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(54) Protection device

(57) A protection device (1) comprising a main body (2) that has an inner surface (2a) meant to be directed toward a portion of the user's body to be protected further comprising an outer surface (2b) that is provided with a plurality of impact absorption protrusions (3) that are spaced each other and yield inelastically.

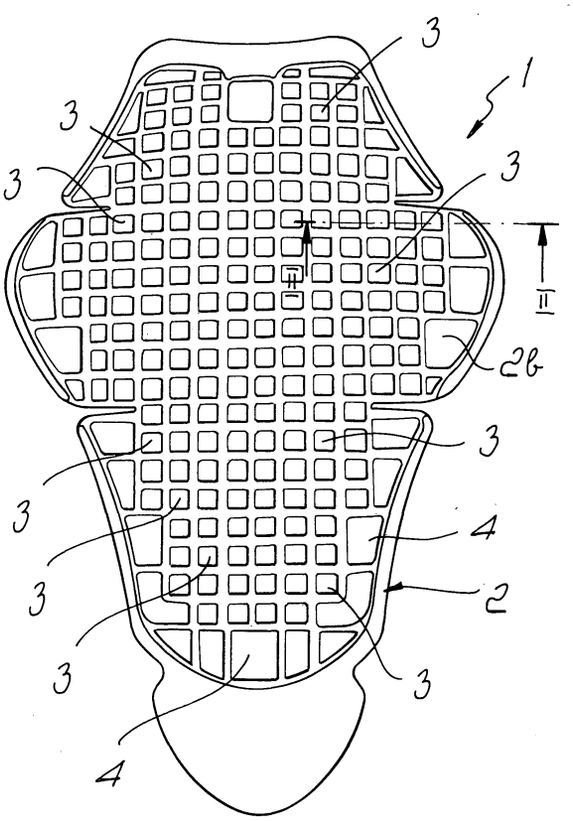

Fig. 1

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Description

[0001] The present invention relates to a protection device.

[0002] It is known that protection devices such as for example back shields, which are used in particular by motorcyclists, or shin guards used in different sports, in order to protect parts of the body that are particularly subject to violent impacts and/or collisions, have been marketed since a long time.

[0003] With reference for example to the motorcycling field, these protection devices are generally constituted by a substantially shell-shaped three-layer sandwich, in which the surface that is designed to be directed toward the portion of the body of the user to be protected is usually slightly concave.

[0004] These sandwiches generally have a base layer, which is designed to be directed toward the body of the user, and a covering layer, between which an impact absorption layer is interposed; in particular, the base layer and the covering layer are made of semirigid material, while the impact absorption layer is made of low-density polyethylene.

[0005] A structure of this type, though being currently widely used, is not devoid of drawbacks.

[0006] First of all, the semirigid nature of the covering layer and particularly of the base layer does not allow to adapt the protection device significantly to the anatomical shape of the region to be protected; accordingly, said protection device is very uncomfortable and unpleasant to wear.

[0007] Moreover, in many cases the devices currently in use have shown an insufficient capacity to absorb impacts, especially in case of violent falls or impacts against blunt objects.

[0008] The aim of the present invention is to provide a protection device that allows to eliminate or at least reduce drastically the drawbacks noted above in conventional devices.

[0009] Within this aim, an object of the invention is to provide a protection device that allows better impact absorption than the devices currently in use.

[0010] Another object of the invention is to provide a protection device that is much more comfortable to wear than currently commercially available ones.

[0011] A further object of the present invention is to provide an accessory, particularly for sportswear, that can be inserted within jackets and suits, ensuring easy and quick fit and maximum freedom of movement for the user.

[0012] A still further object of the present invention is to provide a protection device that is constructively very simple.

[0013] Another object is to provide an invention that has a low production cost, so as to be advantageous also from the economical standpoint.

[0014] This aim and these and other objects that will become better apparent hereinafter are achieved by a protection device that comprises a main body having an inner surface designed to be directed toward a portion of the user's body to be protected and is characterized in that said main body comprises an outer surface that is provided with a plurality of impact absorption protrusions that are spaced each other and yield inelastically.

