(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 686 358 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **94401252.5**

(51) Int. Cl.[6]: **A42B 3/28**

(22) Date of filing: **07.06.94**

(43) Date of publication of application:
13.12.95 Bulletin 95/50

(84) Designated Contracting States:
BE CH DE ES FR GB IT LI SE

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(54) Crash helmet for motorcyclists and the like, provided with adjustable aeration devices

(57) Crash helmet for motorcyclists and the like, provided on top of the cap (1) with at least an air intake (2), above which a shaped streamlined flange (3) is positioned provided with an air inlet window (4) and an air outlet window (5), a translable laminar mobile element (8) being provided in correspondence of said inlet window, suitable to fully or partly close said inlet window (4), ensuring the regularity of the air flow from within the helmet and therefore the absence of turbolences, vibrations and annoying noises near the air intake.

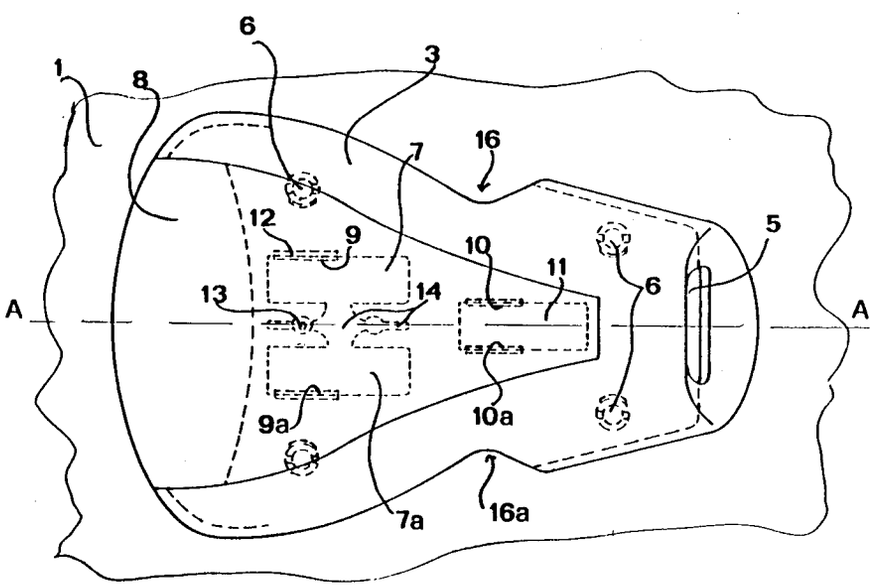

FIG.1

EP 0 686 358 A1

This invention relates to a crash helmet for motorcyclists, car-drivers and sportspeople in general which utilize crash helmets provided with ventilation devices of the aspiration type, whose structure is such as to help a regular and controlled exhaust of the hot air and/or condensate which builds up within the helmet during its use and such as to exert its max. efficiency even at low speeds.

As is known, crash helmets for motorcyclists and, generally, for people taking part in sports competitions which require the use of a helmet, are realized in the shape of a full cap, which in case of integral helmets is provided on the front side, in correspondence of the eyes, with an opening closable through a transparent liftable and/or removable visor. Normally, helmets have a cap or external shell made from a rigid and resistant material, such as polycarbonate or the like or composite materials, inside which a safety padding is coupled, for instance from expanded polystyrene or polyurethane; to this safety padding a lining from soft material constituting a comfort padding is associated. Also open helmets, commonly called "Jet" or "Demijet", have analogous structures. Especially because of their special structure and wrapping shape, integral helmets need to be ventilated in the inside by air circulation, in order to prevent head from overheating and the formation of condensate due to transpiration.

To achieve an adequate ventilation within the helmet, several solutions are adopted which are substantially based on the principle of taking air from the outside through holes or openings provided in given zones of the helmet, to cause it to circulate through the padding layers by means of special channels of various shape and position, and to exhaust it afterwards outside the helmet.

Also a type of crash helmet is known provided with air intakes in the lower front, with circulation of air inside the helmet and exhaust both laterally and on top of the cap where an inclined flange, positioned before air intakes obtained in said cap, creates a depression such as to draw the hot air from the inside of the helmet towards the outside.

U.S. patent 3496854 (F.W. FELDMANN et al.) describes a ventilation device for helmets which comprises a plurality of openings on top of the helmet's cap. Above the openings a channel is positioned provided with air intakes in the upper part, connected to a part of the openings to allow a portion of air to pass through the channel into the helmet, and with air outlet baffles in the lower part connected to the remaining parts of the openings, to remove the air from within the helmet.

A partial closing device may also be provided between the internal and external cap of the helmet, to adjust the air flow through the openings. The device, slidingly connected to the cap, may have a plurality of openings suitable to be selectively aligned with the openings provided on the cap or off-set relatively to same. However, by this type of ventilation there is the drawback that unwished particles, rain or snow penetrate through the openings looking towards the front of the helmet.

GB patent 2167285 (P.L. NAVA) describes a helmet provided with openings on its top, through which the air which penetrates from the lower part of the visor and through passages provided in the lateral parts is exhausted outwards. The openings are provided with an ejector having the shape of a bent cap open towards the back of the helmet and whose aim is to protect the opening from rain and to increase the suction created at the opening level by the air which flows on the helmet. The openings may be opened or closed by means of a suitable sliding device.

U.S. patent 4622700 (J.G. SUNDHALL) describes a helmet provided, in its median part, with backwards looking openings. The external surface of the cap of the helmet is bent towards the inside and extends backwards to join with the cap where it forms a sort of dome.

EP patent 0252243 describes a helmet for motorcyclists in which the cap is provided with holes positioned on the back relatively to the top of the cap, to allow the exhaust of ventilation air; the holes which form outlet orifices are covered by an inclined flange whose opening is orientated towards the back of the helmet; the holes may be closed by a device which slides on a plate and has an intake and holes that may coincide with the holes provided on the cap, causing in this way either a closing or an opening.

All the known embodiments which provide for direct air intakes through openings in the helmet involve in practice annoying conditions of localized cooling, especially at high speeds, and insufficient ventilation at low speeds, because of the load losses which the air flow is subject to in channels, in deviation openings and in exhaust openings.

Besides, as by high speeds the air flow that circulates within the channels is very fast, nuisance conditions for the eyes and the face may set in and even undesirable air jets in the occipital region.

EP patent 0320622 B1 (NOLAN S.p.A.) describes a crash helmet provided with channels for the internal ventilation and an opening on the top of the cap; a streamlined flange is located above these openings, whose shape is such as to create, between the cap surface and the flange, a duct having a decreasing section towards the back of the helmet, so as to allow an air flow passing through said duct to assume locally, in correspondence of the openings provided on the cap, a speed increase and a local pressure decrease,

such as to draw hot air from within the helmet; between the flange and the cap external surface a guided slider is provided which slides on the cap surface inside the duct, said slider being adjustable in correspondence of said openings, wedge-shaped and which can be so positioned as to constitute either a flow shutter or a baffle capable of facilitating the suction of hot air from within the helmet. The slider is guided through a stem which protrudes from the flange through a guide slit.

The device described in EP 0320622 (NOLAN S.p.A.) ensures the air circulation within the helmet and the exhaust of same by suction which takes place from the inside towards the outside of the helmet thanks to the special shape of the device, preventing in this way direct and localized air intakes in correspondence of regions of the head which might have severe adverse reactions, such as headaches, rheumatic pains due to cooling, and the like. However, this device has the drawback that the shutting of the air flow from the inside towards the outside of the helmet takes place by reducing the width of the openings provided on the cap surface, progressively alterating their outline, and also that, when the openings are closed because, especially by high speeds and/or very low temperatures, one does not wish to draw air and to create a suction from within the helmet, the air flow of the device hits all the same the slider and is deviated by same. This can create whirlwinds within the duct, vibrations, annoying noises and the like.

Object of this invention is to provide a crash helmet of the type equipped with suction devices external to said helmet having a structure such as to ensure air suction and exhaust from within the helmet in a constant, uniform and regular way, both by high and low speeds, and independently on the quantity of air exhausted, and without whirlwinds, vibrations, noises and the like taking place.

A further object of this invention is to provide a helmet equipped with suction devices such as to be simply and economically realizable, and applicable, without substantial modifications, also to the various types of helmets already known and utilized.

Still a further object of this invention is to provide a crash helmet equipped with external suction devices with a simple line, aesthetically agreeable and harmonizing, aesthetically and aerodynamically, with the helmet line.

These and still further objects and associated advantages which shall be made clear by the following description, are reached by a crash helmet for motorcyclists and the like, of the type provided in the inside with channels for the ventilation and cooling of the internal air, which helmet, according to this invention, comprises:

- at least an opening or air intake on top of the rigid external cap, in communication with said channels and obtained in the cap and the underlying protective layers,
- a fixed streamlined flange, positioned above said air intake, at a short distance from the cap external surface, so shaped as to create, between the cap and the flange, a duct having a decreasing section towards the back of the helmet, of a substantially trapezoid shape with an inlet window in correspondence of the greater basis and an outlet window in correspondence of the smaller basis, said duct being capable of allowing an air flow passing through it to locally assume, in correspondence of said air intake, a speed increase with a local pressure reduction, such as to cause an air draw from within the helmet up to the exhaust from said air outlet,
- a mobile laminar element constituted by a slider longitudinally translable above said fixed flange and hand-adjustable in correspondence of said inlet window until it covers completely and close said inlet window through the mating of the peripheral edge of said element with the cap surface.

More particularly, said strealined flange is fixed to the cap surface, for instance by means of pins, plates or other analogous means provided peripherally relatively to said flange and suitable to be snap or plug fitted in special seats provided on the cap surface.

The sliding mobile laminar element has also preferably a trapezoid or isosceles triangle shape, so that its perimeter follows the line of said underlying fixed flange, harmonizing with same from the aerodynamic and also the aesthetical aspects.

Said laminar element is caused to be translable above said flange by means of plates or projections provided on the internal side of said element and slidingly engaged and guided in special slits provided on the surface of said flange, said plates or projections being so realized as to second the air flow without giving rise to whirwinds or hindrances to said flow.

Besides, always on the internal side of said mobile laminar element a restrain element with opposing plates or the like is provided, suitable to be snap-engaged in special seats obtained on the surface of said flange, so as to lock said element in a position of opening or total closing of the inlet window, according to need, said element being realized in such a way as to second the air flow without giving rise to whirlwinds or hindrances to said flow.

Through the translation of the laminar element on the inlet window, which translation may reach the complete closing of said window, one obtains

the adjustment of the air flow capacity as well as a depression in correspondence of the air intake suitable to assist the suction of hot air from within the helmet.

Always according to this invention, the fixed flange with the associated mobile laminar element is housed in a corresponding recess provided on the cap surface, so that the peripheral edge of the flange is aerodynamically connected with the cap surface, without surface dishomogeneities and/or discontinuities taking place. According to a variant of this invention, said fixed flange is tapered in the central part, forming in this way two slight symmetrical intendations, and its edge is raised relatively to the helmet surface, so as to create two additional symmetrical side windows for the air inlet in said duct.

Said additional inlet windows allow an air flow to pass through the duct, ensuring therefore the air exchange within the helmet even when the main inlet window is completely covered by the laminar element and closed, for instance by high speeds, for aerodynamic reasons.

According to a variant of this invention, within said duct, on the cap surface and before said air inlet, a baffle is positioned suitable to convey the air flow, to further improve the suction conditions in correspondence of the air intake.

Lastly, on the internal surface of said flange, longitudinal ribs are provided, so shaped and spaced relatively to one another as to keep the air flow always laminar and monodirectional, besides stiffening said flange.

Additionally or alternatively to the ribs provided on the flange, other ribs and/or grooves may be provided on the cap external surface, in correspondence of the area covered by said flange, in order to keep or contribute to keep laminar and monodirectional said air flow.

This invention is disclosed more in detail in the following, according to one preferred non exclusive embodiment, with reference to the enclosed drawings, given only by way of non limitative indication, wherein:

Fig. 1 is a schematic top view of the upper part of the crash helmet subject matter of this invention, with the internal ventilation device in the position of complete closing of the inlet window,

Fig. 2 is a median section along the A-A line of the upper part of the helmet of Fig. 1;

Fig. 3 shows, always schematically, the upper part of the helmet with the ventilation device of Fig. 1, in the position of opening of the inlet window,

Fig. 4 is a median section along the B-B line of the upper part of the helmet of Fig. 3,

Fig. 5 is a section along the C-C line of the upper part of the helmet of Fig. 3, while

Fig. 6 is a median section of the upper part of the helmet provided with an air baffle located inside the duct of the ventilation device.

With reference to the aforementioned figures, the helmet according to this invention is constituted by an external rigid cap 1, for instance from polycarbonate, composite material or the like, in whose inside the protection padding and the comfort padding - not shown in the figure - are associated.

Branched channels are provided inside the helmet according to various known techniques, for the circulation of cooling air, which are in communication with air intakes or holes on the front part of the helmet and/or in correspondence of the chin and the outlet opening for the exhaust of hot air.

According to this invention, the channels within the cap and the padding are in communication with the openings or air intakes 2, whose number ranges preferably from one to three and which are arranged on top of the cap, through which the hot air that has built up inside the helmet is sucked and then exhausted. Such air intakes may be arranged vertically, as shown on Figs. 2 and 4, or be inclined towards the back of cap 1, to facilitate the exhaust of hot air.

To obtain, according to this invention, a hot air suction through air intakes 2, above said air intakes the fixed flange 3 is positioned, substantially bent like cap 1, and kept spaced from cap 1 and so shaped as to form a duct suitable to transmit to an air flow coming in according to arrow N (Figs. 3 and 4) a speed increase in correspondence of air intakes 2, and therefore a localized pressure reduction which causes a draw of hot air from within the helmet at the mouth of the air intakes and its subsequent exhaust according to arrow M.

Said flange 3 has a shape converging towards the back end of the helmet, i.e. a substantially trapezoid shape, with the greater basis carrying the inlet window 4 looking towards the front of the helmet, and the smaller basis 5 looking towards the back.

Said flange has a streamlined shape, in order to obtain the best suction conditions and a laminar non turbulent flow.

The flange is fixed to the cap for instance by means of the butt pins 6 or other suitable means. On flange 3 the mobile sliding laminar element 8 constituted by a slider having a substantially trapezoid shape is positioned, which translates above the inlet window 4 through two couples of plates 9, 9a and 10, 10a, restrained and guided in the slits 7, 7a and 11 provided in flange 3. Said plates are restrained and guided in their relevant slits for instance by means of the protruding edges 12, or the like. The laminar element 8, which can be moved in both directions, forwards and backwards, is hand-operated on the upper surface of said

element which may be provided, to this pupose, with knurls or other suitable grip means suitable to facilitate said grip; the stable stop of element 8 is obtained, for instance, by means of a pin 13 translable in a slit 14.

The fixed flange 3, with the associated mobile laminar element 8 is housed in the recess 15 provided in the rigid cap.

According to a variant of this invention, flange 3 is tapered in a substantially central position and has two side indentations 16 and 16a, and besides the flange edge, in correspondence of said indentations, raises from the cap surface, so as to realize two additional symmetrical side inlet windows (not shown in the drawing) for the air in the duct.

Always according to a further variant of this invention, the ventilation device is provided with a substantially wedge-shaped baffle 20 positioned within the duct, which baffle cooperates to convey the air flow, improving and increasing in this way the suction conditions in correspondence of air intake 2.

