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### (54) Protective garment

(57) A protective garment is made from fabric material and has on the internal surface of the garment a pocket 26 containing protective sheet material 25. Pockets of protective material are located over regions of the garment for which protection is required such as the back 16, elbows 15 and/or shoulders. To outward appearance the garments are conventional.

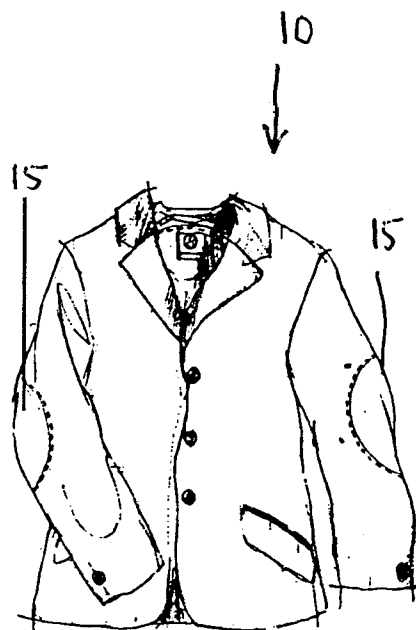


Fig. 1

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## Description

**[0001]** This invention relates to protective garments, in particular for use in sporting or other activities in which the wearer may suffer a force applied at a vulnerable part of the body.

**[0002]** In horseriding riders most frequently suffer injury to the spine and elbow and sometimes to the shoulders and ribs. Protection against such injuries is usually provided, especially during competition or supervised activities, in the form of an external body protector.

**[0003]** Similar protection is also offered for sports such as motorcycle racing, hockey, cricket and football.

**[0004]** An object of the invention is to provide protective garments which give improved protection.

**[0005]** According to the invention a protective garment comprises fabric material formed into an article of clothing, protective material secured into and located at one or more discrete regions of the article where protection is required, a pocket for receiving the protective material internally of the garment, said pocket being attached to an internal surface of the article, and the protective material being capable of absorbing forces applied to the wearer during wear to give protection from such forces.

**[0006]** The invention may be used in otherwise conventional garments such as shirts, trousers, jackets, waistcoats etc, so that the wearer appears to be wearing a conventional garment. The protective material is preferably an impact absorbent material which is shaped according to the region to be protected. Thus, for example, protective material for elbows will be of convex or cup shape to conform to the elbow. Conveniently the protective material is located in a pocket which has an opening through which the material may be inserted into and removable from, for example when not required or when the garment is to be cleaned.

**[0007]** The pocket is fixed in position so that the protective material is always in the correct position for the region to be protected.

**[0008]** The protective material may be sheet material having a peripheral shape and being contoured to provide a convex profile conforming to the shape of the region to be protected.

**[0009]** The pocket is preferably of fabric material sewn around its periphery to form the pocket and then sewn into the garment around its edges at said discrete region.

**[0010]** The protective material is preferably resilient, foamed, elastomeric plastics sheet material which, under the influence of heat and pressure, may be shaped prior to incorporation into a garment, using a former.

**[0011]** Typical regions of the article at which the protective material may be located include elbows, along the back portion of the garment to protect the spine, the coccyx and/or across the shoulders; at the knees, over the chest, and/or in footwear.

**[0012]** Further features of the invention will appear

from the following description of embodiments of the invention given by way of example only and with reference to the drawings, in which:

5 Fig 1 is a front view of a riding jacket to which the invention has been applied,

Fig 2 is a back view of the article shown in Fig 1,

10 Fig 3 is a front view of a waistcoat incorporating the invention,

Fig 4 is a back view of the article of Fig 3,

15 Fig 5 is a front view of a shirt according to the invention,

Fig 6 is a back view of the article of Fig 5,

20 Fig 7 is a front view of riding trousers incorporating the invention,

Fig 8 is a rear view of the article of Fig 7,

25 Fig 9 is a plan view of a unit of protective material for incorporation into a garment,

Fig 10 is a section on the line 10-10 in Fig 9,

30 Fig 11 is a section on the line 11-11 in Fig 9,

Fig 12 shows a set of elbow protectors,

Fig 13 shows a set of shoulder protectors,

35 Fig 14 shows a set of chest protectors,

Fig 15 shows a protector for the lower region of the spine,

40 Fig 16 shows a full spine protector,

Fig 17 shows an upper spine protector,

45 Fig 18 shows a spine protector for a riding jacket,

Fig 19 shows a full back protector, and

50 Fig 20 shows stages in forming and shaping a unit of protective material.

**[0013]** In the drawings there is shown various embodiments of the invention for use in horseriding but the invention can be equally well applied to garments used for other activities.

**[0014]** Referring to Figs 1-8, there are shown various garments, in particular a riding jacket 10 (Figs 1 and 2), a waistcoat 11 (Figs 3 and 4), a collared shirt 12 (Figs

5 and 6), and jodhpurs 13 (Figs 7 and 8). In each case the garments illustrated are of conventional form except that there is incorporated into the garments protective material shown by dashed lines in each drawing.