[0015] Advantageously, a protection device according to the invention is characterized in that said outer surface comprises an outer reinforcement enclosure for said plurality of protrusions in which a filler is accommodated.

[0016] Further features and advantages of the invention will become better apparent from the present detailed description of some currently preferred embodiments thereof, given only by way of non-limitative example with reference to the accompanying drawings, wherein:

Figure 1 is a top elevation view of a protection device according to the invention;
Figure 2 is a sectional view, taken along the line II-II of Figure 1; and
Figure 3 is a perspective view of a shin guard that uses a protection device according to the invention.

[0017] With reference to the figures, a protection device according to the invention, generally designated by the reference numeral 1, comprises a main body 2, which has an inner surface 2a that is designed to be directed toward a portion of the user's body to be protected.

[0018] The main body 2 has, according to the invention, an outer surface 2b that has a plurality of spaced impact absorption protrusions 3; in particular, said protrusions can be substantially shaped like parallelepipeds, as shown in the figures, or can have any other shape.

[0019] Furthermore, the plurality of impact absorption protrusions 3 are arranged in a regular pattern, so as to form for example a substantially matrix-like structure.

[0020] An important feature of the invention consists in that these impact absorption protrusions 3 yield inelastically, i.e., following a violent impact and the consequent generation of momentary forces that act on the outer surface of the device, the impact absorption protrusions 3 undergo a permanent deformation, thus dissipating such momentary forces.

[0021] In greater detail, the outer surface 2a is constituted, according to the invention, by an outer reinforcement enclosure 4 for impact absorption protrusions 3; a filler 3a is accommodated within the outer enclosure 4.

[0022] Also according to the invention, the main body 1 comprises a base 5 that forms the inner surface 2a, which is advantageously constituted by a plurality of projections 6 that are designed to abut against the portion of the user's body to be protected.

[0023] Conveniently, in order to ensure greater com-

fort during use, the projections 6 have a smaller transverse dimension than the impact absorption protrusions 3.

[0024] Furthermore, as shown in Figure 2, the filler 3a extends from the protrusions 3 toward the base 5 so as to form a supporting layer 7.

[0025] The filler 3a that constitutes the internal portion of the impact absorption protrusions 3 and the supporting layer 7 is generally thermoformed together with the outer enclosure 4, while the base 5 is fixed, for example by gluing, to the supporting layer 7.

[0026] Operation of the protection device 1 according to the invention is clearly evident from the above description and in particular it is evident that following an impact or collision the outer enclosure 4 undergoes deformation, causing at the same time a permanent deformation of the filler arranged inside the impact absorption protrusions 3.

[0027] In particular, since the impact absorption protrusions 3 are spaced each other, following an impact they are compressed and simultaneously deformed by crushing, thus extending outward.

[0028] This deformation is allowed by the fact that the impact absorption protrusions 3 are spaced each other and therefore there is a gap region that can be occupied by the impact absorption protrusions 3 that are undergoing deformation.

[0029] It is evident from the above description that a greater impact absorption capacity is ensured by using protection devices according to the invention.

[0030] Furthermore, the provision of a single outer enclosure 4 that is adapted to connect the plurality of impact absorption protrusions 3 allows to distribute the impact on a larger surface.

[0031] The base 5 allows the protection device 1, by way of the plurality of protrusions 6, to adapt in an optimum manner to the portion of the body to be protected and at the same time allows ventilation of the part of the body with which it is meant to make contact, to the benefit of comfort in use.

[0032] As regards the materials that can be used, it has been found that the outer enclosure 4 can be for example advantageously made of EVA (ethylene vinyl acetate), crosslinked expanded polyolefin resin in the wide range of products (HD, LD, LLD), polypropylene (copolymer type), ABS (acrylonitrile-butadiene-styrene thermopolymers), and PA6.

[0033] As regards instead the materials that can be used as filler, materials such as crosslinked expanded polyolefin resins of various densities, EVA (ethylene vinyl acetate), also used with different densities or also polyurethane, have been found to be suitable materials.

[0034] Moreover, it has been found that the same materials used as filler (optionally with different densities) can be used to produce the base 5.

