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(54) Title: PROTECTIVE HEADGEAR

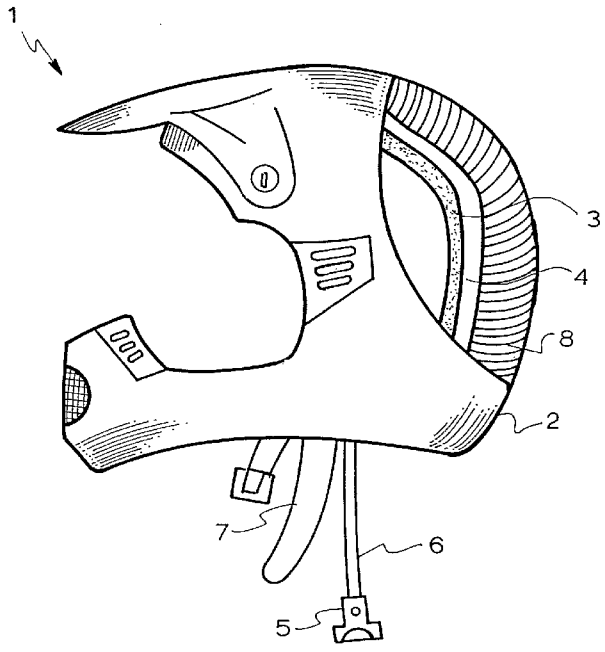

Fig.1.

(57) Abstract: Protective headgear such as a motorcycle helmet is described which provides an improved fit for a wearer. The helmet (1) includes an outer rigid shell (2) over a polystyrene liner (8). An inner lining (3) abuts the skull and head and neck (if required) of the wearer and is manufactured from a soft material. Interposed between the shell (2) and lining (3) is an inflatable bladder (4). The bladder (4) is a hollow cell(s) which essentially follow(s) the contours of the head of the wearer of the helmet (1). A bite valve (5) is located at the base of the bladder (4). With the bladder (4) deflated, the helmet is positioned on the head of the wearer and the chin strap (7) is tightened to an appropriate fit. On blowing air through the valve (5), the bladder (4) is gradually inflated, the bladder (4) then bearing upon the inner lining (3) which, in turn, is forced into contact with the contours of the skull and head (and neck) of the wearer of the helmet (1).

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TITLE: PROTECTIVE HEADGEAR

THIS INVENTION relates to headgear. In particular, it is directed to protective headgear which provides an improved fit for a wearer thereof.

Protective headgear, sometimes referred to more colloquially as a "crash helmet", is required for many occupations and leisure pursuits. Such occupations and pursuits include construction, mining and other heavy industry workers, powered and unpowered bicycle commuting and racing, motor vehicle racing and rallying, horse riding, ball sports such as rugby, grid iron and cricket. Typically, this protective headgear comprises (a) an outer rigid shell manufactured from an appropriate material to protect a wearer from damage to their skull from impact forces and (b) a softer, inner lining to at least partially absorb any impact forces to the head and also to provide a comfortable fit for the wearer of the headgear. Manufacturers of such headgear size the headgear for a range of average head sizes and thus clearly fail to accommodate all of the variations of head shapes and sizes across the range of users of this headgear. Any contour fit adjustment is only provided by tightening a chin strap in an attempt to provide a better contour of the inner lining to the head of the wearer by providing a force at the two points of attachment of the strap to the helmet.

It is thus a general object of the present invention to overcome, or at least ameliorate, one or more of the above-mentioned disadvantages.

Therefore, according to the present invention, there is provided protective headgear, said headgear including:

an outer rigid shell adapted to protect a wearer of said headgear from damage to the skull, head or neck areas or any combination thereof of said wearer from impact forces;

a soft, inner lining adapted to provide a comfortable fit for said wearer of said headgear; and

an inflatable bladder interposed between said shell and said lining, said bladder adapted to substantially conform said lining to the contours of said skull, head or neck areas or any combination thereof of said wearer.

In one embodiment of the present invention, said bladder comprises a single inflatable cell.

In another embodiment of the present invention, said bladder comprises a plurality of interconnected inflatable cells.

Preferably, in all embodiments of the present invention, said bladder includes a valve adapted to allow fluid, such as air, to be pumped into said bladder and subsequently expelled therefrom as required.

