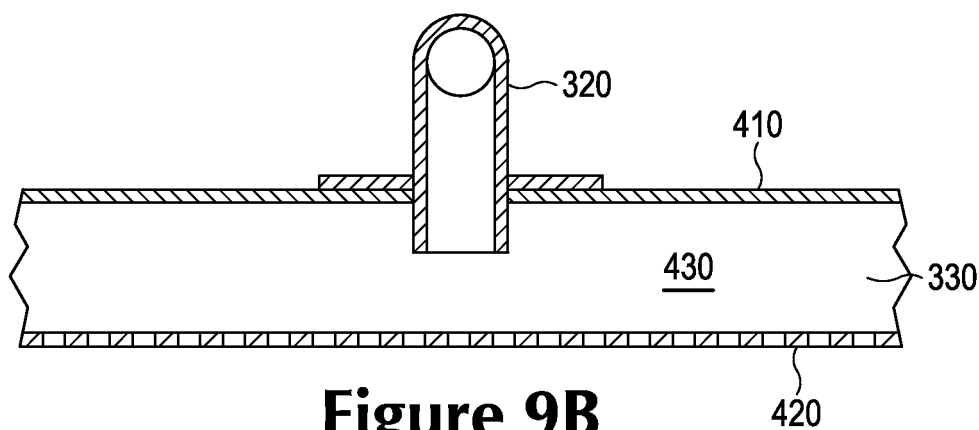


Figure 9B

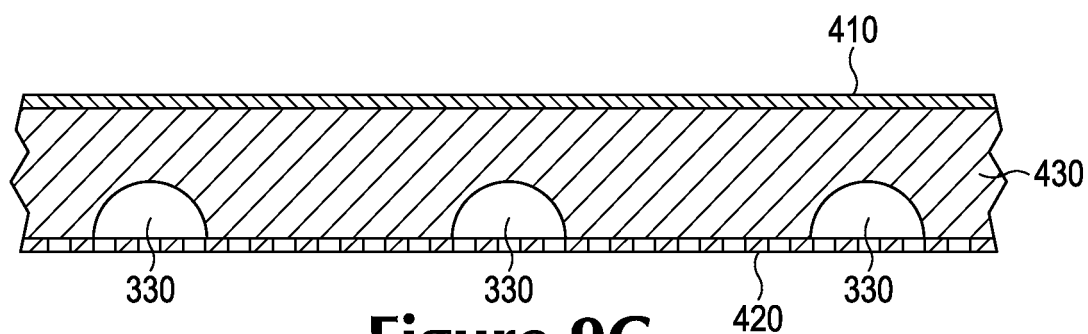


Figure 9C

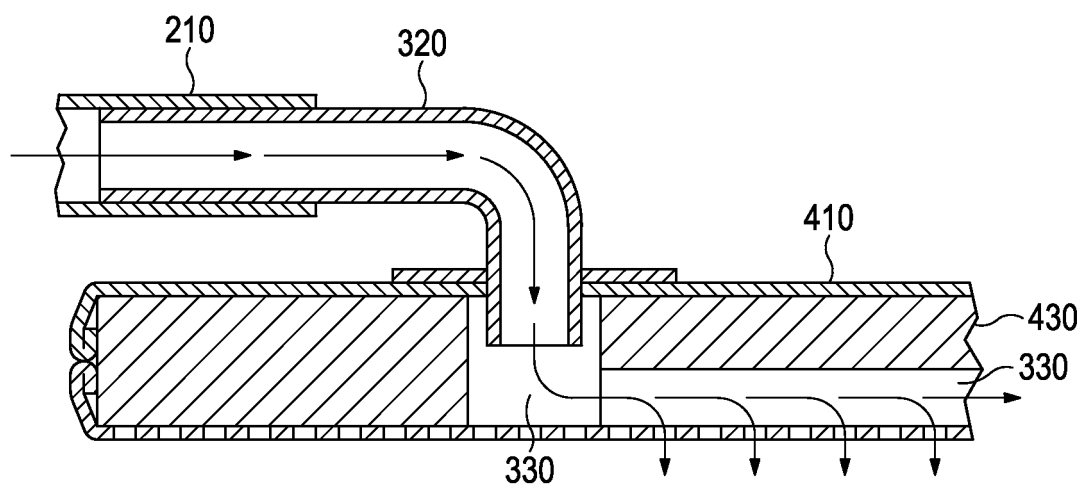


Figure 10A