Claims

1. Crash helmet for motorcyclists and the like, of the type provided internally with channels for the ventilation and cooling of internal air, characterized in that it comprises:

- at least an opening or air intake on top of the external rigid cap, in communication with said channels and obtained in the cap and the underlying protective layers;
- a fixed streamlined flange, positioned above said air intake, at a short distance from the cap external surface, so shaped as to create, between the cap and the flange, a duct whose section decreases towards the back of the helmet, which duct has a substantially trapezoid shape and an inlet window in correspondence of the greater basis and an outlet window in correspondence of the smaller basis, said duct being capable of allowing an air flow passing through it to locally assume, in correspondence of said air intake, a speed increase with a reduction in the local pressure such as to draw air from within the helmet up to the exhaust of said air intake;
- a mobile laminar element constituted by a slider longitudinally translable above said fixed flange, hand-adjustable in correspondence of said inlet window until it covers completely and closes said inlet window through the mating of the peripheral edge of said element with the cap surface.

2. Crash helmpet according to claim 1, characterized in that said mobile laminar element has a trapezoid or isosceles triangle shape, so that its perimeter follows the line of said underlying fixed flange, harmonizing with same from the aerodynamic aspect.

3. Crash helmet according to claim 1, characterized in that said laminar element is caused to be translable above said flange by means of plates or projections provided on the internal side of said element and slidingly engaged and guided in special slits or grooves provided on the surface of said flange, said plates or protrusions being so realized as to second the air flow without giving rise to whirlwinds or hindrances to said flow.

4. Crash helmet according to claim 1, characterized in that on the internal face of said mobile laminar element a restrain element is provided with opposing plates or the like, suitable to be snap-engaged in special seats provided on the surface of said flange, so as to lock said element in a position of opening or complete closing of the inlet window according to need, said element being so realized as to second the air flow without giving rise to whirwinds of hindrances to said flow.

5. Crash helmet according to claim 1, characterized in that said fixed flange with the associated mobile laminar element is housed in a corresponding recess provided on the cap surface, so that the peripheral edge of the flange is aerodynamically connected with the cap surface, without surface dishomogeneities and/or discontinuities taking place.

6. Crash helmet according to claim 1, characterized in that within said duct on the cap surface and before said air intake a baffle is positioned suitable to convey the air flow, improving further the suction conditions in correspondence of the air intake.

7. Crash helmet according to claim 1, characterized in that said fixed flange is tapered in the central part, so as to form two symmetrical slight side indentations, and its edge is raised relatively to the cap surface, forming in this way two additional symmetrical side windows for the inlet of air into said duct.

8. Crash helmet according to claim 1, characterized in that longitudinal ribs are provided on the lower surface of said flange, so shaped and spaced relatively to one another as to

keep in the duct between the flanges and the cap a monodirectional and laminar air flow, said ribs performing also the function of stiffening said flange.

9. Crash helmet according to claim 1, characterized in that longitudinal ribs and/or grooves are provided on the external surface of the cap, in correspondence of the area covered by said flange, to the purpose of cooperating to keep monodirectional and laminar said air flow.