Preferred embodiments of the present invention will now be described with reference to the accompanying drawings wherein:

FIG. 1 is a general schematic sectional view of a typical motorcycle helmet constructed in accordance with the present invention;

FIG. 2 is a view of a first embodiment of a motorcycle helmet constructed in accordance with the present invention;

FIG. 3 is a view of a second embodiment of a motorcycle helmet constructed in accordance with the present invention; and

FIG. 4 is a view of one component of a third embodiment of a motorcycle helmet constructed in accordance with the present invention.

With reference to FIG. 1, the helmet (1) includes an outer rigid shell (2) over a polystyrene liner (8). The shell (2) is manufactured from an appropriate material to protect a wearer of the helmet (1) primarily from damage to their skull and head from impact forces, the material including kevlar, carbon fibre, glass reinforced plastic and similar materials well known in the art. An inner lining (3) abuts the skull and head of the wearer and is manufactured from a soft material such as cotton-covered foam plastics, such an inner lining also being well known in the art. Interposed between the shell (2) and lining (3) is an inflatable bladder (4). The bladder (4) is a hollow single cell manufactured from plastic, rubber or other suitable material well known in the art, which essentially follows the contours of the head of the wearer of the helmet (1). A bite valve (5), similar to the valve found on a water back-pack, is located at the base of the bladder (4).

In use, with the bladder (4) deflated, the helmet is positioned on the head of the wearer and the chin strap (7) is tightened to an appropriate fit. On blowing air through the valve (5), the bladder (4) is gradually inflated, the bladder (4) then bearing upon the inner lining (3) which, in turn, is forced into contact with the contours of the skull and head of the wearer of the helmet (1).

Turning now to FIG. 2, the helmet (10) is of the type commonly referred to as a "full-face" helmet, a helmet which covers the entire head, with a rear that covers the base of the skull, a protective section over the front of the chin, and an open cutout in a band across the eyes and nose with a plastic shield that generally swivels up and down to allow access to the face. The helmet (10) is constructed similarly to that described with reference to FIG. 1 and includes an outer rigid shell (12) over a polystyrene liner (not illustrated). The shell (12) is manufactured from an appropriate material to protect a wearer of the helmet (10) from damage to their skull and head from impact forces, the material including kevlar, carbon fibre, glass reinforced plastic and similar materials well known in the art. An inner lining (13) abuts the skull and head areas of the wearer and is manufactured from a soft material such as cotton-covered foam plastics, such an inner lining also being well known in the art. Interposed between the shell (12) and lining (13) is an inflatable bladder (14). The bladder (14) is a hollow single cell manufactured from plastic, rubber or other suitable material well known in the art, which essentially follows the contours of the head of the wearer of the helmet (10). A bite valve (15), similar to the valve found on a water back-pack, is located at the base of the bladder (14).

With reference FIG.3, the helmet (20) is of the type commonly referred to as an "open-face" helmet, a helmet which covers the head, having a rear that covers the base of the skull but lacks the protective section over the front of the chin offered by a full-face helmet. The helmet (20) is constructed similarly to that described with reference to FIGS. 1 & 2 and includes an outer rigid shell (22) over a polystyrene liner (not illustrated). The shell (22) is manufactured from an appropriate material to protect a wearer of the helmet (20) from damage to their skull and head areas from impact forces, the material including kevlar, carbon fibre, glass reinforced plastic and similar

materials well known in the art. An inner lining (23) abuts the skull and head areas of the wearer and is manufactured from a soft material such as cotton-covered foam plastics, such an inner lining also being well known in the art. Interposed between the shell (22) and lining (23) is an inflatable bladder (24). The bladder (24) is a hollow single cell manufactured from plastic, rubber or other suitable material well known in the art, which essentially follows the contours of the head of the wearer of the helmet (20). A bite valve (15), similar to the valve found on a water back-pack, is located at the base of the bladder (24).

FIG. 4 illustrates an alternative bladder for use in a full-face helmet as described above with reference to FIG. 2. The bladder (34) extends down past the base of the skull of a wearer to follow the contours over the front of the chin section (35). Cut-outs (36a,b) accommodate the temple areas of the wearer.

Most helmets are worn by a single wearer and thus, once the bladder in all embodiments of the present invention has been inflated sufficiently to provide a comfortable fit for that wearer, it would not usually be necessary to deflate the bladder to remove the helmet - once the appropriate contours have been set, no adjustment will be required for the next use by the same wearer. However, of course, if there has been a prolonged delay between uses which has resulted in a slight leakage of air from the bladder, or the wearer might elect to wear sunglasses or similar at the next use, or if indeed the helmet is subsequently used by a different wearer, it is a simple matter to deflate/re-inflate the bladder to ensure that the inner lining adopts the appropriate contours for any given wearer of the helmet.

