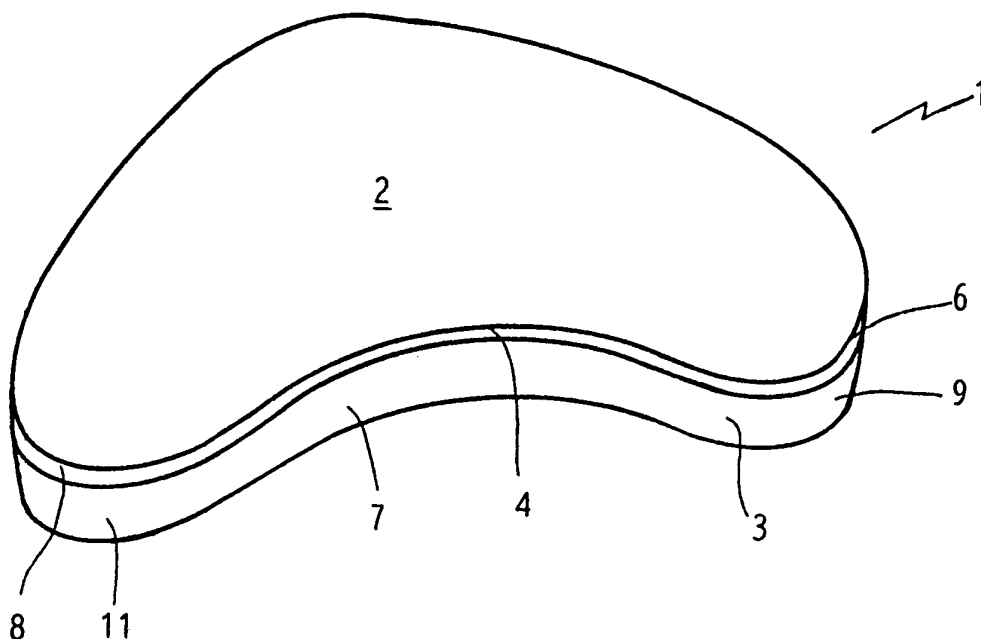




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>5</sup> :</b> <b>A61F 5/01, A63B 71/12</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 94/23672</b> <b>(43) International Publication Date:</b> 27 October 1994 (27.10.94)
<b>(21) International Application Number:</b> PCT/IE94/00021 <b>(22) International Filing Date:</b> 13 April 1994 (13.04.94)  <b>(30) Priority Data:</b> S930285                      14 April 1993 (14.04.93)                      IE  <b>(71)(72) Applicants and Inventors:</b> GODFREY, Eamonn, James [IE/IE]; Ardcoill, Newcastle, Blarney, County Cork (IE). MURPHY, Michael, James [IE/IE]; Fortview, Ardbrack, Kinsale, County Cork (IE).  <b>(74) Agent:</b> MACLACHLAN & DONALDSON; 47 Merrion Square, Dublin 2 (IE).		<b>(81) Designated States:</b> AU, BR, CA, JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** ANKLE PROTECTOR DEVICE**(57) Abstract**

The ankle protector device (1, 1') to be worn on the ankle of a person, comprises an exterior shell (2, 2') and a pliable interior pad (3, 3') adapted to snugly fit over one side of the ankle with the pad adjacent the person's skin whereby the ankle protector covers the ankle. The protector device (1, 1') does not include any additional means for holding it in position, in use. Both the exterior shell (2, 2') and the interior pad (3, 3') are generally "L" shaped. The exterior shell (2, 2') is formed of material having good shock absorbing characteristics.

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## Ankle protector device.

5 The present invention relates to an ankle protector, more particularly a protective device to be worn on the ankle of a person, especially an ankle protector to be worn by a person involved in playing sports such as football, soccer etc.

10 Ankle protectors such as that disclosed in the specification of U.S. Patent No. 4,966,134, are known in the prior art but these ankle protectors require straps, for instance, or similar means to hold the protector around the ankle. Such known protectors resemble ankle support  
15 braces which provide generalised support to the ankle and protect the neighbouring ligaments from injury or aggravation of pre-existing injury. The straps or other attachment means such as velcro\*, for example, are awkward and time consuming to attach onto one's leg.

20 The present invention seeks to alleviate the disadvantages associated with known ankle protectors.

Accordingly, the present invention provides an ankle protector device to be worn on the ankle of a person,  
25 comprising an exterior shell and a pliable interior pad, the exterior shell being manufactured of a material having good shock absorbing characteristics and the interior pad having a cushioning effect, the interior pad being adapted to snugly fit over one side of the ankle with the interior  
30 pad adjacent the person's skin whereby the ankle protector covers the ankle.

