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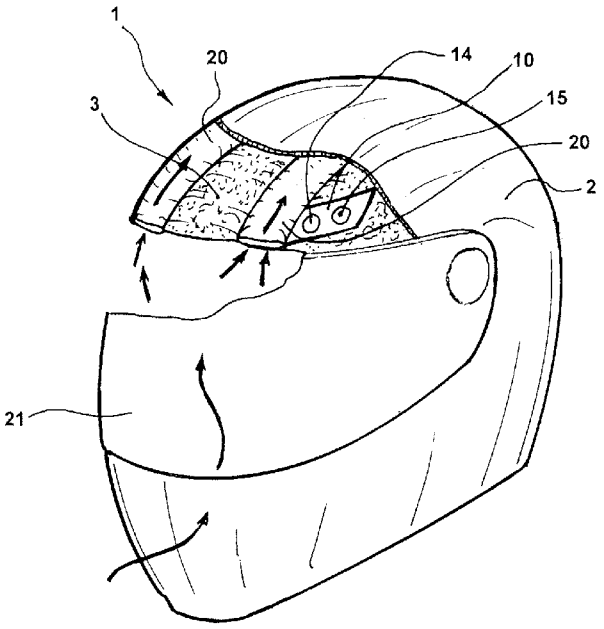

FIG.1

(57) **Abstract**: A protective helmet (1) is described, said helmet comprising one or more air guiding members (20) configured to place in fluid communication at least one area of the helmet (22) with one or more ventilation ports (6) for output/expulsion of air so as to define an area intended for the passage of air flow independent from, and/or isolated, and/or not in fluid communication with, other areas intended for the passage of air flows in the helmet.

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PROTECTIVE HELMET

The present invention relates to a protective helmet, for example for motorcycling use and in particular a helmet provided with ventilation circuits.

Known protective helmets include those, for example for motorcycling use, provided with at least one ventilation opening or port which is formed in the helmet and which places an outer area of the helmet in fluid communication with an inner area so as to allow the entry and/or the circulation of an air flow in the internal space of the helmet. The ventilation of the internal space of the helmet allows comfortable temperatures to be maintained for the motorcyclist's head, in particular during prolonged use, and favours renewal of the air. The ventilation opening or port, or air vent, is generally connected to a series of channels composed of grooves formed in the padding of the helmet, in the polystyrene layer or in another layer of the helmet and designed to distribute the air flow in the internal space in a uniform manner.

It is also known to air an area of the helmet which is situated between the user's face and the visor of the helmet, namely the chamber which is situated in front of the user's field of vision and is closed by the transparent screen which is situated in the front area of the helmet so as to protect the user's face from the air. This zone, which is not aired, risks becoming misted up, this risk being increased by the fact that in this zone the user breathes and there is greater amount of moisture.

In the continuation of the present disclosure, the expression "visor chamber" is understood as meaning that area of the helmet situated between the user's face and the helmet visor.

Airing inside the visor chamber is performed by suitably providing fluid communication between the visor chamber and the aforementioned air channels and/or vent(s) for the helmet so as to create an air flow from the visor chamber and a ventilation port, such that the air of the visor chamber may flow out from the visor chamber and reach the ventilation port from where it may exit.

The present disclosure arises from the realization on the part of the author or the authors that it is not always possible to create an effective ventilation of the visor chamber since it is not always possible to control the air flows inside the helmet owing to the numerous air ports and channels, considering also that these flow may vary over

time for example depending on the position of the helmet during riding, the greater or lesser speed of the motorcycle and/or other factors. As a result, depending on the speed and/or the position of the helmet, turbulences and chaotic flows may be generated inside the helmet and these prevent a regular flow of air from the visor chamber towards the outlet ventilation port, with the risk of a head loss in the flows.

It is therefore not always possible to achieve an optimum circulation of the air and satisfactory demisting of the visor.

A technical problem underlying the present invention is therefore that of providing a protective helmet which is able to overcome this drawback, namely is able to improve the ventilation efficiency inside the helmet and/or achieve further advantages. Said technical problem is overcome by a protective helmet and a method, the main characteristic features of which are specified in the respective independent claims, while other characteristic features are specified in the remaining claims.

The proposed solution forming the basis of the present invention is that, in order to optimize the circulation of air, it is convenient to separate physically, or render independent structurally, one channel which allows the circulation of the air from one area of the helmet, such as the visor chamber, towards the one or more air outlet ventilation ports, and another channel, such as the channel which allows generally circulation of the air or ventilation inside the helmet. Basically, in other words, a proposed idea forming the basis of the present disclosure consists in providing and creating ventilation paths or circuits which are physically separate from each other and/or configured so that there is no mutual fluid communication.

In this way, irrespective of the position of the rider's head and/or the air flows which may be generated inside the helmet, the air flows intended to demist the visor chamber and the air flows which concern in general the circulation of air in the helmet, or a specific area of circulation of the air in the helmet, are independent and/or separate as far as possible, so as to reduce the risk of interference and therefore turbulence.

On the basis of this proposed solution, in accordance with an embodiment of the present disclosure, in order to solve said technical problem, the motorcycling helmet comprises a first ventilation path or circuit which is isolated from, or independent of, a second ventilation path or circuit.

