

12

EUROPEAN PATENT APPLICATION

21 Application number: 82850132.0

51 Int. Cl.³: A 42 B 3/00

22 Date of filing: 10.06.82

43 Date of publication of application:
21.12.83 Bulletin 83/51

84 Designated Contracting States:
AT CH DE FR GB IT LI NL SE

71 Applicant: AB AKTA BARNSÄKERHET
34 Fleminggatan
S-112 32 Stockholm(SE)

72 Inventor: Bell, Robert S.
Asvägen 3
S-171 37 Solna(SE)

72 Inventor: Westius, Stefan L.
Elisborgsbacken 34
S-163 64 Spånga(SE)

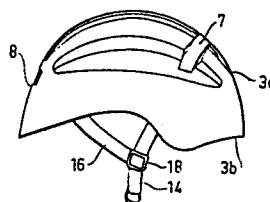
72 Inventor: Sköld, Björn-Ake
Vädures gata 234
S-136 63 Handen(SE)

74 Representative: Onn, Thorsten et al,
AB STOCKHOLMS PATENTBYRA Box 3129
S-103 62 Stockholm(SE)

54 A helmet for use in recreational activity.

57 Helmet for head and face protection and the use of such a helmet in varied climatic conditions. In order to yield a helmet which is light in weight as well as user-adaptable to various climatic conditions, it is suggested that the helmet consists of a moulded impact-absorbing shell fitted with a structure (3a-c, 5) for an active ventilation, adjustable lining cushions (11) and a positioning and retaining webbing (14,16) laced through the shell. For cold-weather use the helmet is reversed front-to-back, whereby ventilation is repressed and the addition of a face and jaw protector (12) is made possible.

FIG 1



A helmet for use in recreational activity

This invention relates to a sports helmet that in one device provides both 1) and open, air inducing helmet with a high degree of ventilation, impact protection and low weight, suitable for warm weather high risk recreational activity, as bicycling or roller-skating and in the same device 2) a closed-faced, non-ventilating helmet, with a jaw and face protecting extension suitable for cold weather high risk activity, such as ice-skating or downhill skiing. The helmet is equipped with two user-adjustable elements, namely 1) an inner pad feature which allows the helmet to be user altered to fit the users (asymmetrical) skull form when the helmet is reversed for winter or summer use, and 2) a free-running retention webbing that is laced through the shell without the use of rivets. This element allows the re-fitting of the helmet for warm and cold weather respectively.

The helmet can achieve the low weights necessary for user acceptance by means of a highly structured polystyrene shell, which affords very high impact absorption and further functions as component in the above-mentioned elements, allowing the reversal and refitting of the helmet for cold and warm weather respectively.

Earlier devices of the prior art consist of various helmets designed to protect workers in the building trades and helmets designed for specific recreational activities, e.g. skiing, motorcycling. Nowhere in the prior art is there shown a helmet which can both function as a ventilating air-inducing helmet for warm-weather activity and a closed helmet affording warmth and protection in the cold. This adaptability feature is made possible in this invention by moulding elements into the impact absorption shell, the aforesaid shell thus coming to be the basis of many elements not found in the prior art.

An object of this invention is to provide a helmet which can easily and inexpensively be adapted for various uses.

Another object of this invention is to provide a warm-weather helmet which induces air through anterior ducts and channels and exits through interior channels, superior holes and posterior openings.

A further object of this invention is to provide a helmet

0096148

which insulates from the cold in cold-weather use.

Another object is to provide a helmet with high-impact absorption and low weight, relating to helmet use among small children.

5 An object of this invention is to provide a helmet which can selectively be user-adapted and re-adapted for warm-weather or cold-weather use.

A further object of the invention is to provide a helmet which can be electively equipped with a face- and jaw-protector.
10

The major advantage of the invention is in sum to provide a high-impact absorption low weight helmet system which can easily be re-configured for highly differing environments and conditions. Other objects and advantages will be apparent from
15 consideration of the following description in connection with the here appended drawings and claims.

