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(54) **INSULATING CLOTHING SYSTEMS AND METHODS OF USE**

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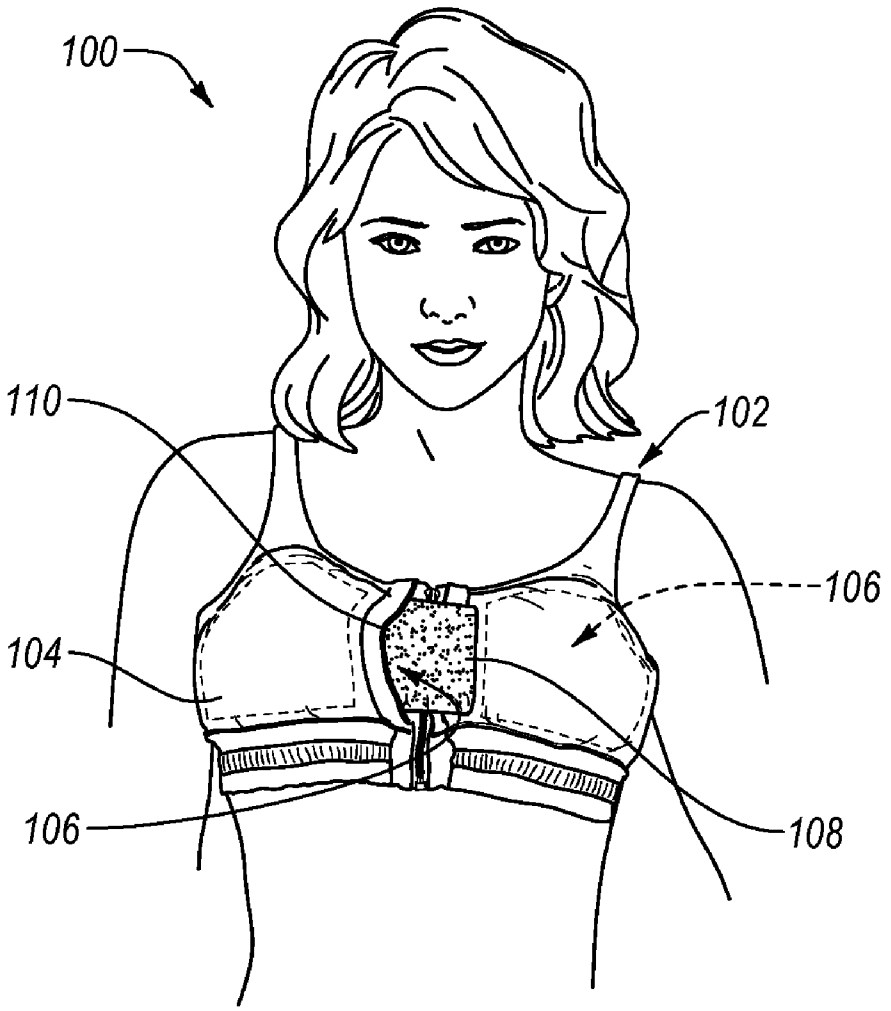
(57) **ABSTRACT**

An insulating clothing system includes an article of clothing having a front portion and at least one pocket in the front portion. The pocket is configured to at least partially cover at least one intimate part of a user. At least one insulating insert including at least one layer of thermal insulation material is removably positioned in the pocket and configured to passively provide thermal insulation to the intimate part. The at least one insulating insert can provide an R-value of greater than about 3.5.



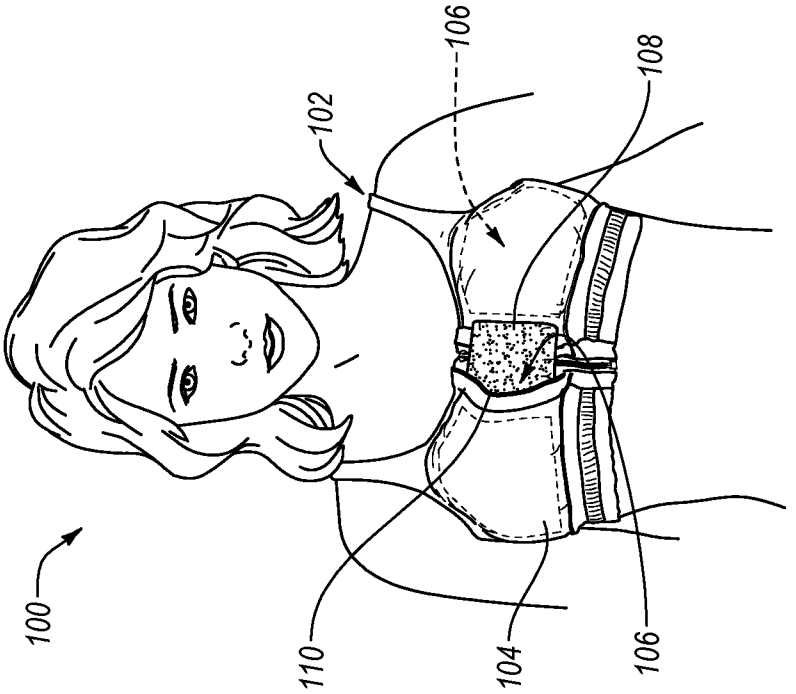


FIG. 2

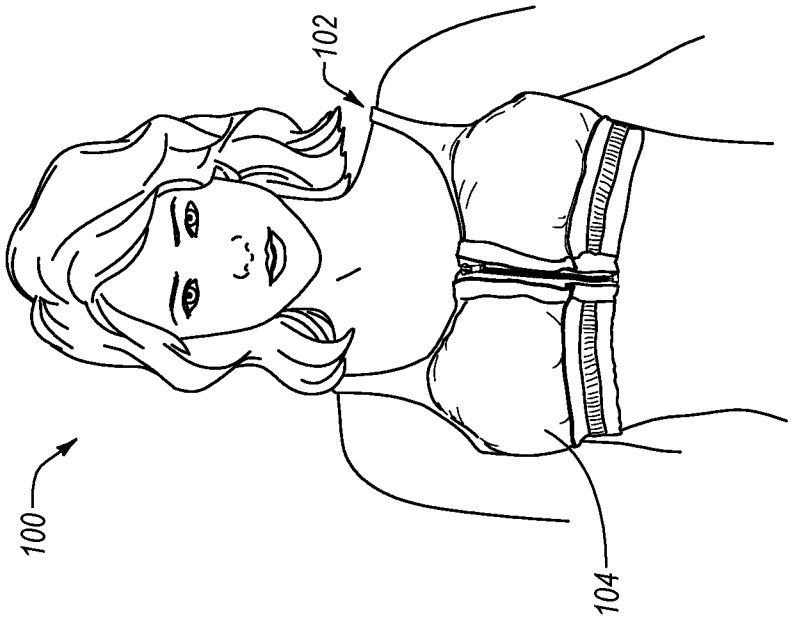


FIG. 1

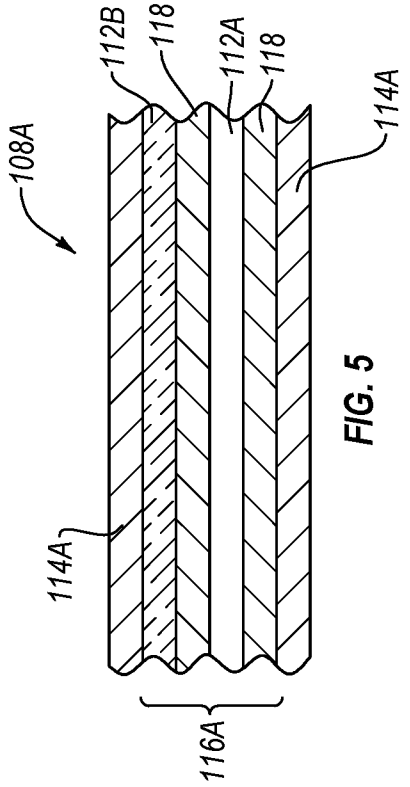


FIG. 5

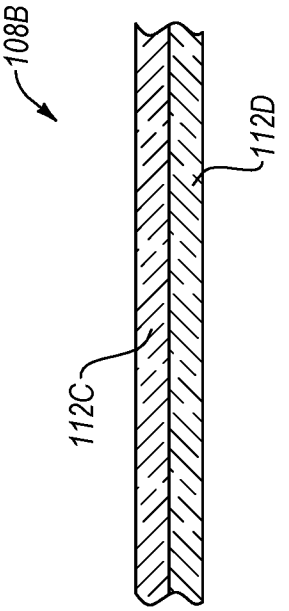


FIG. 6

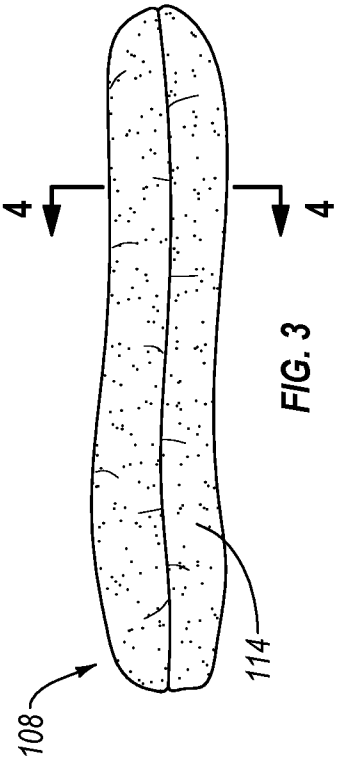


FIG. 3

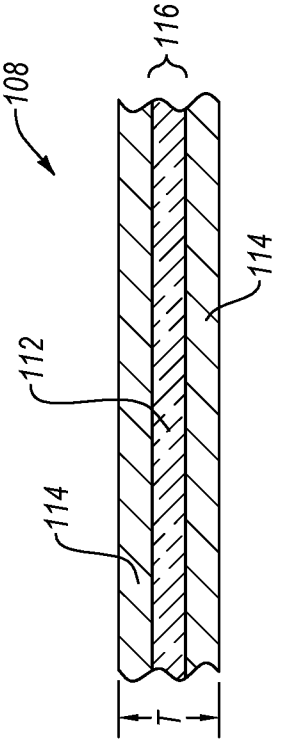


FIG. 4

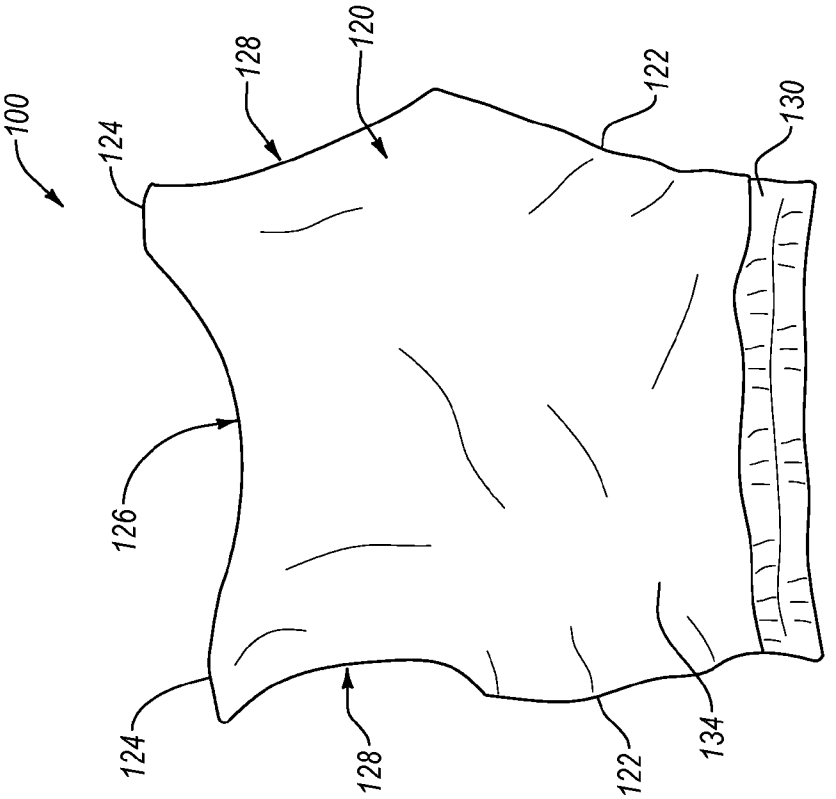

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FIG. 8

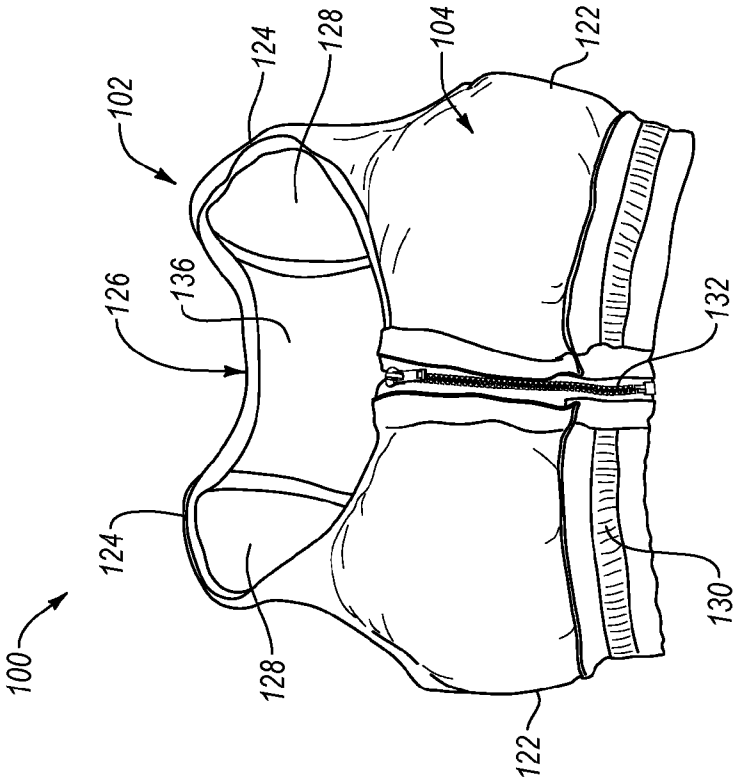
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FIG. 7

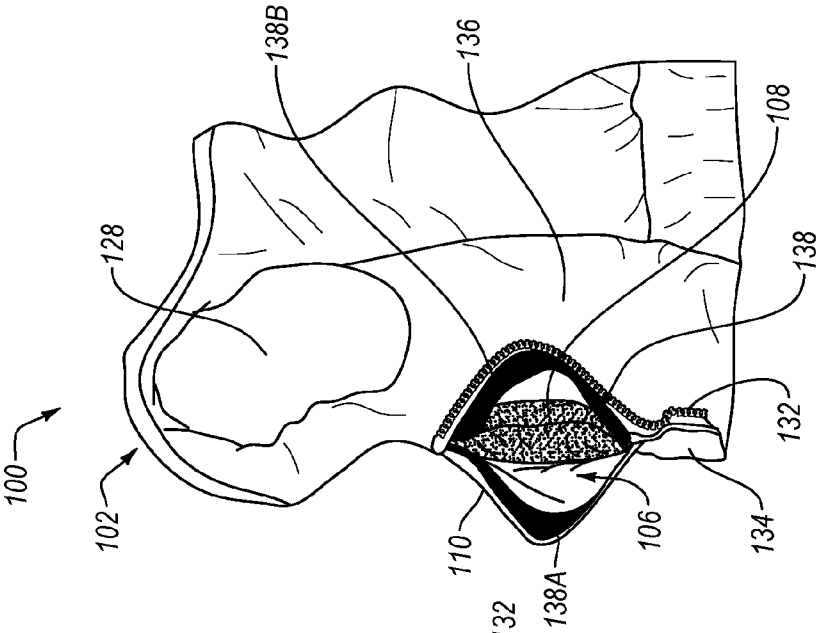
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FIG. 10

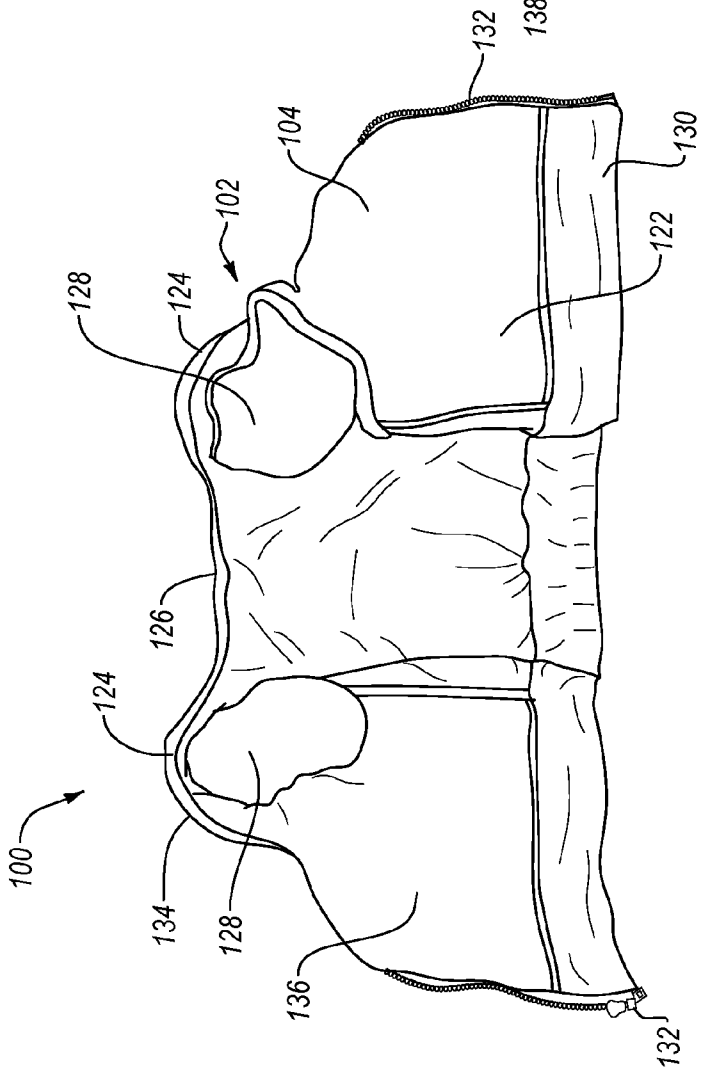
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FIG. 9

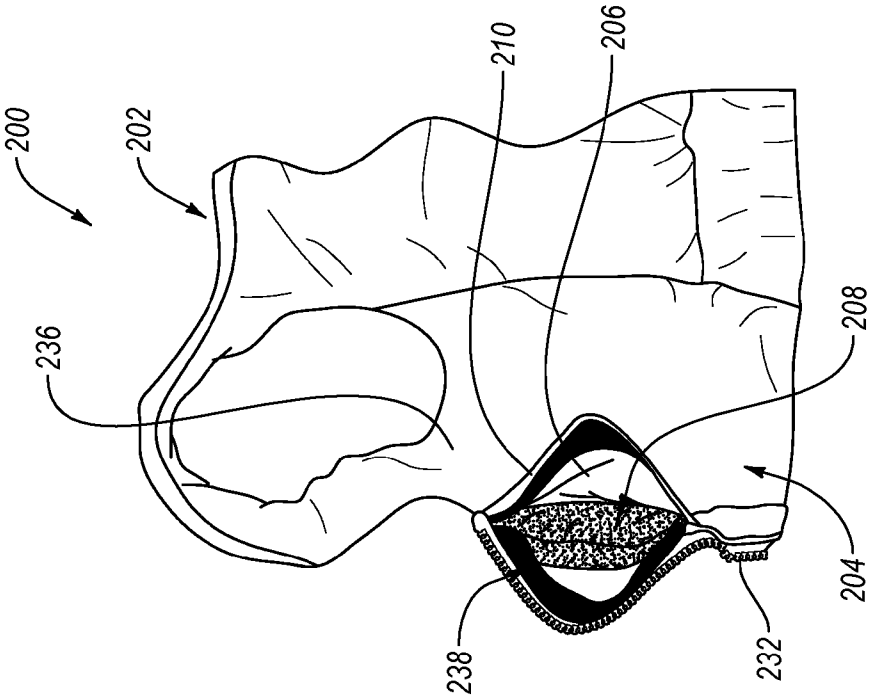
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FIG. 12