The present invention thus provides protective headgear which can readily conform to the contours of the skull, head, chin and neck areas or any combination thereof of a wearer of the headgear, thus providing a more comfortable fit of that headgear, irrespective of the size and shape of the head and skull of that wearer.

It will be appreciated that the above described embodiments are only exemplifications of the various aspects of the present invention and that modifications and alterations can be made thereto without departing from the inventive concept as defined in the following claims.

CLAIMS

1. Headgear including:

an outer rigid shell adapted to protect a wearer of said headgear from damage to the skull, head or neck areas or any combination thereof of said wearer from impact forces;

a soft, inner lining adapted to provide a comfortable fit for said wearer of said headgear; and

an inflatable bladder interposed between said shell and said lining, said bladder adapted to substantially conform said lining to the contours of said areas or any combination thereof of said wearer.

2. Headgear as defined in Claim 1 wherein, said bladder comprises a single inflatable cell.

3. Headgear as defined in Claim 1 wherein, said bladder comprises a plurality of interconnected inflatable cells.

4. Headgear as defined in any one of Claims 1 to 3 wherein, said bladder includes a valve adapted to allow fluid to be pumped into said bladder and subsequently expelled therefrom as required.

5. Headgear as defined in Claim 4 wherein, said fluid is air.

6. Headgear as defined in any one of Claims 1 to 5 wherein, said rigid shell is selected from kevlar, carbon fibre or glass reinforced plastic material.

7. Headgear as defined in any one of Claims 1 to 6 wherein, said inner lining is a covered foam plastic material.

8. Headgear as defined in any one of Claims 1 to 7 wherein, said inner lining is a cotton-covered foam plastic material.

9. Headgear as defined in Claim 7 or Claim 8 wherein, said foam plastic material is polystyrene.

10. Headgear as defined in any one of Claims 1 to 9 wherein, said bladder is manufactured from a plastic or rubber material.