The invention will be described in detail below, with the help of examples, illustrated by drawings, in which:

Fig. 1 is a lateral view of the helmet shell according
20 to the invention;

Fig. 2 is a front view, partially in section, of the helmet in Fig. 1, adapted for warm-weather use;

Fig. 3 is a front view of the helmet adapted for cold-weather use with additional face and jaw protector;

25 Fig. 4 is a detail of the front view in Fig. 2;

Fig. 5 is a cross section of a part of the helmet, showing a webbing retention area;

Fig. 6 is a view similar to Fig. 5 but showing another webbing retention area;

30 Fig. 7 is a view from below of a part of the helmet, partially in cross section;

Fig. 8 is a side view of the helmet adapted for warm-weather use, showing the flow of air through the helmet;

35 Fig. 9 is a partial view from above showing ventilation holes in the upper part of the helmet in Fig. 8;

Fig. 10 and 11 are showing lining cushions used inside the helmet;

Figs. 12 and 13 show a closure for ventilation holes in the helmet;

40 Fig. 14 shows a detail, in section, of the fastening of

the additional face and jaw protector shown in front view in Fig. 3, and

Fig. 15 is a side view of the helmet, adapted for cold-weather use, shown in front view in Fig. 3.

5 The helmet shown in side view in Fig. 1 has its warm-weather anterior to the right. The shell, embodied in expanded polystyrene is corrugated with a series of ridges (1), also seen in cross section in Fig. 2. The corrugation is expressed in the helmet interior as a number of channels (2). The corruga-
10 tion leads to an impact absorption significantly higher than the typical smooth polystyrene impact absorption liner in conventional helmets. This impact absorption is maximized in the area (9) in which the helmets is least rigid. For warm-weather use this area is suitably forward-facing. In a typical
15 biking accident the bicycle is arrested by an impediment and the cyclist vaults forward.

Physical activity in warm weather, as in roller-skating or biking results in sweating, and requires a high degree of ventilation. The entire anterior area of the helmet comprises
20 a superstructure for ventilation (3a-c), which in turn has three elements for active ventilation:

The lower anterior area, shown in Fig. 4 provides a broad duct (3a) together with the typical face and forehead of the user, the aforesaid duct serving to lift moving air from the
25 flow across the face upwards and into the interior channels (2). The flow of air is shown in Fig. 8. This flow is aided by the turbulence area (3b) and the anterior vertical holes (3c), shown from below in Fig. 7. A user is sometimes station-ary; placing the anterior area (9) forwards also brings the
30 passive ventilation holes (5) shown from above in Fig. 9 into a perpendicular position.

A further element for warm-weather use is the profile of the helmet, seen in Fig. 1. The design covers the temples and rear of the head, leaving the ears free, which reduces wind
35 noise in bicycling and allows the user to hear traffic in this mode.

A number of product elements are combined in order to allow the helmet to be reversed for cold weather use, shown in front view in Fig. 3, so that the unbroken area now faces
40 forwards. The human head is non-symmetrical in several relevant

regards. First, the bizygomatic breadth (over the temples) is typically less than the rear breadth. If this fact is at all recognized in helmet design, it leads to an asymmetrical inner lining. Secondly, the throat is placed forward of the vertical line passing through the midpoint of the head. This fact, again generally unrecognized, should lead to an asymmetrical webbing for helmet retention, so arranged that the webbing should cross under the throat, forward of the helmets midpoint.

This invention makes a forward-rearward reversability possible by several elements relating to head asymmetry. First, as shown in Figs. 10 and 11, the lining cushions in immediate juxtaposition to the skin are removable and of different thicknesses. A square of Velcro (registered trade mark) or similar material placed at a dozen points in the interior allows Nylon (registered trade mark) or similar faced lining cushions (11) to be added and removed at will at the various points. By using an expanded material with closed cell structure for the cushions, a user can easily modify the lining with a kitchen scissors, for a high degree of individual customization.

Secondly, the webbing positioning and retaining the helmet on the head prior to and during impact needs to be adapted to the forward/rearward positions. The webbing seen in Fig. 1, is adjusted forwards/rearwards by the use of two webbings (14) and (16) which are mated below the ear by a plastic coupling (18). The adjustment requires that at least one of the webbings is fixed in a lateral direction. In this invention the webbing is not riveted as customarily is the case. Fig. 5 shows the anterior webbing retention area, in which the webbing (14) is doubly laced (6) through the shell. This element, together with the tensioning bridge (7) yields a high degree of friction shell-against-webbing, which allows free adjustment of the webbing whilst holding the webbing in the desired position.

At the (warm-weather) posterior surface the webbing retention area (8) is recessed, in order to reduce ventilation when this area becomes the leading surface in cold weather use. This area is shown in cross section in Fig. 6.

In cold weather use, as shown in Fig. 3, the leading edge above the forehead (15) is smooth, to reduce turbulence and cooling. The holes used in passive and active ventilation (5)

and (3c) are now at the rear. Ventilation is further reduced by a closure (19) shown in Figs. 12 and 13. This closure has a holder (13) for ski-goggles at the rear. A typical winter use is ice-skating, where a typical injury is caused by falling rearwards. Here the high-impact area (9) faces appropriately rearwards.

In some cold-weather uses, shown in Fig. 15 in side view, it becomes necessary to cover the users ears. By use of a face and jaw-protector (12) moulded in expanded polystyrene or other low-weight cell material the helmet can be extended laterally and to the front. The protector can be fastened at the sides with parallell splined pins (17) which hold the protector in place but can be removed when needed. The use of these pins is shown in Fig. 14, which depicts the fastening area (10).

1. A helmet for use in recreational activity, characterized in that it comprises a corrugated shell of expanded polymeric material, fitted with external ridges (1) and internal channels (2) and at one end a ventilation area (3a-c) and a maximum impact absorption area (9), the helmet also including a reversible, removable user adaptable head breadth adaptor (11).

2. A helmet according to claim 1, characterized in that at the end with the ventilation area (3a-c) and the maximum impact absorption area (9) there is a double-laced webbing retention structure (6) with tensioning bridge (7) and at the other end a recessed webbing retention area (8).

3. A helmet for warm-weather use according to claim 1 or 2, characterized in that the ventilation area (3a-c) and the maximum impact absorption area (9) are in the anterior end of the helmet.

4. A helmet according to claim 3, characterized in that the ventilation area includes an air duct (3a), turbulence indentations (3b) and active ventilation holes (3c).

5. A helmet according to claim 3 or 4, characterized in that it comprises superior passive ventilation holes (5) substantially perpendicular to the motion of the user.

6. A helmet for cold-weather use according to claim 1 or 2, characterized in that the ventilation area (3a-c) and the maximum impact absorption area (9) are in the posterior end of the helmet.

7. A helmet according to claim 6, characterized in that a side closure face and jaw protector (12) is affixable to a fitting area (10) at the helmet sides.

FIG.1

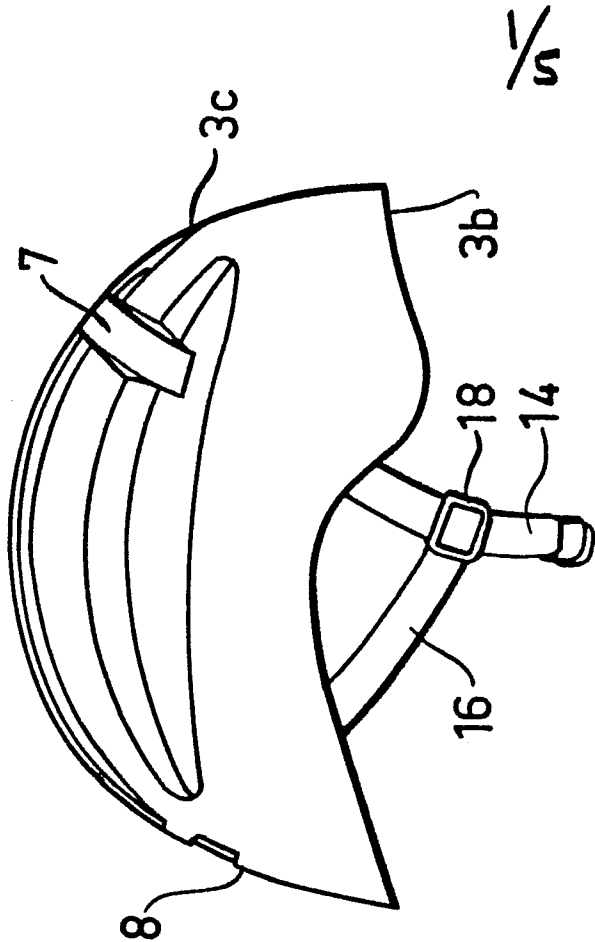


FIG.2

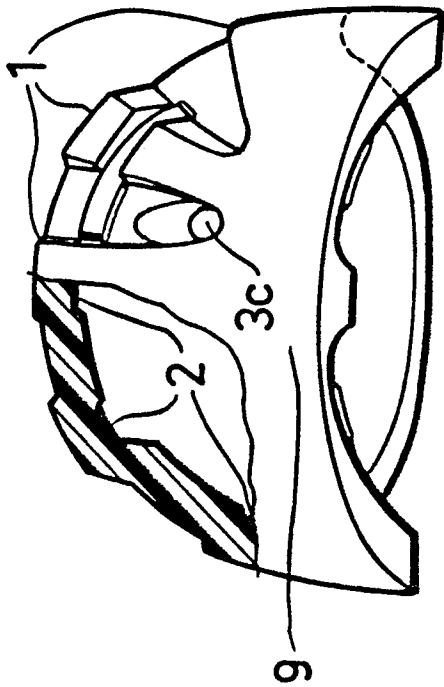
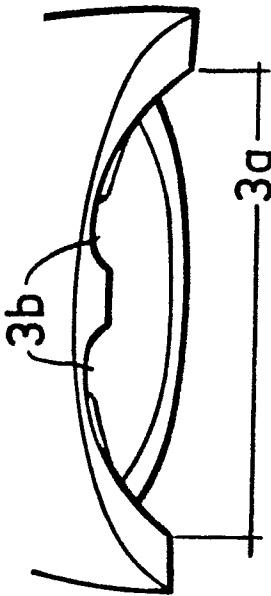


FIG.4



2/5

FIG.15

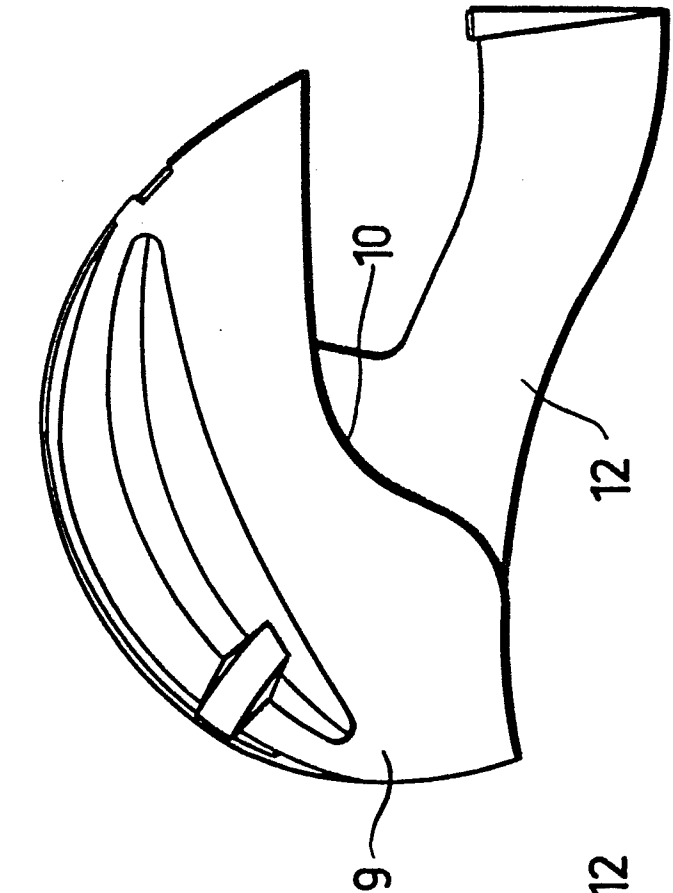


FIG.3

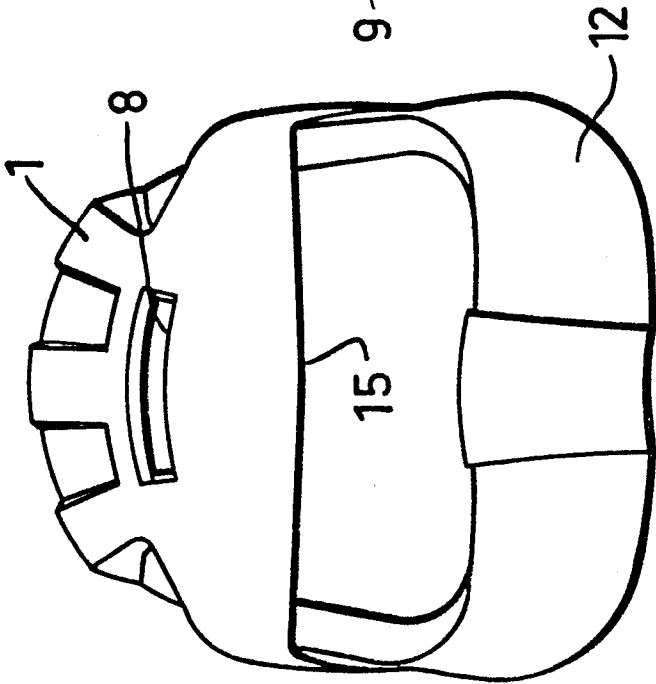


FIG. 6

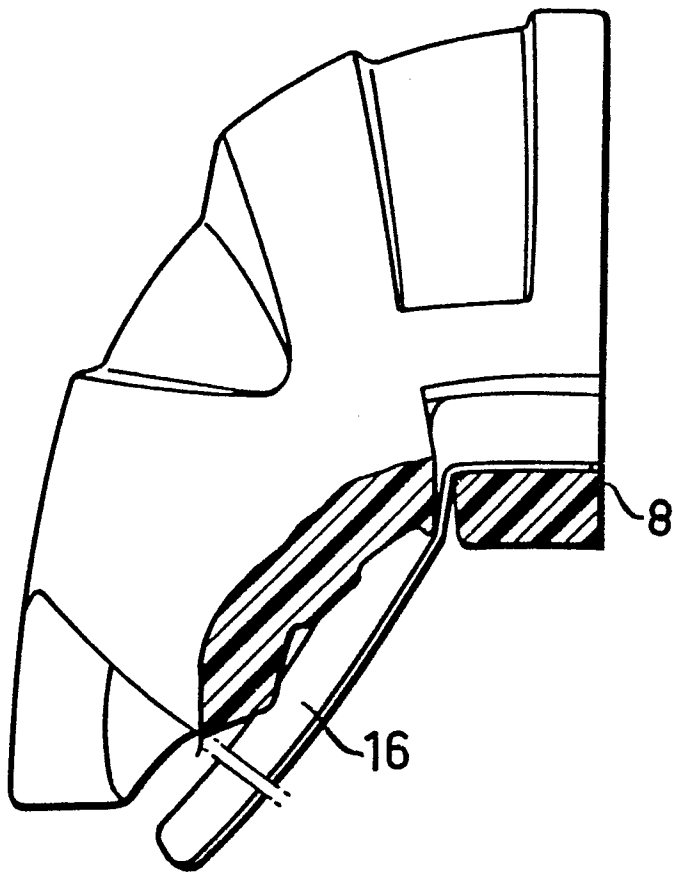


FIG. 5

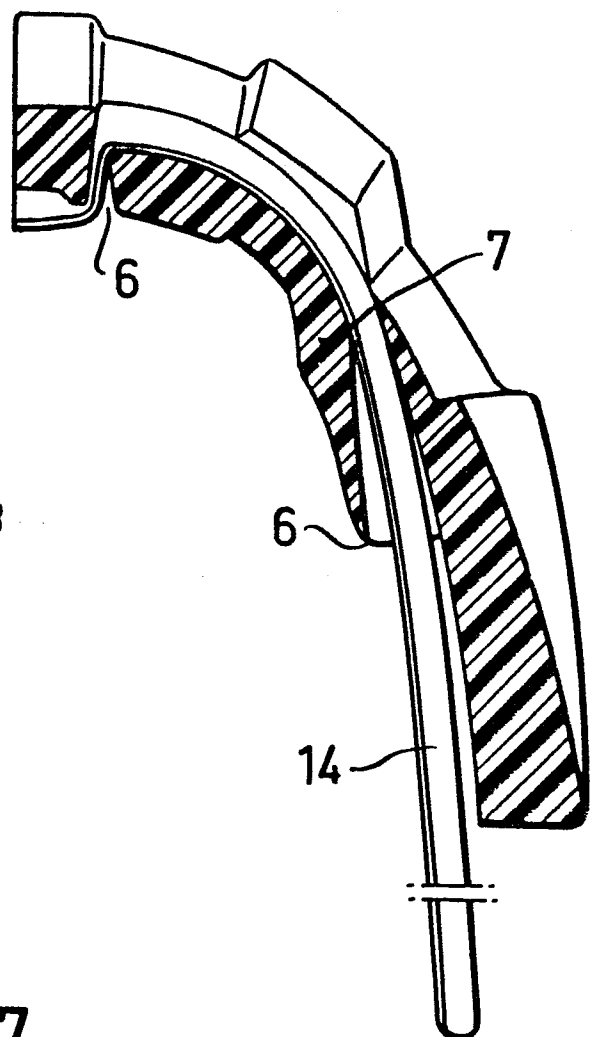


FIG. 7

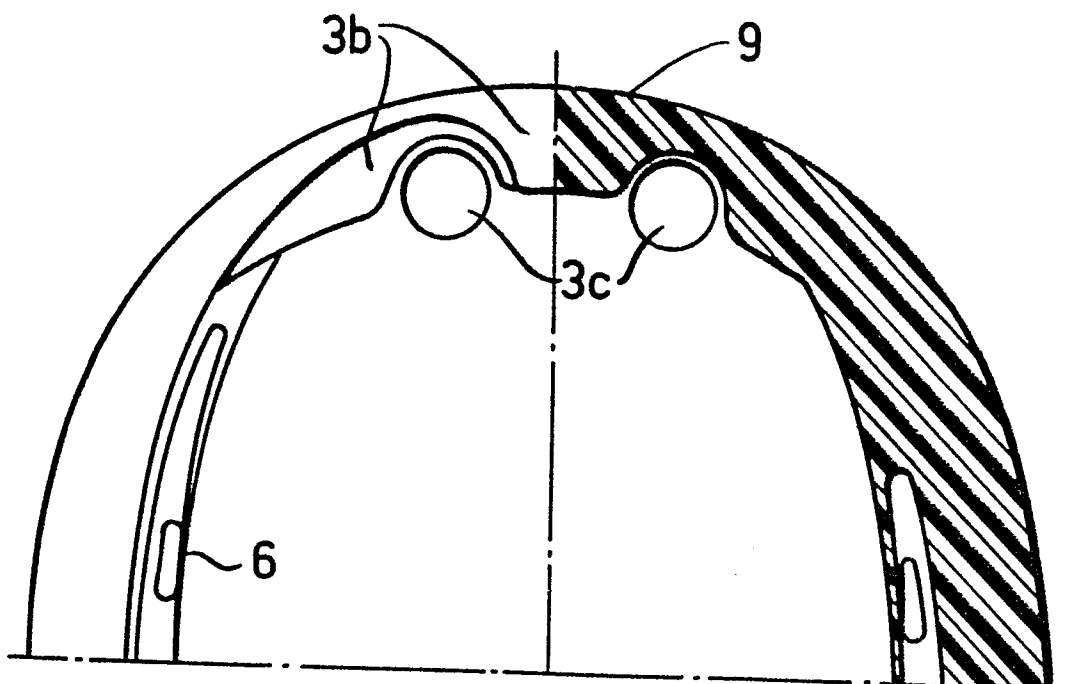


FIG. 8

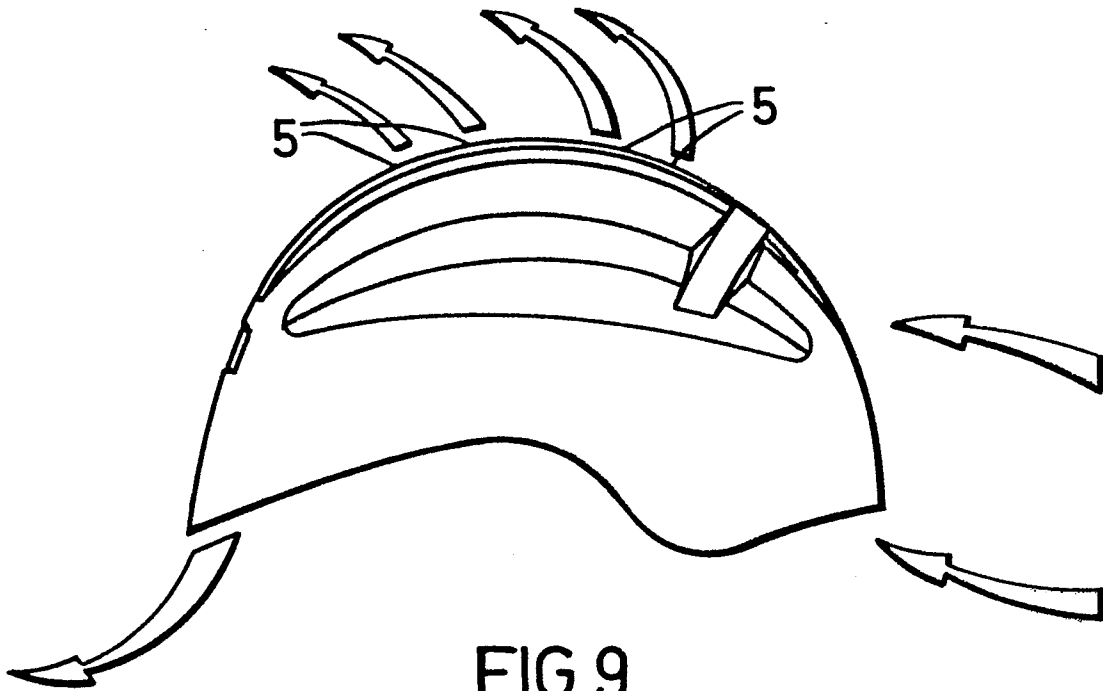


FIG. 9

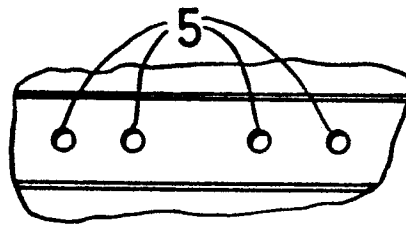


FIG. 11