Moreover, on the basis of the aforementioned proposed solution, in accordance with an embodiment of the present disclosure, in order to solve said technical problem, the motorcycling helmet comprises one or more guiding members which place an area of the helmet in fluid communication with a ventilation port for output of the air and are configured to render an air flow independent of another air flow, so as to avoid the possible creation of turbulence due to interference between flows and consequent head losses due to said turbulence or chaotic flows.

A guiding member may be understood as meaning a body with a closed cross-section, such as a tubular body, or a body which, once mounted on the helmet, forms a closed cross-section, able to cause an air flow to flow in an isolated manner from other air flows.

Owing to the use of guiding members, it is possible to design *a priori* a ventilation system which allows the direction of the flow to be controlled and thus the ventilation efficiency to be maximized.

For example, in one embodiment of the present disclosure, the guiding members place a visor chamber in direct fluid communication with a ventilation port intended to output air from the helmet.

The air output ventilation port may be an opening which is located in the rear area of the helmet which is in technical jargon of the sector is referred to as "rear extractor". Recall of the air from the visor chamber takes place by means of aspiration. In fact, during the movement of the motorcycle, a vacuum is created in the region of the rear extractor and sucks the air from the internal area of the helmet and therefore also from the visor chamber and therefore produces the desired demisting action.

If the helmet is a full-face helmet with chin-piece an air vent which is in fluid communication with the visor chamber is provided in the region of the chin-piece. An air flow which departs from the chin-piece, passes into the visor chamber and continues via the guiding members towards an air outlet port is thus produced.

Consequently, the air for demisting the visor does not come into contact at all, or only minimally, with an air flow intended for example for ventilation and/or general airing of the helmet, since this demisting air is directed inside the guiding members which lead into the visor chamber and do not allow fluid communication with the

remainder of the internal area of the helmet.

Further advantages and characteristic features of the motorcycling helmet according to the present invention will become clear to persons skilled in the art from the following detailed and non-limiting description of an embodiment thereof with reference to the accompanying drawings in which:

- Figure 1 is an axonometric view, from the front, of a protective helmet partially cross-sectioned in accordance with an embodiment of the present disclosure;
- Figure 2 is a view, from the rear, of a protective helmet partially cross-sectioned in accordance with an embodiment of the present disclosure;
- Figure 3 is an axonometric view of the protective helmet according to Figure 1 in which, differently from Figure 1, an outer shell has been removed and a guiding member is partially raised;
- Figure 4 is a view, from the rear, of the helmet according to Figure 2 in which an outer shell has been removed and a guiding member is partially raised;
- Figure 5 is a front view of the helmet according to Figure 1;
- Figure 6 shows a cross-section along the line VI-VI of Figure 5;
- Figure 6A is a detail VI of Figure 6;
- Figure 7 is a cross-section along the line VII-VII of Figure 5;
- Figure 7A is a detail VII of Figure 7;
- Figure 8 is a cross-sectional view along the line VI-VI of Figure 5, in which, differently from the cross-section of Figure 6, the guiding members have been removed.

With reference to Figures 1 to 8, the motorcycling helmet 1 according to the invention comprises an outer cap or shell 2 with anti-penetration function and a layer with energy absorption function 3, for example made of polystyrene. The outer shell 2 and the layer with energy absorption function 3 form part of a general body of the helmet.

In particular, in a front top area of the outer shell 2, the protective helmet 1 includes a plurality of front ventilation openings or ports 4, 5, in the example two ports 4, 5.

The protective helmet 1 also includes a visor 21 and a visor chamber 22.

The protective helmet 1 shown in the figures is also a helmet of the full-face type and includes a chin-piece.

In a rear area of the outer shell 2, the helmet 1 includes a plurality of rear ventilation openings or ports, also called rear extractors 6, in the example two rear extractors 6, only one of which is visible in the figures.

As can be seen from the figures, the helmet shown in the present embodiment is symmetrical with respect to a midplane or sagittal plane. In particular the two front ventilation ports 4, 5 and the two rear extractors 6 are symmetrical with respect to the midplane or sagittal plane. As a result, the internal ventilation components of the helmet are arranged symmetrically on both sides, right-hand half and left-hand half, of a sagittal plane, so as to ensure symmetrical ventilation on both sides of the helmet. The description which follows is provided only in relation to a group of ventilation components located in the left-hand half of the helmet. It is understood that the same components are also present in the right-hand half of the helmet. Alternatively, it is also possible for there to be a single group of components centred on a sagittal plane of the helmet.

It is also pointed out that, in the figures, the helmet is shown in a condition when not worn. However, in the context of the present disclosure it is assumed that the helmet is worn. Consequently, in the context of the present disclosure, any spatial reference such as rear, anterior, front, right-hand, left-hand and similar spatial references are to be understood as referring, by way of indication and/or example, to a condition in which a helmet is worn, and these spatial references are to be understood as being relative to the head of the person. Moreover, when reference to air flows is made, it is to be understood that these are generated in the helmet when a user is riding a vehicle wearing the helmet 1.

Moreover, in the context of the present disclosure, the expression "front ventilation port" will be understood as meaning a ventilation port formed in the front area of a user and able to allow the entry and/or the circulation of an air flow in the internal space of the helmet so as to air the head of a user both via channels and via holes formed in the polystyrene or in another layer of the helmet.