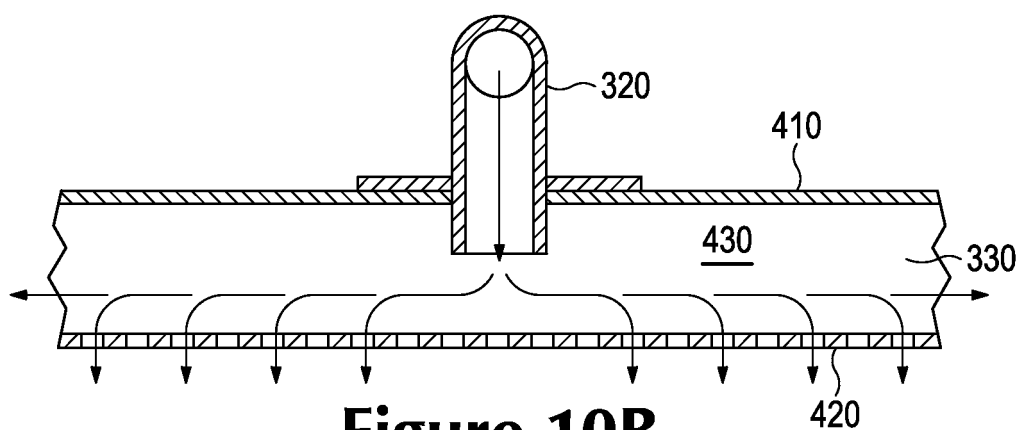


Figure 10B

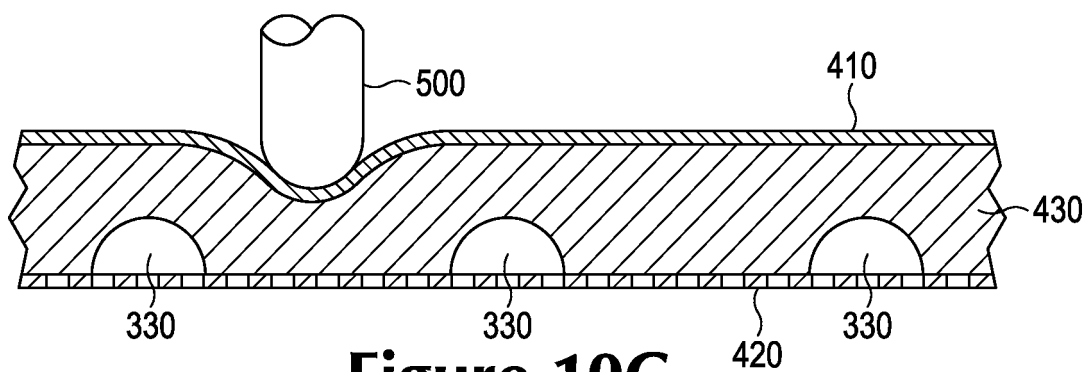


Figure 10C

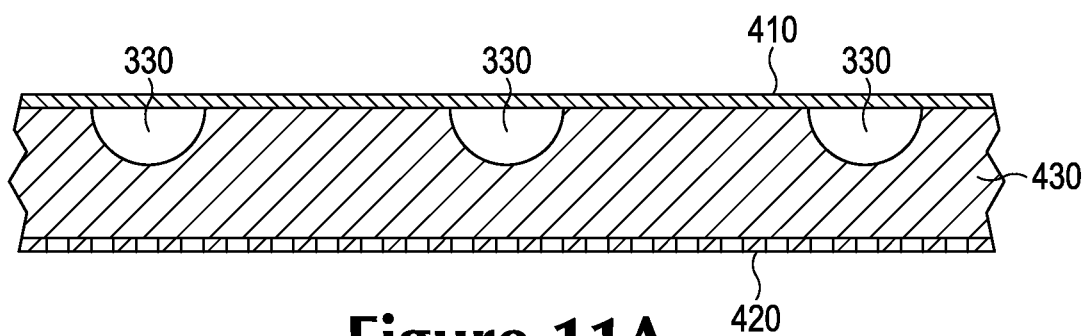


Figure 11A

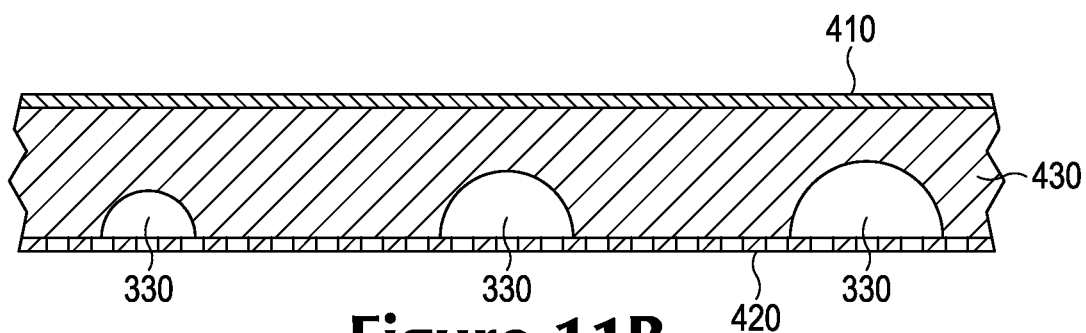