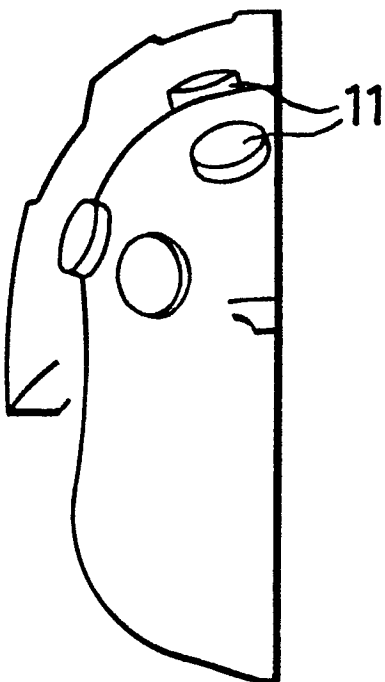


FIG. 10

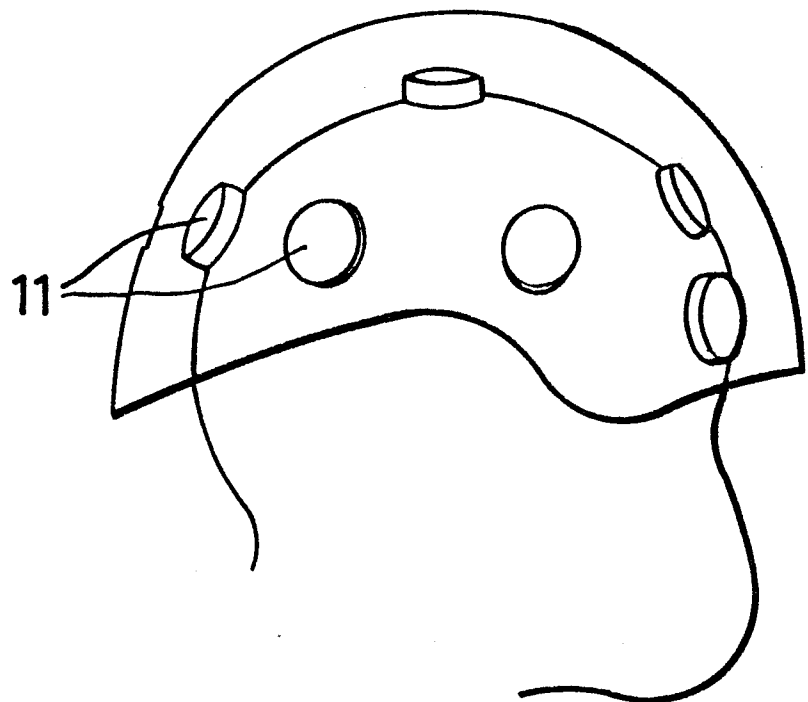


FIG.12

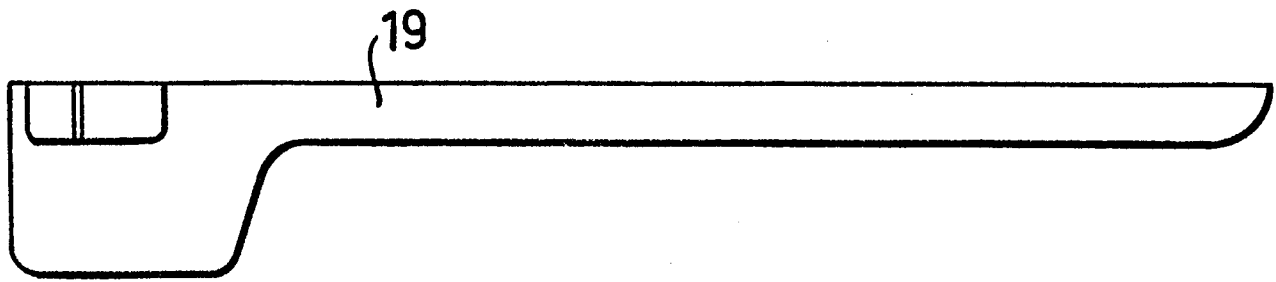


FIG.13

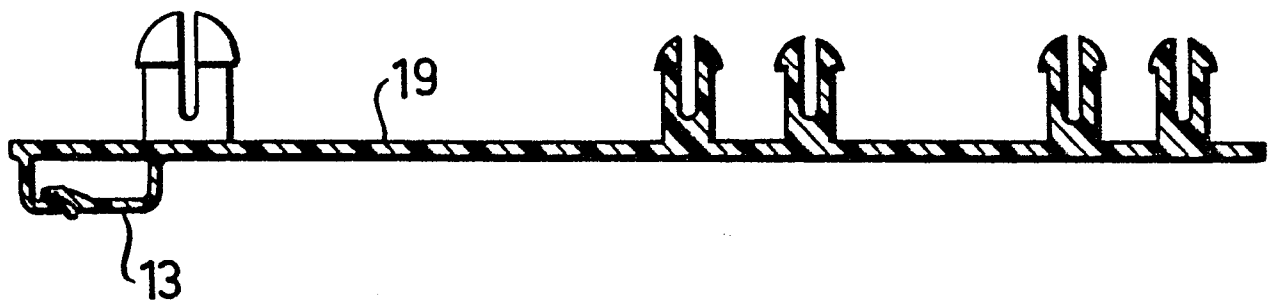
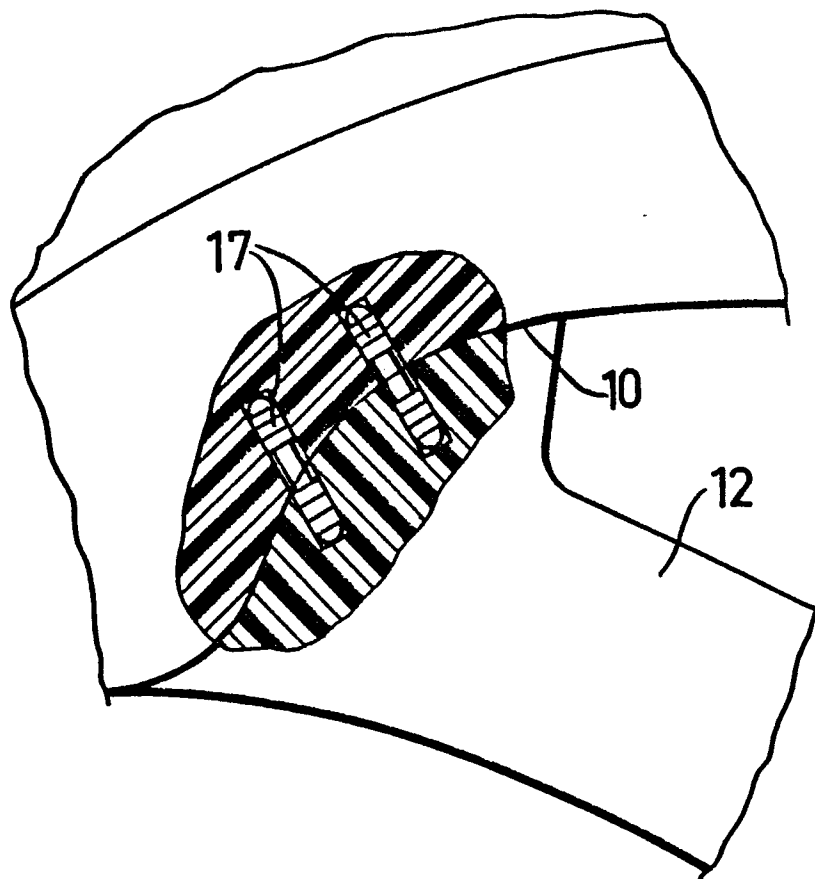


FIG.14





European Patent
Office

EUROPEAN SEARCH REPORT

0096148

Application number

EP 82 85 0132

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	US-A-3 925 821 (LEWICKI) *The whole document*	1,4	A 42 B 3/00
A	--- US-A-3 783 450 (O'CONNOR) *The whole document*	1,4	
A	--- FR-A-2 466 205 (BIBOLLET) *Page 3, lines 27-38; pages 4,5; page 6, lines 1,2; claims 1-3,5,7; figures*	1,4,5	
A	--- DE-U-7 906 475 (RÖMER) *The whole document*	1	
A	--- GB-A-1 456 824 (EVERITT W. VERO & CO.) *The whole document*	1	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	--- US-A-4 024 586 (LAMB) *Claims; figures*	1	A 42 B
A	--- US-A-4 044 400 (LEWICKI et al.) *Claims; figures*	2	
A	--- FR-A-2 141 431 (FUKS) *The whole document*	7	
--- -/-			
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17-02-1983	Examiner BOURSEAU A.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



DOCUMENTS CONSIDERED TO BE RELEVANT			Page 2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
A	US-A-2 250 275 (RIDDELL) *Page 2, left-hand column, lines 71-75; right-hand column, lines 1-42; figure 4*	7	
A	US-A-3 478 365 (VARGA) *Claims; figures*	7	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17-02-1983	Examiner BOURSEAU A.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			