The layer with energy absorption function 3 includes grooves 9, 10, 11 and front

holes 13, 14, 15. In particular, a first longitudinally extending groove 9, which extends along the entire top of the helmet and reaches the rear area, and a second groove 10 of shorter length, which branches off one side of the first groove 9, are provided. The front holes 13, 14, 15 are formed in the second groove 10. The front holes 13, 14, 14 place the housing area, or inner side of the helmet, inside which the user's head is arranged, in communication with the respective front ventilation port 4, 5.

The layer with energy absorption function 3 also includes rear holes 18, 19 which place the housing area of the helmet in communication with each respective rear extractor 6. A third groove or recess 11 of smaller length is formed in the layer 3 in the region of the rear holes 18, 19.

According to one aspect of the present disclosure, the protective helmet 1 includes one or more guiding members 20, in the example one guiding member 20 for each half, i.e. right-hand half and left-hand half, of the helmet. The guiding member is, for example, a tube or tubular body, or tubular jacket, or sleeve, which is preferably made of soft material and able to be adapted to the cap-shaped form of the helmet and which is in fluid communication with given areas of the helmet and allows the creation of an air circuit which is independent from other circuits or air flows in the protective helmet 1.

Alternatively, the guiding member is a body which, when mounted in the helmet, is able to create an air circuit or area which is independent of other air circuits or flows inside the protective helmet 1.

In the embodiment shown in the figures, the guiding member 20 is seated inside the first groove 9 and places the visor chamber 22 in fluid communication with the respective rear extractor 6.

In order to establish this fluid communication, the guiding member 20 enters, or leads into, or opens out directly inside the visor chamber 22 and opens out in turn inside the respective rear extractor 6. In order to achieve such an opening arrangement, the guiding member 20 may be arranged so as to open out inside the visor chamber 22 on one side and the extractor 6 on the other side, and the guiding member 20 may be retained/held inside the respective groove 9 between the shell 2 and the layer with energy absorption function 3.

The layer 20 is preferably not in fluid communication with the respective front ventilation port 4, 5 so that an air flow which flows from the visor chamber 22 towards the rear extractors 6 does not interfere with an air flow which enters via the front ventilation port 4, 5 in order to air the user's head.

The management and organization of the air flows is described below with reference to the attached figures.

With reference to Figure 6 and Figure 6A it can be seen that the air which strikes the helmet enters via the front ventilation ports 4, 5 and, owing to a vacuum effect which is created, during riding of the motorcycle, in the rear area of the helmet in the region of the rear extractors 6, is sucked inside the helmet.

This air, which may be called ventilation/circulation air, passes through the holes 13, 14, 15, enters into the head region and passes out through the rear holes 18, 19 towards the rear extractors 6. The front ventilation ports 4,5, the holes 13, 14, 15, the rear holes 18, 19 and the rear extractors 6 form an air circuit.

The ventilation/circulation air flows may vary depending on the speed of the motorcycle, the position/inclination of the helmet and/or the position of the motorcyclist.

In order to demist the visor, owing to the vacuum which is created in the region of the rear extractors 6, an air flow is sucked in via the visor chamber 22 and, passing inside the guiding members 20, is expelled through the rear extractors 6 (Figure 7). The air may enter into the visor chamber 22 via the underlying zone of the helmet in the region of the chin and the neck of the user and/or via suitable air vents provided in the chin-piece (not visible in the drawings). The visor chamber 22, the guiding member 20 and the rear extractors 6 form another air circuit.

As can be understood from Figure 6 and Figure 6A any air which circulates via the front ventilation port 4, 5 and passes along the first groove 9 on the outer side of the guiding member 20, does not interfere with the air which passes inside the guiding member 20.

Consequently, if, depending on the speed of the motorcycle, position/inclination of the helmet and/or position of the motorcyclist, the ventilation/circulation air flow varies inside the helmet, this variation in flow does not affect or interfere with the

demisting air flow. Consequently, the risk of turbulence or chaotic air flows being formed, in particular in the intersection zone of the grooves 9, 10, which could result in head losses for the demisting ventilation, is avoided.

In fact, if such a guiding member were not present, as can be seen in Figure 8, considerable turbulence could form in the air circuits, in particular with an increase in the ventilation/circulation air flow, with the negative effect of head loss in the demisting air flow.

The embodiment of the motorcycling helmet described and illustrated here forms only one example which may be subject to numerous variations. For example, it is possible to envisage a version which is double compared to that described, with the use of a guiding member arranged in fluid communication with the front ventilation ports for conveying the ventilation/circulation flow.

Alternatively it is possible to envisage the use of guiding members both for the ventilation/circulation air flow and for the demisting air flow.

It should in fact be noted that, owing to the use of air guiding members and in general any other system which isolates the air circuits connecting ventilation openings with areas of the helmet or with other ventilation openings, such that the air flows are independent, it is possible to design or organize *a priori* a ventilation system according to needs and depending on the type of helmet to be made.

The number of grooves and ventilation holes, as well as their positioning in the helmet, may also be varied according to needs.

The grooves or recesses may be formed in any layer which forms the helmet, depending on the structure and configuration of the helmet. The layer with energy absorption function or the layer with anti-penetration function may be made using any material known to the person skilled in the art.

It should also be noted that the fluid flows in the helmet which are independent of each other may be different from the specific air flows described in the aforementioned embodiment.

CLAIMS

1. Protective helmet (1) comprising a first ventilation path or circuit and a second ventilation path or circuit, wherein the first ventilation path or circuit and the second ventilation path or circuit are paths or circuits physically separate or independent from each other, or paths or circuits not in mutual fluid communication, or paths or circuits configured to prevent a mutual interference between air flows.