Figure 11B

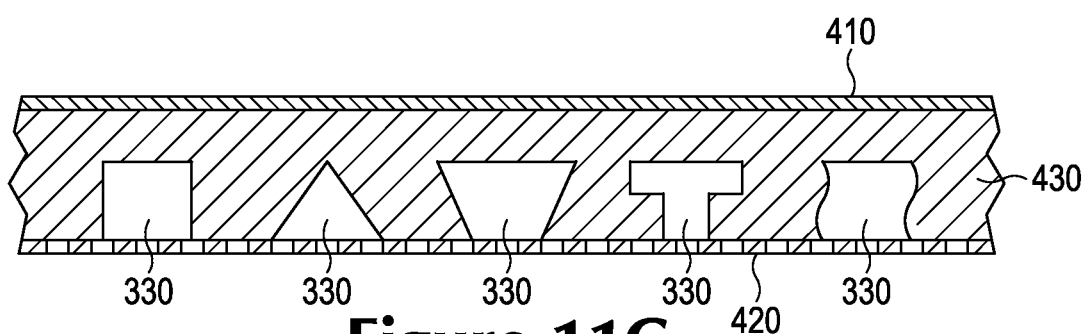


Figure 11C

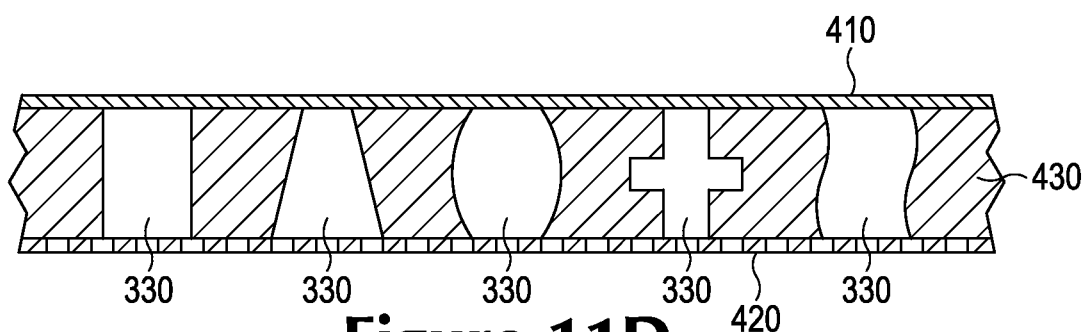


Figure 11D

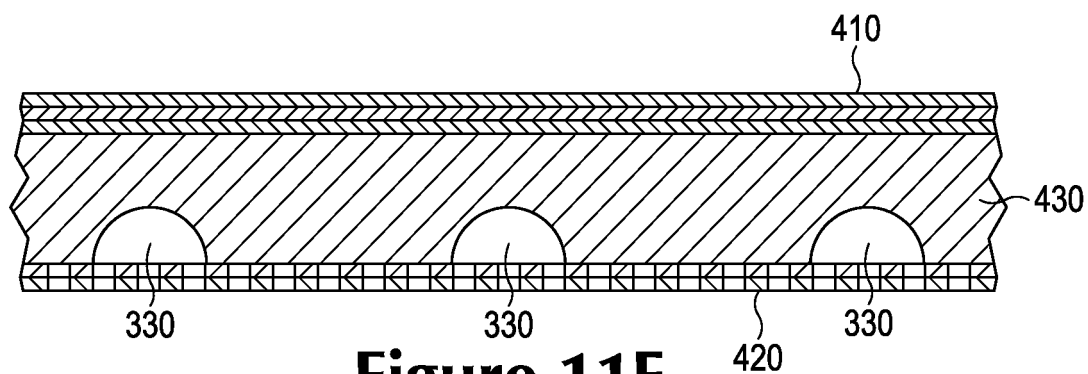


Figure 11E