11. Headgear as defined in any one of Claims 1 to 10 which is an open-face helmet.

12. Headgear as defined in any one of Claims 1 to 10 which is a full-face helmet.

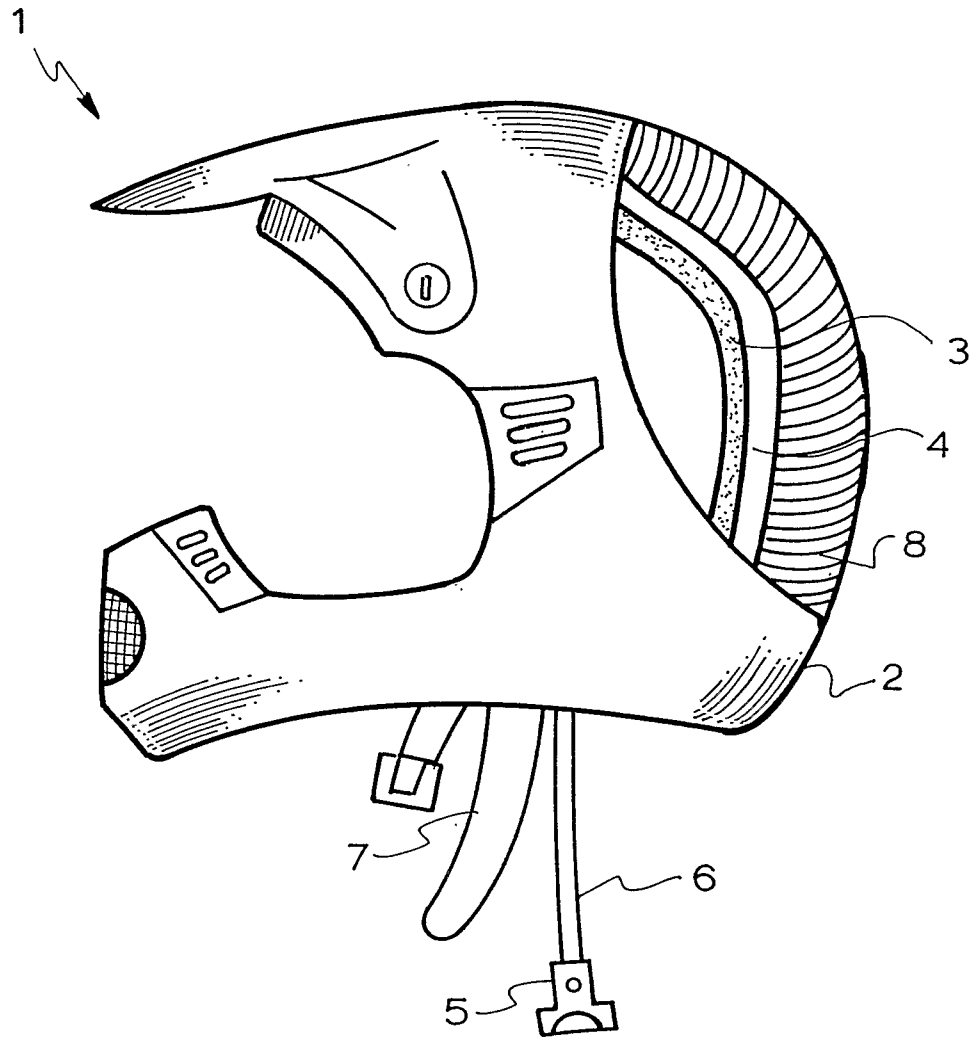

Fig.1.

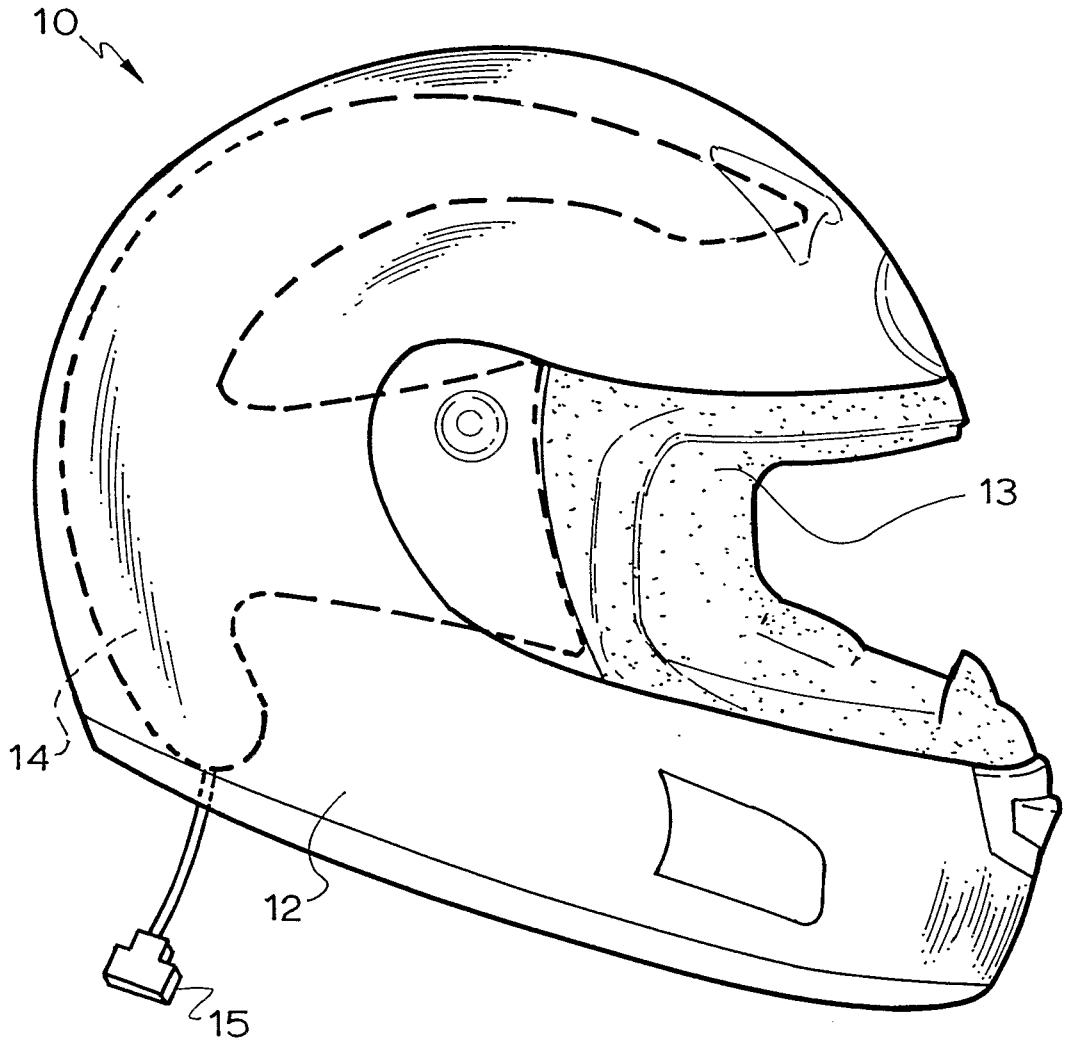

Fig. 2.