2. Protective helmet (1) including one or more air guiding members (20) configured to place in fluid communication at least one area of the helmet (22) with one or more ventilation ports (6) for output/expulsion of air so as to define a first ventilation path or circuit intended for the passage of air flow in the helmet, wherein the first ventilation path is independent from, and/or isolated, and/or not in fluid communication with, or not interfering with, a second path or circuit intended for the passage of another air flow in the helmet.

3. Protective helmet (1) according to claim 1 and claim 2.

4. Protective helmet (1) according to claim 2 or 3, wherein said one or more guiding members (20) is/are one or more tubular bodies (20) or bodies configured to define a closed cross-section when mounted in the helmet.

5. Protective helmet (1) according to claim 2, 3 or 4, wherein the area of the helmet is a visor chamber (22).

6. Protective helmet (1) according to any one of the preceding claims 2 to 5, wherein the ventilation port (6) is a rear ventilation port of the helmet.

7. Protective helmet (1) according to Claim 5 and Claim 6, wherein the first path extends between the visor chamber (22) and said rear ventilation port (6) of the helmet and wherein the second path extends between a front ventilation port (4,5) and said rear ventilation port (6) of the helmet, wherein said one or more guiding members (20) are associated with one and/or the other one of said first path or circuit and said second path or circuit.

8. Protective helmet (1) according to claim 5 and claim 6, or claim 7, wherein said one or more tubular bodies are bodies which can be manipulated individually with respect to a structure of the helmet and one of said first path or circuit and said second path or circuit is defined by said tubular bodies and the other of said first path or circuit

and said second path or circuit is defined by holes formed in said structure of the helmet.

9. Protective helmet (1) according to claim 8, wherein said tubular bodies are closed with respect to said holes.

10. Protective helmet (1) according to any one of the preceding claims, comprising a body of the helmet, and wherein the first ventilation path or circuit and the second ventilation path or circuit are channels extending in the body of the helmet each between a respective inlet mouth or opening and a respective outlet mouth or opening.

11. Protective helmet (1) according to any one of the preceding claims, wherein the first ventilation path or circuit and the second ventilation path or circuit are paths included in a same layer (3) of the helmet.

12. Protective helmet (1) according to any one of the preceding claims, wherein the first ventilation path or circuit and the second ventilation path or circuit are paths covered by an outer shell (2) of the helmet.

13. Protective helmet (1) according to any one of the preceding claims, including a layer with energy absorption function (3) and wherein both the first ventilation path or circuit and the second ventilation path or circuit extend in the layer with energy absorption function (3) in an area comprised between an intrados side of the layer with energy absorption function (3) and an outer shell (2) of the helmet.

14. Protective helmet (1) according to any one of the preceding claims, wherein the first ventilation path or circuit and the second ventilation path or circuit both extend between a front area of the helmet and a rear area.

15. Protective helmet (1) according to any one of the preceding claims, wherein the first ventilation path or circuit has a ventilation function different from the second ventilation path or circuit, and wherein the first ventilation path or circuit is designed to allow demisting of a visor of the helmet, and the second ventilation path or circuit is designed to allow ventilation or airing of the user's head.

16. Protective helmet (1) according to any one of the preceding claims in combination with claim 2, including one or more grooves or recesses (9, 10) and wherein said one or more tubular bodies (20) are housed in a respective groove or recess (9).

17. Protective helmet (1) according to claim 15 in combination with claim 12, wherein said grooves or recesses (9, 10) are formed in said layer with energy absorption function (3).

18. Protective helmet (1) according to any one of the preceding claims, comprising at least one first longitudinally extending groove (9) which extends along the entire top of the helmet between a front area and a rear area of the helmet, and a second groove (10) that branches off on one side of the first groove (9) and is located in a front region of the helmet, said first groove (9) being intended to accommodate a respective tubular body (20), and said second groove (10) being provided with one or more through-holes (13, 14, 15) intended to provide fluid communication between the front ventilation port (4, 5) and an inner side of the helmet, and wherein the helmet includes one or more through-holes (18, 19) configured to provide fluid communication between the rear ventilation port (6) and an inner side of the helmet.

19. Protective helmet (1) according to claim 18, wherein said one or more front ventilation ports (4, 5), said one or more first through-holes (13, 14, 15) and said one or more second through-holes (18, 19) and said one or more rear ventilation ports (6) are part of said second circuit.

20. Method for managing ventilation in a protective helmet, wherein the method envisages

- arranging a first ventilation path or circuit and a second ventilation path or circuit, wherein the first ventilation path or circuit and the second ventilation path or circuit are paths or circuits physically separate or independent from each other, or paths or circuits not in mutual fluid communication, or otherwise paths or circuits configured to avoid a mutual interference between flows of air, or

- directing at least one air flow in a first air circuit of the helmet from an area of the helmet towards one or more ventilation ports (6) for output/expulsion of air independently and/or separately and/or without fluid communication with respect to, or without interfering with, at least one second circuit intended to allow passage of an air flow into the helmet.