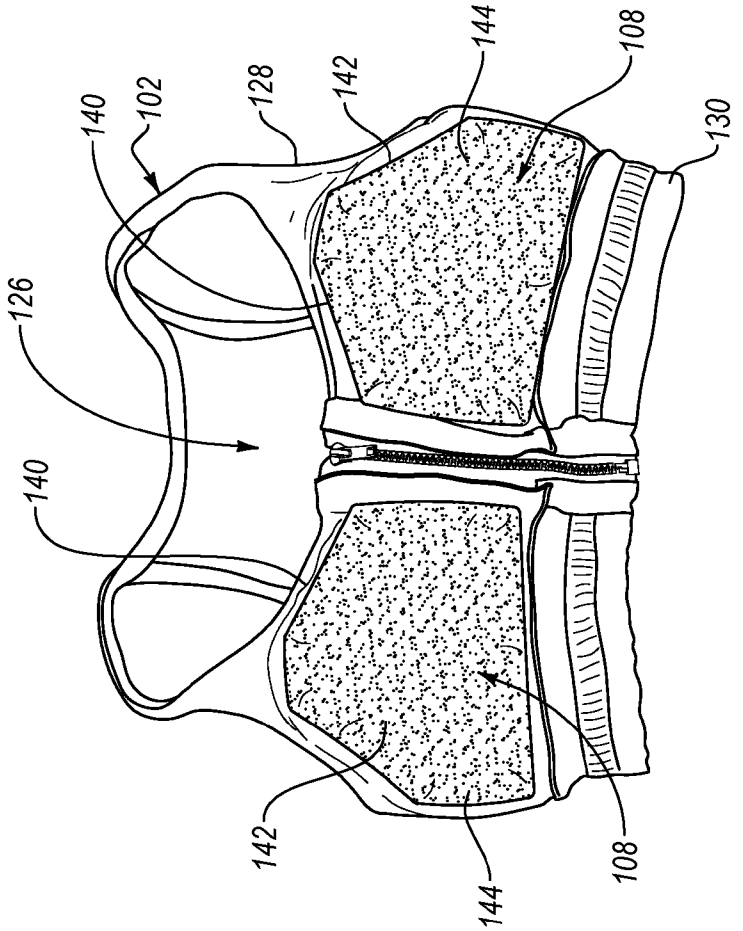
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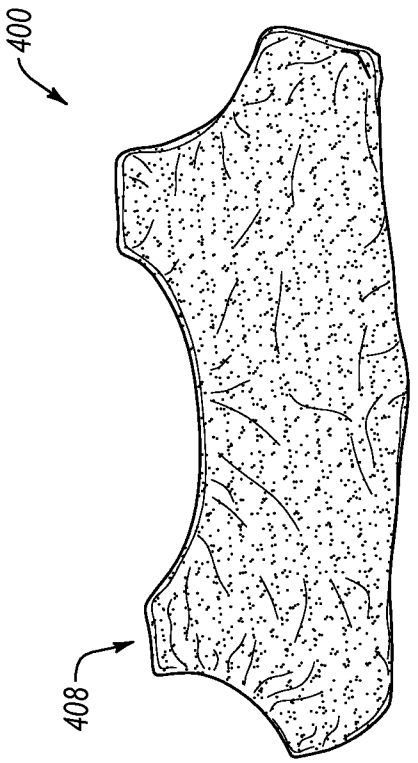
FIG. 11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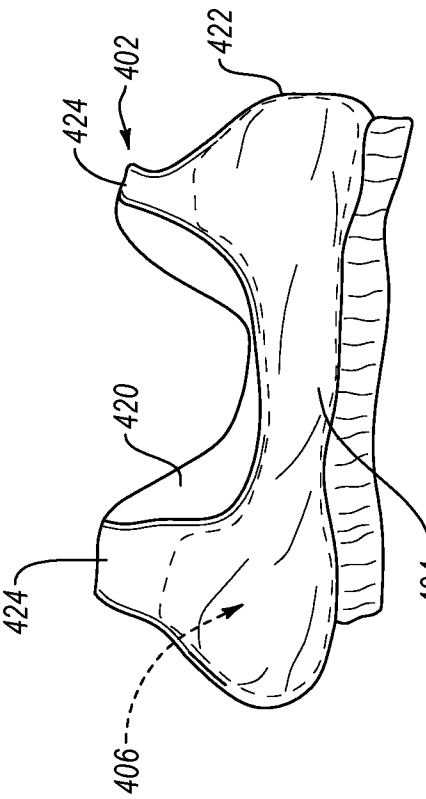
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FIG. 14

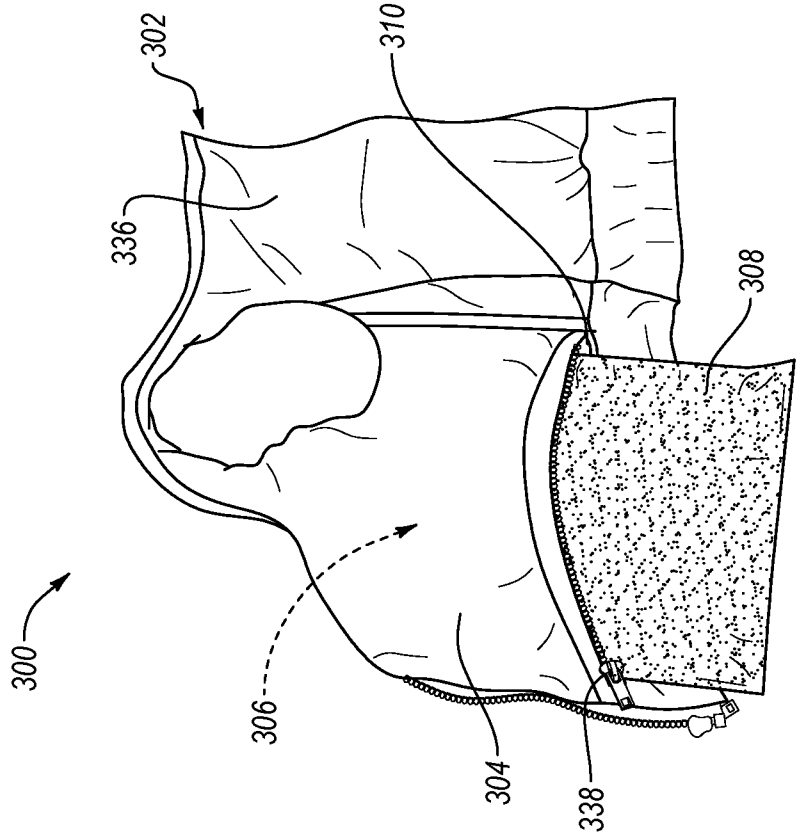
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FIG. 13

