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None

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Online databases:WPI,CLAIMS

(54) Limb protector/guard

(57) A shin protector includes a front or outer layer (2) of relatively hard impact resistant material, a backing layer (7, 9, 10) of a relatively more deformable material and a number of tubes (12, 13, 14, 15) embedded within the backing layer, the tubes being arranged generally lengthwise of the layers of the device.

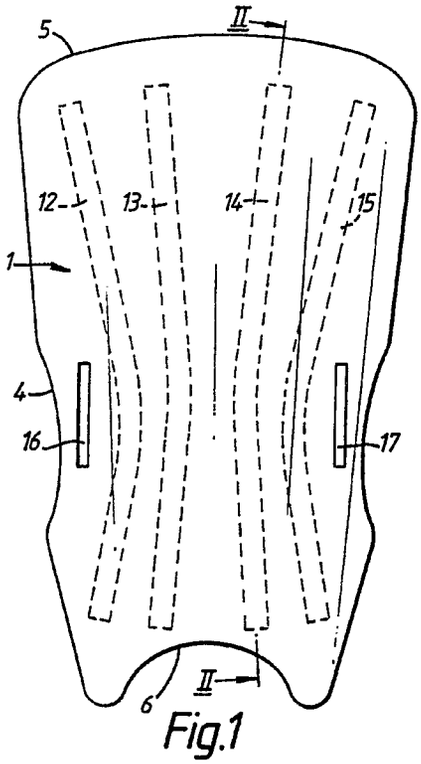

Fig.1

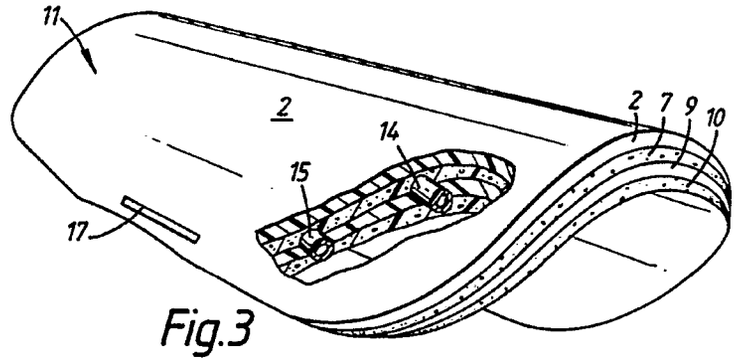

Fig.3

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

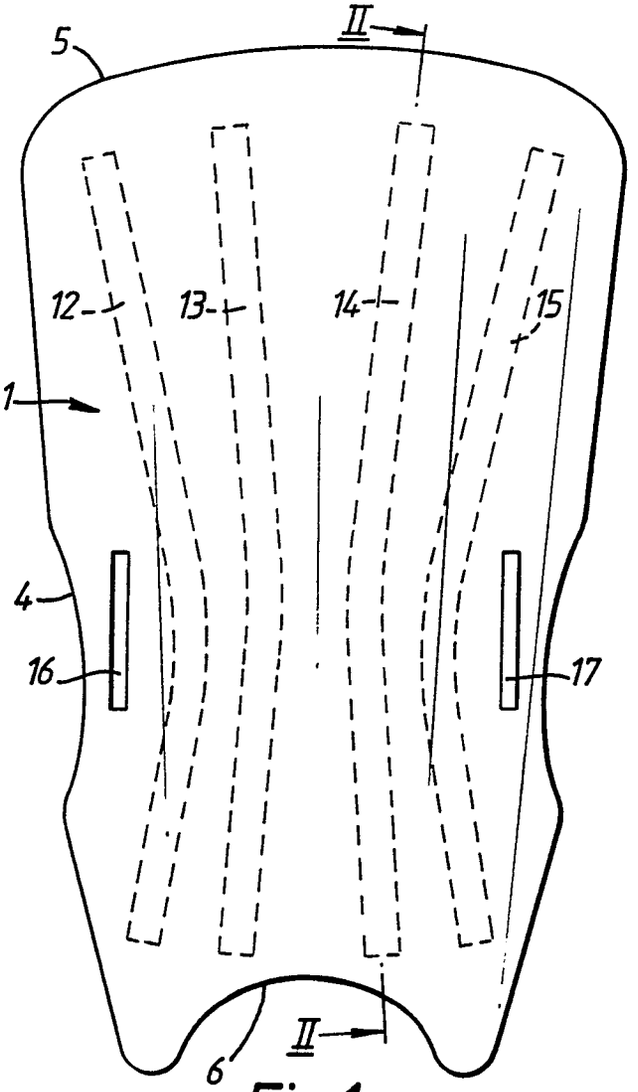

Fig.1

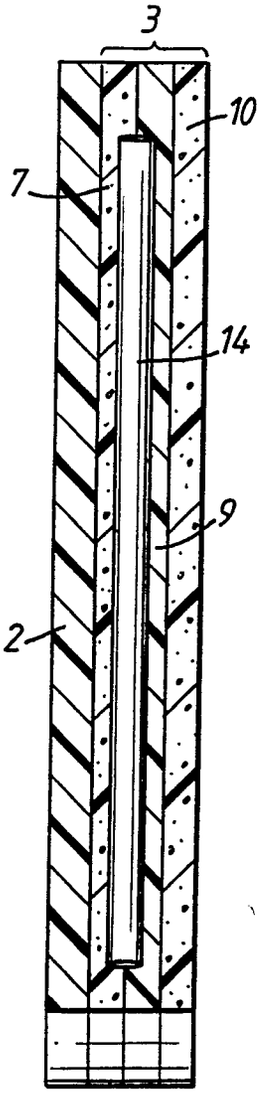

Fig.2

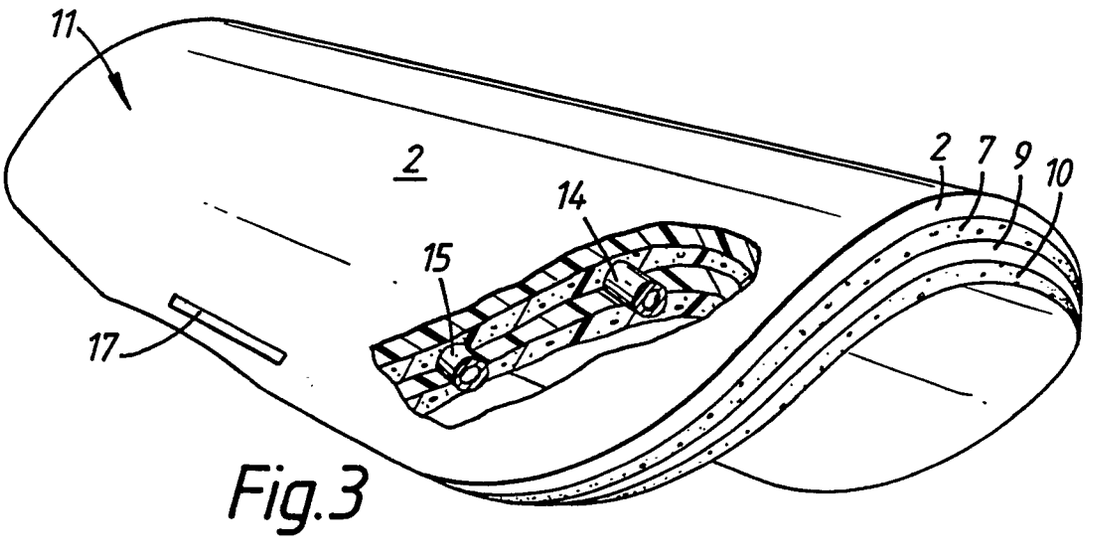

Fig.3

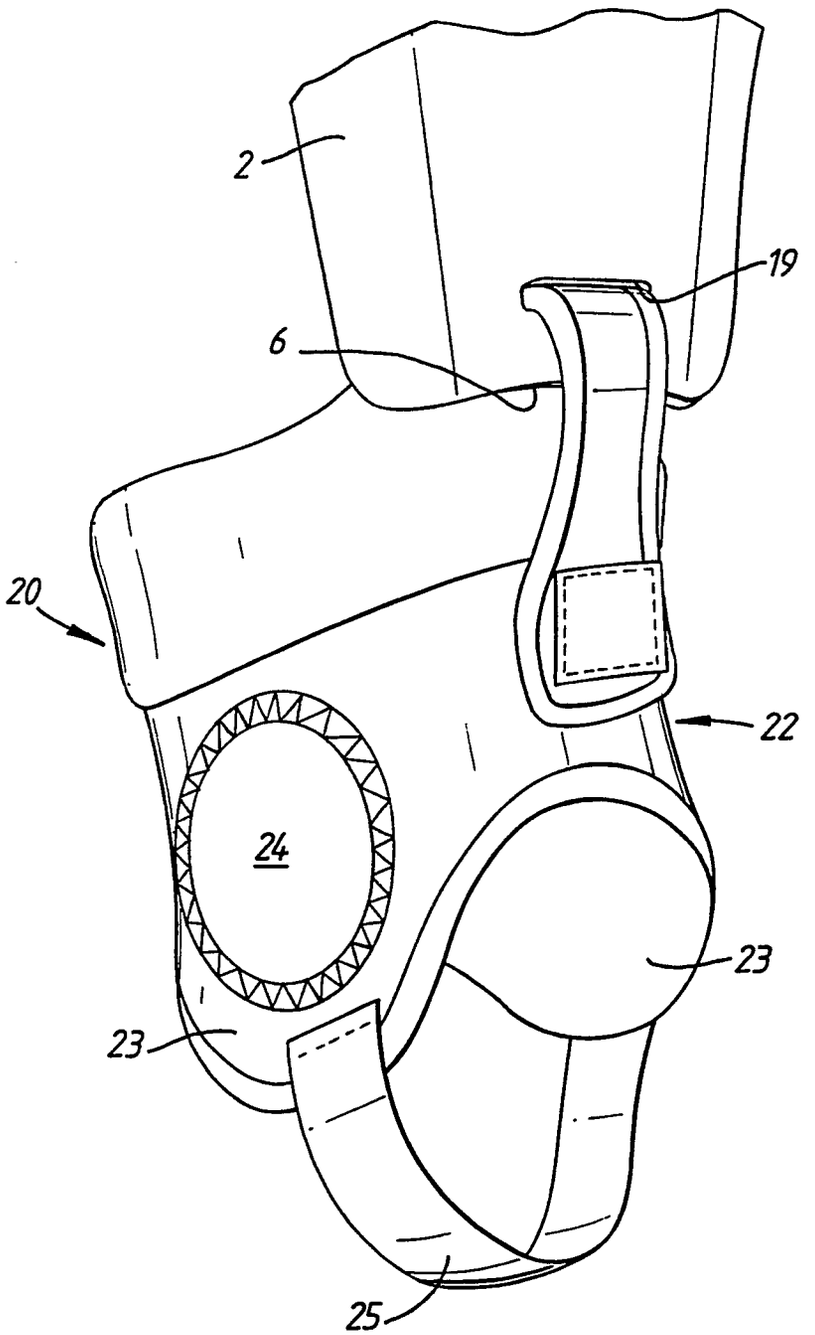

Fig.4

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LIMB PROTECTORS/GUARDS

This invention relates to limb protectors/guards for protecting the limbs of sports persons, work persons or others who are likely to be in situations in which their limbs are at risk from damage by impact against the limb whether by the limb itself striking something or by something striking the limb.

Limb protection devices are now extensively used in relation to ball kicking sports such as football and hockey.

In accordance with present day requirements for certain levels (i.e., professional, senior amateur) of play of such sports the use of protection devices for the shin of the player's legs has become, effectively, mandatory.

Several devices for the protection of the shins of sports person's legs are well known.