21. Method according to claim 20, wherein an air flow which extends from the visor chamber towards the ventilation port for output of air is made independent, or

isolated, from another flow, wherein one of said flows is conveyed in one or more tubular bodies (20) or bodies configured to form a closed cross-section once mounted in the helmet and the other of said flows is conveyed in holes formed in a layer with energy absorption function (3), said tubular bodies (20) or bodies configured to form a closed cross-section once mounted in the helmet being bodies which are structurally independent or singly able to be manoeuvred with respect to said layer with energy absorption function (3).

22. Method according to claim 20, wherein an air flow, which extends from the visor chamber (22) towards the ventilation port (6) for output of air for demisting the visor is made independent from, or is isolated with respect to, an air flow extending between a front ventilation port (4, 5) and said ventilation port (6) for output of air and intended to air an internal area of the helmet intended to accommodate the head of a user.

23. Method according to any one of the preceding claims 20 to 22, wherein the air is made to exit from a rear area of the helmet via the two independent paths.

24. Method according to any one of the preceding claims 20 to 23, wherein the first ventilation path or circuit and the second ventilation path or circuit convey air flows with a different function inside the helmet.

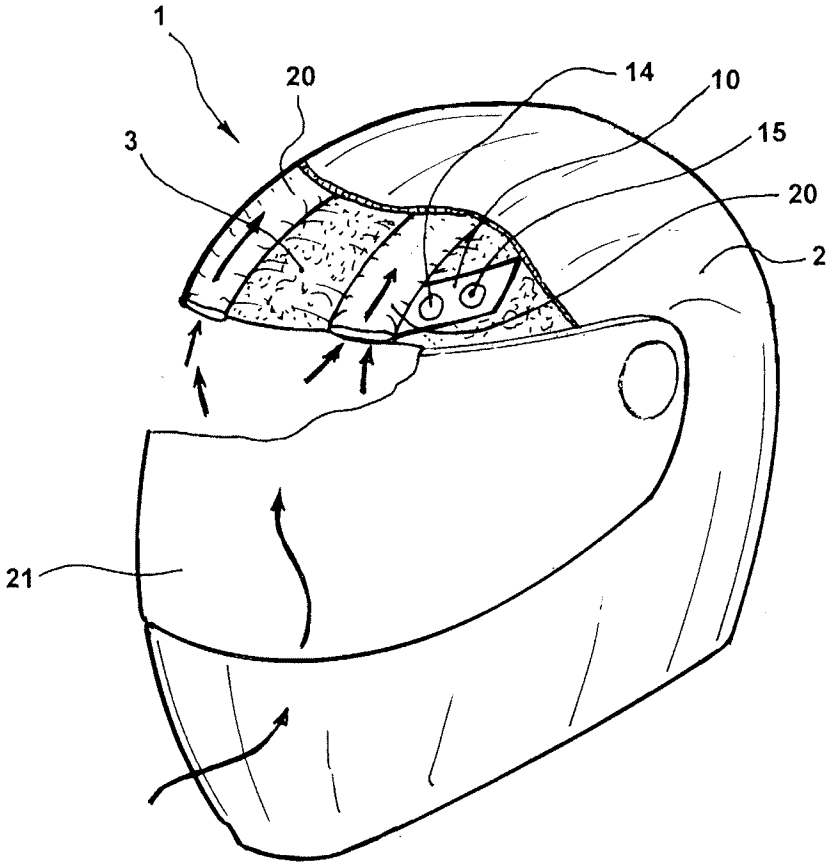

FIG.1

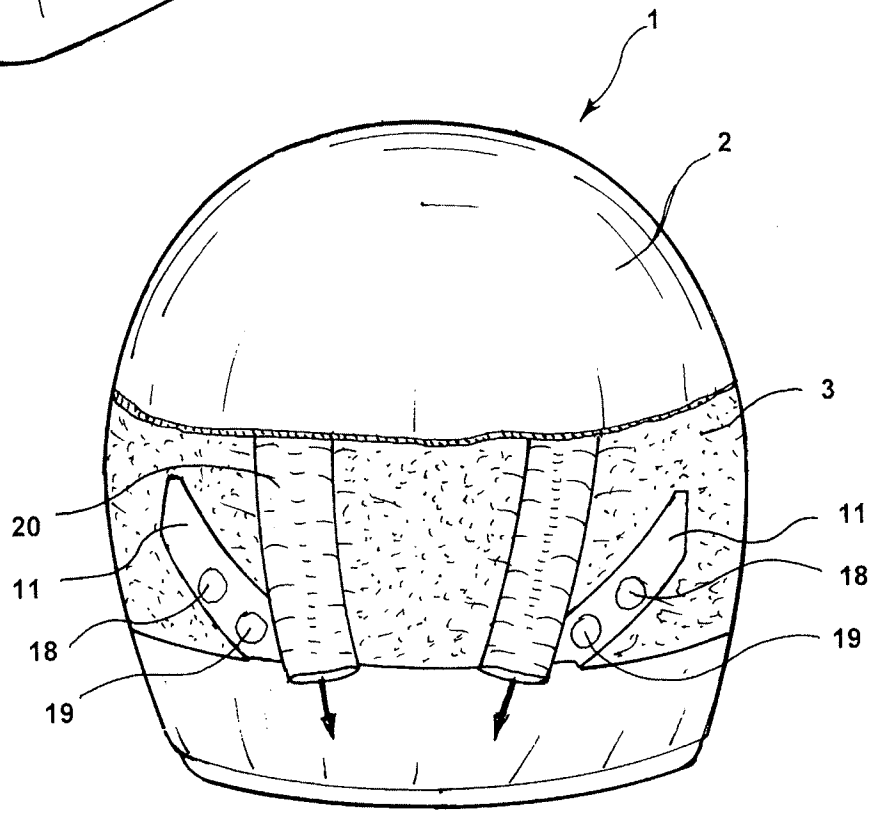

FIG.2