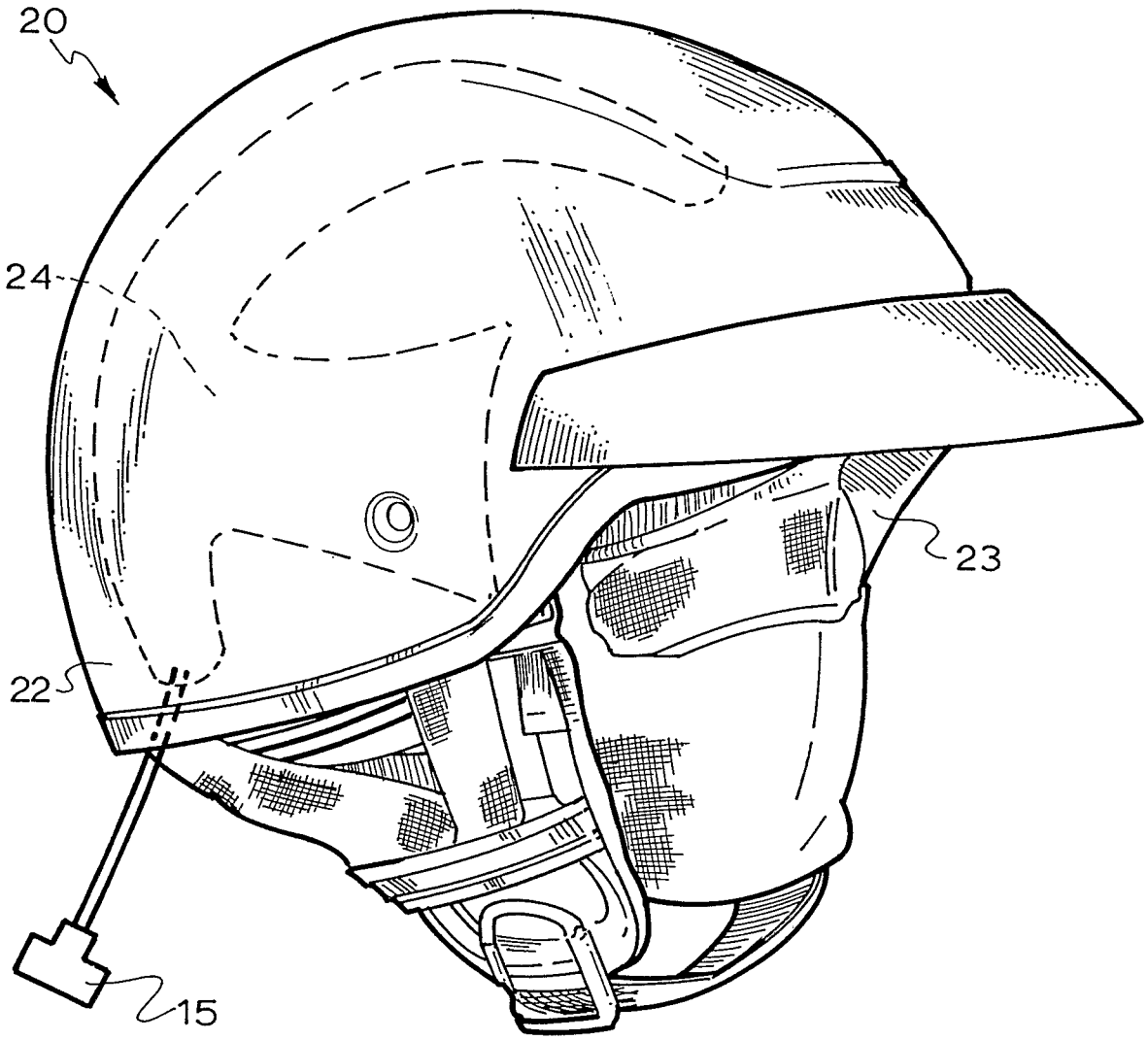

Fig. 3.

