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(54) **Crash helmet provided with a visor**

(57) Crash helmet provided with a visor (1) housed flush, which visor is provided, at its left and right sides, with a visor-holder (2) substantially shaped as a circular section, which is properly formed and provided with sliding and locking means (18,19,20), said visor-holder (2) being elastically coupled to sliding means which allow

said visor (1) to perform simple and continuously combined multidirectional movements, said movements allowing said visor (1) to leave its peripheral seat, rotate rearwards, and clearing the visual field.

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Description

[0001] The present invention has as an object a crash helmet provided with a visor housed flush into the dome body.

[0002] As known, the protrusions of the visor profile from the crash helmet body, particularly but not exclusively those of the upper edge, generate a discontinuity of the visor/crash helmet dome profile, thus modifying the aerodynamic flows and preventing a proper operation and efficiency of the various air extractors, anyway they are located.

[0003] Another problem is that protrusions assist rain water infiltrations, particularly in case of poor impermeability of the visor/crash helmet assembly, in the following situations:

- when at a standstill, the protrusion acts as a conveying channel;
- when in motion, speediness and air dynamic pressure assist infiltrations, which dangerously interfere with the vision by trickling down the visor interior.

[0004] From tests conducted into the wind tunnel, it was recognized that only with a visor/crash helmet dome profile formed with a continuously convex pattern, optional recesses being properly linked and sized, the following results can be obtained:

- enhancement of aerodynamic penetration;
- decreased resistance index of the assembly, with consequent lower fatigue of the user neck muscles;
- reduction of turbulences to the minimum;
- reduction of noise;
- obtainment of a proper operation of the aerodynamic fittings.

[0005] Some arrangements of mechanisms, most of which by the same inventor, are already known and already solved the problem of the flush housed visor in the past.

[0006] However, all known solutions have the fastening and operative mechanism of the visor located laterally, into the area of ears, thus reducing that space reserved for:

- ears;
- impact deadening material;
- sound filtering systems.

[0007] The inventive idea on which the system is based is described in the present specification, and consists in that, by its application, the area of ears is free of mechanisms and can easily accommodate external ears, normally compressed in a very reduced space.

[0008] With a proper shape of the dome, the impact deadening material thickness can be further enhanced.

[0009] In addition, headsets can be best applied for

communication, as well as other useful devices for a surer use of the crash helmet.

[0010] Starting from the idea of clearing ears, it was envisaged as a solution a system which allows having:

- the visor in a closed position, flush to the dome;
- the visor operated in an intuitive and natural way, which can leave its seat and rotate around the ear area.

[0011] The rising and closing of the visor are performed with easy movements which are instinctive and usual, and once closed the visor remains into its seat surely and steadily.

[0012] Such aims are achieved by a crash helmet provided with a visor housed flush into the dome body, according to claim 1, to which we refer for concision.

[0013] Further important features of the invention are pointed out into the following claims.

[0014] Hereafter, some feasible technical solutions of the basic inventive concepts, which are the object of the invention, are described with reference to the attached drawings.

- Fig. 1 shows a partial sectional side view of a crash helmet visor according to the present invention;
- Fig. 2 shows a detail in a sectional view taken along line A-A' of fig. 1;
- Fig. 3 shows a partial sectional view of a crash helmet provided with a visor according to the present invention;
- Fig. 4 shows a detail in sectional view of the upper visor profile, and fig. 4bis shows a second form of such an element;
- Fig. 5 shows a detail in sectional view taken along line C-C' of fig. 1 in a first operating position, and fig. 6 shows a detail in sectional view taken along line C-C' of fig. 1 in a second operating position;
- Fig. 7 shows a detail in sectional view of the visor sliding elements in an alternative embodiment of the present invention;
- Fig. 8 shows a detail in sectional view of fig. 7 in a first operating position, and fig. 9 shows a detail in sectional view of fig. 7 in a second operative position;
- Fig. 7bis shows a detail in sectional view of the visor sliding elements in a further embodiment of the present invention;
- Fig. 8bis shows a detail in sectional view of fig. 7bis in a first operation position;
- Fig. 7tris shows a detail in sectional view of the visor sliding elements in a further embodiment of the invention;
- Fig. 8tris shows a detail in sectional view of fig. 7bis in a first operating position;
- Fig. 10 shows a partial sectional side view of the inventive visor for crash helmets, in which a hand is also drawn while acting to show the opening system;
- Fig. 10bis shows a detail of the crash helmet visor

according to the present invention, and figg. 10ter, 10quater, and 10quinques show modifications of said detail in sectional view.

[0015] Fig. 1 shows a partial sectional side view of a crash helmet visor 1 according to the present invention, which is mounted into two visor-holding sections 2SX and 2DX, and which in its closed position is flush to the dome 3 and follows its shape, thus forming a continuous ideal line.

[0016] A lateral profile 4 of the visor-holder 2, also visible in section A-A' of fig. 2, comprises a spoiler 5 which, properly shaped, deviates the air flow flowing onto lateral surfaces, thus forming a detachment area 6.

[0017] The detachment area 6 acts as an insulator, thus allowing to reduce rustling noise perceived by the ears and caused by the air flowing onto the surface.

[0018] The crash helmet thus becomes more silent and the driver is able to better perceive the traffic noise, enhancing driving security and comfort.

[0019] The visor 1, which in its closed position is flush and fitted into its peripheral seat, in order to rise has to:

- leave its peripheral seat where it lies;
- contemporarily move upwards and backwards.

[0020] When the user naturally acts on the lower front protrusion "a" of fig. 1, pushing upwards the visor 1, all the provisions envisaged by the invention to allow the visor leaving its seat and rotating, which are hereafter described, become operative.

[0021] The upper bevelled profile 7 of the visor 1 has a particular pattern which matches with a corresponding bevel of the upper edge 8 of the crash helmet.

[0022] These, which work urged in contrast with each other, allow both rising and enlarging of the visor 1, which frees from its upper seat and partially also from its lateral seat.

[0023] The rising of the visor 1 simultaneously drives a carriage shown in fig. 1, which, due to its spring coupling, that is a spring 10 and an articulated connecting rod 14, moves forwards and outwards the visor 1 and visor-holder 2 assembly, thus clearing completely the visor 1 from left and right lateral seats.

[0024] Particularly, the carriage has an articulated connecting rod 14, to which is linked a spring 10 that, according to a preferred embodiment of the invention, ends with wheels 16.

[0025] In fig. 1 is also shown the upper articulation point 15 of the articulated connecting rod 14.

[0026] At the same time, with the assistance of two rollers 19, proper supporting/sliding means 18 and 20 are laid and positioned on a profile 35 shaped as a circular section, on which said sliding means slide while keeping the visor 1 raised and detached when moving upwards and rearwards.

[0027] Particularly, numbers 18, 19 and 20 designate visor sliding and locating wheels, thus indicating as a

whole said supporting/sliding means.

[0028] At the end of travel, the sliding wheels 19 locate into proper seats and keep the raised visor fixed.

[0029] A cover 17 is provided, which cover has a compliant portion 17bis that, when the visor is closed, is flush to the dome profile and acts to make the carriage with its articulated connecting rod pass and return to the aesthetic position when the visor 1 closes.

[0030] In fig. 1 is also visible an elastic clip 22 adapted to lock and release the visor 1, a "salami slice shaped" anchorage 23 to lock the visor 1, and a hook 24 (both at left and right) to fit in the visor 1.

[0031] The lowering of the visor 1 causes the reverse repetition of the above-said movements, and brings back the visor to its ordinary seat in closed position, flush to the dome body of the crash helmet.

[0032] In that way the leaving forwards and outwards movements from the fit-in seats 24 are easily performed, as well as the subsequent rotation upwards and rearwards, and the following closing operation, all with a natural, smooth and continuous movement.

[0033] In order to assist the visor in leaving the seat where it lies, its upper profile is bevelled with a proper slope which matches with an equivalent angle of the upper edge of the crash helmet dome 3.

[0034] In order to avoid possible abrasion unwanted effects thereof, the edge 8 is made of an anti-friction material.

[0035] The edge 8 is concurrently the seat of some portions of the visor 1, the water-tight seal 9 and the lateral profile 4 of the visor-holder 2, thus allowing an easier and more accurate manufacture thereof, particularly in cases of composite domes.

[0036] Being properly shaped, the edge 8 (also shown in fig. 4bis) can also represent and gather into a single piece the upper grid 11 for air suction, the seat of the coupling 12 of the quill 13 for the removable and washable interior, as well as the seat of the air and water-tight seal.

[0037] It is now described the visor edge made of an elastomeric material of the invention, first remarking that usually visors have a tab "a" protruding outwards (visible in fig. 10tris) which is applied or is part of the lower edge of the visor 1.

[0038] A further embodiment (fig. 10quater) envisages that the edge material is comprised of a properly thick spongy technopolymer 33, which is sufficiently pliable to the pressure applied by a finger, in order to provide a finger support surface, and sufficiently compliant to resume its originary shape and function.

[0039] Fig. 10quinques shows a further embodiment relating to the rising of visor 1, in which it is also visible an elastomeric or technopolymer edge 34 including the nose mask.

[0040] To avoid having a protrusion while having everything flush, the lower edge 29 of the crash helmet visor is made of an elastomeric material and is designed to be easily pliable to pressure applied by a finger.