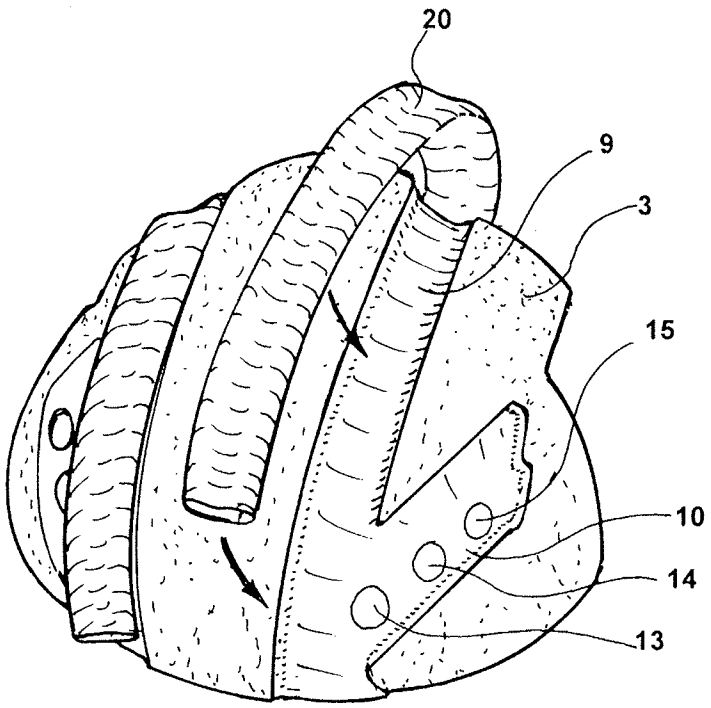

FIG.3

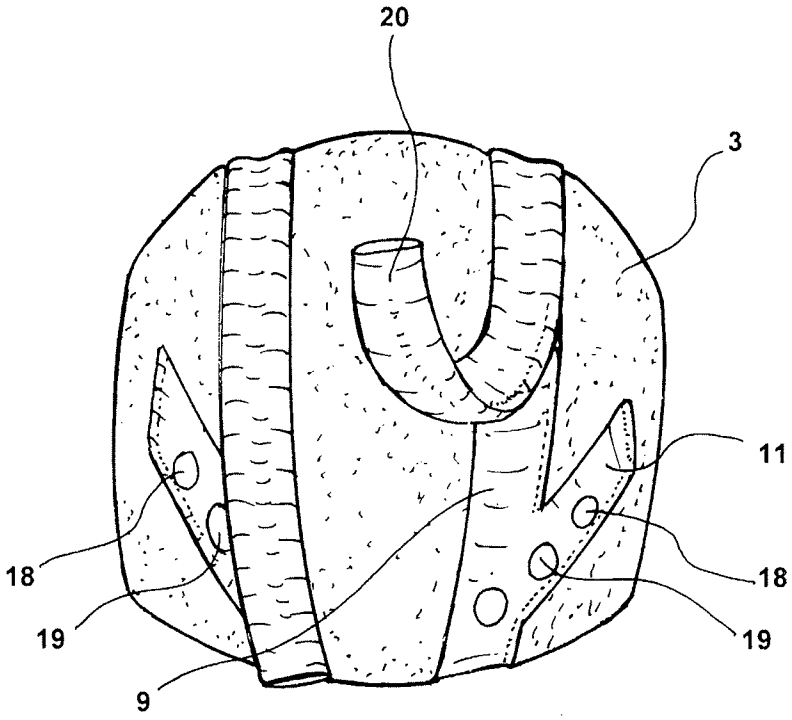

FIG.4

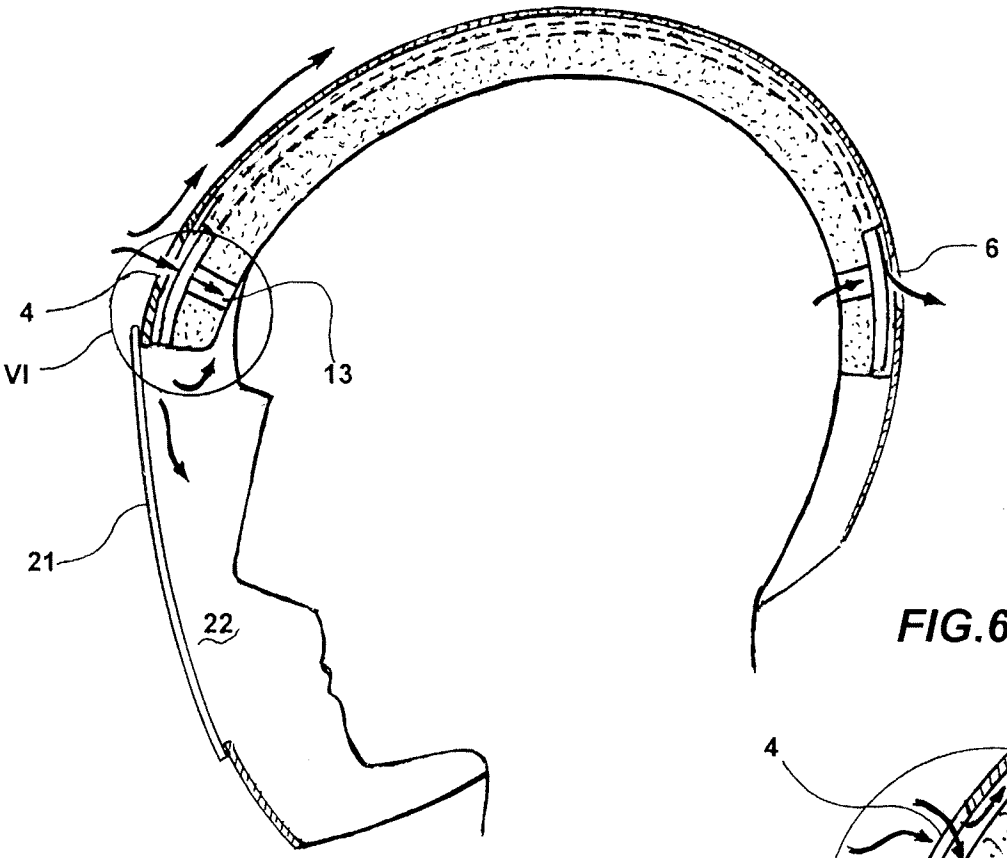

FIG.6

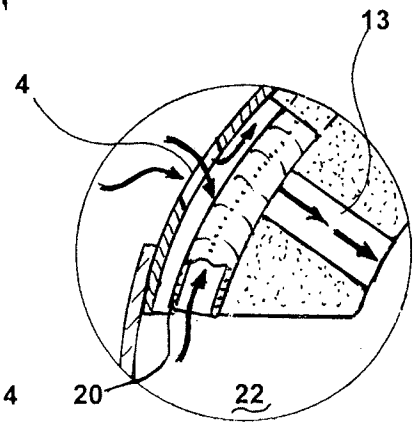

FIG.6A

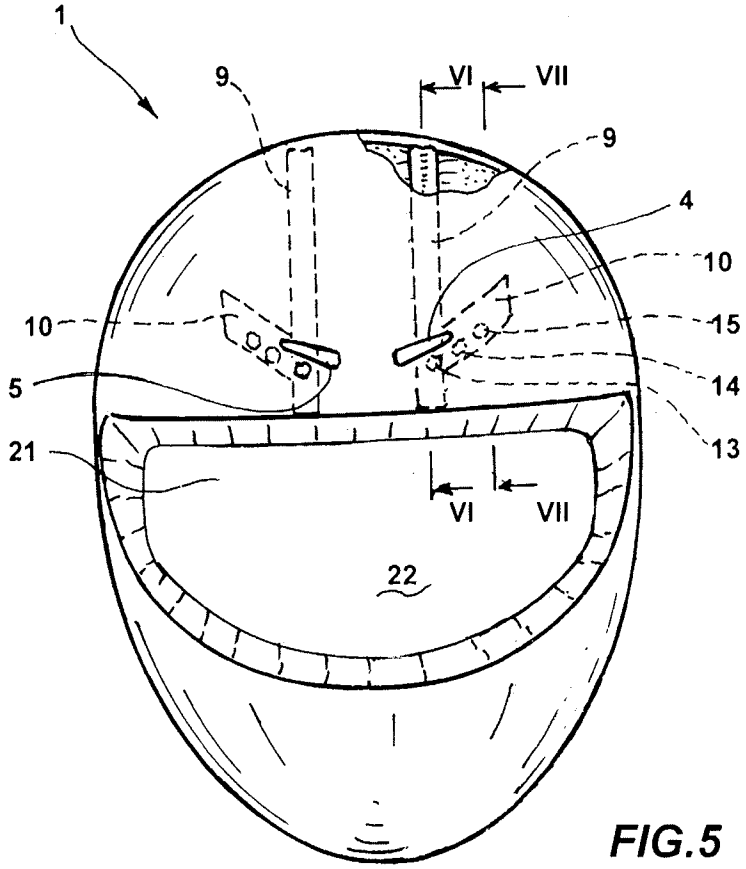

FIG.5

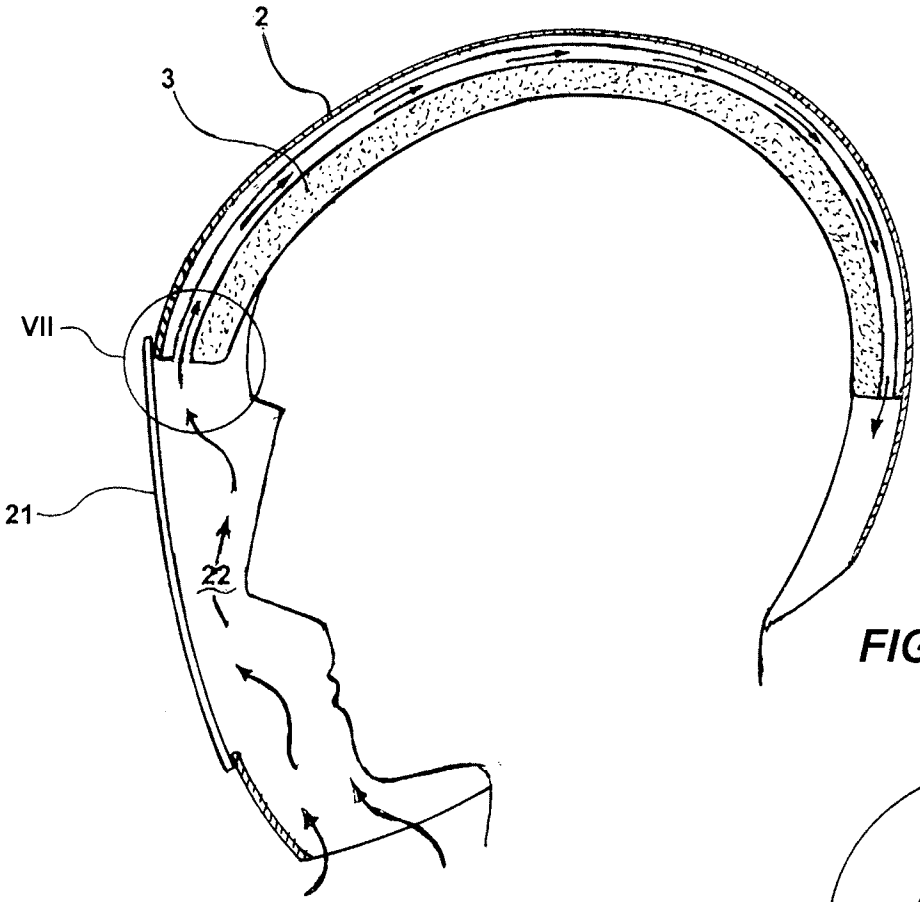

FIG.7

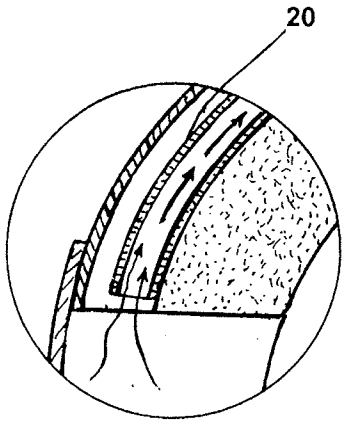

FIG.7A

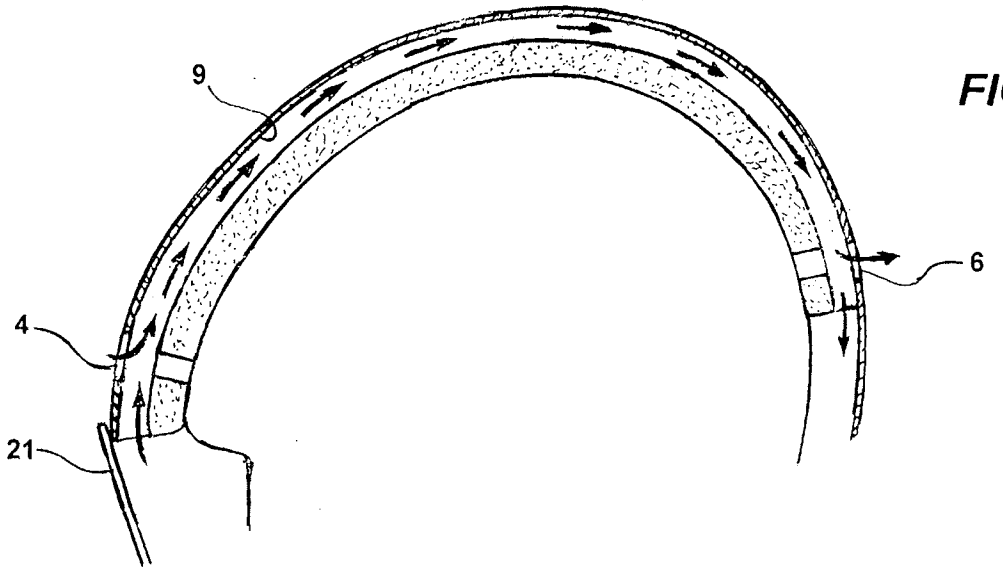

FIG.8

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/051686

A. CLASSIFICATION OF SUBJECT MATTER
INV. A42B3/24 A42B3/28
ADD.

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)
A42B

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 394 566 A (HONG SCOTT S [US]) 7 March 1995 (1995-03-07) column 3, line 23 - column 4, line 39; figure 2	1-7, 10-24
X	DE 10 2004 048843 A1 (SCHUBERTH ENGINEERING AG [DE]) 13 April 2006 (2006-04-13) paragraphs [0018] - [0023]; figures 1-3	1-7, 10-24
X	US 4 514 864 A (HUBER SIEGFRIED [DE]) 7 May 1985 (1985-05-07) column 3, line 45 - column 5, line 37; figure 1	1-5, 20-24
X	US 6 263 513 B1 (MURAKAMI TAKESHI [JP]) 24 July 2001 (2001-07-24) column 5, lines 6-58; figures 1-3	1,20

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 June 2016	01/07/2016

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	D'Souza, Jennifer

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/051686

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 612 675 A (BROERSMA LESTER V [US]) 23 September 1986 (1986-09-23) column 3, lines 7-61; figures 1,2 column 5, lines 52-61 -----	1,20

INTERNATIONAL SEARCH REPORT

Information on patent family members

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