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(54) Title: REPLACEABLE CONNECTION DEVICE FOR GARMENTS

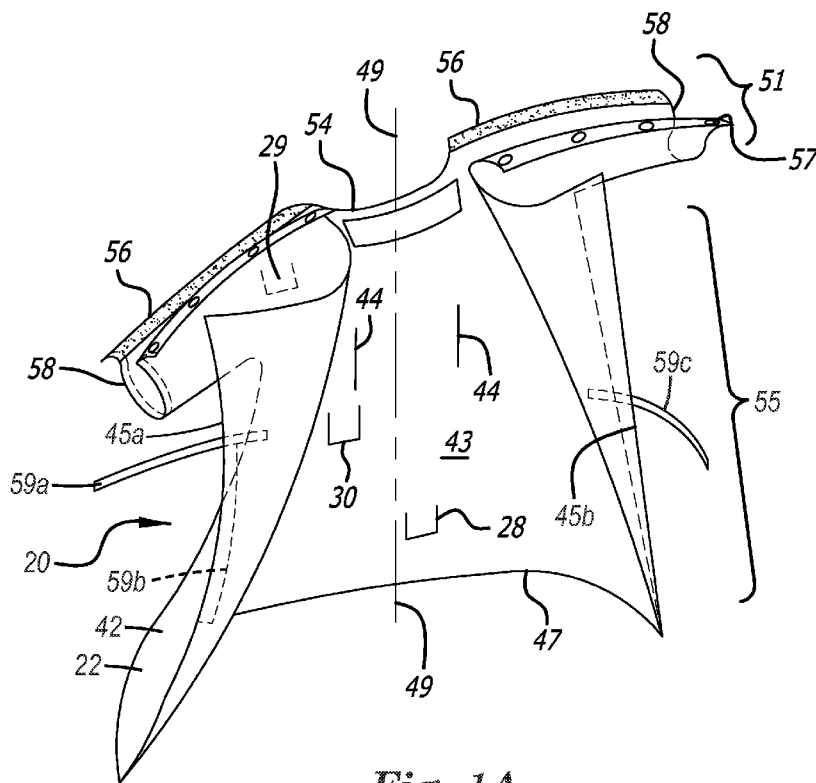


Fig. 1A

(57) Abstract: At least some aspects of the present disclosure feature a garment having a first connection device, a connection mate configured to connect to the first connection device, and a second connection device proximate to the first connection device. The second connection device is configured to connect to the connection mate.

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Replaceable Connection Device for Garments

Technical Field

[0001] The present disclosure generally relates to replaceable connection device for garments. At least some aspects of the present disclosure relate to replaceable connection device for warming device.

Summary

[0002] At least some aspects of the present disclosure feature a warming device, comprising a garment a outside surface, a convective device attached to or integrated with the garment, a first connection device disposed on the outside surface, a connection mate configured to connect to the first connection device, and a second connection device disposed on the outside surface and proximate to the first connection device.

[0003] At least some aspects of the present disclosure feature a garment, comprising: a outside surface, a first connection device disposed on the outside surface, a connection mate configured to connect to the first connection device, and a second connection device disposed on the outside surface and proximate to the first connection device. The second connection device is formed by one or more peripheral lines of weakness on the garment.

Brief Description of Drawings

[0004] The accompanying drawings are incorporated in and constitute a part of this specification and, together with the description, explain the advantages and principles of the invention. In the drawings,

[0005] Figures 1A and 1B illustrate elements of a warming device with replaceable connection device;

[0006] Figure 1C is a close up view of one embodiment of the connection devices;

[0007] Figure 1D shows one embodiment of a line of weakness;

[0008] Figures 1E-II illustrate some embodiments of replaceable connection devices to be used on garments; and

[0009] Figures 2A and 2B are cross-sectional views of two embodiments of a warming device.

Detailed Description

[0010] At least some aspects of the present disclosure direct to garments with replaceable connection device such that the replaceable connection device can be used to affix the garment to a person or an animal when a primary connection device is no longer functional. For example, when a disposable gown is used in a clinic setting, instead of untying the connection strips, the patient or the healthcare provider

may tear apart a first connection strip; in such cases, a second connection strip can be used in place of the first one.

[0011] In some embodiments, a garment can be a disposable garment. In some cases, a garment can be a warming device with at least one convective apparatus attached to or integrated with the garment. A garment can be a clinical garment used to temporarily clothe a patient in a clinical setting. Such garments include hospital gowns, robes, bibs and other equivalents. The clinical setting may be a medical or dental office or clinic, a hospital, or any facility or institution that provides medical or dental treatment to patients. A convective apparatus receives and distributes at least one stream of inflating medium in a structure for being disposed on, adjacent, or next to the core and/or the limbs of a body. When pressurized with warmed air, a convective apparatus emits warmed air through one or more of its surfaces. The emission of inflating medium can be through mechanical openings for example, holes, apertures, interstices, slits and the like; or using air permeable materials.

[0012] Of course, although the device is herein referred to as a “warming” device and is described as operating with warmed, pressurized air, it may also operate with pressurized air at ambient temperature or cooled, pressurized air. Moreover, it may be useful to operate the device with pressurized air that includes a mixture of selected constituents including water vapor, medicaments, scented compounds, and the like.

[0013] In one aspect, a warming device may be worn on a person where it receives a stream of warmed pressurized air, distributes the pressurized air within a convective apparatus, and emits the air through one or more surfaces of the convective apparatus to warm the person’s body. In the warming device illustrated and described in some embodiments, the convective apparatuses are inflatable. That is, their structures, flaccid when not in use, tauten when receiving a stream of pressurized air. In some embodiments, the warming device includes two connection devices (a first connection device and a second connection device) that are configured to connect to a connection mate, such that the second connection device can be used to connect to the connection mate when the first connection device is destroyed or compromised. In one embodiment, the two connection devices and the connection mate are tie strips. In such embodiment, a second tie strip can be used to tie to the tie strip mate to affix the warming device to a person, if a first tie strip is broken after a prior use.

[0014] Exemplary warming device constructions include a clinical garment and one or more convective apparatuses integrated with or attached to the clinical garment. In some aspects, an elongated upper body convective apparatus in the upper portion of the clinical garment extends between the sleeves. In some aspects, a lower, multi-section convective apparatus is integrated with or attached to the clinical garment, beneath the upper portion. In yet other aspects, both upper body and lower multi-section convective apparatuses are integrated with or attached to the clinical garment, from the upper portion to the lower hem.

[0015] Figures 1A and 1B illustrate elements of a warming device 20 with replaceable connection device. While one or more convective apparatus are included in the warming device in the illustration, a

warming device can be a garment without convective apparatus. The view in Figure 1A is from the rear of the garment 22, looking toward the inside surface of the garment, which faces the chest, or thorax of a person. In some cases, at least one convective apparatus is supported on the inside surface of the garment. The garment 22 includes an outside surface 42, an inside surface 43, two opposing lateral hems 45a and 45b, a lower hem 47, and a longitudinal axis 49. The garment 22 has an upper portion 51 with two opposing sleeves 53 and a scooped upper edge 54, and a lower portion 55. The garment may have two slits 44. The slits 44 can be used as hand slits allowing a user to put hands within the garment. In some cases, the garment 22 may have flaps 28, 29, and 30 that provide access to inlet ports through the front of the garment 22.