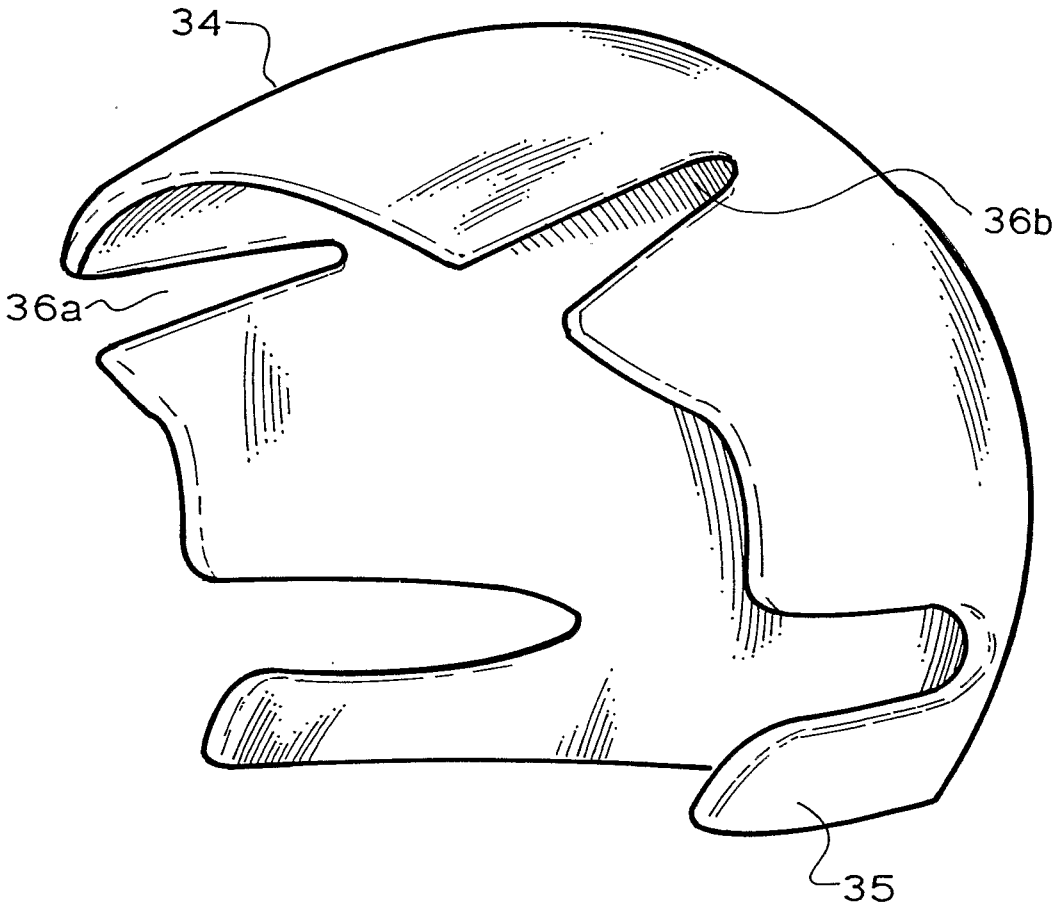

Fig. 4.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2008/000784

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A42B 3/12 (2006.01)

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)

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI/EPODOC IPC/ECLA A42B 1/08, 1/10, 3/06, 3/10, 3/12, A63B 71/10 & Keywords bladder, inflate, valve, blow & like terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4586200 A (POON) 6 May 1986 Figures 1-6, column 3 line 13 to column 5 line 5	1-12
X	US 5890232 A (PARK) 6 April 1999 Figures 1-2, 7A, column 2 line 62 to column 3 line 60	1-12
X	US 4038700 A (GYORY) 2 August 1977 Figure 1, page 2 line 87-122	1-12
X	EP 1316264 A2 (FRANCHINI et al.) 4 June 2003 Figures 1-3, paragraphs 19-35	1-12

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 October 2008	30 OCT 2008
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer **ALLAN SMAILES** AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : +61 2 6283 2154

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2008/000784

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	4586200	NONE					
US	5890232	NONE					
US	4038700	AT	420576	BE	842898	CA	1038103
		DE	2526336	FR	2313879	GB	1496095
		JP	52000550	NL	7606305		
EP	1316264	IT	MO20010235				

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX