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(54) **GARMENTS AFFORDING PROTECTION AGAINST KNOCKS OR BLOWS**

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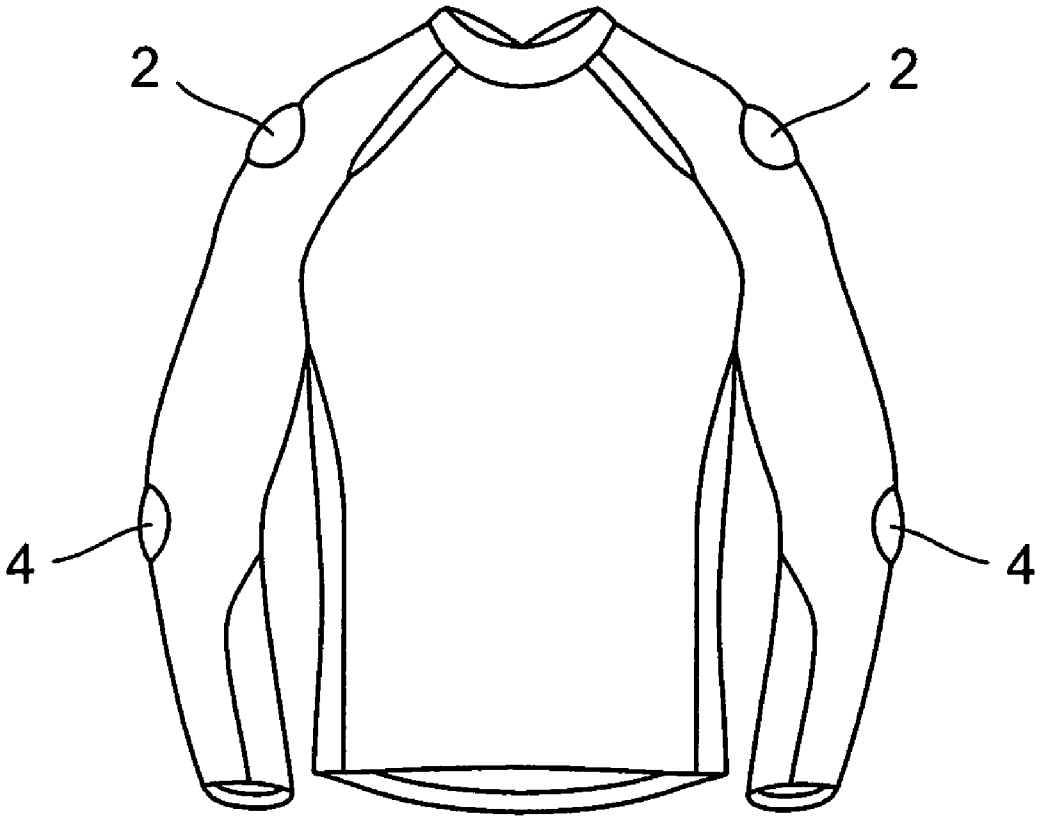
(57) **ABSTRACT**

A garment, particularly an article of clothing, that provides a wearer with a degree of environmental protection, as well as protection against knocks and blows. The garment is made from a thermal, waterproof or windproof fabric material and has one or more padded shielding region comprising a layer, or layers, of protective shock-absorbing material affixed to the garment. In certain embodiments, there are two or more layers of protective material sewn into the shielding region of the garment.