[0016] The sleeves 53 have an edge 58 and may be long or short. Short sleeves are preferred if access must be had to a person's arms for instrumentation and/or IV delivery. Each sleeve 53 may have an elongated seam 56. Each seam 56 may be held closed by means 57 including, for example, buttons, snaps, hook and loop material, tape, and/or straps, or any equivalent thereof. Such means can be operated to let a seam 56 be opened and to again close a seam, once opened. The garment 22 may open on a side. Preferably, the garment 22 opens in the rear. The opening may be full, as illustrated in Figure 1A, or it may be a slit rising from above the lower hem 47. As the example shown in Figures 1A and 1B, the opening may be closed by a connection device 59a along the lateral hem 45a and a connection mate 59c along the lateral hem 45b which releasably connect to keep the hems together. Such connection devices may include, for example, buttons, snaps, hook and loop material, tape, and/or straps, or any equivalent thereof. As illustrated in Figure 1A, integrally-formed straps 59a and 59c are configured for tying the opposing lateral hems 45a and 45b together. The garment 22 may include another connection device 59b along the lateral hem 45a to replace the connection device 59a. In some cases, the connection devices 59a and 59b are disposed on the outside surface 42. In some other cases, the connection devices 59a and 59b can be disposed on the inside surface 43 that is facing a person wearing the garment 22. In some embodiments, the connection device 59b can be integrated with the garment 22 and formed by a peripheral line of weakness. The garment 22 may be constructed from non-woven or woven materials. In some cases, the garment 22 is made from a non-woven blend of polyester with a natural fiber such as wood pulp.

[0017] Figure 1C is a close up view of one embodiment of the connection devices 59a and 59b. In some embodiments, the connection device 59b can be a tie strip integrally formed or defined in the peripheral of the lateral hem 45a by a peripheral line of weakness 69 that runs parallel with the edge of the lateral hem 45a and ends at location 69a. The peripheral line of weakness 69 may be constituted of a trace or pattern of perforations extending along the periphery of the lateral hem 45a. In some other embodiments, the connection device 59a may have a line of weakness 66 to allow quick separation. For example, a clinical garment is worn by a patient during pre-operative period; the patient or the healthcare provider can quickly take off the clinical garment by tearing apart the tie strip 59a at the line of weakness 66, when

the patient enters into the operation room; and the patient can wear the same clinical garment again by securing the garment using the straps (i.e., tie strips) 59b and 59c during post-operative period. Similarly, the line of weakness 66 may be constituted of a trace or pattern of perforations. In some cases, the connection device 59a can be a tie strip integrally formed or defined in the peripheral of the lateral hem. In some cases, the connection devices 59a and 59b can be formed by two adjacent peripheral lines of weakness.

[0018] It is further desirable to reduce tendencies for the separating force to be diverted toward a side edge or across an end edge, either of which can result in a tie strip being torn altogether from an end. Certain constructions which keep the separating force confined to the track of a line of weakness can prevent such occurrences. Referring to Figure 1D, peripheral lines of weakness 69 may be formed between a seal 67a and a seal 67b running just inside the periphery of the lateral hem 45a. This will tend to confine a tearing force along a peripheral line of weakness 69 to a track between the seals 67a and 67b. It may also be effective to terminate each line of weakness 69 in a hole 92 through the track. In an alternative embodiment, the connection device 59b can be a strap attached to the garment 22 at location 69a by any means, for example, gluing, heat sealing, stapling, sewing, welding, or the like. The line of weakness (e.g., line of weakness 66 or 69) can be a straight line, a curved line, a wavy line, or in other shapes.

[0019] Figures 1E-II illustrate some embodiments of replaceable connection devices to be used on garments. The connection devices 59d and 59e are loops allowing the strap or belt 59c to go through and tie a knot. In some embodiments, the connection devices 59d and 59e are disposed on the outside surface 42 of the garment 22. In some implementations, the strap or belt 59c can be attached to the garment 22 on a first end, as illustrated in Figure 1B. In such implementations, the second end of the strap 59c will tie back to its own middle section. In some other implementations, the strap 59c can go through one of the loops 59d and 59e and tie a knot using the first and the second ends. In such implementations, the strap 59c can be attached to the garment 22 at a middle section or can be detached from the garment 22. In some cases, the connection devices 59d and 59e are proximate to the lateral hem. In some other cases, the connection device 59d and 59e can be placed close to the middle of the garment 22, where the line 45c is at the middle part of the garment 22.

[0020] The connection device 59d has two ends 89a and 89b and two sides 89c and 89d. The connection device 59e has two ends 91a and 91b and two sides 91c and 91d. In some cases, the connection devices 59d and 59e can be a loop with one end attached to the garment 22 (as illustrated in Figure 1G). In some other cases, the connection devices 59d and 59e can be a loop with both ends attached to the garment 22. At least one of the connection devices 59d and 59e can be formed by lines of weakness on the garment 22. For example, the connection device 59e can be a loop integrally formed or defined in the peripheral of the lateral hem 45a by two peripheral line of weakness at 91c and 91d, as illustrated in Figure 1E. In

some configurations, the connection device 59d can have a line of weakness 89e as a break line that allows quick separation.

[0021] In the embodiment illustrated in Figure 1F, the two ends 89a and 89b for the loop 59d are close to each other, and the two ends 91a and 91b for the loop 59e are close to each other. In the embodiment as illustrated in Figure 1G, the two ends of the connection devices, 89a and 89b, 91a and 91b, are overlapped. In some cases, at least one of the connection devices 59d and 59e can have a line of weakness (e.g., line of weakness 89e, line of weakness 91e) as a break line to allow quick separation. In the embodiment illustrated in Figure 1E, the connection devices 59d and 59e are adjacent along the longitude direction of the garment 22 and the connection device 59e is integrated with the garment 22 and formed by lines of weakness at its sides 89c and 89d. In the embodiment illustrated in Figure 1H and 1I, the connection devices 59d and 59e are parallel to each other and one of the sides of each connection device (e.g. 89d and 91c) overlap. In some cases, the connection devices 59d and 59e can be parallel but the sides do not overlap. As illustrated in Figure 1I, the connection device 59d is formed by separating the lines of weakness at 89c and 89d and allows the strap 59c to go through.

[0022] Referring to Figure 1B, although one opening 61 is illustrated in the upper body convective apparatus 60, one or more additional inlet ports may be provided for convenience. Unused inlet ports are sealed or closed by known means to prevent air escaping therethrough. Preferably the opening 61 is provided through the impermeable surface of the upper body convective apparatus 60; it may also be provided through an edge of the upper body convective apparatus 60. The opening 61 may be mounted on the impermeable surface 64 with an opening through the impermeable surface to receive the nozzle of an air hose, or it may comprise a sleeve of material, or any other equivalent structure. When the upper body convective apparatus 60 is used for therapeutic warming, the ends of the apparatus are unfolded from the sleeves 53. Then, pressurized air flowing through an opening such as the opening 61 inflates the upper body convective apparatus 60. An opening can have various shapes and structures, for example, a round shape opening (e.g., opening 61), an inlet port (e.g. inlet port 74), sleeve openings at the edge of the top and bottom layers, or the like.

[0023] As illustrated in Figure 1B, the multi-section convective apparatus 70 has separately inflatable sections. Because this convective apparatus is disposed on the inside surface in the lower portion of the clinical garment, it may also be referred to as the “lower convective apparatus” 70. A “section” of the lower convective apparatus 70 is a portion or division that may be inflated and operated separately from any other section. For example, the lower convective apparatus 70 has a inflatable section 71 and a inflatable section 72. The inflatable section 71 may be inflated and operated separately from the inflatable section 72, and the inflatable section 72 may be inflated and operated separately from the inflatable section 71.

[0024] In the lower convective apparatus 70 shown in Figure 1B, the inflatable section 71 has an inlet port 74 and a “dog bone” shape. Alternatively, the inflatable section 71 may have the shape of a capital I,

with upper and lower cross bars. Although one inlet port 74 is illustrated in the inflatable section 71, one or more additional inlet ports may be provided for convenience. Unused inlet ports are sealed or closed by known means to prevent air escaping therethrough. Preferably the inlet port 74 is provided through the impermeable surface of the lower convective apparatus 70. The inlet port 74 may comprise a collar 74a of stiff material mounted on a portion of the impermeable surface in the section with an opening 74b opening through the surface to receive the nozzle of an air hose, or it may comprise a sleeve of material, or any other equivalent structure. In some embodiments of the inflatable section 71, the permeability of the permeable surface may vary in different portions of the sections (e.g., the upper section, middle section, low sections, etc.) in order to reduce or eliminate variances in temperature of air expelled through the permeable surface of the section.

[0025] As seen in Figure 1B, the inflatable section 72 has a U-shaped outline with lower edge 82 and side edges 83 and 84. The inflatable section 72 generally forms an outline that surrounds the inflatable section 71 on three sides. Although one inlet port 85 is illustrated in the inflatable section 72, one or more additional inlet ports may be provided for convenience. Unused inlet ports are sealed or closed by known means to prevent air escaping therethrough. Preferably the inlet port 85 is provided through the impermeable surface of the therapeutic convective apparatus 70, although it may also be provided through an edge of the lower convective apparatus 70. The inlet port 85 may comprise a collar 85a of stiff material on the impermeable surface with an opening 85b through the impermeable surface to receive the nozzle of an air hose, or it may comprise a sleeve of material, or any other equivalent structure. Pressurized air flowing through the inlet port 85 inflates the inflatable section 72. The surface 86 of the inflatable section 72 is permeable, permitting pressurized air that is flowing into and inflating the inflatable section 72 to be expelled toward the interior of the clinical garment 22 (that is, toward a patient wearing the device 20).

[0026] In some aspects of the lower convective apparatus 70, the upper edge of the inflatable section 71 is part of the upper edge of the lower convective apparatus 70 in order to position the upper transverse part 77 approximately against and transverse to the upper chest, between the shoulders, of a patient wearing the clinical garment 22. This advantageously locates the upper transverse part 77 for delivery of air for comfort warming the chest of the patient.

[0027] The dog-bone and U construction of the lower convective apparatus 70 is not intended to be limiting; it is just one example of how the apparatus may be provided with separately-inflatable sections for comfort and therapeutic warming, and other possible two-section constructions are shown and described in related applications that are listed above.

[0028] With reference to Figure 1B, in some cases, the inlet port 74 of the inflatable section 71 may have a smaller opening 74b than the opening 85b through the inlet port 85 of the inflatable section 72. In this case, the opening 61 of the upper body convective apparatus 60 and 85b of the inflatable section 72 can be of equal size. Consequently, the inlet port 74 accepts an air hose nozzle with a smaller diameter than the air hose nozzle diameter accepted by the openings 61 and 85. The smaller nozzle diameter signifies a

comfort warming air supply with an air hose having a smaller diameter than the air hose of a therapeutic warming air supply. Further, the smaller air hose may be coupled to a heater blower unit with a smaller capacity than that of the heater blower unit of a therapeutic warming air supply, which can be connected to either the upper body convective apparatus 60 or the inflatable section 72 of the lower convective apparatus 70. The provision of an inlet port 74 dimensioned for a smaller-diameter hose enables the inflatable section 71 to operate in response to a lower capacity heater/blower unit designed for comfort warming. The provision of inlet ports 61 and 85 dimensioned for a larger-diameter hose enables the upper body convective apparatus 60 and the inflatable section 72 of the lower convective apparatus 70 to operate in response to a higher capacity heater/blower unit designed for therapeutic warming. The upper convective apparatus 60 is therefore constructed for warming with high intensity, and the lower convective apparatus 70 has an inflatable section 71 constructed for warming with low intensity and a inflatable section 72 constructed for warming with high intensity.

[0029] The inlet port 85 is disposed in a middle portion of the lower convective apparatus 70, near a side. Preferably, the therapeutic section inlet port 85 is located substantially midway between the upper edge 80 and the lower edge 82, near one of the side edges, such as the side edge 84. In Figure 1A, the opening covered by the flap 30 through which the therapeutic section inlet port 85 is accessed is formed substantially in a middle portion of the clinical garment 22 so as to be aligned with the therapeutic section inlet port 85 when the lower convective apparatus 70 is supported on the inside surface 43 of the clinical garment 22.

[0030] Figure 1B illustrates one embodiment of a warming device having the convective apparatuses 60 and 70 when both are supported on the inside surface 43 of the clinical garment 22. A warming device may have one or more convective apparatuses and each convective apparatus may have one or more inflatable sections. As illustrated in Figure 1B, the upper edge 80 of the lower convective apparatus 70 overlaps the lower edge of the upper body convective apparatus 60. The upper edge 80 may be retained in place by tacking, taping, or a light adhesive acting between the upper edge 80 and the upper body convective apparatus 60 and/or the inside surface 43 of the clinical garment.

[0031] As illustrated in Figure 1B, the upper body convective apparatus 60 is an elongate convective apparatus disposed, supported, or integrated with the inside surface 43 of the clinical garment 22, in the upper portion 51, transverse to the longitudinal axis 49 and extending from sleeve 53 to sleeve 53. Warmed, pressurized air flows into and inflates the upper body convective apparatus 60, and exits through the permeable surface 64 toward a patient. The lower convective apparatus 70 with separately inflatable sections is disposed, supported, or integrated with the inside surface 43, in the lower portion 55, and is disposed longitudinally to the clinical garment 22, with the longitudinal axis 49 and extending from just above the lower edge 65 of the upper body convective apparatus 60 toward the lower hem 47. In the embodiment as illustrated in Figure 1B, the lower convective apparatus 70 has the construction with a dog-bone shaped inflatable section 71, and a second, separately-inflatable inflatable section 72 that

frames the inflatable section 71 to provide therapeutic warming. An opening in the lower portion 55 of the clinical garment 22 (such as the flap 28 in Figure 1A) provides access by which an air hose can connect to the inlet port 74 of the inflatable section 71 of the lower convective apparatus 70 to operate the inflatable section 71 for warming. Warmed, pressurized air flows into and inflates the inflatable section 71, and exits through the permeable surface of the section, toward a patient. An opening in the lower portion 55 of the clinical garment 22 (such as the flap 30 in Figure 1A) provides access by which an air hose can connect to the inlet port 85 of the inflatable section 72 of the lower convective apparatus 70 to operate the section for warming. Warmed, pressurized air flows into and inflates the inflatable section 72, and exits through the permeable surface 86 of the section, toward a patient.

[0032] In some embodiments, each of the convective apparatuses 60 and 70 may be formed by joining two sheets of material with a closed impermeable seam formed by sealing the sheets of material around their peripheries and, in the lower convective apparatus, one or more additional closed impermeable seams to define separate comfort and therapeutic sections. One of the sheets is relatively impermeable and the other sheet is relatively more permeable to permit airflow therethrough. A sheet can be air permeable using various materials or mechanical structures, for example, air-permeable materials, apertures, interstices, slits, or the like.