[0015] Thus for the riding jacket 10 there is incorporated elbow protectors 15, and a shoulder and back protector 16. For the waistcoat 11 there is a full back protector 18 and chest protectors 19.

[0016] For the shirt 12 there are again elbow protectors 15 and an upper spine protector 20.

[0017] For the jodhpurs 13 there is a lower spine and coccyx protector 21.

[0018] In each case the protective material is shaped and formed according to the location and is incorporated into a fabric pocket in the manner shown in Figs 9-11. In these drawings is shown diagrammatically a shaped piece of protective material 25 around which is located a fabric pocket formed of fabric layers 26 to each side of the material 25 and sewn around the peripheral edges at 27 to form an enclosed pocket for the material in which the material 25 is a close fit. Usually the sewing will be interrupted over a portion of the periphery of the material 26 to provide access for locating the protective material 25 into and from the pocket.

[0019] In use in a garment the protective material 25 within the pocket is sewn into the inside surface of the outer layer of the garment over the region of the garment required so that the material is in a fixed position.

[0020] In Figs 12-19 there is shown in Fig 12 a set of elbow protectors 15, in Fig 13 a set of shoulder protectors 16, in Fig 14 a set of chest protectors 19, in Fig 15 a lower back or coccyx protector 21, in Fig 16 a full spine protector 17, in Fig 17 an upper spine protector 30, in Fig 18 a riding jacket spine protector 20 and in Fig 19 a full back protector 18. It will be appreciated that these drawings show the protector shapes in plan view but, at least in some cases, the protectors will be shaped on a former (as will be described) in addition to the edge shaping shown.

[0021] The protective material used is preferably resilient, foamed plastics material which provides shock absorbency when encountering a force. Suitable material is that available from Astron Elastomerprodukte under "Memory V13" which is of nitriles/PVC composition. This material is cut out in the desired shapes from 5 - 15mm thickness sheet 35 using a cutting tool. This is as seen in Fig 20, in this case showing the formation of protective material 15 for elbows. The cut out portions are placed on a former 36 and pressure and heat are applied to the material to form into the desired shape. In this case the shape is of convex or cup shaped construction to conform to the shape of the elbow. The sheet 35 may be used in two or more layers, one on top of the other totalling 10 - 20mm thick or the sheet may be a single layer of thickness, for example 8 - 10 mm thick.

[0022] In the case of other protective material for other regions the material will be shaped accordingly. Thus, for example, a shoulder protector 16 will be of elongate

curved configuration. Similarly spine protectors will be of transversely curved elongate shape. The general preferred shape is retained in use but there remains some flexibility from the preformed shape to adapt to the user's shape

[0023] It will be noted that the various garments to which this invention is applied may be of conventional construction, which may be relatively loose fitting, and the protective material is located under the area of the garment fabric which is positioned in use over the area to be protected. It will be appreciated that by employing protective material into conventional garments these are more likely to be worn to afford the necessary protection, especially when the activity is unsupervised. Moreover the protective garment can be worn for various activities and by those who are prone to be subject to impact by reason of disablement, age etc. If the protective garments are worn as conventional clothing, this will result in reducing injuries without the stigma which may otherwise arise from such wear.

## Claims

1. A protective garment comprising fabric material formed in an article of clothing, protective material secured into and located at one or more discrete regions of the article where protection is required, a pocket for receiving the protection material internally of the garment, the pocket being attached to an internal surface of the article, and the protective material being capable of absorbing force applied to the wearer during wear to give protection from such force.
2. A garment according to Claim 1 wherein the protective material is impact absorbent material shaped according to the region to be protected.
3. A garment according to Claim 2 wherein the protective material is sheet material having a peripheral shape according to the region to be protected and being contoured to provide a convex/concave shape conforming to the shape of the region to be protected.
4. A garment according to Claim 2 or 3 wherein the protective material is formed from elastomeric sheet of between 10 - 20 mm in thickness which, under pressure and heat, is arranged to be shaped on a former according to the region to be protected.
5. A garment according to any one of the preceding claims wherein the protective material is located in the garment to protect one or more of the following regions; the upper and lower back and spine, the coccyx, the elbows, the shoulders, the knees and the chest.

6. A garment according to any one of the preceding claims wherein the pocket is of fabric material having the protective material sewn into it and the pocket is attached to an internal surface of the garment fabric. 5
7. A garment according to Claim 6 wherein the pocket is provided with an opening through which the protective material is accessible to insert and remove said material from the pocket. 10
8. A garment according to any one of the preceding claims wherein the garment is intended for horse riding and comprises jodhpurs and/or a riding jacket. 15
9. A protective garment substantially as described with reference to the drawings. 20
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