It is an object of the present invention to provide a limb protector construction which in use avoids problems that have exhibited themselves as a result of the now extensive use of known limb protectors.

Broadly, according to a first aspect of the present invention there is provided a protector/guard arrangement including a front or outer layer of relatively hard impact resistant material, and characterised by a backing layer including of a relatively deformable material for cushioning impact force and by a number of tubes embedded within the backing layer, the tubes being arranged

generally lengthwise of the protector/guard.

Preferably the protector/guard of the invention is primarilly for the protection of a user's shin bone.

According to a further feature of the invention the arrangement incorporates means for providing protection to a second limb or body part.

Preferably, said second body part is the ankle region of the user.

Preferably, the spacing of the tubes in the mid-length portion of the protector/guard is less than the spacing at the opposite end regions thereof.

In particular, those portions of the tubes located in the opposite end regions are splayed apart as compared with their relative positioning at the mid-length portion.

Preferably, at least some of the tubes extend for substantially the full length of the protector/guard.

For a better understanding of the invention and to show how to carry the same into effect reference will now be made to the accompanying drawings in which:-

Figure 1 is an elevation of an embodiment of a limb protector/guard arrangement incorporating the concepts of the invention;

Figure 2 is a schematic sectional side view along the line II-II of the limb protector/guard arrangement of Figure 1;

Figure 3 is a part cut away perspective view of a specific embodiment of the limb protector/guard arrangement

generally shown in Figures 1 and 2; and

Figure 4 is a schematic perspective wiew of that part of the arrangement which serves as means for the protection of the ankle region of the user.

Referring now to the drawings and more particularly to Figures 1 to 3, a limb protector/guard arrangement 1 is generally shaped in relation to the particular limb it is desired to protect. In the embodiment of the Figures the limb to be protected is the shin bone of a person using the protector/guard. The protector/guard comprises a layered sandwich including an outer layer 2 of relatively hard impact resisting material and an inner or backing layer assembly 3. The purpose of this backing layer assembly is to provide a cushioning effect in relation to any impacts occuring upon the front layer 2.

The outer surface of the layer 2 is generally smooth without abrupt transitional zones. A particular material used for the layer 2 is a high impact HDZ polyethylene.

The overall form/shape of the protector/guard 1, which is intended to protect the user's shin, provides a central portion 4 and an associated upper end portion 5 and the lower end portion 6.

The inner or backing layer assembly 3 is formed by a first layer 7 which is positioned immediately adjacent to the outer layer 2; an intermediate layer 9; and a covering layer 10 which when the protector is in use faces towards the limb to be protected.

The layer 7 is formed from foamed plastics material such as an EVA foam and is firmly adhered to the rear or inner

surface 11 of the front layer 2.

A set of tubes 12,13,14 and 15 is located between layer 7 and the intermediate layer 9, said tubes being at least partially embedded embedded in the foamed layer 7. The intermediate layer is formed from a polyester and is deformable to provide part channels for receiving and locating the tubes and physical support for the tubes.

The inner layer 10 is formed from EVA foam material and, in practice, serves to provide additional cushioning effect.

As will be seen from the drawings the tubes 12, 13, 14 and 15 are positionally set so that they are effective over a greater area of the top section 5 and the bottom section 6 of the protector/guard 1 than at central portion which as may be seen from the Figures is somewhat narrower than the upper and lower portions of the protector/guard 1.

The tubes 12 to 15 are intended to provide an elastomeric like springiness/resiliency to the limb protector 1 such that the force of any inpact on the protector 1 is distributed away from the immediate point of contact on the layer 2 in such manner that if the effects of the impact force on the protector induce compression of the front layer 2 towards the user's limb (not shown) this compression and its associated impact force is cushioned by the combination of the resiliency of the tubes and that of the backing layer assembly 3.

It will be appreciated that the wall thickness, for example 2 millimetres, of the tubes would be selected in such manner as to afford a suitable resistance to the impact by reason of the tube crushing resistance characteristics. In other words, the tube wall thickness

is such as to offset immediate tube collapse on impact and to enable effective reduction in the impact force within the time period/interval required for an impacted tube to collapse.