[0033] Air permeable materials include, for example, woven fabrics, nonwoven fabrics, perforated film, porous film, laminated material (e.g., nonwoven fabrics with perforated film, etc.), flocked fabrics, and the like. Nonwoven fabrics include, for example, carded thermally bonded nonwovens, spunbond nonwovens, hydroentangled/spunlaced nonwovens, SMS (Spunbond-Meltblown-Spunbond) nonwovens, airlaid nonwovens, wet-laid nonwovens, or the like. The air impermeable strip uses materials having less air permeability (i.e., air impermeable materials). Air impermeable materials include, for example, single layer plastic film (e.g., Polyethylene, Propylene, Polyurethane, polyester, etc.), metal film (e.g., aluminum foil film, etc.), elastic film (e.g., polyurethane, Kratons, etc.), multi-layer film (e.g., co-extruded film, blown film, etc.), film coated paper, and the like. In some implementations of an air permeable sheet with apertures, the density of apertures can vary among areas and/or inflatable sections. For example, the inflatable section 71 can have apertures with higher density than apertures in the inflatable section 72. The sheets are further connected by discontinuous seals or stake points within the closed impermeable seams. The two sheets with which a convective apparatus is formed may be separate from the clinical garment 22, in which case the convective apparatuses are permanently or releasably attached, fixed, or adhered to the inside surface 43 of the clinical garment 22, with their permeable surfaces facing inwardly, toward a patient wearing the device 20. An exemplary construction in this regard is illustrated in FIGS. 1A and 1D and FIGS. 3A-3C of PCT publication WO 2003/086500. Alternately, the convective apparatuses may be formed or constructed integrally with a clinical garment 22 made of relatively impermeable material by attaching relatively permeable sheets to portions of the inside surface of the

clinical garment 22. An exemplary construction in this regard is illustrated in FIGS. 1D and 1E and FIGS. 3D-3F of PCT publication WO 2003/086500.

[0034] The convective apparatus can be formed or assembled separately from the clinical garment and then attached to its inside surface. The means by which the convective apparatuses may be so attached include taping, sewing, gluing, heat sealing, stapling, or welding, or any combination of these. Snaps, buttons, and hook and eye articles may also be used.

[0035] In some implementations, the convective apparatuses can be formed by heat sealing two sheets of material together. Each convective apparatus is formed with an impermeable polypropylene film and a permeable laminate sheet comprising a layer of nonwoven material on which a layer of polypropylene is extruded. The laminate sheet is made permeable by perforations formed there through. For the multi-section convective apparatus, the perforation densities are varied in order to provide the difference in permeability between the comfort and therapeutic sections. The polypropylene layer and polypropylene film are joined by an impermeable seal around their peripheries. Preferably, the impermeable seal is continuous. In the multi-section convective apparatus the polypropylene layer and polypropylene film are further joined by one or more additional seals continuous seals or stake points within the peripheral seal to form the comfort and therapeutic sections. Each convective apparatus is attached to a clinical garment by double-sided tape acting between the polypropylene film and the inside surface of the clinical garment so that the nonwoven material faces the patient. The reason for locating the polypropylene film on the inside surface of the clinical garment is to reduce the bulk and stiffness of the convective apparatus, thus making the warming device more comfortable to the patient.

[0036] Figures 2A and 2B are cross-sectional views of two embodiments of a warming device 200 with convective device attached to or integrated with a clinical garment. As illustrated in Figure 2A, the warming device 200 includes a garment sheet 210, a material sheet 203, a base sheet 204, and an attachment device 209. In some cases, at least one of the sheets can be made from a polyolefin non-woven extrusion coated, each with a coating of polypropylene on one side. In some other cases, at least one of the sheets can be poly lactic acid spunbond with polyolefin based extrusion coat. Each of the sheets 210, 203, and 204 may have one or more layers. For example, the garment sheet 210 may include two layers, a top layer 201 and a bottom layer 202. In some cases, the base sheet 204 is air permeable and the material sheet 203 is not air permeable. An air permeable sheet can be air permeable via mechanical structures, for examples, having openings formed by punching, slitting, or cutting, or via material property. The material sheet 203 is attached to a surface of the base sheet 204 to form an inflatable portion. The attachment device 209 can use any permanent or releasable attachment means, for example, two-sided adhesive, perforated tear-away tabs, hook and loop, sewing, snaps, heat, ultrasonic, rivets, repositionable adhesives, mechanical reclosable fasteners, or the like. In some cases, at least some portions of the garment sheet 210 has a first garment surface 210a and a second garment surface 210b, where the first garment surface has greater friction coefficient than the second drape surface. In some

embodiments, the coefficient of friction of either surface 210a or 210b can be selectively varied to create areas that can retain or be adapted to retain surgical related instruments, cables, or hoses.

[0037] Alternatively, as illustrated in Figure 2B, the warming device 200 includes a garment sheet 210, a base sheet 204, and an attachment device 209. In such embodiment, the garment sheet 210 is not air permeable and the base sheet 204 is air permeable. The garment sheet 210 is attached to a surface of the base sheet 204 to form an inflatable portion by the attachment device 209.

Exemplary Embodiments

[0038] Embodiment 1 is a warming device, comprising: a garment a outside surface, a convective device attached to or integrated with the garment, a first connection device disposed on the outside surface, a connection mate configured to connect to the first connection device, and a second connection device disposed on the outside surface and proximate to the first connection device.

[0039] Embodiment 2 is the warming device of Embodiment 1, wherein the second connection device is formed by one or more peripheral lines of weakness on the garment.

[0040] Embodiment 3 is the warming device of Embodiment 1 or Embodiment 2, wherein the second connection device is a tie strip formed by a peripheral line of weakness on the garment and configured to connect to the connection mate.

[0041] Embodiment 4 is the warming device of any one of the previous Embodiments, wherein the first connection device is a tie strip formed by a peripheral line of weakness on the garment.

[0042] Embodiment 5 is the warming device of Embodiment 3, wherein the connection mate is a tie strip configured to tie to the first connection device or the second connection device.

[0043] Embodiment 6 is the warming device of Embodiment 5, wherein the connection mate is formed by a peripheral line of weakness on the garment.

[0044] Embodiment 7 is the warming device of any one of the previous Embodiments, wherein the first connection device is a loop having a first end and a second end, wherein the first end and the second end of the first connection device are attached to the garment.

[0045] Embodiment 8 is the warming device of Embodiment 7, wherein the second connection device is a loop having a first end and a second end, wherein the first end and the second end of the second connection device are attached to the garment.

[0046] Embodiment 9 is the warming device of Embodiment 7 or Embodiment 8, wherein the connection mate is a strip configured to loop around the first connection device or the second connection device.

[0047] Embodiment 10 is the warming device of any one of the previous Embodiments, wherein the first connection device has a line of weakness defining a break line.

[0048] Embodiment 11 is a garment, comprising: a outside surface, a first connection device disposed on the outside surface, a connection mate configured to connect to the first connection device, and a second

connection device disposed on the outside surface and proximate to the first connection device, wherein the second connection device is formed by one or more peripheral lines of weakness on the garment.

[0049] Embodiment 12 is the garment of Embodiment 11, further comprising: a convective device integrated with or attached to the garment.

[0050] Embodiment 13 is the garment of Embodiment 11 or Embodiment 12, wherein the second connection device is a tie strip formed by a peripheral line of weakness on the garment and configured to connect to the connection mate.

[0051] Embodiment 14 is the garment of any one of the Embodiment 11 to Embodiment 13, wherein the first connection device is a tie strip formed by a peripheral line of weakness on the garment.

[0052] Embodiment 15 is the garment of Embodiment 13, wherein the connection mate is a tie strip configured to tie to the first connection device or the second connection device.