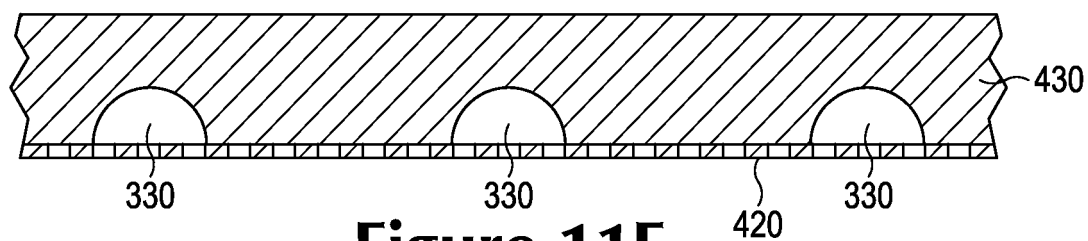


Figure 11F

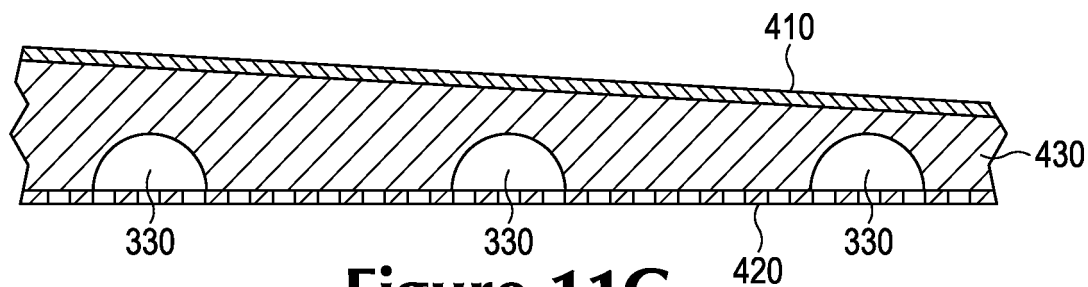


Figure 11G

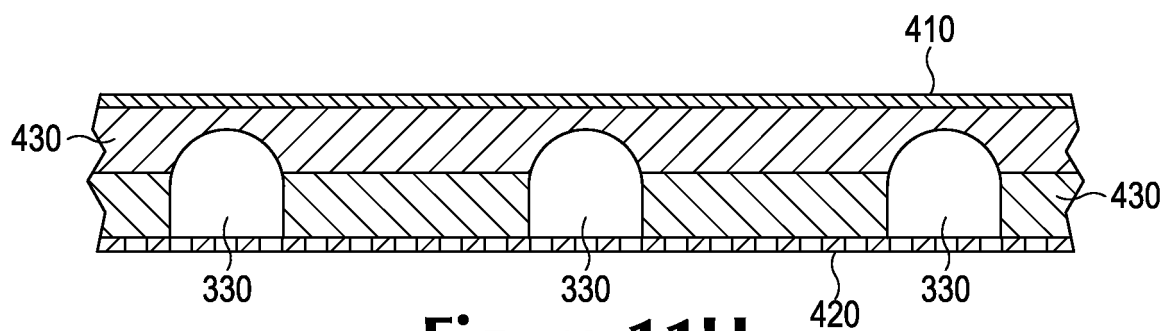


Figure 11H