Preferably, the interior pad and exterior shell are adhered together. However, in an alternative embodiment, the  
35 interior pad may be replaceable and may include a flange

\* Velcro is a trade mark.

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so as to hold the exterior shell securely in place.

Alternatively, the exterior shell and interior pad may be permanently adhered together. Advantageously, the device  
5 has a generally bulbous profile whereby an ankle is accommodated by the device.

Conveniently, the interior pad is manufactured from a material having anti-hypo-allergenic properties.

10 Preferably, the device is manufactured from light-weight materials whereby the device is comfortable and easy to wear.

15 The ankle protector according to the invention has the advantage that it does not include or require any additional means for holding it in position. The protector device is held in place, initially, by virtue of being between the wearer's ankle and his sock. Subsequently,  
20 heat generated from the ankle area causes the interior pad to be held in position in which case, the protector is held in place both by the sock and by the heating effect.

Advantageously, the radii of curvature of the ankle  
25 protector are appropriately arranged so that the protector snugly fits over and around the ankles thereby covering the vulnerable ankle area.

In a first embodiment, the exterior shell is manufactured  
30 from a material having good shock absorbing characteristics.

In a second embodiment of the protector device, the exterior shell is manufactured from plastics material which in addition to having good shock absorbing characteristics,  
35 also has good impact resistance characteristics, such as acrylonitrile butadiene styrene (ABS) plastics material

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which is a hard material. This hard exterior shell also has the advantage that it may deflect an incoming kick from for instance, a football boot, by actually diverting the boot away from the ankle. However, in the event of a kick  
5 being delivered directly to the ankle, the shock absorbing characteristics of the hard exterior shell together with the cushioning effect of the interior pad substantially reduces the impact of the kick and the trauma inflicted.

10 The interior pad is manufactured from a polymeric material which has anti-hypo-allergenic properties such as polyethylene or polyurethane foam. Thus, the ankle protector device is manufactured from light-weight materials and is therefore, comfortable and easy to wear  
15 about one's ankles.

Another advantage of the ankle protector is that the polymeric foam of the interior pad has the effect that it warms the joints and thereby helps prevent an injury.  
20 Indeed, if injury is received, the warmth assists in recovery or assists in recovery of a pre-existing injury which has been aggravated.

It will be appreciated that in use, one ankle protector  
25 device is positioned over an ankle so that to protect both sides of the ankle, a pair of devices is required. It is therefore proposed that the devices will be sold as a set comprising four such protector devices.

30 The invention will now be described more particularly with reference to the accompanying drawings which show, by way of example only, two embodiments of the ankle protector device in accordance with the present invention.

35 In the drawings:

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Figures 1 and 1a are perspective views of the ankle protector device in a first embodiment, the exterior shell and interior pad being adhered together;

5

Figures 2 and 2a are perspective views of the hard exterior shell which comprises the ankle protector device in a second embodiment;

10 Figure 3 is a side view of the interior pad which comprises the ankle protector device in the second embodiment;

Figure 3a is a perspective plan view of the interior  
15 pad of the device in the second embodiment;

Figure 4 and Figure 5 are perspective views of the interior pad with the hard exterior shell positioned thereon in accordance with the second embodiment of the invention;

20

Figure 6 is a cross-sectional perspective view along the line X-X of Figure 5; and

Figure 7 is a cross-sectional perspective view along the  
25 line X-X of Figure 5 with the hard exterior shell removed from the pad.

Referring initially to Figures 1 and 1a of the drawings, an ankle protector device in accordance with a first  
30 embodiment of the invention is shown and is indicated generally by the reference numeral 1. Each ankle protector device 1 comprises an exterior shell 2 and a pliable, conformable interior pad 3, which is adhered to the exterior shell 2. Both the exterior shell 2 and the  
35 interior pad 3 are generally "L" shaped. The exterior

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shell 2 has good shock absorbing characteristics. The interior pad 3 is manufactured from light-weight, easy to wear, anti-hypo-allergenic polymeric material such as polyethylene or polyurethane foam.

5

The exterior shell 2 includes an arcuate portion 4, and curved portions 6, 8 and a rounded portion 10. Similarly, the interior pad 3 includes correspondingly shaped arcuate portion 7, curved portions 9, 11 and a rounded portion 10 corresponding to that indicated by reference numeral 10 on the exterior shell 2 but which is not shown on Figures 1 and 1a.

The radius of curvature of the respective arcuate portions 4 and 7 is approximately 45mm, radius of curvature of the curved portions 6 and 9 is approximately 12mm, of the curved portions 8 and 11 approximately 12.5mm, and of the respective rounded portions approximately 12mm. The radius of curvature of both shell 2 and pad 3 is approximately 66mm. The curvature of the shell 2 and pad 3 is specifically designed so that the ankle protector 1 fits snugly over and around a wearer's ankle area.

Referring now to Figures 2 to 7 of the drawings, an ankle protector in accordance with the second embodiment of the invention is shown and is indicated generally by the reference numeral 1'. Each ankle protector 1' comprises an exterior shell 2' which is manufactured from plastics material such as ABS which is a hard material and has good impact resistance and shock absorbing characteristics. Each ankle protector 1' also comprises a pliable, conformable replaceable interior pad 3'. The interior pad 3' is manufactured from light-weight, easy to wear, anti-hypo-allergenic polymeric material such as polyethylene or polyurethane foam. As in the first

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embodiment, both the exterior shell 2 and the replaceable interior pad 3 are generally "L" shaped.

5 The respective shapes of the hard exterior shell 2' and the interior replaceable pad 3' are complementary so that the exterior shell 2' fits into the replaceable pad 3'. The pad 3 includes a flange 5' which sits on the exterior shell 2' when the latter is inserted in the pad 3' and holds the exterior shell 2' securely in place.

10

The hard exterior shell 2' includes an arcuate portion 4', curved portions 6', 8' and a rounded portion 10'.

15 The replaceable pad 3' includes corresponding shaped arcuate portion 7', curved portions 9', 11' and rounded portion 13'.

20 The radius of curvature of the respective arcuate portions 4' and 7' is approximately 45mm, radius of curvature of the curved portions 6' and 9' is approximately 12mm, of the curved portions 8' and 11' approximately 12.5mm, and of the respective rounded portions approximately 12mm. The radius of curvature of both shell 2' and pad 3' is approximately 66mm. The curvature of the shell 2' and pad 25 3' are specifically designed so that the ankle protector device 1' fits snugly over and around a wearer's ankle area.

30 To use either of the ankle protector device 1, 1', a wearer places one ankle protector device 1, 1' over each ankle i.e. a wearer would need four ankle protectors, one to cover each ankle area. Each ankle protector 1, 1' is worn with the interior pad 3, 3' adjacent to the wearer's ankle and with the exterior shell 2, 2' facing outwardly. The 35 ankle protector 1, 1' is worn adjacent the ankle and inside



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a wearer's sock so that the ankle protector 1, 1' is between the ankle and sock. Initially, the ankle protector 1, 1' is held in place by the sock but as heat is generated from the wearer's ankle area, this heating creates a suction-type effect and helps hold the ankle protector 1, 1' in place. If a kick from a football boot for instance, is directed towards the ankle, the shape, nature of the curvature and characteristic of the exterior shell 2, 2' cause the boot to be deflected hence avoiding impact to the ankle.

However, in the event that the ankle is struck, the degree of injury will be lessened because of the shock absorbing characteristics of the exterior shell 2, 2' and cushioning effect of the interior pad 3, 3'.

The ankle protector 1, 1' also has the advantage that the shape thereof enables it to fit into the "dip" which generally occurs on the rim of a football boot around the ankle area allowing the ankle protector to sit on the rim of the football boot.

It will of course be understood that the invention is not limited to the specific details described herein, which are given by way of example only, and that various modifications and alterations are possible within the scope of the invention as defined in the appended claims.

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CLAIMS:

1. A protective device to be worn on the ankle of a person, comprising an exterior shell and a pliable interior pad, the exterior shell being manufactured of a material having good shock absorbing characteristics and the interior pad having a cushioning effect, the interior pad being adapted to snugly fit over one side of the ankle with the interior pad adjacent the person's skin whereby the ankle protector covers the ankle.
2. A protective device according to Claim 1 in which the device is of size to allow it to be worn inside and initially held by a person's stocking and the pad is adapted to grip onto the ankle, so that the device does not require any additional means for holding it in position on an ankle.
3. A protective device according to Claim 1 or Claim 2 wherein the radii of curvatures of the device correspond generally to the curvatures of a person's ankle so as to allow the device to be snugly fitted over and around one side of the ankle thereby covering the vulnerable ankle area.
4. A protective device according to any one of the preceding claims wherein the exterior shell and interior pad are affixed together.
5. A protective device according to any one of claims 1 to 3, wherein the pad includes a flange to hold the exterior shell securely in place.

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6. A protective device according to any one of the preceding claims wherein the device has a generally bulbous profile.

5 7. A protective device according to any one of the preceding claims wherein the interior pad is manufactured from a material having anti-hypo-allergenic properties.

10 8. A protective device according to any one of the preceding claims wherein the device is manufactured from light-weight material whereby the device is comfortable and easy to wear.

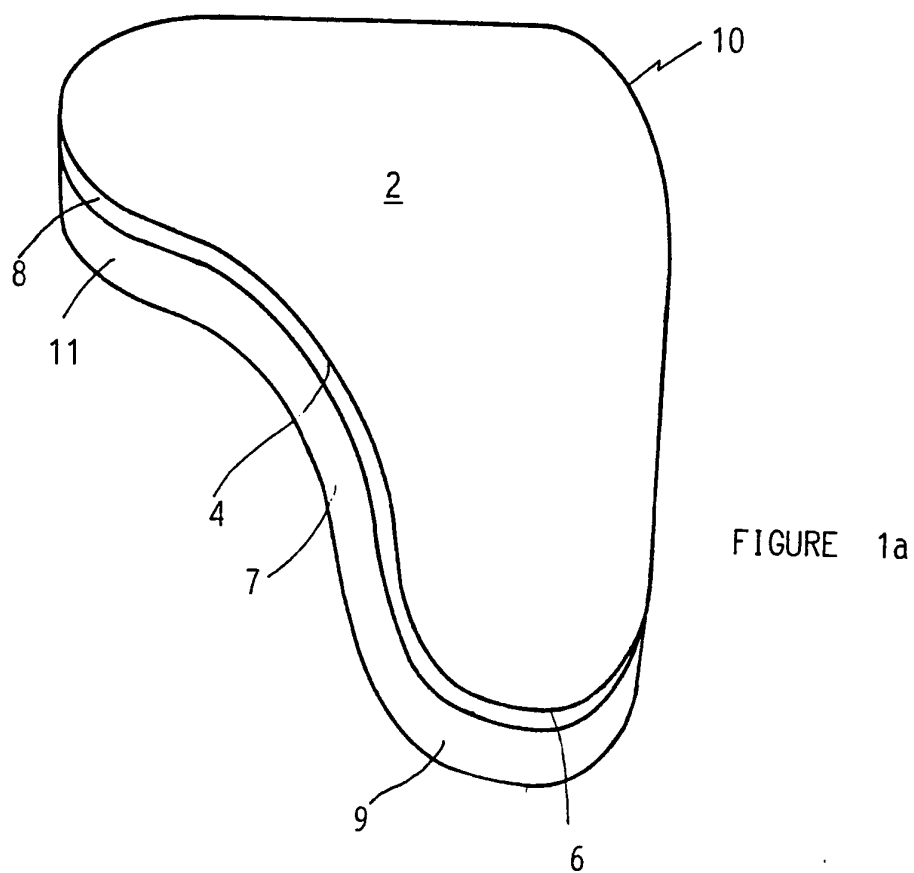
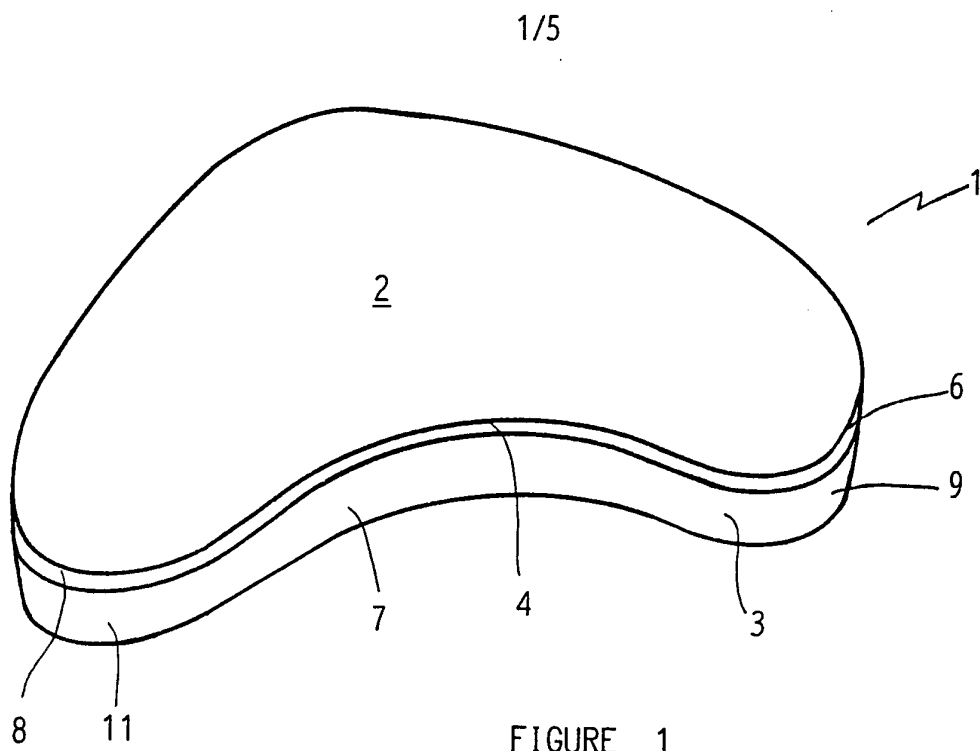
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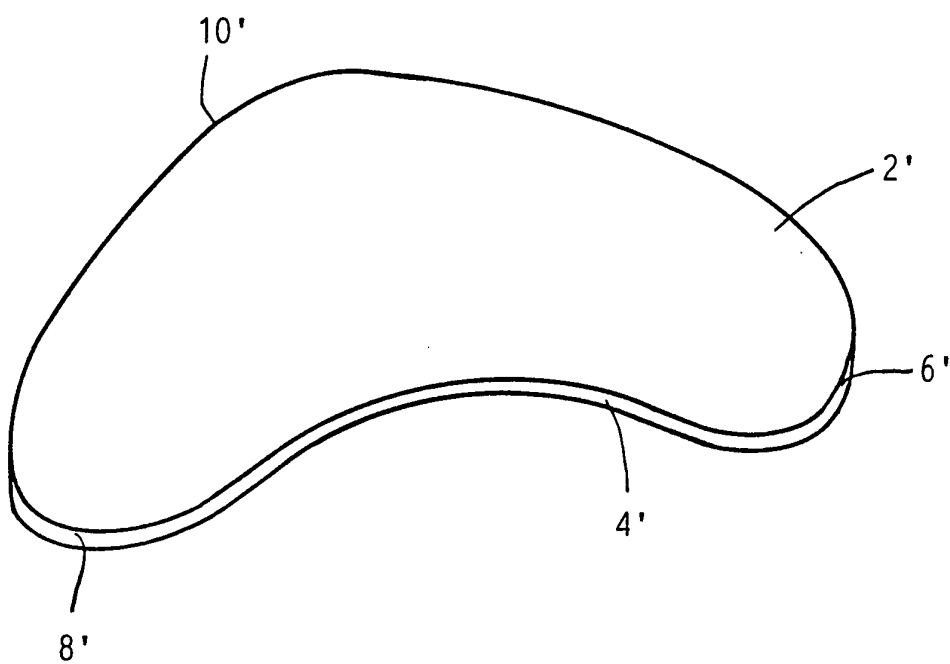