[0053] Embodiment 16 is the garment of Embodiment 15, wherein the connection mate is formed by a peripheral line of weakness on the garment.

[0054] Embodiment 17 is the garment of any one of the Embodiment 11 to Embodiment 16, wherein the first connection device is a loop having a first end and a second end, wherein the first end and the second end of the first connection device are attached to the garment.

[0055] Embodiment 18 is the garment of Embodiment 17, wherein the second connection device is a loop having a first end and a second end, wherein the first end and the second end of the second connection device are attached to the garment.

[0056] Embodiment 19 is the garment of Embodiment 17 or Embodiment 18, wherein the connection mate is strap configured to pass the first connection device or the second connection device.

[0057] Embodiment 20 is the garment of any one of the Embodiment 11 to Embodiment 19, wherein the first connection device has a line of weakness defining a break line.

[0058] The present invention should not be considered limited to the particular examples and embodiments described above, as such embodiments are described in detail to facilitate explanation of various aspects of the invention. Rather the present invention should be understood to cover all aspects of the invention, including various modifications, equivalent processes, and alternative devices and materials falling within the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A warming device, comprising:
a garment having an outside surface,
a convective device attached to or integrated with the garment,
a first connection device disposed on the outside surface,
a connection mate configured to connect to the first connection device, and
a second connection device disposed on the outside surface and proximate to the first connection device.
2. The warming device of claim 1, wherein the second connection device is formed by one or more peripheral lines of weakness on the garment.
3. The warming device of claim 1, wherein the second connection device is a tie strip formed by a peripheral line of weakness on the garment and configured to connect to the connection mate.
4. The warming device of claim 1, wherein the first connection device is a tie strip formed by a peripheral line of weakness on the garment.
5. The warming device of claim 3, wherein the connection mate is a tie strip configured to tie to the first connection device or the second connection device.
6. The warming device of claim 5, wherein the connection mate is formed by a peripheral line of weakness on the garment.
7. The warming device of claim 1, wherein the first connection device is a loop having a first end and a second end, wherein the first end and the second end of the first connection device are attached to the garment.
8. The warming device of claim 7, wherein the second connection device is a loop having a first end and a second end, wherein the first end and the second end of the second connection device are attached to the garment.
9. The warming device of claim 7, wherein the connection mate is a strip configured to loop around the first connection device or the second connection device.

10. The warming device of claim 1, wherein the first connection device has a line of weakness defining a break line.
11. A garment, comprising:
 - a outside surface,
 - a first connection device disposed on the outside surface,
 - a connection mate configured to connect to the first connection device, and
 - a second connection device disposed on the outside surface and proximate to the first connection device, the second connection device formed by one or more peripheral lines of weakness on the garment.
12. The garment of claim 11, further comprising:
 - a convective device integrated with or attached to the garment.
13. The garment of claim 11, wherein the second connection device is a tie strip formed by a peripheral line of weakness on the garment and configured to connect to the connection mate.
14. The garment of claim 11, wherein the first connection device is a tie strip formed by a peripheral line of weakness on the garment.
15. The garment of claim 13, wherein the connection mate is a tie strip configured to tie to the first connection device or the second connection device.
16. The garment of claim 15, wherein the connection mate is formed by a peripheral line of weakness on the garment.
17. The garment of claim 11, wherein the first connection device is a loop having a first end and a second end, wherein the first end and the second end of the first connection device are attached to the garment.
18. The garment of claim 17, wherein the second connection device is a loop having a first end and a second end, wherein the first end and the second end of the second connection device are attached to the garment.
19. The garment of claim 17, wherein the connection mate is strap configured to pass the first connection device or the second connection device.