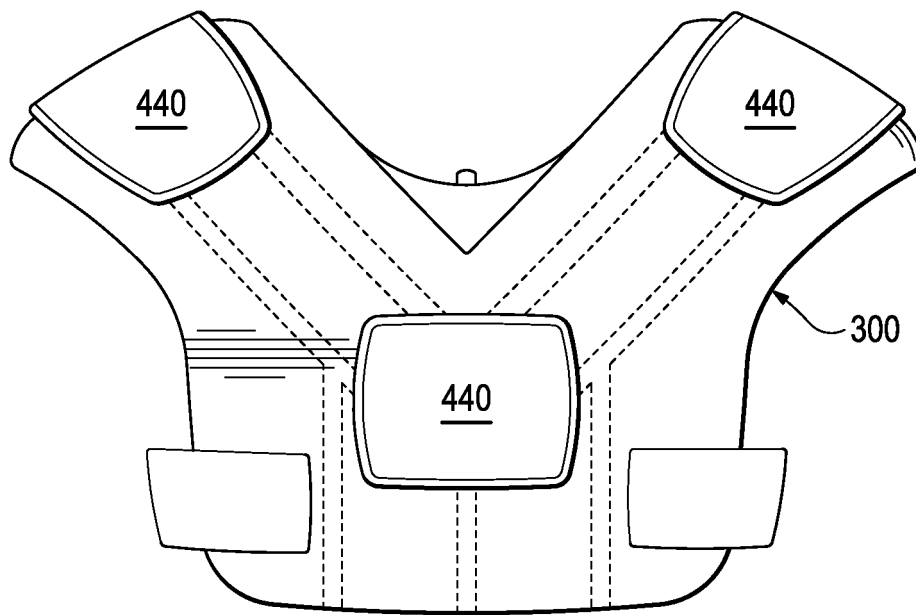


Figure 12A

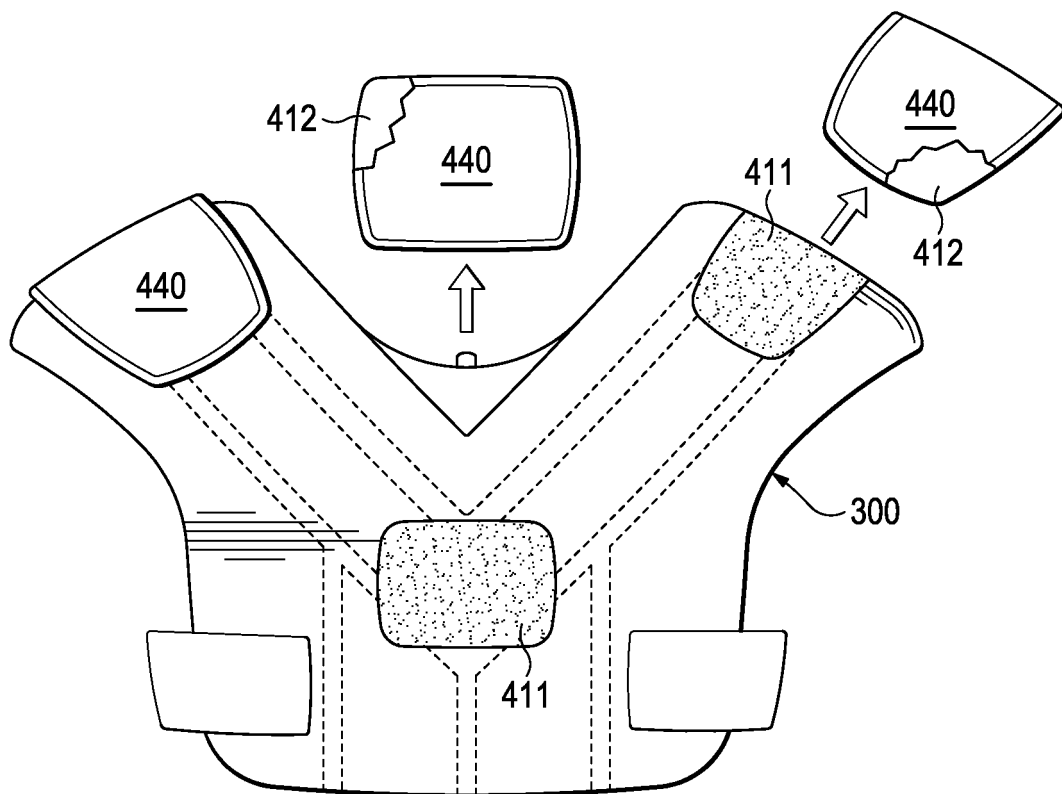


Figure 12B

REFERENCES CITED IN THE DESCRIPTION

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