FIGURE 2

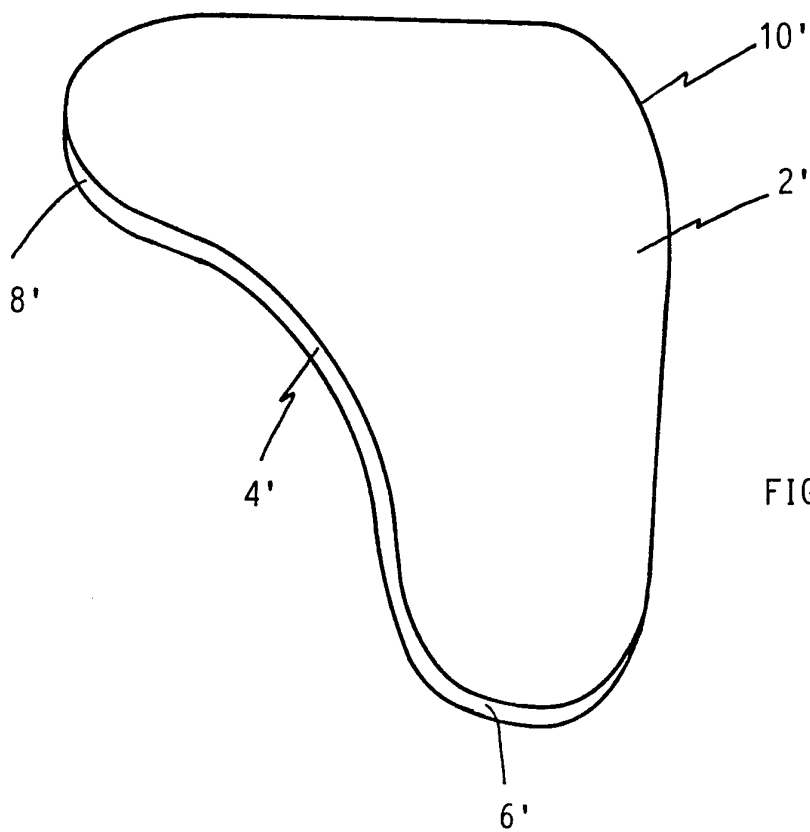


FIGURE 2a

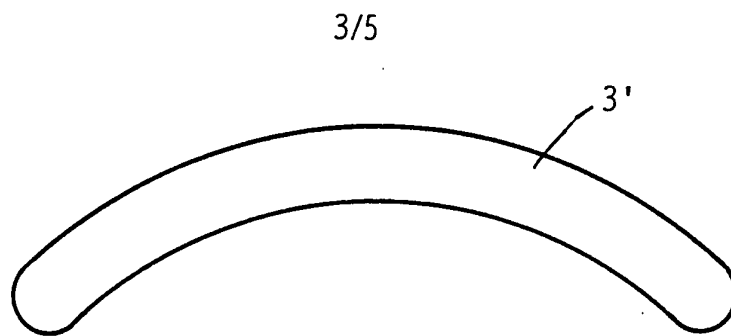


FIGURE 3

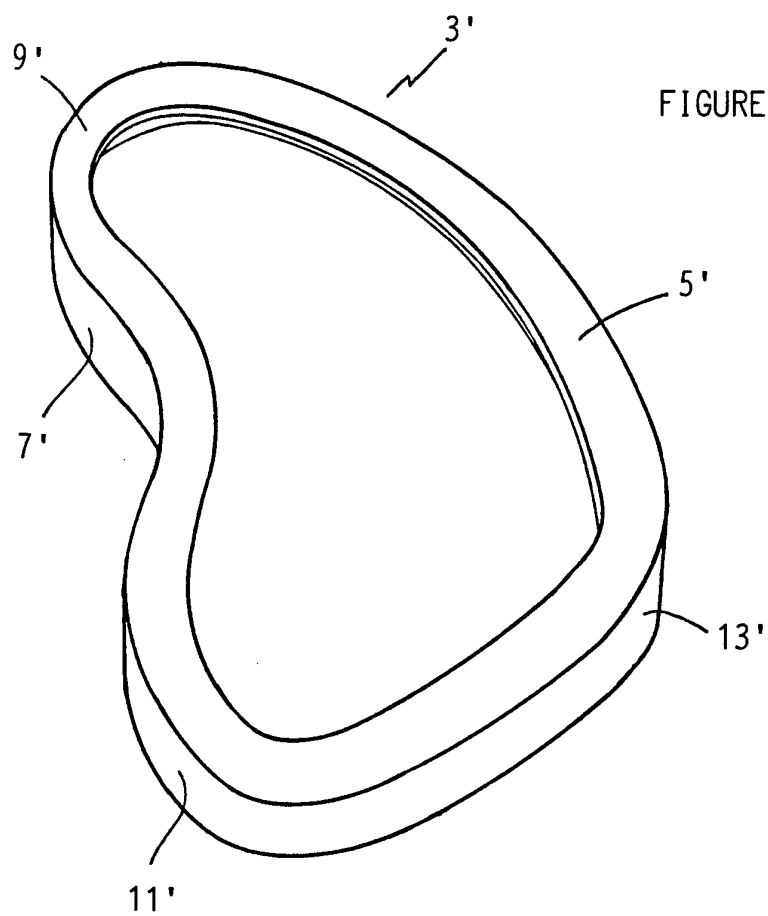


FIGURE 3a

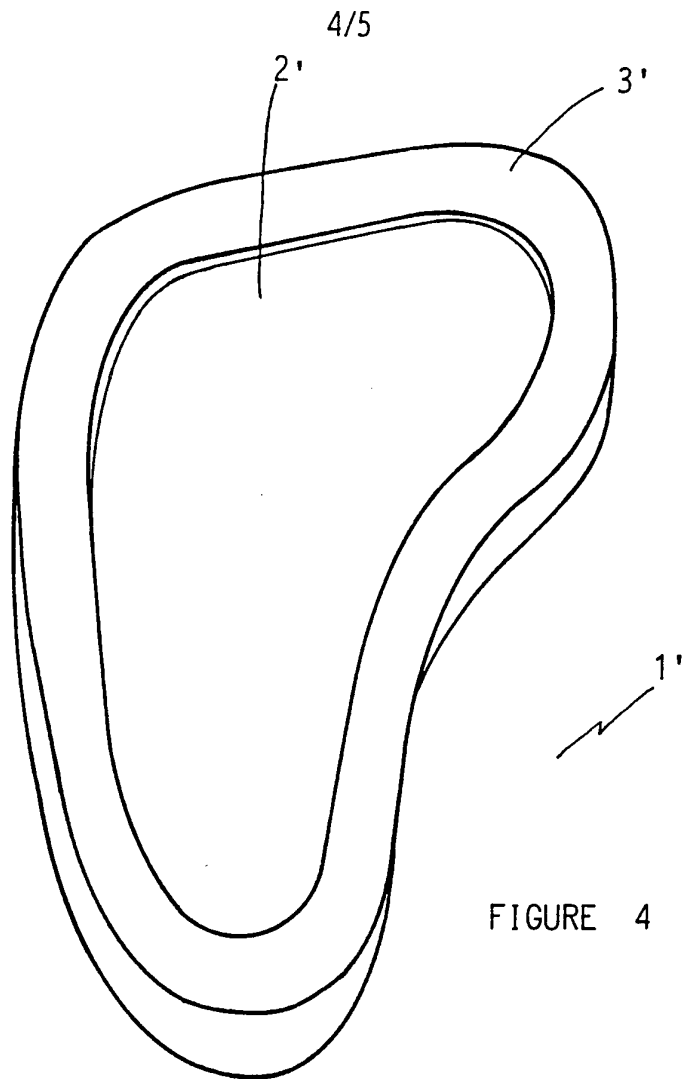


FIGURE 4

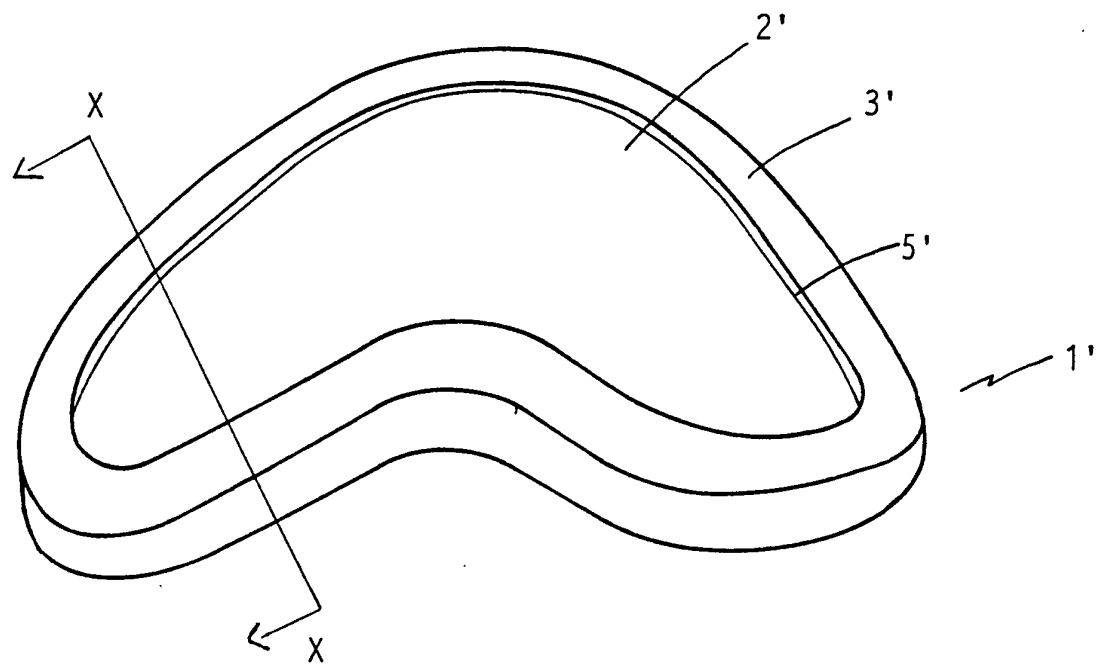


FIGURE 5

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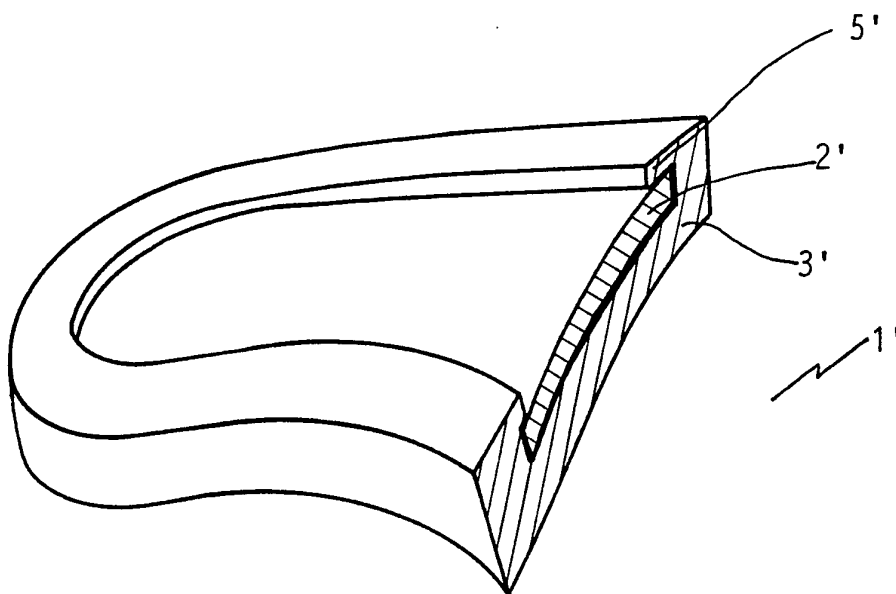


FIGURE 6

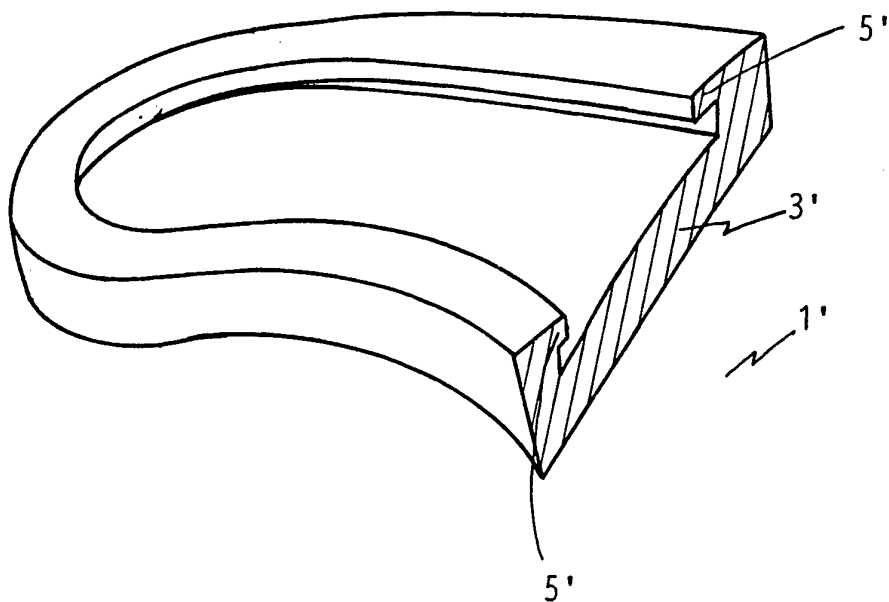


FIGURE 7



## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IE 94/00021

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 A61F5/01 A63B71/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 5 A61F A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,91 08028 (QUASERSPORT LTD.) 13 June 1991 see abstract; claims; figures 1-3,7 see page 15, line 23 - line 29 ---	1-4,6-8
A	US,A,5 007 416 (BURNS ET AL.) 16 April 1991 see column 1, line 54 - column 2, line 14; figures 1-3 ---	1-8
A	WO,A,90 10395 (NÄSLUND) 20 September 1990 see abstract; figure 1 ---	1-8
A	US,A,5 092 319 (GRIM) 3 March 1992 see column 2, line 44 - line 57; figures 1-3 ---	1
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,3 465 364 (KENNETH) 9 September 1969 see column 1, line 60 - column 2, line 6; figure 3 ---	1
A	EP,A,0 485 943 (KLEYLEIN) 20 May 1992 -----	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IE 94/00021

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