20. The garment of claim 11, wherein the first connection device has a line of weakness defining a break line.

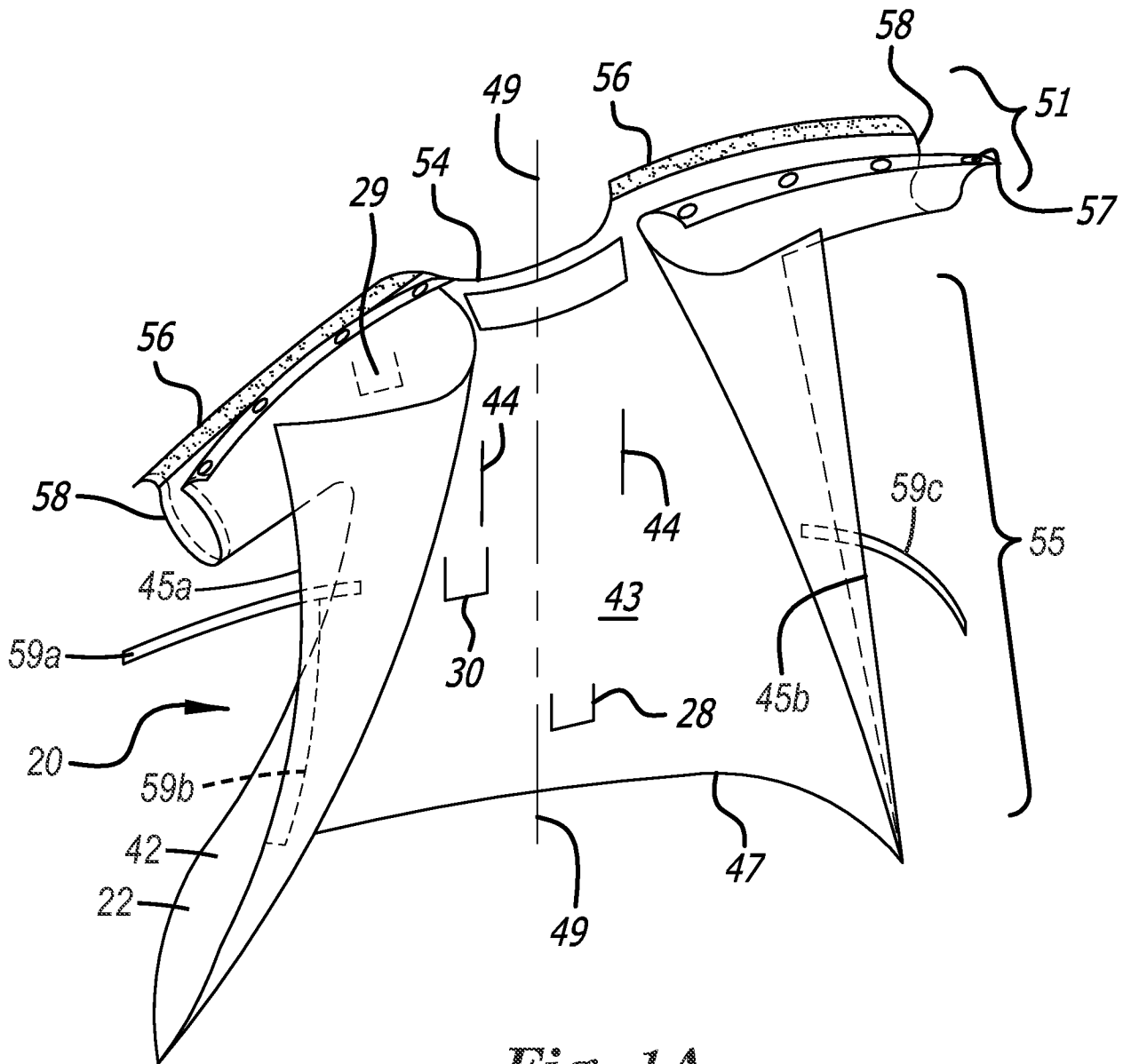


Fig. 1A

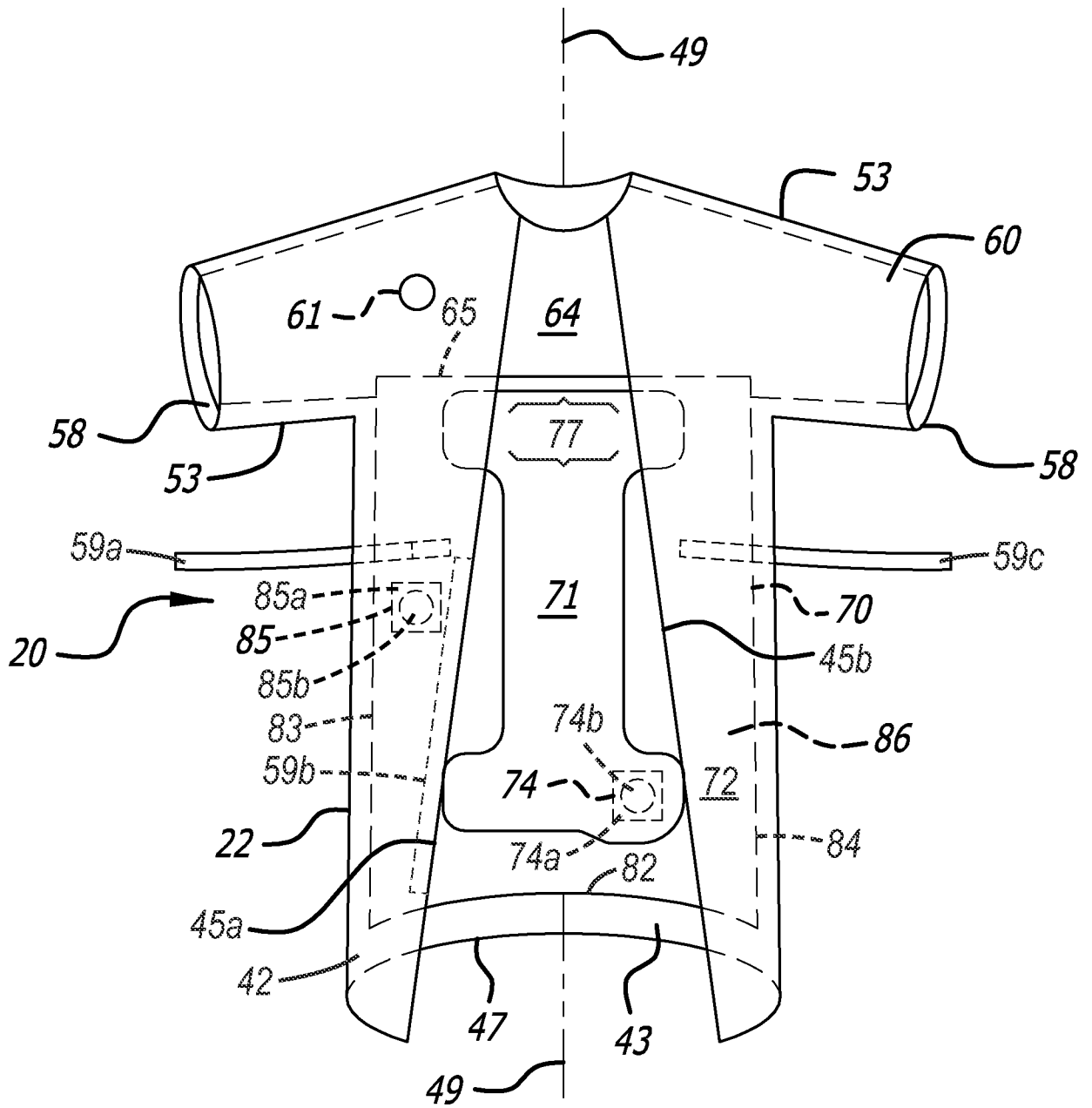


Fig. 1B

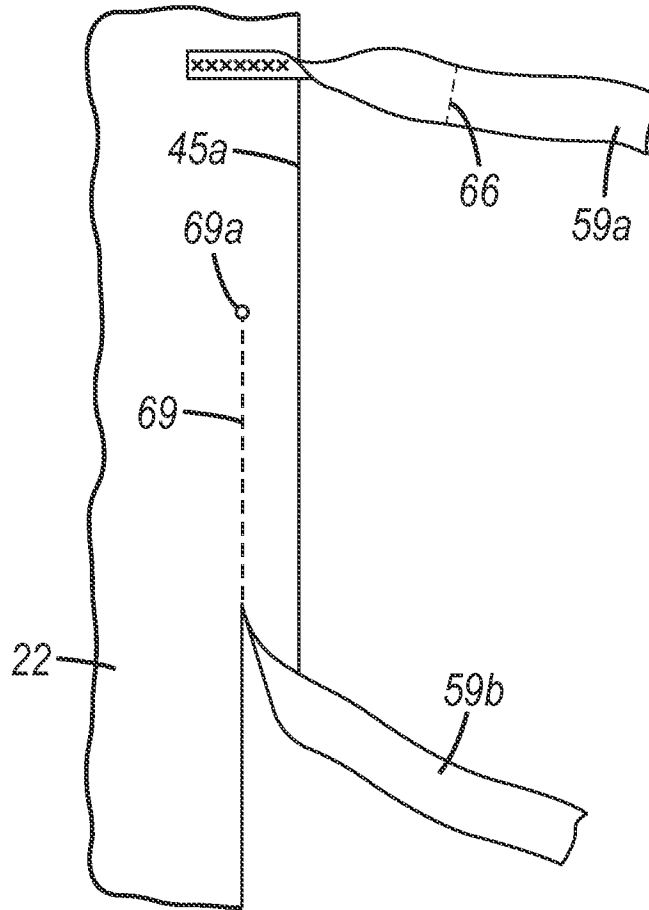


Fig. 1C

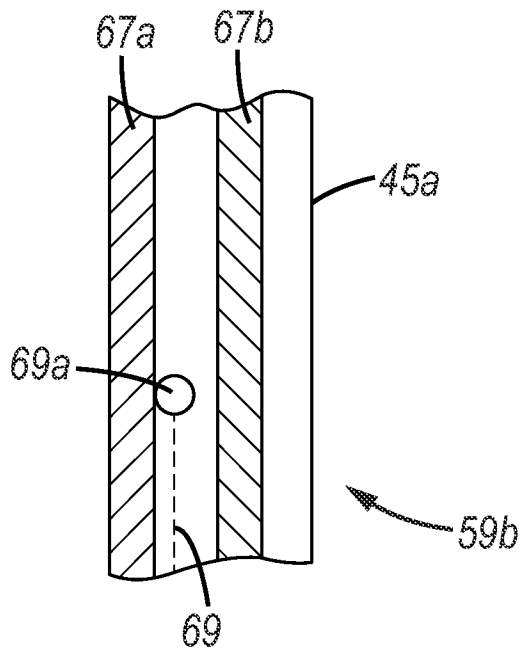


Fig. 1D

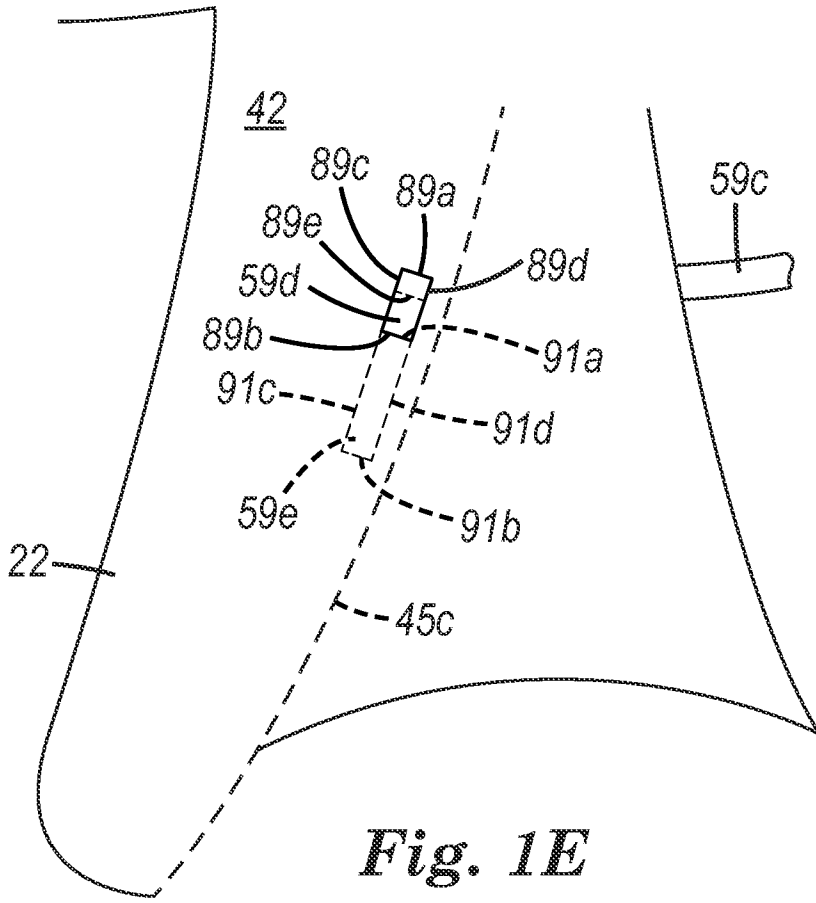


Fig. 1E

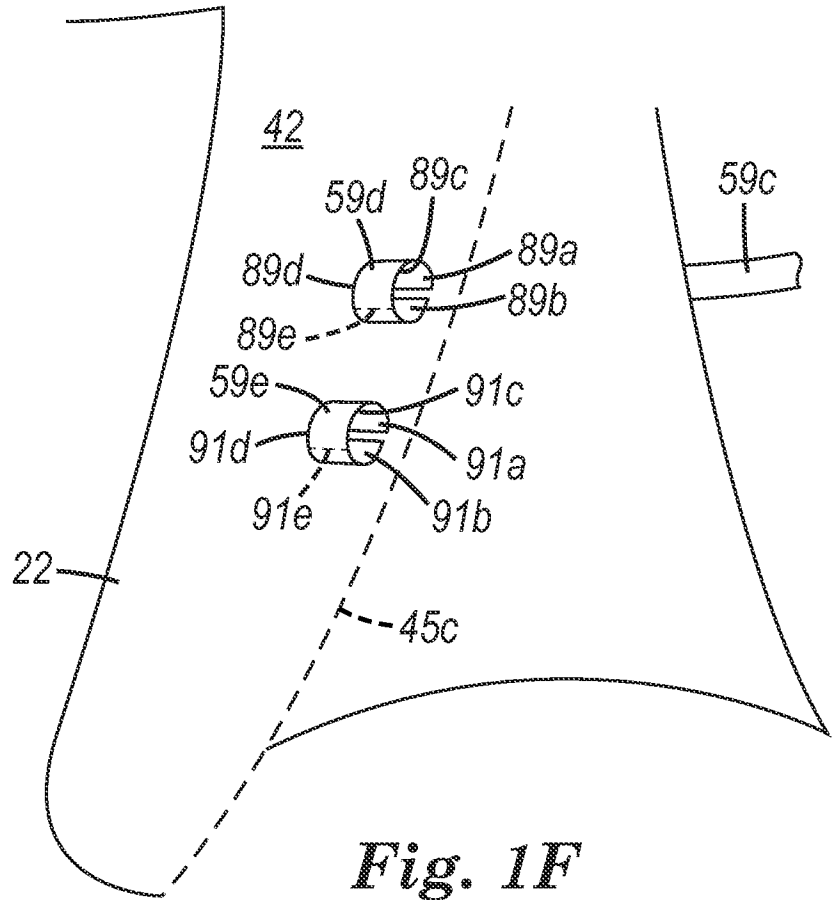


Fig. 1F

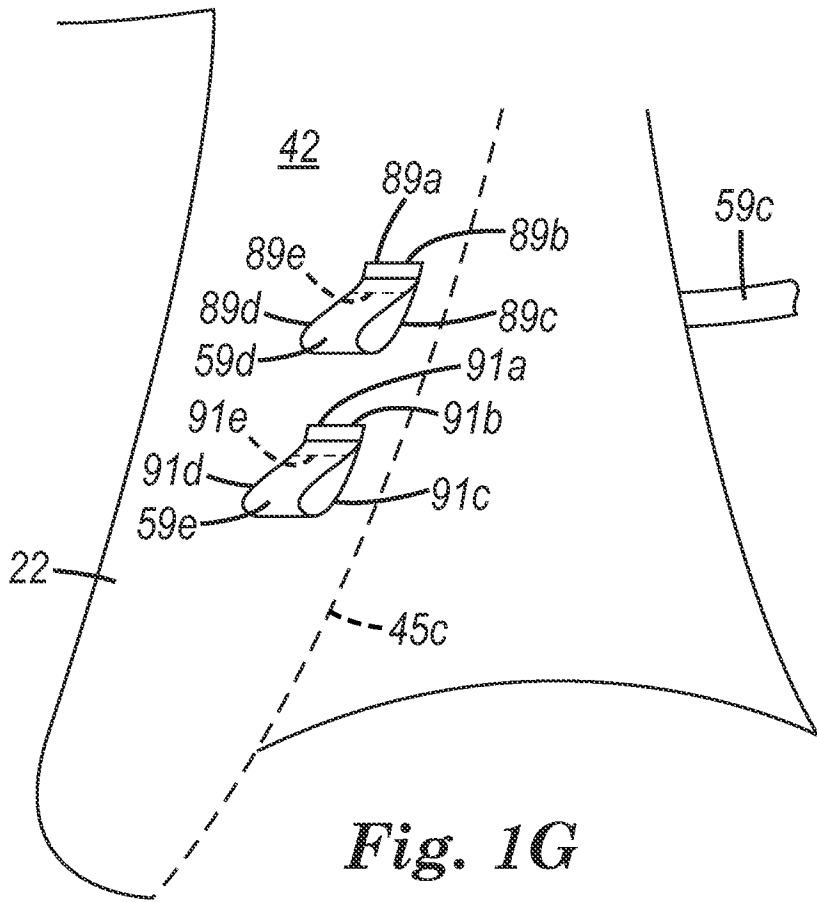


Fig. 1G

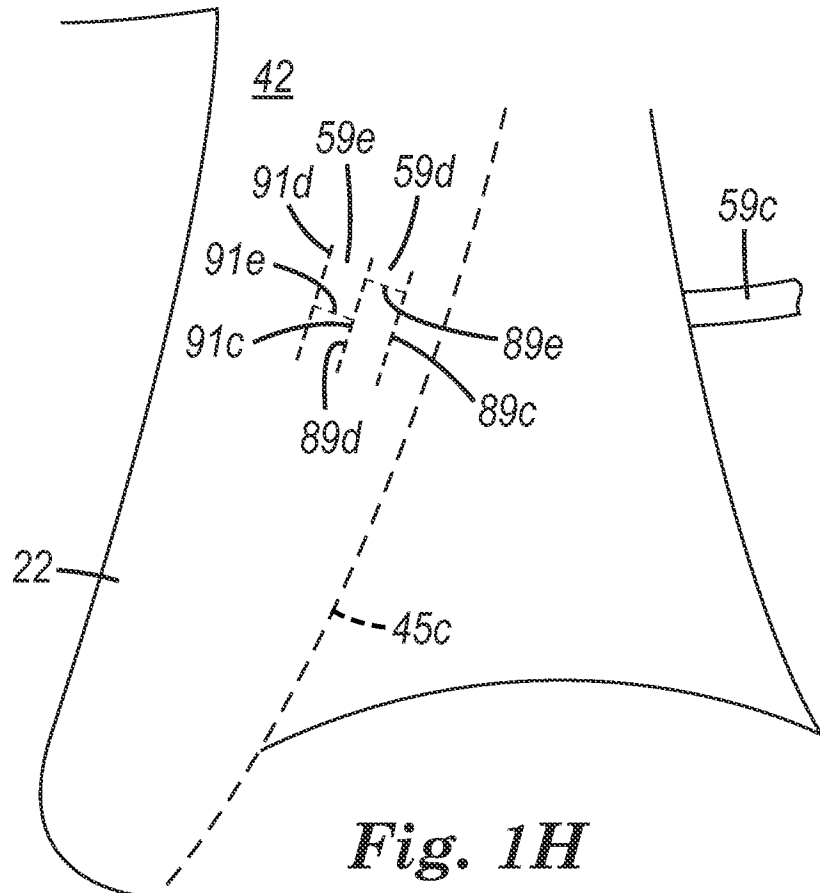
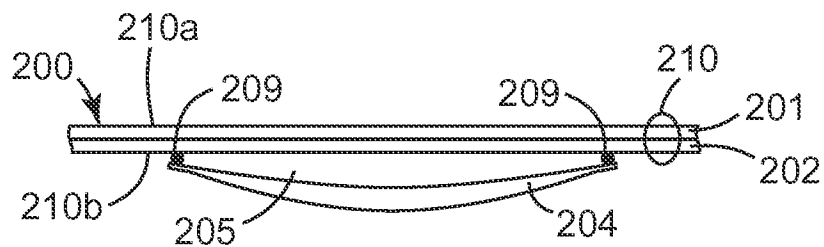
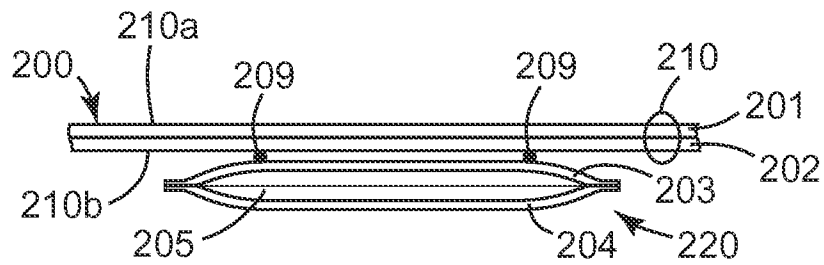
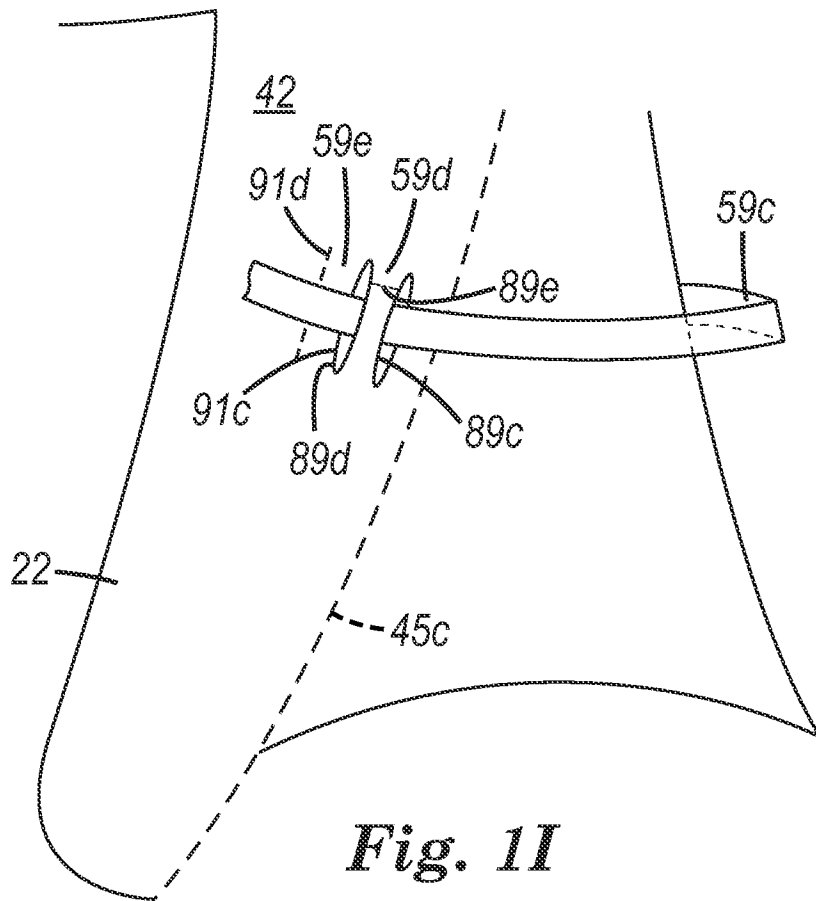


Fig. 1H



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/070498

A. CLASSIFICATION OF SUBJECT MATTER
INV. A41D13/002 A41D13/005 A41D13/12 A61F7/00
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