[0035] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0036] In particular, it can be noted that the protection device according to the invention can have different shapes according to its use: for example, Figure 1 illustrates a protection device that is shaped so that it can constitute a back protection shield that can be detachably applied to jackets, heavy jackets and the like, particularly for motorcycling.

[0037] Figure 3 instead illustrates a protection device that is shaped like a shin guard, but nothing prevents use of the inventive concept to produce protective gear of any shape and suitable for the most disparate requirements; it is therefore possible to obtain protective gear for the chest region or also protective gear suitable for snowboarding.

[0038] All the details may further be replaced with other technically equivalent elements.

[0039] Thus, for example, the protrusions can have a parallelepipedal shape, as shown, but nothing prevents them from being constituted by cylinders that have a circular base, a hexagonal base, et cetera.

[0040] The materials and the dimensions may be various according to requirements.

[0041] The disclosures in Italian Patent Application No. VR2002A000064 from which this application claims priority are incorporated herein by reference.

[0042] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A protection device, comprising a main body that has an inner surface meant to be directed toward a portion of the user's body to be protected, **characterized in that** said main body comprises an outer surface that is provided with a plurality of impact absorption protrusions that are spaced each other and yield inelastically.

2. The protection device according to claim 1, **characterized in that** said outer surface comprises an outer reinforcement enclosure for said plurality of impact absorption protrusions within which a filler is accommodated.

3. The protection device according to claim 1, **characterized in that** said plurality of impact absorption protrusions have a matrix-like arrangement.

4. The protection device according to claim 1, **characterized in that** said main body comprises a base that forms said inner surface and has a plurality of projections that are designed to abut against said

portion of the user's body to be protected.

5. The protection device according to claim 4, **characterized in that** said plurality of projections have a smaller transverse dimension than said plurality of impact absorption protrusions.

6. The protection device according to claim 4, **characterized in that** said main body comprises a supporting layer that is adapted to connect said base to said plurality of impact absorption protrusions.

7. The protection device according to claim 2, **characterized in that** said outer enclosure is made of rigid polypropylene or EVA or crosslinked expanded polyolefin resin or ABS or PA6.

8. The protection device according to claim 2, **characterized in that** said filler is a crosslinked and expanded high-density polyolefin resin or EVA.

9. The protection device according to claim 4, **characterized in that** said base is made of a crosslinked and expanded low-density polyolefin resin or EVA.

10. The protection device according to one or more of the preceding claims, **characterized in that** said filler is thermoformed together with said outer enclosure.

11. The protection device according to claim 6, **characterized in that** said base is fixed to said supporting layer by gluing.

12. The protection device according to one or more of the preceding claims, **characterized in that** it is a back protection shield.

13. The protection device according to one or more of the preceding claims, **characterized in that** said back protection shield can be detachably applied to jackets, heavy jackets or the like.

14. The protection device according to one or more of the preceding claims, **characterized in that** it is a shin guard.