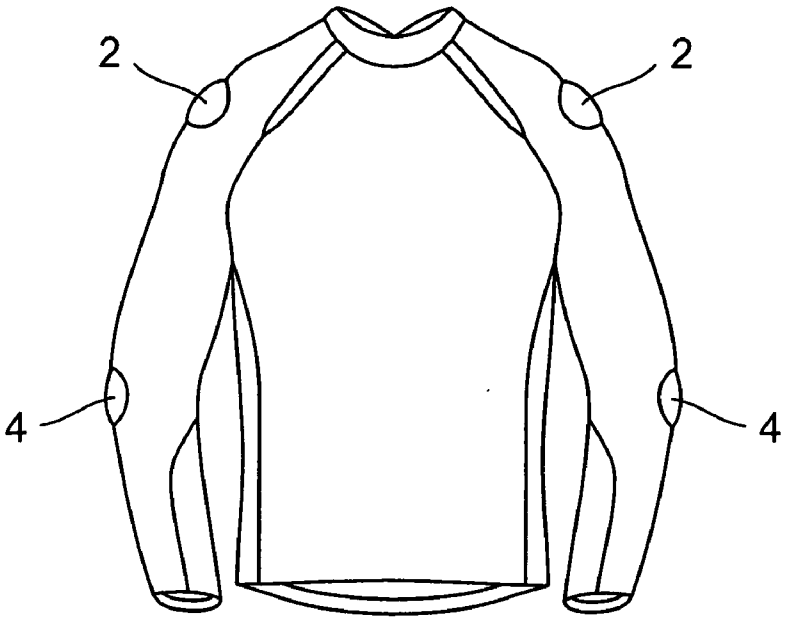


Figure 1

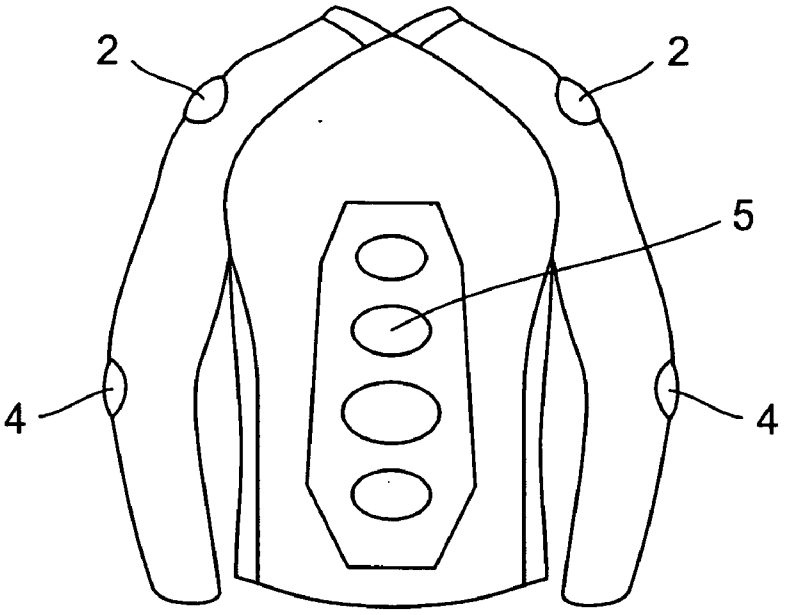
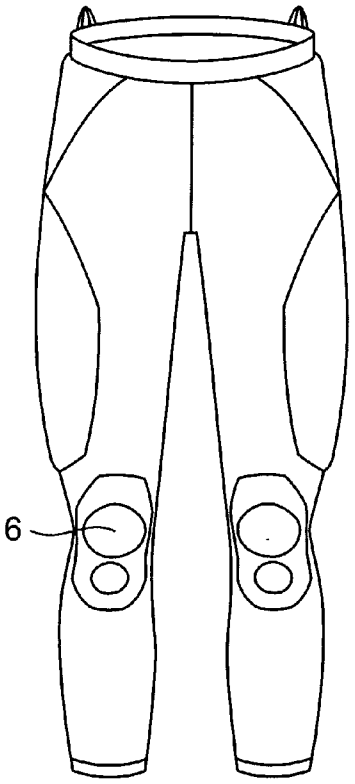


Figure 2



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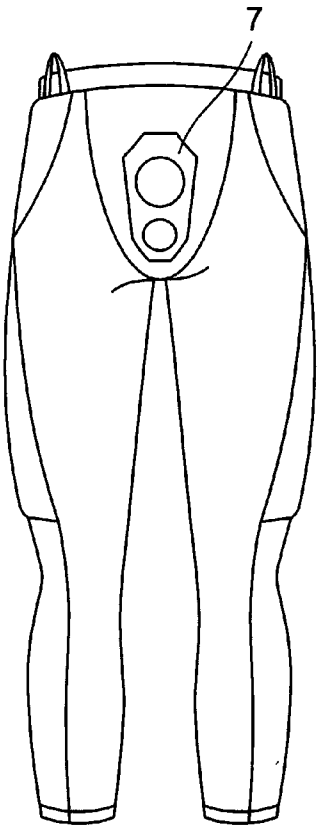