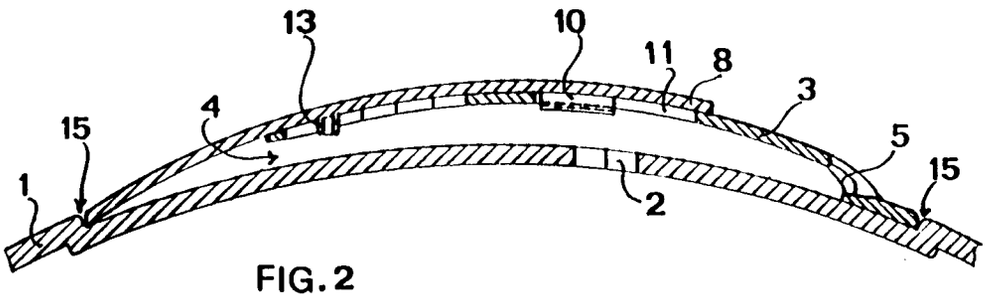

FIG. 2

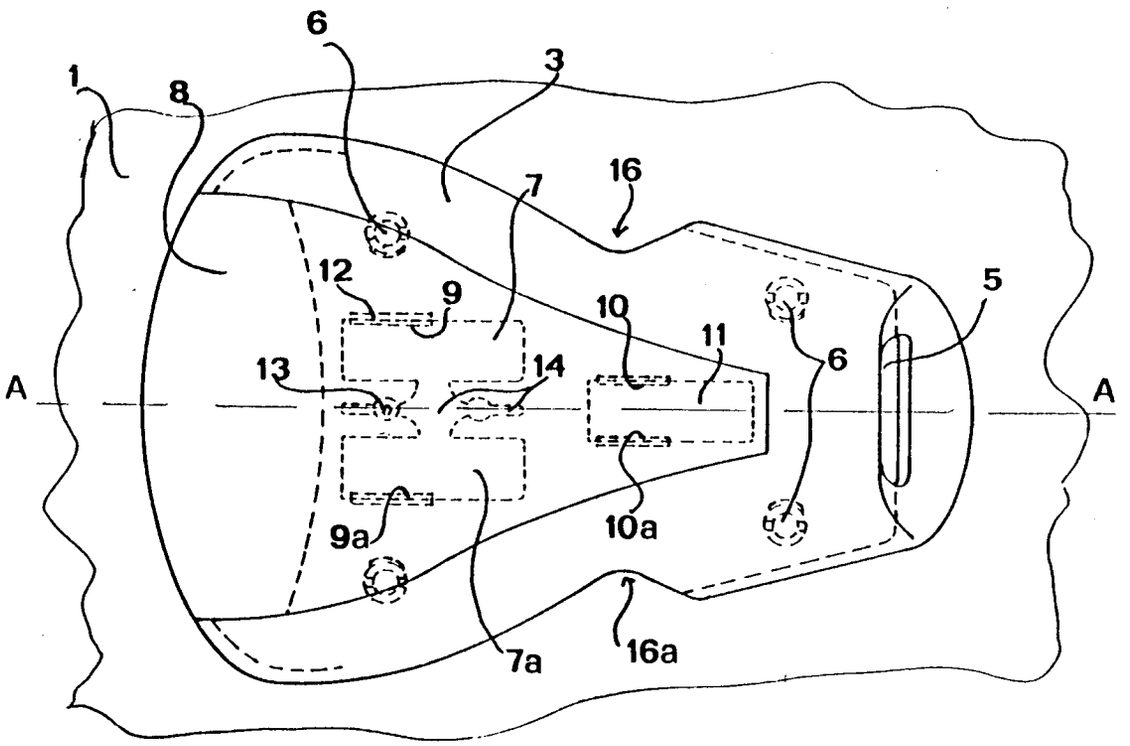

FIG. 1

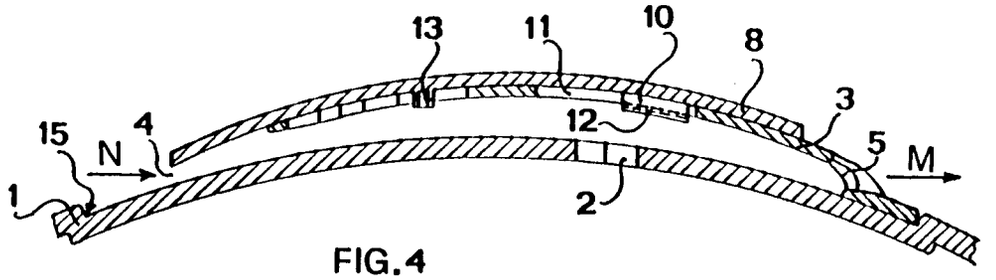

FIG.4

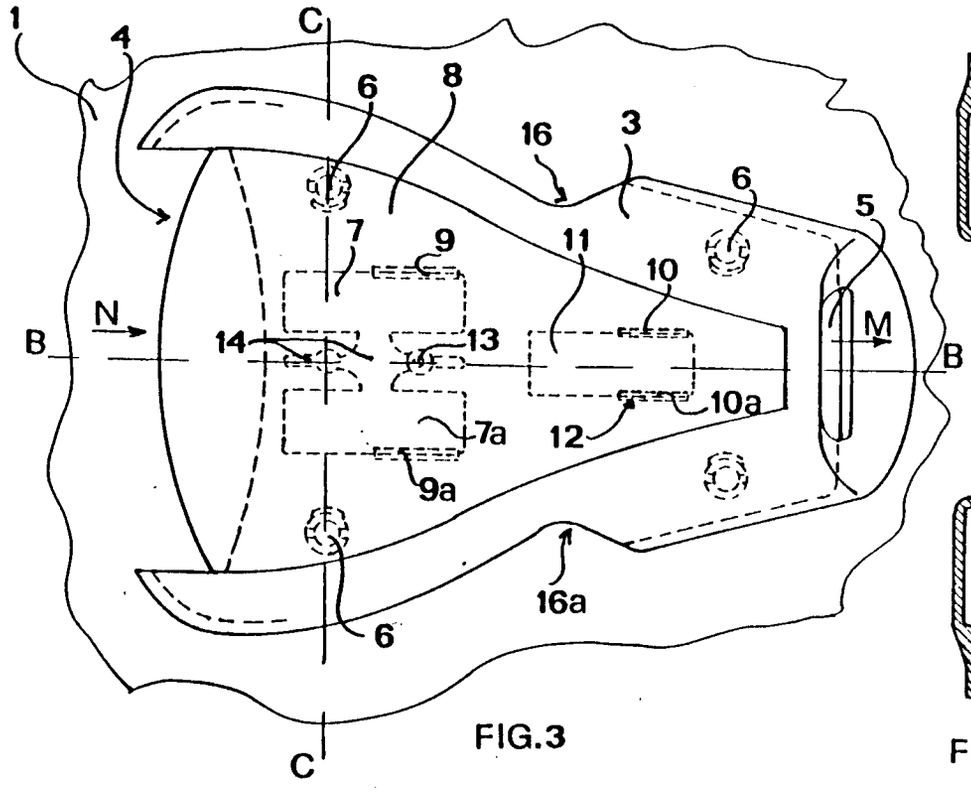

FIG.3

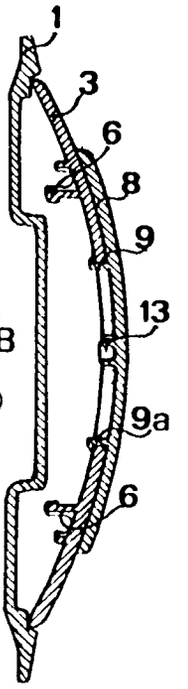

FIG.5

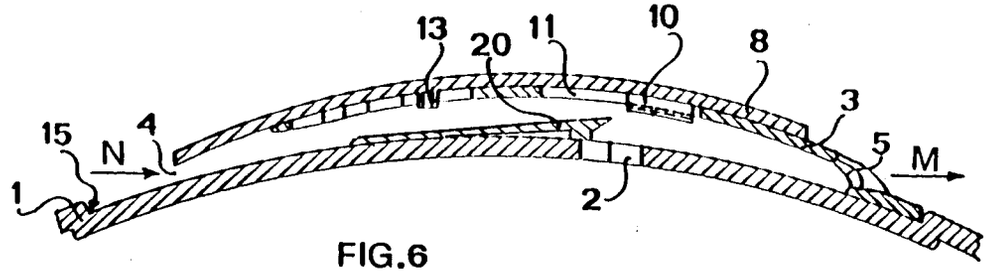

FIG.6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 40 1252

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.6)
D,A	US-A-3 496 854 (F. W. FELDMANN ET AL) * the whole document *	1-3,6,7	A42B3/28
A	JP-U-63 030 322 (.....) * figures 1,2,5,8,9 *	1,3,4	
D,A	EP-A-0 320 622 (NOLAN S.P.A.) * the whole document *	1,6,8,9	
A	EP-A-0 474 941 (SHOEI KAKO KABUSHIKI KAISHA)		
A	EP-A-0 571 065 (SHOEI KAKO KABUSHIKI KAISHA)		
A	EP-A-0 586 932 (F. M. FALLERT MOTOR GMBH & CO)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A42B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 December 1994	BOURSEAU, A

CATEGORY OF CITED DOCUMENTS

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