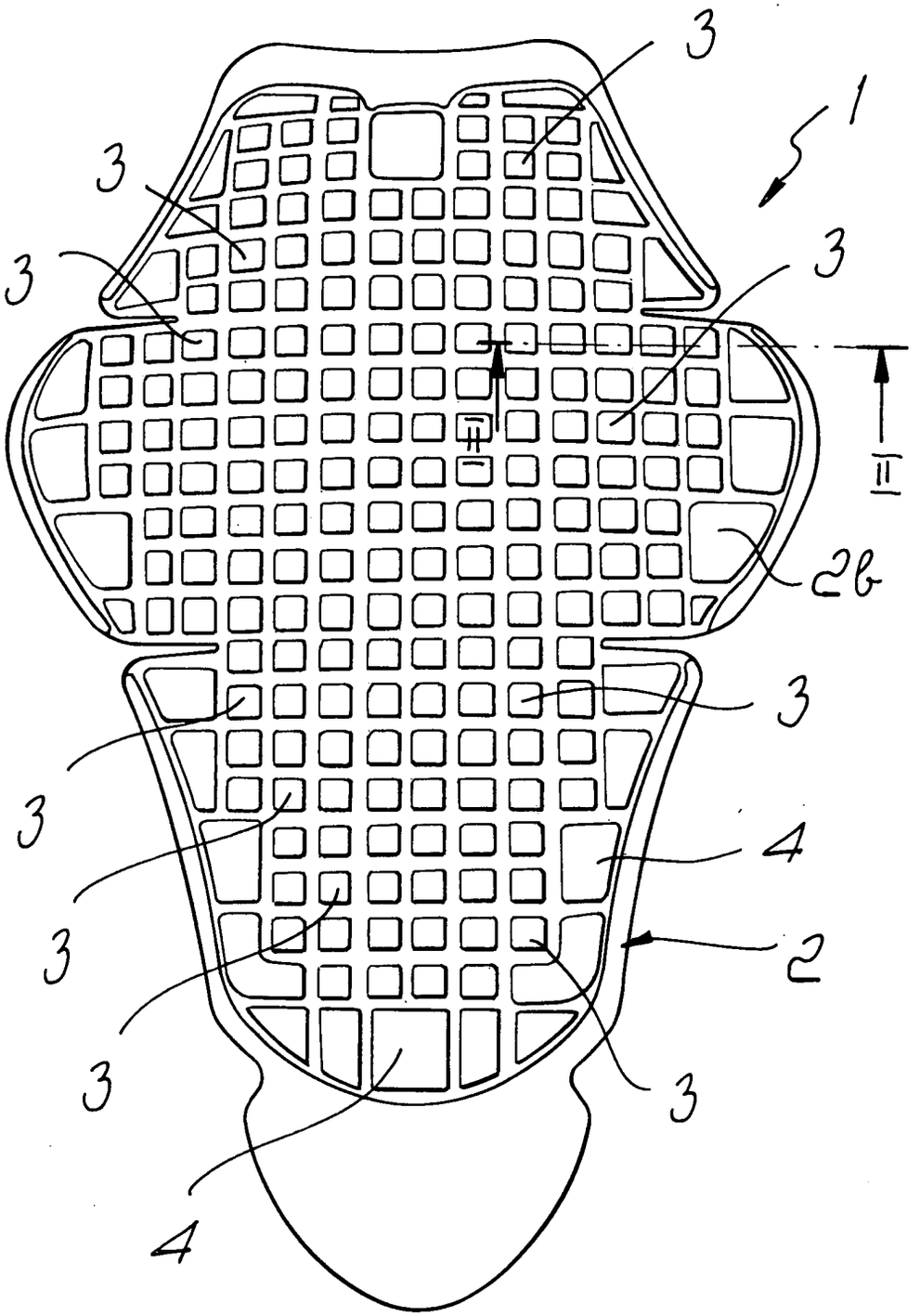

Fig. 1

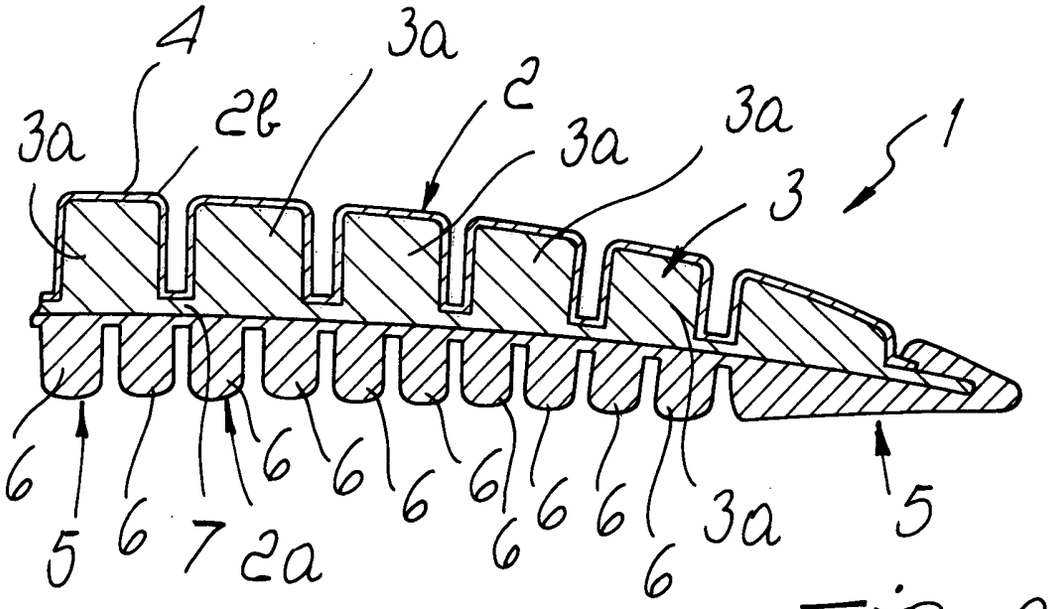

Fig. 2

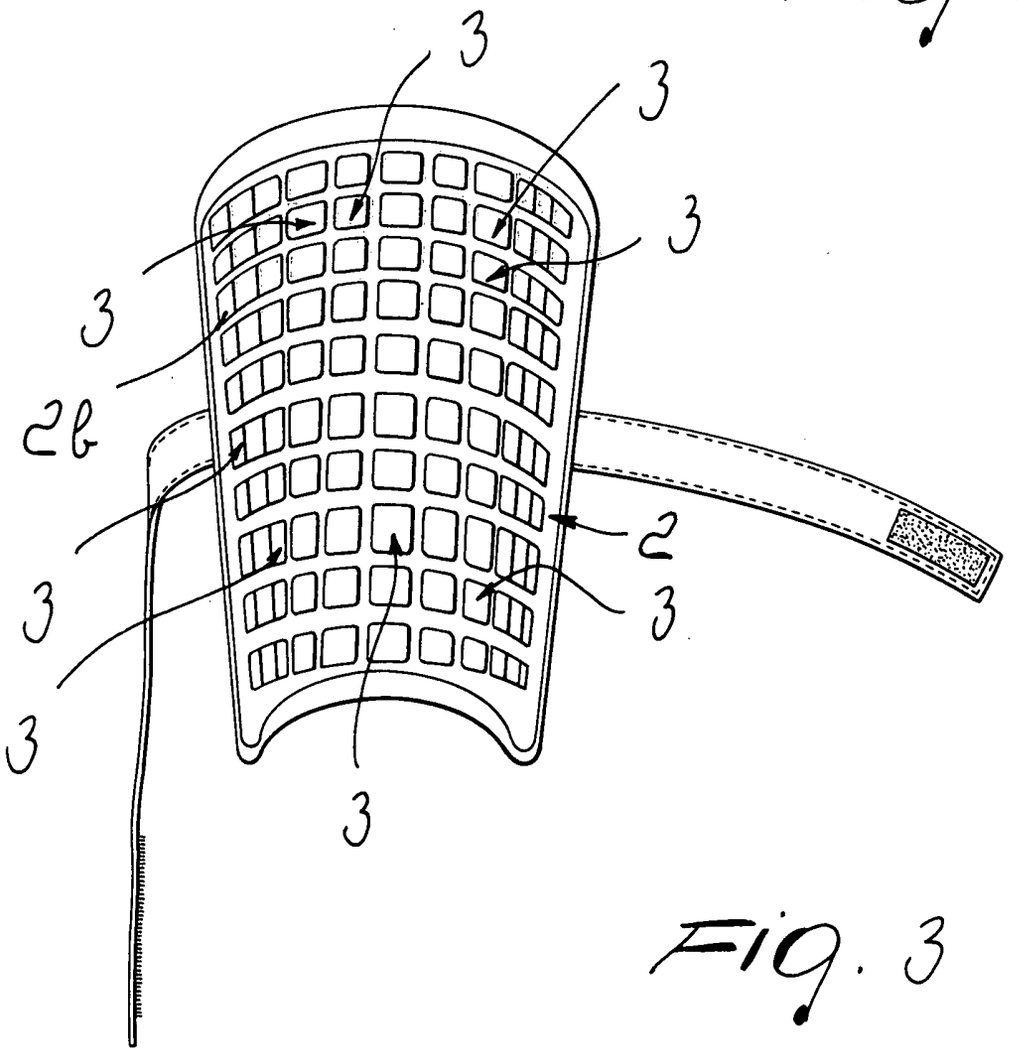

Fig. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 00 9744

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 September 2003	Oelschläger, H

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X : particularly relevant if taken alone
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