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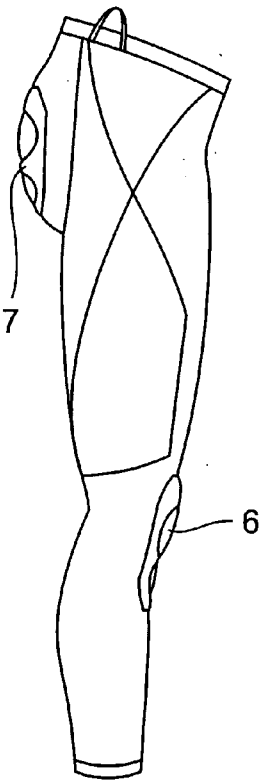

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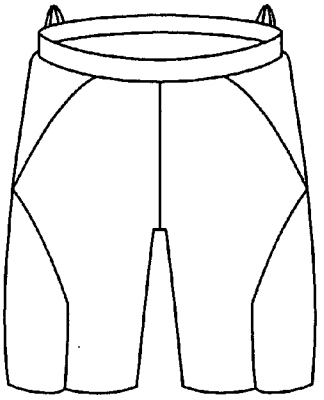


Figure 6

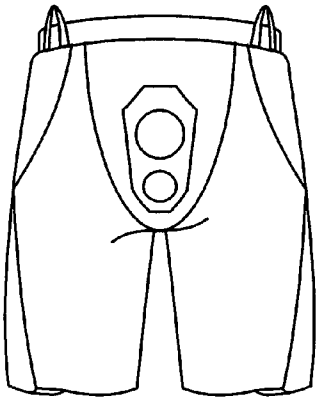
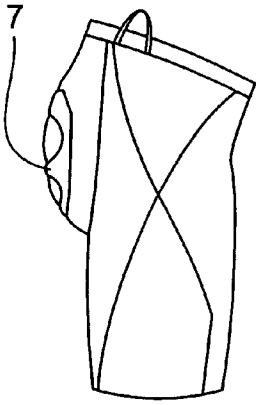


Figure 7



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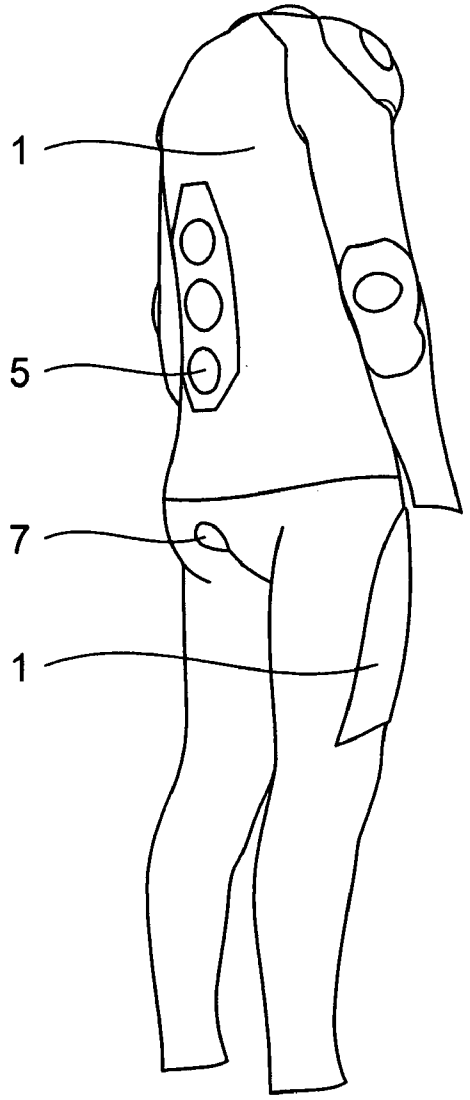