Through slots 16, 17 are provided for the reception of tapes, of which one is partially shown in Figure 3, by means of which the protector/guard can be secured to a user's leg. These tapes can be connectable by any convenient connection means such as that involving hooks and loops.

It will be noted from the Figure 2, that the the ends of the tubes are located inwardly of the outermost ends of the various layers whereby the tubes are totally housed/encapsulated within the associated layers.

It will be understood that whilst the tubes, in the embodiment shown, extend for the full length of the protector sets of shorter tubes can be provided with the innermost ends of these tube sets overlapping.

A further slot 19 is provided at the lower end 6 of the protector/guard.

This slot is intended to receive a flexible connection means 20 which serves effectively to connect an ankle protection element 20 of i.e., sock-like form to the lower end 6.

The ankle protection element (Figure 4) may be regarded as comprising a neoprene sock 22 so shaped as to be mountable to the upper part of the foot at the ankle joint, the shaping providing two side panels 23 each of which is intended to lie adjacent to the adjacent part of the ankle joint. The actual ankle joint is additionally protected

by pads 24, for example of soft polyethelene, are mounted to the to the sock 22. The shaping of the sock is such as to avoid undesired constriction at the achilles heel area. The sock is provid ed with a positioning/retaining loop 25 which when in use passes under the foot (not shown). The connection strap between the sock and said bottom portion 6 is selectively adjustable thereby to enable user adjustment of thr ankle sock.

In relation to materials for the above discussed protector device it is proposed to use for a spefic protector/guard arrangement a plastics material such as polyethelene for the outer layer 2, a rubber compound for the tubes and a resiliently compressible plastics material such as a plastics foamed material such as an extruded polyethelene having, for example, a density of 0.9 grams per cubic centimetre and an impact resistance of for example 24 Kilograms per cubic Metre.

CLAIMS

1. A protector/guard arrangement including a front or outer layer of relatively hard impact resistant material, and characterised by a backing layer assembly (3) including of a relatively deformable material for cushioning impact force and by a number of tubes (12,13,14,15) embedded within the backing layer assembly, the tubes being arranged generally lengthwise of the protector/guard.

2. A protector/guard arrangement as claimed in claim 1, and characterised in that the spacing of the tubes (12,13,14,15) in the mid-length portion (4) of the protector/guard is less than the spacing at the opposite end regions (5,6) thereof.

3. A protector/guard arrangement as claimed in claim 1 or 2, and characterised in that those portions of the tubes (12,13,14,15) located in the opposite end regions (5,6) are splayed apart as compared with their relative positioning at the mid-length portion (4).

4. A protector/guard arrangement as claimed in claim 1,2 or 3, and characterised in that the tubes (12,13,14,15) extend for substantially the full length of the protector/guard.

5. A protector guard arrangement as claimed in any one of the preceding claims, and characterised in that the protector/guard is adapted to cooperate with a shin bone of a user.

6. A protector/guard arrangement as claimed in any one of the preceding claims, and characterised by the

incorporation of a second part for providing protection to a second limb or body part.

7. A protector/guard arrangement as claimed in claim 6, and characterised in that said second part is the ankle region of the user.

8. A protector/guard arrangement as claimed in any preceding claim, and characterised in that the spacing of the tubes in the mid-length portion of the protector/guard arrangement is less than the spacing at the opposite end regions thereof.

9. A protector/guard arrangemnt as claimed in any preceding claim, and characterised in that the backing layer assembly comprises a first layer of foamed plastics material; an intermediate layer of plastics material and a a covering layer.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

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(ii) Int Cl (Ed.5) A63B 71/08, 71/10, 71/12, 71/14

Search Examiner
MR R J MIRAMS

Date of completion of Search
3 NOVEMBER 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES : WPI, CLAIMS

Documents considered relevant following a search in respect of Claims :-
1 TO 9

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).