A41D A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/047917 A1 (ARIZANT HEALTHCARE INC [US]; ANDERSON THOMAS P [US]; LINDRUD SHAD N [U] 26 April 2007 (2007-04-26) page 13, line 12 - line 13; figure 3A -----	1-20
A	US 2009/228083 A1 (ANDERSON THOMAS P [US] ET AL) 10 September 2009 (2009-09-10) figure 3E -----	1-10
A	US 4 829 602 A (HARRELD DONALD R [US] ET AL) 16 May 1989 (1989-05-16) figure 1 -----	10
A	US 3 468 299 A (AMATO CARL D) 23 September 1969 (1969-09-23) figure 1 -----	7
	-/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 26 May 2015	Date of mailing of the international search report 02/06/2015
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer van Voorst, Frank

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/070498

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 230 546 A (SABEE LOIS E) 25 January 1966 (1966-01-25) figure 2	1-10

X	US 2006/135936 A1 (MARKOVICH STACY N [US] ET AL) 22 June 2006 (2006-06-22) figure 1	11-20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/070498

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

A warming device, comprising: a garment having an outside surface, a convective device attached to or integrated with the garment, a first connection device disposed on the outside surface, a connection mate configured to connect to the first connection device, and a second connection device disposed on the outside surface and proximate to the first connection.

2. claims: 11-20

a garment, comprising: a outside surface, a first connection device disposed on the outside surface, a connection mate configured to connect to the first connection device, and a second connection device disposed on the outside surface and proximate to the first connection device, the second connection device formed by one or more peripheral lines of weakness on the garment.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/070498

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