Figure 9

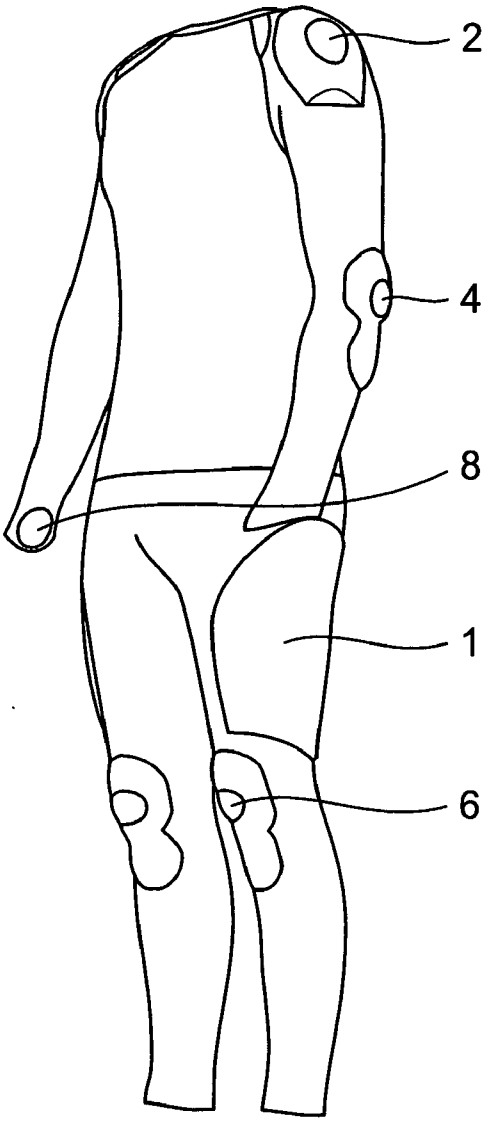

Figure 10

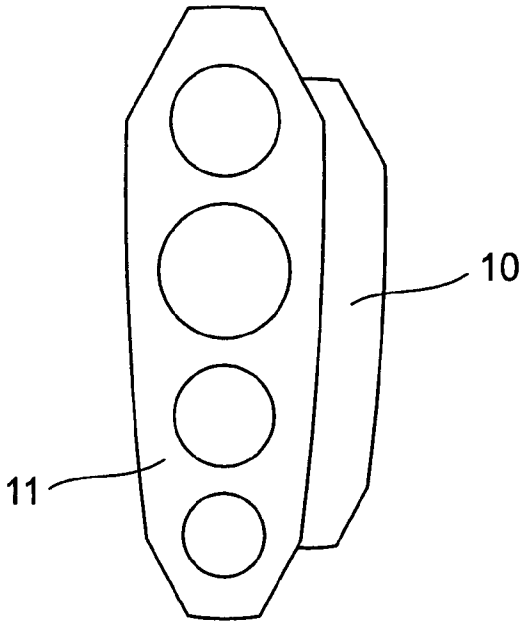

Figure 11

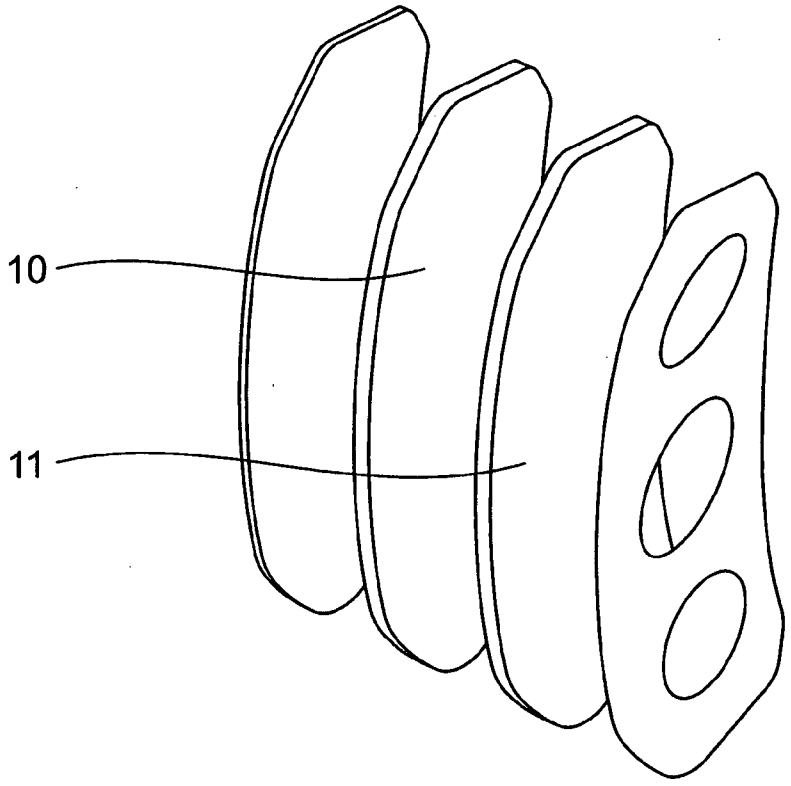

Figure 12

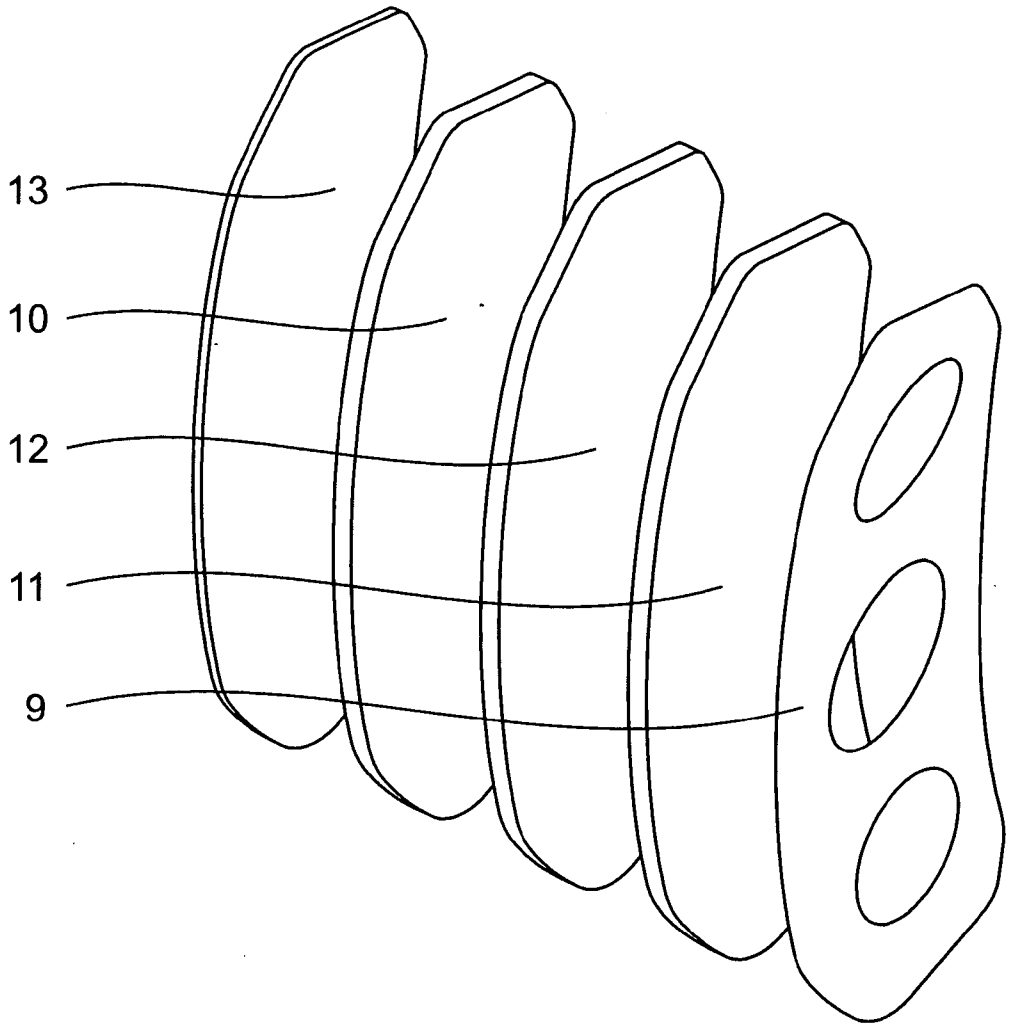

Figure 13

GARMENTS AFFORDING PROTECTION AGAINST KNOCKS OR BLOWS

[0001] This application claims priority from and incorporates herein by reference United Kingdom Application No. 0601697.6, filed Jan. 27, 2006.

BACKGROUND OF THE INVENTION

[0002] The current invention relates to protective garments and in particular to garments affording protection against knocks and/or blows.

[0003] Various shields and pads are available for protection while engaging in sporting activities. These shields or pads are worn over or under clothing. A number of manufacturers have tried to incorporate shields or pads into sports clothing, but the clothing is either bulky or cumbersome to wear or offers little real protection against knocks or blows. Such garments also offer little if any environmental protection to the wearer.