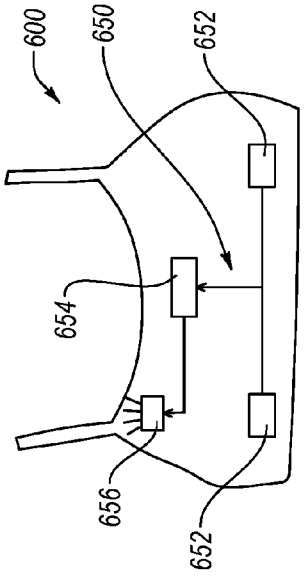

FIG. 16

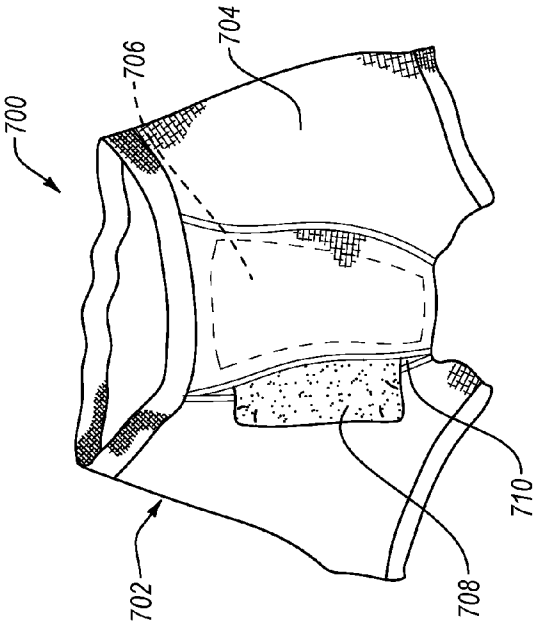

FIG. 17

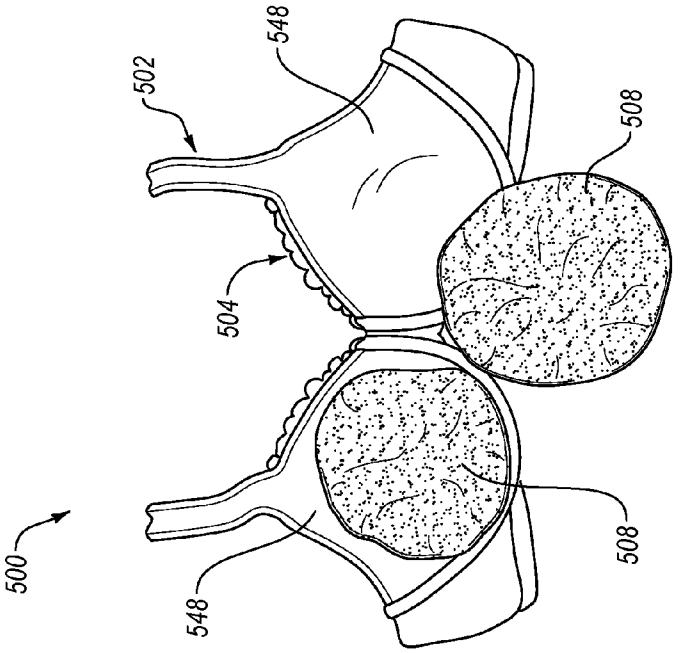

FIG. 15

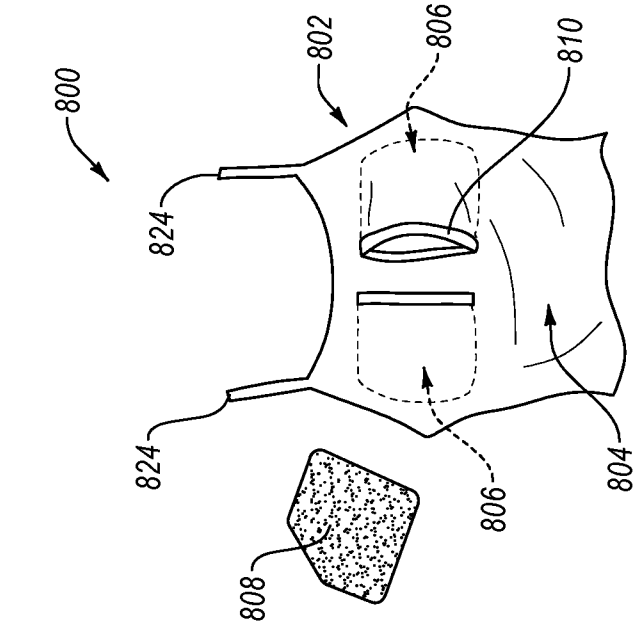

FIG. 19

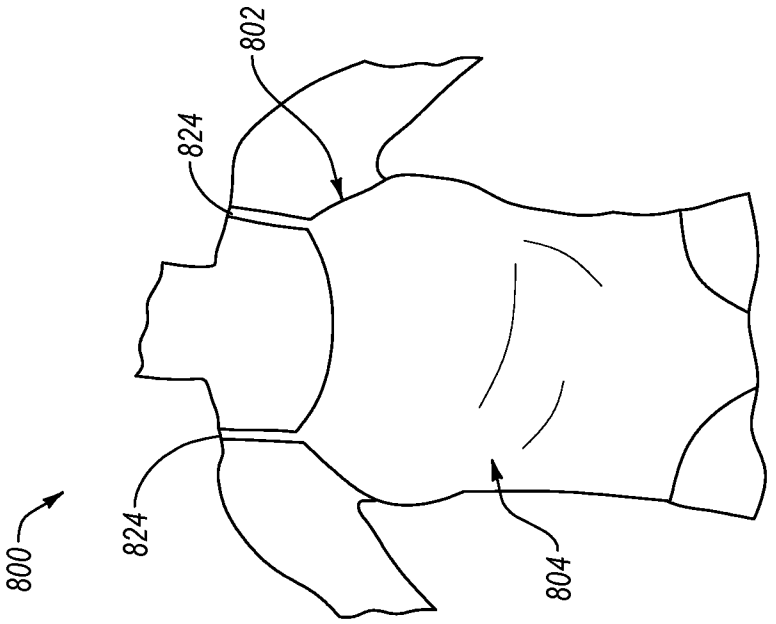

FIG. 18

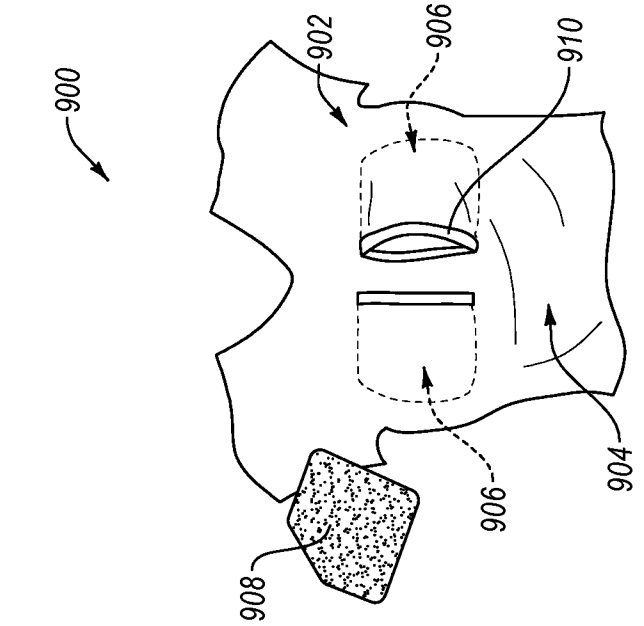

FIG. 21

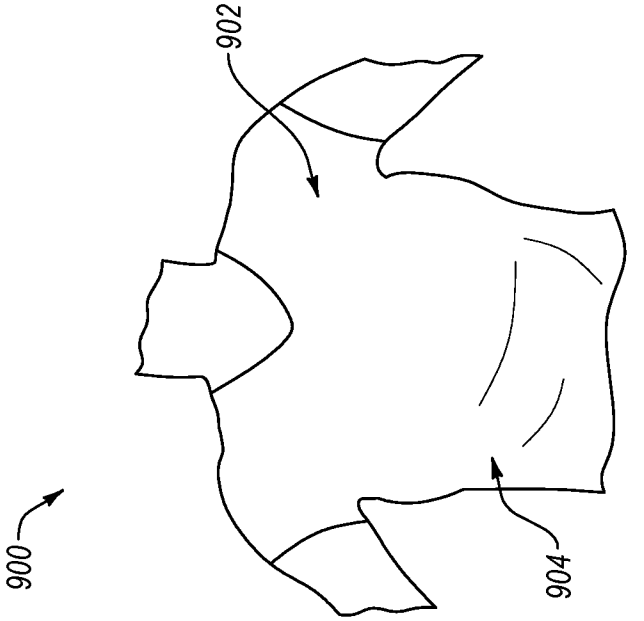

FIG. 20

INSULATING CLOTHING SYSTEMS AND METHODS OF USE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of and claims priority to U.S. patent application Ser. No. 14/446,737, entitled "INSULATING CLOTHING SYSTEMS AND METHODS OF USE", filed Jul. 30, 2014, which claims the benefit of and priority to U.S. Provisional Patent Application Ser. No. 61/862,859, entitled "INSULATING BRAS, BRA SYSTEMS, AND METHODS OF USE", filed Aug. 6, 2013. All of the aforementioned applications are incorporated by reference herein in their entirety.

BACKGROUND

[0002] A common complaint of women with breast implants is that the implants tend to be cooler than the rest of the body. This is because breast implants do not have a blood supply, are filled with saline or silicone, and essentially sit outside the chest cavity just beneath the skin or beneath the skin and a thin muscle layer. Cold breast implants can cause a number of problems for a woman. For example, in cooler or cold weather, cold implants can cause other portions of the woman's body to drop in temperature or to feel cold or chilled. This can be slightly uncomfortable to very painful for a woman. Moreover, in cooler or cold temperatures, the tissues around the implants can tighten changing the shape of the breast, or making the breast look unnatural. Women with natural breasts are also known to experience sensitivity and/or discomfort when their breasts get too cold.

[0003] Some women have attempted to keep their breasts warm using conventional bras. However, conventional bras are generally designed for shaping, supporting the breasts, and/or style, not warmth. Others have attempted to keep their breasts warm by wearing excess layers of clothing or winter clothing. But, this can be bulky, inconvenient, impractical, and even ineffective.

[0004] Women are not alone in struggling to keep their intimate parts comfortably warm. For example, men's undergarments may provide support and protect male genitalia from outer clothing. However, in cold weather, conventional men's undergarments are known to provide inadequate thermal coverage in the crotch region, which, in turn, can result in discomfort or even frostbite.

[0005] Thus, there remains a need for clothing that can better insulate one or more intimate parts of a user.

SUMMARY

[0006] One or more embodiments of the present invention solve one or more of the foregoing or other problems in the art with insulating clothing systems that conveniently and discretely help to thermally insulate a user's intimate parts. In particular, one or more embodiments include an article of clothing having a front portion and at least one pocket in the front portion. The pocket is configured to at least partially cover at least one intimate part of a user. At least one insulating insert including at least one layer of thermal insulation material is removably positionable in the pocket and configured to passively provide thermal insulation to the intimate part. The at least one insulating insert can exhibit an R-value of greater than about 3.5.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] To further clarify the above and other advantages and features of the present disclosure, a more particular description of the disclosure will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the disclosure and are therefore not to be considered limiting of its scope, nor are the drawings necessarily drawn to scale. The disclosure will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

[0008] FIG. **1** is a front environmental view of an insulating bra system according to an embodiment;

[0009] FIG. **2** is another front environmental view of the bra system shown in FIG. **1** with a pocket open showing an insulating insert according to an embodiment;

[0010] FIG. **3** is a side view of an insulating insert according to an embodiment;

[0011] FIG. **4** is a cross-sectional view of the insulating insert shown in FIG. **3** taken along section line **4-4**;

[0012] FIG. **5** is a cross-sectional view of an insulating insert according to another embodiment;

[0013] FIG. **6** is a cross-sectional view of an insulating insert according to another embodiment;

[0014] FIG. **7** is front view of an insulating bra system according to an embodiment;

[0015] FIG. **8** is a back view of the bra system shown in FIG. **7**;

[0016] FIG. **9** a front view of the bra shown in FIG. **7** in an open position;

[0017] FIG. **10** is a partial front view of the bra system shown in FIG. **7** showing a pocket open;

[0018] FIG. **11** is front view of the bra system shown in FIG. **7** with the insulating inserts removed for ease of reference;

[0019] FIG. **12** is a partial front view of a bra system showing a pocket open according to another embodiment;

[0020] FIG. **13** is a partial front view of a bra system showing a pocket open according to another embodiment;

[0021] FIG. **14** is an exploded front view of an insulating bra system according to another embodiment;

[0022] FIG. **15** is a partial exploded back view of an insulating bra system according to another embodiment;

[0023] FIG. **16** a schematic view of an insulating bra system according to another embodiment.

[0024] FIG. **17** is an isometric view of an insulating underwear system according to an embodiment;

[0025] FIG. **18** is a front environmental view of an insulating swimsuit system according to an embodiment;

[0026] FIG. **19** is a front view of the inside of the insulating swimsuit system shown in FIG. **18**;

[0027] FIG. **20** is a front environmental view of an insulating t-shirt system according to an embodiment; and

[0028] FIG. **21** is a front view of the inside of the insulating t-shirt system shown in FIG. **21**.

DETAILED DESCRIPTION

[0029] The present disclosure is directed toward exemplary embodiments of an insulating clothing system that conveniently and discretely help to thermally insulate one or more intimate parts of a user.

[0030] For further ease of understanding the exemplary embodiments of an insulating clothing system as disclosed

herein, a description of a few terms is necessary. As used herein, the term "intimate part" refers to a place on the human body which is customarily kept covered by clothing in public venues and conventional settings, as a matter of decency. Intimate parts may include, for example, female breasts, the vagina, the penis, the buttocks, and the like. As used herein, the term "thermal conductivity" refers to a measure of the ability of a material to transfer heat. As used herein the term "thermal resistance" is a measure of a material's resistance to heat flow. Mathematically thermal resistance is the thickness of the material divided by the thermal conductivity of the material. The thermal resistance of a material can be of great importance when determining the applicability of a material in cold weather conditions. A low thermal conductivity means the fabric material has a high resistance to heat flow. The R-value of a material describes its thermal resistance (e.g., how much the material inhibits the transfer of heat). The higher the R-value, the more effective the level of insulation. R-values as used herein are in units of $ft^{2\cdot\circ}$ F.·h/Btu.

[0031] As used herein the term "Clo" refers to a measure of the thermal resistance value of clothing, especially at is relates to relative human comfort within that clothing at a given set of conditions. The use of the unit Clo implicitly means that it relates to the whole body and thus includes heat transfer by exposed body parts. The Clo unit is defined as the amount of clothing required by a resting subject to be comfortable at a room temperature of 70 degrees Fahrenheit with air movement of 0.1 m/s and humidity less than 50%. The higher the Clo value the greater the thermal resistance (i.e., warmth). A value of 0 Clo corresponds to a naked person. A Clo value of about 0.01 to 0.03 corresponds to a person wearing a standard bra. A value of 1 Clo corresponds to a person wearing a typical business suit (shirt, undershirt, trousers, and suit jacket). The highest practical Clo value of 4 is that of Eskimo clothing (fur pants, coat, hood, gloves, etc.). One Clo equals 0.155 m^2K/W. As used herein, the term "temperature rating" refers to the lowest acceptable air temperature at which the intimate part of an average person would be comfortable when wearing a certain clothing article at a given set of specific conditions.

[0032] The exemplary embodiments of an insulating clothing system can be configured in various configurations of bras, underwear, swimsuits, shirts, dresses, compression clothing, pants, or other appropriate clothing. For example, exemplary embodiments of an insulating clothing system can comprise an insulating bra system **100** that facilitates thermal insulation of a woman's breasts as shown in FIGS. **1** and **2**. The bra system **100** includes a bra **102** with a front portion **104** adapted to be comfortably worn by a user. The front portion **104** can include pockets **106** formed therein for selectively retaining insulating inserts **108**. The insulating inserts **108** can be inserted into and/or removed from the one or more pockets **106** via pocket openings **110** situated on the bra **102**.

[0033] Referring now to FIGS. **3** and **4**, the insulating inserts **108** can include one or more thermal insulation materials **112** situated within a cover **114** that enhance protection of the user's breasts from the cold and/or elements. The cover **114** can include a soft woven fabric or a flannel-like material including wool, cotton, and/or synthetic fiber. The cover **114** can define top and bottom layers with a receiving space **116** formed between the top and bottom layers.

[0034] The one or more thermal insulation materials **112** can comprise at least one layer of synthetic fiber thermal insulation secured inside of the receiving space **116**. The at least one layer of synthetic fiber thermal insulation can be secured inside of the receiving space **116** via stitching. The at least one layer of synthetic fiber thermal insulation can be secured inside of the receiving space **116** via snaps, hooks, adhesives, magnets, hook-and-loop type systems, or any other suitable securement system. The synthetic fiber thermal insulation can include microfiber thermal insulation material, THINSULTE®, PRIMALOFT®, POLARGUARD® double-sided polyester fleece, or other suitable materials.

[0035] As seen, the insulating insert **108** may exhibit a thickness T. The thickness T may define in part the level of thermal insulation provided by the insulating insert **108**. For instance, an insulating insert **108** that is thicker than another insulating insert **108** having the same or similar construction may provide a higher level of thermal insulation. The thickness T may be greater than about a 0.05 inches, about 0.1 inches, about 0.2 inches, about 0.4 inches, about 0.6 inches, or about 0.8 inches. The thickness T may be between about 0.05 inches and about 1 inch, about 0.1 inches and about 0.8 inches, or about 0.2 inches and about 0.6 inches. The insert **108** may exhibit a greater or lesser thickness.

[0036] The thickness T may be constant or variable. For instance, a portion of the insulating insert **108** positionable over the tip of the user's breast may exhibit a thickness T that is greater than the thickness T of a portion of the insert **108** positionable nearer the user's rib area. This has the effect of providing a greater level of insulation at the tip of the breast, where the temperature decrease in the breast may tend to be greater.

[0037] The construction of the insulating insert **108** advantageously limits heat conduction and/or convection through the insulating insert **108**. For example, conventional bras often include open-cell foam or similar material inserts or filling in the breast area which are relatively air and/or vapor permeable, providing less thermal coverage and little if any resistance to heat flow. In addition, when such foam becomes wet, either from perspiration or other sources, it stays wet, leaving the breast moist. Other conventional bras often include silicone or gel shaping inserts. Such inserts are known to be relatively perceptible to temperature change and tend to store heat and cold. Thus, when exposed to colder temperatures, the inserts will become and remain colder longer. Consequently, such bras inadequately protect the breasts from colder temperatures, causing discomfort and/or injury to the user.

[0038] By limiting heat conduction and/or convection through the inserts **108**, the insulating inserts **108** of the bra system **100** reduce the transfer or heat between the breasts and the external or surrounding environment. This has the effect of keeping the temperature of the breasts closer to the user's body temperature, which, in turn, reduces user discomfort and/or sensitivity.

[0039] Under the same or similar conditions, the insulating inserts **108** in the bra **102** can maintain the temperature of the user's breast more than about 1 degree, about 2 degrees, about 3 degrees, or about 4 degrees warmer than foam shaping inserts in the bra **102**. The insulating inserts **108** can be at least about 30%, about 40%, about 50%, about 60%, or about 100% warmer than standard silicone or foam bra shaping inserts. For instance, each inch of thickness of a silicone or foam bra shaping insert typically provides an R-value less than about 3. For an inch of thickness, the insulating insert **108** can provide an R-value of greater than about 3.5, about 4, about 4.5, about 4.7, about 5, about 6, about 6.5, or about 7.

For an inch of thickness, the insulating insert **108** can provide an R-value of between about 3.2 and about 7, about 3.5 and about 6.5, or about 4.5 and about 6. The insulating insert **108** having a thickness T can provide an R-value of greater than about 3.5, about 4, about 4.5, about 4.7, about 5, about 6, about 6.5, or about 7. The insulating insert **108** having a thickness T can provide an R-value of between about 3.2 and about 7, about 3.5 and about 6.5, or about 4.5 and about 6. The insulating insert **108** can provide higher or lower R-values.

[0040] In an embodiment, the one or more thermal insulation materials **112** of the insulating insert **108** can exhibit relatively higher R-values. For example, to obtain a given level of heat flow, insulating inserts **108** with higher R-values can be made thinner. This can allow the insulating inserts **108** to have a thinner construction, making the insulating inserts **108** more readily concealable within the bra **102**. The one or more thermal insulation materials **112** and/or the cover member **114** can include a plurality of layers that in combination increase the average R-value of the insulating inserts **108**.

[0041] The insulating bra system **100** can be at least about 30%, about 40%, about 50%, about 60%, or about 100% warmer than a standard bra. A standard bra has a Clo value of between about 0.01 and about 0.03. The bra system **100** can provide a Clo value of at least about 0.045 Clo, about 0.055 Clo, about 0.06, about 0.065, about 0.07 Clo, about 0.075 Clo, about 0.08 Clo, about 0.085 Clo, or about 0.1 Clo. The bra system **100** can provide a Clo value of between about 0.045 Clo and about 0.2 clo, about 0.05 Clo and about 0.015 Clo, about 0.055 and about 0.08 Clo, or about 0.06 Clo and about 0.075 Clo. The bra system **100** can be configured to substantially maintain its thermal properties even when wet. In other embodiments, the bra system **100** can provide higher or lower Clo values.

[0042] One or more of the insulating inserts **108** inserted in the pockets **106** can increase a Clo value of the bra **102** by at least about 5%, about 10%, 15%, about 25%, about 30%, about 35%, about 40%, about 45%, about 50%, about 60%, or about 100%. One or more of the insulating inserts **108** inserted in the pockets **106** can increase the Clo value of the bra **102** between about 5% and about 100%, about 10% and about 90%, or about 30% and about 80%. For instance, in an embodiment, the insulating inserts **108** inserted in the pockets **106** can increase the Clo value of the bra **102** from about 0.04 to about 0.045, from about 0.05 to about 0.06, or less or more.

[0043] The insulating inserts **108** can be temperature rated. For instance, an insulating insert **108** may be temperature rated down to about −20 degrees Fahrenheit, about −10 degrees Fahrenheit, about 0 degrees Fahrenheit, about 10 degrees Fahrenheit, about 20 degrees Fahrenheit, about 40 degrees Fahrenheit, or about 60 degrees Fahrenheit. The insulating insert **108** can be temperature rated between about −20 degrees Fahrenheit and about 60 degrees Fahrenheit, about −10 degrees Fahrenheit and about 50 degrees Fahrenheit, about 0 degrees Fahrenheit and about 40 degrees Fahrenheit, or about 10 degrees Fahrenheit and about 30 degrees Fahrenheit. The insulating inserts **108** can exhibit higher or lower temperature ratings.

[0044] One or more different insulating inserts **108** may exhibit different levels of thermal resistance. This allows the user to select one or more of the insulating inserts **108** based on different types of activities, different seasons, and/or weather conditions. For instance, if the user is planning on wearing the bra **102** snowmobiling, the user may select and insert insulating inserts **108** in the bra **102** that exhibit a higher R-value or Clo value.

[0045] The insulating inserts **108** can also vary in configuration such that a user can customize the bra **102** as desired. For example, the bra **102** may include an insulating insert **108** for use in the rain and another insulating insert **108** for use in the winter or freezing temperatures. Accordingly, a user may insert the insulating inserts **108** into the bra **102** depending on the weather conditions. In other embodiments, if an insulating insert **108** is damaged or worn, the user may simply replace it without having to purchase a whole new bra **102**. In the event something is spilled on the insulating insert **108**, the insulating insert **108** may be removed from the bra **102** for washing without having to wash the entire bra **102**, thereby helping to preserve the shape and/or volume of the bra **102**. Moreover, in other embodiments, the user may customize the bra **102** based on different activities of the user. For example, if the user is going to play sports or go hiking, the user may insert an insulating insert **108** into the bra **102** that includes a moisture-wicking material.

[0046] Moreover, one or more of the insulating inserts **108** themselves may be customizable. For example, the bra **102** may exhibit a standard and/or generic configuration and the insulating inserts **108** may be custom to the user. For example, the insulating inserts **108** may include a shape, size, thermal insulation value, or any other characteristic that is custom to a specific user. Accordingly, the bra **102** may provide a user with an individual fit based on the preferences of the user.

[0047] The insulating inserts **108** can advantageously provide passive thermal insulation to the user's breast. Particularly, the insulating inserts **108** can provide thermal insulation to the user's breast without emitting heat or the need of an external power source or an external heat source. Such passive thermal insulation eliminates the risk of injuring or burning the user that can be present when heating elements or heated gel inserts are inserted in a bra. This can be especially important for a user who has had breast reconstruction after a mastectomy, leaving the user with virtually no feeling in the user's breast. This also advantageously provides more convenience and discretion to the user by minimizing the need to manipulate the inserts **108**.

[0048] It should be appreciated that many variations of the insulating inserts **108** having different constructions can be used for thermally insulating the breasts. Although such variations may differ in form, they perform substantially similar functions. For instance, while the insulating insert **108** is shown including three layers, in other embodiments, the insulating insert may include one, two, four, six, or any other suitable number of layers of protection in order to achieve the desired amount of thermal insulation.

[0049] While the one or more thermal insulation materials **112** is described comprising at least one layer of synthetic fiber thermal insulation, the one or more thermal insulation materials **112** can comprise wool, merino wool, synthetic fiber thermal insulation, down, feathers, high density polyester, poly fill, wind-resistant materials, combinations thereof, or any other suitable material. The cover **114** can include thermal insulation material, waterproof material, wicking material, GORE-TEX®, combinations thereof, or any other suitable materials.

[0050] The one or more thermal insulation materials **112** and/or the cover **114** can include one or more materials that are configured to block or limit air flow. For instance, the

cover **114** can include wind resistant material, such as, but not limited to, double weave nylon, spandex, wind resistant fleece, neoprene, packcloth, rip stop, or any other suitable wind-resistant material. The thermal insulation materials **112** can include high loft fibers that trap air, retaining body heat. This allows the insulating inserts **108** to retain body heat through lowering convective heat loss. The thermal insulation materials **112** can comprise loose materials contained within the receiving space **116**. The thermal insulation materials **112** can comprise compressed materials contained with the receiving space **116**.

[0051] In other embodiments, the insulating inserts can be configured to reduce the amount of heat a user loses as thermal radiation. For instance, the one or more thermal insulation materials **112** can include one or more thermally reflective materials that do not efficiently radiate heat from the chest area of the user. In user, as the user's body emits electromagnetic waves towards her surroundings, the insulating insert **108** may trap such energy between the insulating inserts **108** and the user's breasts, which, in turn, insulates or warms the breasts.

[0052] FIG. **5** illustrates an insulating insert **108**A according to another embodiment. As seen, the insulating insert **108**A can include a layer of down **112**A situated and secured inside of an inner cover **118** comprising a soft woven fabric. The inner cover **118**, containing the down **112**A, along with a layer **112**B of synthetic fiber thermal insulation are situated and secured within the receiving space **116**A of an outer cover **114**A of soft woven fabric. The layer of down **112**A can be positionable nearer the user's skin surface with the layer **112**B of synthetic fiber thermal insulation next to the down **112**A opposite the skin surface. This has the effect of creating a wind barrier and trapping body heat between the skin surface and layer **112**B, which, in turn, improves thermal insulation of the breasts. It will be appreciated that in other embodiments the layer **112**B of synthetic fiber thermal insulation can be positionable nearer the user's skin surface than the layer of down **112**A.

[0053] The cover of the insulating inserts can be omitted. For example, FIG. **6** illustrates an insulating insert **108**B comprising a first layer **112**C and a second layer **112**D of thermal insulation material. This can allow the insulating insert **108**B to have a more low-profile construction.

[0054] The construction of the bra **102** will now be described in more detail in relation to FIGS. **7-11**. Referring now to FIGS. **7** and **8**, the bra **102** can include the front portion **104**, a back portion **120**, side portion **122**, and a pair of shoulder straps **124**. The front portion **104** can be configured to support the breasts of the user. Optionally, the front portion **104** may include a pair of cup portions configured to at least partially enclose and support the breasts. The cup portions may at least in part be held in place by the straps **124**.

[0055] The back portion **120** can be configured to extend across the back of the user. The back portion **120** can include an adjustment system such that the bra **102** can be adjusted to the size of the torso of the user.

[0056] The side portions **122** can extend between the front portion **104** and the back portion **120** and can be configured to extend under the arms of the user. The side portions **122** can be integral to the front portion **104** and/or the back portion **120**. The side portions **122** can be separate from the front portion **104** and/or the back portion **120**.

[0057] The shoulder straps **124** can be connected between the front portion **104** and the back portion **120** and configured to extend across the shoulders of the user. Optionally, the shoulder straps **124** can include an adjustment system such as buckles to adjust the length of the shoulder straps, which, in turn, can adjust the support provided to the breasts. In other embodiments, the shoulder straps **124** can be omitted. For instance, the bra **102** may be a strapless bra.

[0058] The bra **102** can include a top opening **126** for placement of the bra **102** over the head and over the shoulders of the user. The top opening **126** can include a lower cut configuration such that the bra **102** can be more discretely concealed under a user's outer clothing. Arm openings **128** can be located in both side portions **122** for insertion of the arms therethrough. Portions of the bra **102** between the top opening **126** and the arm openings **128** can form the shoulder straps **124**.

[0059] In some embodiments, a band member **130** is attached to a bottom portion of the bra **102** so that the band member **130** extends around the user, below the breast line in contact with the user's torso. The band member **130** can provide contact to the user's body over a larger torso area, which, in turn, can at least in part compressively stabilize the breasts in relation to the torso.

[0060] The bra **102** can include a bra closure system **132** to open and close a front opening in the bra **102**. The bra closure system **132** can comprise a zipper. The front opening in the bra **102** can be closed by bringing together and securing edges of the two ends of the front portion **104** with the bra closure system as shown in FIG. **7**. Closure of the bra closure system **132** may be achieved by movement of the zipper from top to bottom or from bottom to top. Closure from top to bottom motion of the zipper can enable smoother compression of the breasts downward toward the user's torso.

[0061] To open the front opening of the bra **102**, the zipper can be moved in the opposite direction such that the edges of the two ends of the front portion **104** detach from one another as shown in FIG. **9**. With the front opening open, putting on and taking off the bra **102** may be easier and more convenient. It will be appreciated that while the bra closure system **132** is described comprising a zipper, other closure systems are possible. For instance, the bra closure system **132** can include a hook-and-loop type system, snaps, clips, hooks, magnets, combinations thereof, or any other suitable closure system. It will further be appreciated that the bra closure system **132** may be situated in any suitable location on the bra **102** such as, but not limited to, one or more of the side portions **122**, the back portion **120**, or the like. In other embodiments, the bra **102** may not include a front opening and the closure system may be omitted.

[0062] Referring to FIGS. **7** and **9**, the bra **102** can include an outer layer **134** and a liner **136**. The outer layer **134** can include a cotton jersey knit material. The outer layer **134** can include a spandex material or double weave nylon. The outer layer **134** can include a synthetic fabric, microfiber, a multi stretch fabric, nylon, polyester, satin, elastic materials, non-elastic materials, compressible materials, wool, combinations thereof, or any other suitable material.

[0063] The liner can be in contact with the skin of the user and can be made from a soft flexible material such as merino wool mix. The liner **136** can include a smooth soft polymeric material. This can help absorb moisture. The liner **136** can include artificial fiber, flannel, fleece, cotton, wicking material, or any other suitable material. The liner **136** can extend along substantially the entire inside of the outer layer **134**.

The liner **136** can extend along less than the entire inside of the outer layer **134**. Optionally, the liner **136** may be omitted.

[0064] It will be appreciated that while the bra **102** is described including the outer layer **134** and the liner **136**, in other embodiments the bra **102** may include one, three, four, or any other suitable number of layers. For instance, the bra **102** may include an intermediate layer between the liner **136** and the outer layer **134**. This may provide additional material stability to the bra **102**. An additional layer can also provide additional modesty and/or moisture management capabilities to the bra **102**.

[0065] As seen in FIG. **10**, the pockets **106** can be situated on the front portion **104** and are adapted to receive and support therein the insulating inserts **108**. The pockets **106** can be formed in any suitable manner. The pockets **106** can be at least in part defined between the outer layer **134** and the liner **136**. Alternatively, the pockets **106** can comprise separate pockets situated on the outer layer **134** or the liner **136** of the bra **102**. The pockets **106** can be separate from one another. For instance, one or more seams may be sewn into the bra **102** to separate the pockets **106** from one another. The pockets **106** can be configured as a continuous pocket extending around the user. The bra **102** can include two, three, four, or any other suitable number of pockets **106**. The pockets **106** can be situated as any suitable location on the bra **102**. The pockets **106** can be located on the front portion **104**, the side portions **122**, and/or the back portion **120**. Alternatively, the pockets **106** can be lined with one or more materials to further insulate the user's breast and/or to provide a smoother appearing exterior surface of the bra **102**. The pockets **106** can be substantially hidden from a casual viewer.

[0066] The pockets **106** can exhibit a shape generally corresponding to the left and/or right part of the front portion **104** extending between the top opening **126**, the arm openings **128**, and the band member **130**. The pockets **106** can be shaped to generally correspond to the shape of a portion of the user's breasts. The pockets **106** can be shaped to generally correspond to the shape of the insulating inserts **108**. The pockets **106** can exhibit a generally rectangular shape, a generally trapezoidal shape, a generally oval shape, or any other suitable shape. Optionally, the pockets **106** can be omitted. For instance, the insulating inserts **108** can be attached or removably attached to the liner **136** of the bra **102**.

[0067] The insulating inserts **108** are inserted and removed from the pockets **106** via the pocket openings **110**. The pocket openings **110** can comprise slits in the outer layer **134** that are in communication with the pockets **106**. The slits can extend between about the band member **130** and about the upper edge region of the front portion **104** at or near the bra closure system **132**. This advantageously allows the user to exchange or remove the inserts **108** from the pockets **106** without having to remove or lift the bra **102** away from the user's body, substantially increasing accessibility and/or discreteness. It will be appreciated that while the pocket openings **110** are shown comprising slits, in other embodiments, the pocket openings **110** can comprise cut-outs, slots, flaps, combinations thereof, or any other suitable type of opening.

[0068] Referring still to FIG. **10**, the bra **102** can include a pocket closure system **138** for selectively opening and closing the pocket openings **110**. The pocket closure system **138** can comprise a hook-and-loop type system (e.g., VELCRO®) situated at or near each pocket opening **110**. The hook-and-loop type system can include a first portion **138**A attached to an interior surface of the outer layer **134** and a second portion **138**B attached to an opposing surface of the liner **136**. This arrangement allows the pocket closure system **138** to be substantially hidden or concealed, which, in turn, improves the aesthetic appearance of the bra **102** with or without outer clothing.

[0069] In use, the user can selectively close the pocket openings **110** by attaching the first portion of the pocket closure system **138** to the second portion of the pocket closure system **138**. To open the pocket openings **110**, the first and second portions of the pocket closure system **138** can be detachably separated, providing access to the pockets **106**. While the pocket closure system **138** is described as a hook-and-loop type system, in other embodiments, the pocket closure system **138** can comprise hooks, snaps, magnets, flaps, or any other suitable system. Optionally, the pocket closure system **138** can be omitted. For instance, the insulating inserts **108** can be retained inside of pockets **106** by the walls of the pockets **106**.

[0070] The insulating inserts **108** can be provided in the pockets **106** in any suitable manner. One of the insulating inserts **108** may be disposed in each of the pockets **106**. One insulating insert **108** can be disposed in one of the pockets **106** and the other pocket **106** may be empty. A plurality of insulating inserts **108** can be disposed in a single pocket **106**. For instance, the insulating inserts **108** can be stacked or layered within the pockets **106**.

[0071] Optionally, the insulating inserts **108** can be releasably secured within the pockets **106** so that the insulating inserts **108** are held in the pockets **106** against movement of the bra **102** and/or the user. The insulating inserts **108** can be releasably secured within the pockets **106** via hook-and-loop type system, adhesives, mechanical fasteners, or another suitable attachment system.

[0072] FIG. **11** illustrates the bra **102** with the insulating inserts **108** removed for ease of reference. The insulating inserts **108** can be shaped to generally correspond to the shape of the pockets **106**. Such an arrangement can help the insulating inserts **108** snugly fit within the pockets **106**. The insulating inserts **108** can include a shape that does not generally correspond to the shape of the pockets **106**. The insulating inserts **108** can have a generally rectangular shape with one or more cutouts forming a first concave portion **140** that generally corresponds to a portion of the top opening **126** and a second concave portion **142** that generally corresponds to the arm opening **128**. This can allow the insulating insert **108** to more comfortably surround and/or support the user's breast. This can also reduce the visibility of the insulating insert **108** to a casual viewer, increasing the discreteness of the bra **102**.

[0073] The shape and/or size of the insulating inserts **108** can also be configured to provide greater insulating coverage of the breasts. For instance, by increasing the surface area of the insulating inserts **108** covering the breasts, the exposed surface area of the user decreases, which, in turn, can increase the Clo value of the system **100**.

[0074] The insulating inserts **108** can include an outer wing portion **144** configured to extend around at least a portion of the outside of a user's breast. By increasing the area of the breast covered by the insulating insert **108**, the insulating insert **108** may help reduce heat loss by reducing the surface area of the user's breast that is exposed to moving air or the cold. Alternatively, the insulating insert **108** can include a second wing portion configured to extend along the inside or

underside of the user's breast, thereby, increasing the thermal coverage provided to the breast by the insulating insert **108**.

[0075] The insulating insert **108** can include one or more materials exhibiting a compressibility and/or flexibility so that the shape of the insulating insert **108** can generally conform to the contour of a breast. For instance, the insulating insert **108** can be configured to form a cup-like shape when positioned over the user's breast. This may allow the insulating insert **108** to more closely conform to the breast, limiting air flow and reducing heat loss via conduction. This arrangement may also effectively increase the thickness of the breast and surface area of the breast covered by the insulating insert **108**, decreasing heat loss.

[0076] The configuration of the system **100** described herein is to be regarded as exemplary only, as any suitable configuration of the system is possible. For instance, in other embodiments, the bra **102** may include one or more compression panels configured to help support the user's breast. While at least one layer of synthetic fiber thermal insulation is described being inside of a receiving space **116** of the cover **114**, other embodiments, the receiving space **116** may be at least in part a void space configured to help limit conductive heat loss. In other embodiments, the receiving space **116** can includes a mass of fibers, high density foam, or other suitable low thermal conductivity materials.

[0077] While the pocket openings are described being situated in the front portion, the pocket openings can be located in any suitable location. For instance, FIG. **12** illustrates a partial view of an insulating bra system **200** according to another embodiment. The system **200** includes a bra **202** and insulating inserts **208**. The system **200** can be similar to the system **100** except that the pocket openings are formed on the interior of the bra **202**. For instance, the bra **202** includes a front portion **204**. The front portion **204** can include pockets **206** for selectively retaining the insulating inserts **208**. The insulating inserts **208** can be inserted and removed from the pockets **206** via pocket openings **210**.

[0078] The pocket openings **210** comprise slits in communication with the pockets **206**. The slits can be formed in the liner **236** on the interior of the bra **202** and can be located at or near the bra closure system **232**. This has the effect of hiding the pocket openings **210** on the inside of the bra **202**, improving the discreteness of the bra **202**. The bra **202** can include a pocket closure system **238** on each pocket **206** similar to the pocket closure system **138** previously described.

[0079] FIG. **13** illustrates an insulating bra system **300** according to another embodiment. The system **300** includes a bra **302** and insulating inserts **308**. The bra **302** includes pockets **306** in a front portion **304**. The front portion **304** can include pockets **306** for selectively retaining the insulating inserts **308**. The insulating inserts **308** can be inserted and removed from the pockets **306** via pocket openings **310**.

[0080] The pocket openings **310** can comprise slits in the liner **336** along the bottom of the pockets **306**, extending below the breast line of the users. This may facilitate insertion and/or removal of the insulating inserts **308** from the pockets **306**. The bra **302** may include a pocket closure system **338** on each pocket **306** similar to the pocket closure system **138**. For instance, the pocket closure system **338** can comprise a zipper.

[0081] In other embodiments, the pocket openings may be situated along the top of the pockets. In yet other embodiments, the pocket openings may comprise slits extending diagonally across one or more parts of the front portion of the bra. It will be appreciated that while the pocket openings are shown comprising slits, in other embodiments, the pocket openings can comprise cut-outs, slots, flaps, combinations thereof, or any other suitable type of opening.

[0082] FIG. **14** is an exploded view of an insulating bra system **400** according to another embodiment. The bra system **400** can include a bra **402** and a single insulating insert **408**. The bra **202** can include a front portion **404**, a back portion **420**, side portions **422**, and a pair of shoulder straps **424**. The front portion **404** may be configured to support the breasts of the user. The back portion **420** may be configured to extend across the back of the user. The side portions **422** may extend between the front portion **404** and the back portion **420**. The side portions **422** can extend under the arms of the user. The shoulder straps **424** can extend across the shoulders of the user.

[0083] The bra **402** does not include a front opening and may be donned and doffed without the need of a bra closure system. For instance, the bra **402** can be put on by simply pulling the bra **402** over the user's head and onto the user's torso.

[0084] The front portion **404** can include a pocket **406** for selectively retaining the insulating insert **408**. The pocket **406** can extend across the chest area of the user. The pocket **406** can comprise a separate pocket located on the inside surface of the bra **402**.

[0085] The insulating insert **408** may be inserted and removed from the pocket **406** via a pocket opening similar to pocket opening **310**, formed in the bottom of the pocket **406**. The pocket opening can include a pocket closure system such as a hook-and-loop system, a zipper, hooks, snaps, buttons, a flap system, combinations thereof, or the like.

[0086] The insulating insert **408** can be configured similar to the insulating insert **108**. For instance, the insulating insert **408** can include one or more thermal insulation materials and can be configured to help insulate the user's breast. The insulating insert **408** can comprise a synthetic fiber thermal insulation cover filed with down material. This can help reduce conductive and/or convective heat loss from the user in the chest area. The insulating insert **408** can also conveniently and discretely insulate a user's breasts from cold, wind, and/or precipitation.

[0087] The insulating insert **408** can exhibit a geometric shape that generally corresponds to the front portion **404** and side portions **422**. This has the effect of increasing the insulating coverage of the user's breasts. The insulating insert **408** may further effectively increase the thickness of the breasts to reduce heat loss.

[0088] FIG. **15** is a back isometric view of an insulating bra system **500** according to another embodiment. The system **500** can include a bra **502** and insulating inserts **508**. The bra **502** can comprise a standard or generic bra including a front portion **504**. The front portion **504** can include bra cups **548**. The insulating inserts **508** can be configured to be situated in the bra cups **548**. The insulating inserts **508** can be generally cup-shaped. The insulating inserts **508** can have a generally concave shape. The insulating inserts **508** can include a thicker center and tapered edges for discretely added insulation. The insulating inserts **508** can include at least one dart or fold sewn into insulating insert **508** to help provide a three-dimensional shape to the insulating insert **508**. The insulating inserts **508** can be positioned between the bra **502** and the user's breast. This arrangement allows the insulating inserts **508** to be used with almost any bra, which, in turn, makes the

system **500** extremely versatile and relatively discrete. For instance, a user can use the insulating inserts **508** with the user's favorite bra.

[0089] FIG. **16** is a schematic view of an insulating bra system **600** including a temperature detection system **650** according to another embodiment. One or more sensors **652** may be disposed in the bra **602** for detecting the temperature of the breasts of the user. The sensors **652** can include thermocouples, infrared temperature sensors, or any other suitable sensor. The sensors **652** may be located in any suitable portion of the bra **602**. For instance, at least one of the sensors **652** can be located on the interior of the bra **602** over a breast of the user.

[0090] The bra **602** can include an electrical signal system **654**. The electrical signal system **654** can be responsive to the one or more sensors **652** and configured to provide an electrical signal when the temperature of the breasts is detected. The electrical signal system **654** can comprise a transducer, a control unit, and/or the like.

[0091] A stimulating system **656** can be situated on a portion of the bra **602** remote from the user's breasts. The stimulating system **656** can comprise a vibrator, an audible device, a light emitting device, or any other suitable stimulus. The stimulating system **656** may be responsive to the electrical signal from the electrical signal system **654** and configured to provide sensory stimulation to the user when the detected temperature of the breasts satisfies certain criteria. For instance, the stimulating system **656** may be configured to only provide sensory stimulation when the temperature of a breast is determined to be below a minimum threshold temperature selected by a user. This allows a user with little or no feeling in her breasts to be informed or warned of low breast temperatures.

[0092] While insulating bra systems have been described, in other embodiments, the insulating clothing systems can be configured in various configurations of underwear, every-day wear, swimsuits, pants, or other suitable clothing. For instance, FIG. **17** illustrates an insulating clothing system comprising an insulating underwear system **700** according to an embodiment. The system **700** can include male underwear **702** and an insulating insert **708**. The front portion **704** can include a pocket **706** formed therein for selectively retaining the insulating insert **708**. The pocket **706** can comprise a separate pocket located on the inside surface of the underwear **702** and can be positioned over the male genitalia.

[0093] The insulating insert **708** can be inserted and removed from the pocket **706** via a pocket opening **710** in communication with the pocket **706**. Optionally, the pocket opening **710** can include a pocket closure system similar to the pocket closure systems previously described. The insulating insert **708** can at least in part thermally insulate the user's genitalia. The insulating insert **708** can be configured similar to the exemplary embodiments of the insulating inserts previously described. For instance, the insulating insert **708** can include one or more thermal insulation materials situated inside of a cover. The insulating insert **708** can include wind-resistant material such as, but not limited to, double weave nylon and spandex, wind-resistant fleece, neoprene, packcloth, ripstop, or any other suitable wind-resistant material. This has the effect of thermally insulating the user's genitalia, which, in turn, can protect the genitalia from discomfort or even frostbite. It will be appreciated that in other embodiments the insulating insert can be used in conventional men's underwear. For instance, the insulating insert **708** can be positioned in the front portion of a pair of compression boxers between the male genitalia and the boxers.

[0094] FIGS. **18** and **19** illustrate an insulating clothing system comprising an insulating swimwear system **800** according to an embodiment. The system **800** can include a swimsuit **802** including a front portion **804** and straps **824** supporting the swimsuit **802**. The front portion **804** can include pockets **806** formed therein for selectively retaining the insulating inserts **808**. As seen in FIG. **19**, the pockets **806** can comprise separate pockets located on the inside surface of the swimsuit **802** and can be positioned over the breasts of the user. The insulating inserts **808** can be inserted and removed from the pockets **806** via pocket openings **810** in communication with the pockets **806**.

[0095] The insulating inserts **808** can be configured similar to one or more of the exemplary embodiments of the insulating inserts previously described. The insulating inserts **808** can be configured for use in water. The insulating inserts **808** can include one or more thermal insulation material situated inside of a sealed silicone cover. This can allow the system **800** to thermally insulate the user's breast even while swimming or participating in other watersport activities.

[0096] FIGS. **20** and **21** illustrate an insulating clothing system comprising an insulating t-shirt system **900** according to an embodiment. The system **900** can include a t-shirt **902** including a front portion **904**. The t-shirt **902** can be any suitable type of t-shirt. For instance, the t-shirt **902** can comprise a compression t-shirt, a casual t-shirt, a long sleeve t-shirt, a slim fit t-shirt, an athletic t-shirt or any other suitable type of shirt. The t-shirt **902** can be made of cotton, spandex, elastic or stretchy material, polyester, nylon, flat knit compression fabric, synthetic material, jersey cotton, natural tencel material, combinations thereof, or any other suitable material.

[0097] The front portion **904** can include pockets **906** formed therein for selectively retaining the insulating inserts **908**. As seen in FIG. **21**, the pockets **906** can comprise separate pockets located on the inside of the t-shirt **902** and can be positioned over the breasts of the user. In other embodiments, the t-shirt **902** can include a liner and an outer layer and the pockets **906** can be defined at least in part between the liner and the outer layer.

[0098] The insulating inserts **908** can be inserted and removed from the pockets **906** via pocket openings **910** in communication with the pockets **906**. The insulating inserts **908** can be configured similar to one or more of the insulating inserts previously described. In use, the insulating inserts **908** can be positioned in the pockets **906** to passively provide thermal insulation to the user's breasts.

[0099] Of course, it is to be understood that not necessarily all objects or advantages may be achieved in accordance with any particular embodiment of the invention. Thus, for example, those skilled in the art will recognize that the invention may be embodied or carried out in a manner that achieves or optimizes one advantage or group of advantages as taught herein without necessarily achieving other objects or advantages as may be taught or suggested herein.

[0100] The skilled artisan will recognize the interchangeability of various disclosed features from the disclosed embodiments and variations. In addition to variations described herein, other known equivalents for each feature can be mixed and matched by one of ordinary skill in this art to construct an insulating clothing system in accordance with principles of the present invention.

[0101] Although this invention has been disclosed in the context of exemplary embodiments and examples, it therefore will be understood by those skilled in the art that the present invention extends beyond the specifically disclosed embodiments to other alternative embodiments and/or uses of the invention and obvious modifications and equivalents thereof. Thus, it is intended that the scope of the present invention herein disclosed should not be limited by the particular disclosed embodiments described above. Additionally, the words "including," "having," and variants thereof (e.g., "includes" and "has") as used herein, including the claims, shall be open ended and have the same meaning as the word "comprising" and variants thereof (e.g., "comprise" and "comprises").

What is claimed is:

1. An insulating clothing system comprising:

a bra including a front portion adapted for receiving at least one breast of a user, said front portion defining at least one pocket extending substantially between a top and a bottom of said front portion, and at least one pocket opening in communication with said at least one pocket, said at least one pocket opening formed in an outer layer of said bra such that the user can access said at least one pocket without having to remove or lift the bra away from the breast; and

at least one insulating insert removably positionable in said at least one pocket and arranged to substantially shield and thermally insulate the at least one breast from an external environment, said at least one insulating insert including at least one layer of thermal insulation material and exhibiting an R-value greater than about 3.5.

2. The system of claim **1**, wherein said at least one insulating insert comprises at least one layer of synthetic fiber thermal insulation material secured within a cover made from a soft woven fabric.

3. The system of claim **2**, wherein said cover is substantially wind-resistant.

4. The system of claim **1**, wherein said at least one insulating insert comprises:

a down fill material;

an inner cover containing said down fill material;

at least one layer of synthetic fiber thermal insulation material situated on an outer surface of said inner cover; and

an outer cover containing said inner cover and said at least one layer of synthetic fiber thermal insulation material, said outer covering defining at least one exterior layer of said at least one insulating insert.

5. The system of claim **4**, wherein said inner cover is configured to be positioned between the skin surface of the user and said at least one layer of synthetic fiber thermal insulation material.

6. The system of claim **4**, wherein said outer cover includes a merino wool material or a flannel material.

7. The system of claim **1**, wherein said at least one insulating insert comprises a synthetic fiber thermal insulation material and down fill.

8. The system of claim **1**, wherein said insulating insert is configured to at least in part conform to the contour of the intimate part.

9. The system of claim **1**, wherein said at least one insulating insert exhibits an R-value greater than about 5.

10. The system of claim **1**, wherein said at least one insulating insert exhibits an R-value greater than about 6.

11. The system of claim **1**, wherein said at least one insulating insert covers substantially an entirety of the breast.

12. The system of claim **1**, wherein said at least one insulating insert increases a Clo value of the bra by at least about 15 percent.

13. The system of claim **1**, wherein said at least one insulating insert includes a moisture-wicking material.

14. The system of claim **1**, wherein the at least one breast comprises a breast implant.

15. The system of claim **1**, wherein said at least one pocket opening is located at or near a centerline of said front portion.

16. The system of claim **1**, wherein said at least one pocket opening comprises a slit extending between the top and the bottom of said front portion.

17. An insulating clothing system comprising:

a bra including:

a back portion; and

a front portion opposite said back portion, and adapted for receiving at least one breast of a user, said front portion defining at least one pocket and at least one pocket opening in communication with said at least one pocket, said at least one pocket extending substantially between a top and a bottom of said front portion; and

at least one insulating insert removably positionable in said at least one pocket and arranged to substantially shield and thermally insulate the at least one breast from an external environment, said at least one insulating insert including at least one layer of thermal insulation material.

18. The system of claim **17**, wherein said at least one pocket opening is formed in an outer surface of said front portion.

19. An insulating clothing system comprising:

a bra including:

a back portion; and

a front portion opposite said front portion, and adapted for receiving at least one breast of a user, said front portion defining at least one pocket and at least one pocket opening in communication with said at least one pocket, both said at least one pocket and said at least one pocket opening extending substantially between a top and a bottom of said front portion; and

at least one insulating insert removably positionable in said at least one pocket and arranged to substantially shield and thermally insulate the at least one breast from an external environment, said at least one insulating insert including at least one layer of synthetic fiber thermal insulation situated within a cover formed of wool.

20. The system of claim **19**, wherein said at least one pocket opening is formed in an outer surface of said front portion.

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