SUMMARY OF THE INVENTION

[0004] It is an object of the current invention to ameliorate all or at least some of the aforementioned shortcomings.

[0005] It is also an object of the current invention to provide an improved protective garment affording protection against knocks and blows.

[0006] It is yet a further object of the current invention to provide a protective garment for a sporting activity that affords protection against environmental conditions experienced during the activity, for example, wet, windy and/or cold conditions that might be experienced by persons engaged in sailing, windsurfing, kite boarding, skiing or snowboarding.

[0007] According to the present invention there is provided a garment affording a wearer of the garment protection against knocks and blows comprising an article of clothing made from a thermal material and having two or more layers of protective material sewn into at least one shielding region of the article. In certain embodiments, the article comprises two or more layers of protective material sewn into shielding regions of the article.

[0008] Preferably the thermal material is one that provides a degree of thermal insulation from one or more environmental conditions selected from a group comprising wet (i.e., water), wind and cold.

[0009] Preferably the protective material is selected from a group comprising EVA foam, expanded foam, 3D mesh and crush resistant closed cell foam.

[0010] Preferably each one of the two or more layers comprises a different one of the protective materials selected from the aforementioned group.

[0011] Preferably the protective material is moulded or shaped to a body profile of the wearer.

[0012] Preferably the shielded regions are one or more of the shoulders, elbows, spine, knees or posterior of the article of clothing.

[0013] Further aspects of the invention will became apparent from the following description, which is given by way of example only.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] A preferred form of the present invention will now be described with reference to the accompanying drawings in which:

[0015] FIGS. **1** and **2** are front and back views respectively of a protective long sleeve shirt according to the invention,

[0016] FIGS. **3**, **4**, and **5** are front, back and side views respectively of protective pants according to the invention.

[0017] FIGS. **6**, **7**, and **8** are front, back and side views respectively of protective shorts according to the invention.

[0018] FIGS. **9** and **10** are back and front perspective views respectively of a protective shirt and pant combination.

[0019] FIGS. **11** and **12** are perspective illustrations of layers of a protective shield of the garments.

[0020] FIG. **13** is an illustrative view showing; an alternative embodiment of a protective shield.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] In FIGS. **1** through **10**, there is shown various protective garments, for use when engaged in sports activities such as sailing windsurfing, kite boarding, skiing, or snowboarding, comprising a garment having a plurality of padded shielding regions **2**, **4**, **5**, **6**, **7**, with shock-absorbing qualities (i.e. a material that has a characteristic of absorbing energy from knock or blows impacted on the material) for protecting particular body pants such as shoulders, elbows, spine, knees and posterior (buttocks) against knocks and blows sustained while participating in the sports activity. In the preferred embodiment, the garment is an undergarment designed to be worn under known sports clothing and can be any article of clothing such as a shirt, pants (e.g. long-johns) or shorts as required. The garment is made from a martial having good thermal properties (i.e. a material providing a degree of thermal insulation) such as Polartec Power Dry technical fabric; from US company Malden Mills.

[0022] The plurality of shielded regions **2**, **4**, **5**, **6**, and **7** each comprise one or more layers **10**, **11** of specially selected materials having protective shock-absorbing properties. These materials may also have thermal and comfort properties to add to the wearability of the garment. Referring to FIGS. **11** and **12**, in the preferred embodiment of the invention, the shielded regions comprise an outer layer **11** of 3D Air mesh and an inner layer **10** of perforated EVA foam. The mesh and foam materials are heat moulded to shape and held in place by sandwiching them between the outer garment layer **9** and an inner panel of fabric **13** stitched to the outer layer **9** around the periphery of the shielded region. In the preferred embodiment, the stitching does not penetrate through the layers of protective materials but is tightly positioned around the materials firming a snug packet between the fabric layers to hold the protective materials in place.

[0023] The protective materials are heat moulded to conform to the particular body region where they are to be utilized in a shielding region. This ensures that the protective materials and thus shielded regions are of a proper size and shape which adds to the degree of protection, comfort and

wearability of the garment. Heat moulding of the garments is done in accordance with material manufacturers recommendations. The required size and shape of the protective material layers is readily determined by the skilled addressee from body size and shape information well known in the art of garment manufacturer and relates to the size of garment being made (i.e., the size of wearer the garment is designed to fit) and the shape profile of the body part that the shielded region is located to protect.

[0024] It is envisaged that some protective materials may not be mouldable and such materials can be cut or otherwise formed to the required size and shape in accordance with manufacturer's recommendations.

[0025] In the illustrated embodiments, the outer Polartec Power Dry layer has oval openings exposing areas of the 3D Air mesh layer. This is done for aesthetic purposes only, has no functional purpose, and is not intended to limit the scope of the invention.

[0026] The garment can be worm as an undergarment while participating in sporting activities, such as skiing or snowboarding, for example, and helps keep the wearer both comfortable and protected from environmental conditions, in this case cold, and will also afford the wearer a degree of protection against knocks and blows to vulnerable areas of the body, such as shoulders, elbows, spine, knees and posterior, if the wearer falls or crashes.

[0027] In the above described preferred embodiment, the garment is an undergarment designed to be worn under regular sports clothing. In other embodiments of the invention, the garment is designed as an intermediate or an outer layer garment and is made from any fabric that provides a degree of insulation from environmental conditions, such as cold, water and wind (i.e. fabrics having thermal, waterproof and/or windproof characteristics) to be expected when engaging in certain sporting activities, including but not limited to, water, wind and winter sports, and in particular extreme sports. Such suitable fabrics include, but are not limited to, polar fleece, and merino/spandex and polyester/spandex composites. A composite fabric is an engineered fabric, made from two or more components. Spandex is a manufactured elastomeric fibre that can be repeatedly stretched without breaking and will still recover to its original length. Polyester is another manufactured fibre that has high strength, excellent resiliency, high abrasion resistance and low absorbency allows the fabric to dry quickly. Merino is wool that gives fabrics comfort and warmth. Polar fleece was created by Malden Mills in 1979 and is a soft napped synthetic wool fabric made from Polyethylene Terephthalate (PET) and has similar properties to wool at a faction of the weight.

[0028] In the preferred embodiment, the stitching does not penetrate through the layers of protective materials. In other embodiments it is envisaged that the stitching penetrates one or more of the layers of protective material to hold the layers more firmly in place. Additionally, the layers may also be held together and to the fabric by an adhesive.

[0029] In the preferred embodiment, the layers of shock-absorbing material are held in place by sandwiching them between the outer garment layer and an inner fabric panel stitched to the outer layer. In alternative embodiments, the inner panel of fabric is stitched to the outside of the garment or the protective layers are sewn directly into the outside or inside of the garment fabric, without sandwiching between an additional fabric panel.

[0030] In other embodiments of the invention various other protective materials are employed for the shielding regions. Such materials include EVA (ethylene vinyl acetate) foam, expanded foam, 3D mesh and crush resistant closed cell foam. Ethylene vinyl acetate is a mixture of polyethylene and vinyl acetate plastics. It is a soft foamy plastic with high shock absorption properties and is commonly used in the midsoles of shoes.

[0031] It is also envisaged that in some embodiments, there may be one, two or more layers of the protective material depending on the intended use of the garment and the level of knock or blow protection required. For example, one embodiment of the garment may be shade for recreational sports people that participate at a modest level within a sporting activity and another embodiment of the garment may be made for expert, professional or daredevil sports people that participate at a more extreme level within the same sporting activity. The garment for recreational sports people has only one or two layers of protective material in shielding regions, whereas the garment for extreme or daredevil sports people has two or three or more protective layers in each shielded region. Additionally, certain areas of the body no more readily knocked or are more sensitive to knocks or blows and so within the one garment different shielded regions may have a different number of protective layers to give a suitable level of shock absorbing protection for that region. For example, in some embodiment of the invention, garments have multiple layers comprising perforated EVA foam & Air Mesh in shielding regions at the spine, posterior, elbow, shoulders and knees, and a single layer of perforated impact foam in shielding regions at the thigh, hip, shoulder blades and neck.

[0032] It is also envisaged that where two or more layers are used in one shielding region, then each layer will comprise a different one of the protective materials selected from the aforementioned group providing its own unique form of protection. However, even where: multiple layers of a single material are used comfort and protection are improved over a single thinner layer of material. Regions of thinner layered materials are more easily conformed to the body shape for comfort and absorb greater amounts of impact energy through contact surfaces between layers.

[0033] An example only of an alternative embodiment is illustrated in FIG. **13**. The shielded regions have an additional middle layer **12** of crush resistant closed cell foam for additional protection. The foam consists of polyethylene or polypropylene in an elastic adhesive. A typical example is Brock Foam from Brock USA (www.brockusa.com). The foam is also heat moulded to shape and located between the fabric layers with the EVA foam and 3D mesh layers.

[0034] It should be appreciated that modifications and alternations obvious to those skilled in the art are not to be considered as beyond the scope of the present invention. For example, the description refers to fabric that provides a degree of insulation from environmental conditions such as water, wind and cold. Many such fabrics are known and can be employed in the invention. However, this is not meant to limit the scope of use of the invention. It is envisaged that future fabrics may have superior thermal, waterproof and/or

windproof characteristics to those currently known and such new fabrics can readily be employed in the current invention.

[0035] Additionally, the above description also refers to various protective materials having shock-absorbing properties. This is again not meant to limit the scope of the invention. This list comprises only the most suitable shock-absorbing materials known to and used by the applicant at the time of preparing this application. Many other such materials are known and can be employed in the invention. It is also envisaged that future materials may be developed that are thinner or more flexible or have superior shock absorbing properties to those currently known and such new materials can readily be employed in the current invention.

[0036] It is also envisaged that garments according to this invention may find application in many other less extreme and/or conventional sports than those mentioned above in the description. For example, the invention may provide garments for rugby, soccer and like winter contact sports or even summer sports. One example is, say, batsman's clothing for cricket in which the garment is designed to be worn as a single layer and has shielded regions located in the forearms, leg, thigh and groin areas of the clothing articles. The batsman's garment is made from a fabric having thermal characteristics aimed at keep the batsman cool and dry on hot days. The advantage of the invention in this application is that the batsman is afforded a greater level of both environmental and impact protection than provided by his regular batting attire without adding unduly to its bulkiness or discomfort.

[0037] While the systems and methods of this invention have been described in terms of preferred embodiments, it will be apparent to those of skill in the art that variations may be applied to the systems, methods, and in the steps or in the sequence of steps of the method described herein without departing from the concept, spirit and scope of the invention. More specifically, it will be apparent that certain materials that are both functionally and mechanically related might be substituted for the materials described herein while the same or similar results would be achieved. All such similar substitutes and modifications to those skilled in the art are deemed to be within the spirit, scope and concept of the invention as defined by the appended claims.

What is claimed is:

1. A garment affording a wearer of the garment protection against knocks and blows comprising an article of clothing made from a thermal material and having two or more layers of protective material sewn into at least one shielding region of the article.

2. The garment of claim 1 wherein the thermal material is one that provides a degree of thermal insulation from one or more environmental conditions selected from a group comprising water, wind and cold.

3. A garment affording a wearer of the garment protection against knocks and blows comprising an article of clothing made from a fabric having one or more of thermal, waterproof and/or windproof characteristics, and the article of clothing having one or more protective shielding regions comprising one or more layers of a shock absorbing material sewn into the article of clothing.

4. The garment of claim 3 wherein the layers of protective material are sewn into a plurality of shielding regions of the article.

5. The garment of claim 3 wherein the shielding regions are one or more of a shoulders, elbows, spine, knees or posterior of the article of clothing.

6. The garment of claim 3 comprising two or more layers of the protective material, wherein the protective material is selected from a group comprising EVA, foam, expanded foam, 3D mesh and crush resistant closed cell foam.

7. The garment of claim 6 wherein each one of the two or more layers comprises a different one of the protective materials selected from the group

8. The garment of claim 6 wherein the two or more layers comprise one layer of crush resistant closed cell foam.

9. The garment of claim 3 wherein the protective material is moulded or shaped to a body profile of the wearer.

10. A garment comprising a body of thermally insulating material, and at least one shielding portion attached to the body so as to provide protection against knocks and blows, wherein the shielding portion comprises at least two layers of protective material.

11. The garment of claim 10 wherein the at least one shielding portion is stitched to the body.

12. The garment of claim 10 wherein the at least two layers comprise a layer of mesh.

13. The garment of claim 10 wherein the at least two layers comprise a layer of foam.

14. The garment of claim 10 wherein the at least two layers comprise a layer of perforated form.

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