[0041] Said finger (normally the inch, also gloved) can thus deform the profile at any point, also fixed according to a selection (normally the front), by applying a gentle pressure, and penetrate sufficiently to reach the hold needed to rise the visor.

[0042] The elastomeric edge 29, as described, allows the following outcomes:

- the support base of the lower edge of visor 1 is compliant, thus perfectly adapting, if provided with the correct size, to the profile of the visor 1;
- in this way a surer tight to air and water can be obtained;
- there is no protrusion, thus no generation of turbulences;
- the user, being him/her right or left-handed, can rise the visor 1 from any point of the lower perimeter thereof, not being required to search for the tab, which is not always visible when wearing the crash helmet.

[0043] Now it will be described an alternative mechanism for moving away the visor and making it to go out from its lateral seat, while moving upwards.

[0044] The system shown in figg. 7-9 differs from the system of the figure in the shape of the coupling between the visor-holder 2 and the retaining/sliding carriage, and in the shape of the carriage.

[0045] In the present case, the carriage is substantially comprised of a sole spring wire 10, which with its particular pattern performs more functions at the same time, that is:

- it retains at its ends the sliding means (slider 26 or roller 16, both indicated in the figure by way of example);
- it has one or more turns 25 to the right and left sides of its central stem, which push the visor-holder 2 and visor 1 assembly outwards, and keep it in an enlarged position, shown in fig. 9, during the opening and closing movements;
- its central stem firmly couples to a portion 28 made of an anti-friction technopolymer, which is properly shaped to push the visor-holder 2 and visor 1 assembly outwards and receive and retain the spring 10 in a fixed position, that is not allowing a free articulation at this point;
- the technopolymer portion has, at its upper portion, the seat of the coupling pin, and a free rotation point 27 with the visor-holder 2, in order to allow the visor-holder 2 to leave laterally, while keeping parallelism to the exit plane, as also shown in fig. 9.

[0046] Fig. 7bis shows a detail, in sectional view, of the visor sliding elements in a further embodiment of the invention.

[0047] Particularly, it can be seen the spring 10, in which the central stem couples to a portion 28bis made

of an anti-friction technopolymer.

[0048] Fig. 7tris shows a further modification of the elastic coupling for allowing movements between the visor-holder 2 and the crash helmet, in which said elastic coupling is comprised of a properly shaped spring 10tris, which couples the visor-holder 2 to the retaining/sliding system of visor 1.

[0049] Such a component performs the function of retaining runners or wheels in their seat, the function of multidirectional elastic connection and, thanks to its cam shape 40, drives the portion 2tris outwards and represents a fixed point for connection during rotation phases.

[0050] The invention is not limited only to crash helmets for motor sports: it can be of interest and advantage for any kind of crash helmet, also when a high level of impact deadening is not required by rules, as for example for sky, climbing, horse-riding, skating, flying helmets, and others.

[0051] The present invention is therefore liable to many modifications and changes, all within the inventive concept expressed in the attached claims, while technical details can vary as needed.

[0052] All cited dimensions, parametric values and physical quantities, as well as the used materials, should be meant as non-limiting examples of the invention features.

List of components forming the flush visor assembly

[0053]

1. Visor
2. Visor-holder, right side 2.dx, and left side 2.sx
3. Crash helmet dome
4. Lateral profile of the visor-holder
5. Spoiler for flow deviation
6. Low rustling noise region
7. Sloped planes of the visor upper edge and dome edge
8. Anti-friction material edge
9. Air and water-tight seal
10. Carriage spring
11. Passage opening for the air drawn into the crash helmet
12. Squill for retaining the removable interior
13. Elastic profile for retention of the removable interior squill
14. Articulated connecting rod
15. Upper articulation point of the connecting rod
16. Wheels applied to the spring
17. Cover
- 17bis. Elastic portion of the cover to let the connecting rod pass
18. Sliding and positioning wheel of the visor-holder
19. Sliding and supporting wheel of the visor-holder
20. Sliding, supporting and positioning roller of the visor-holder
21. Lower left and right fit-in lip of the visor-holder

- 22. Elastic clip for locking and releasing the visor
- 23. Salami slice shaped anchorage for locking the visor
- 24. Left and right fit-in hook of the visor
- 25. Left and right spring turn
- 26. Sliding runner made of anti-friction material
- 27. Locking pin of the delta spring stem
- 28. Hinge coupling the spring and the visor-holder, having only one free rotation point
- 29. Elastomeric edge
- 30. Gap for holding the visor edge
- 31. Drawing of an opening hand
- 32. Lower edge of the visor
- 33. Detail made of a closed cell technopolymer, which is pliable and compliant
- 34. Edge made of an elastomer or technopolymer, including the nose mask
- 35. Profile of the visor-holder shaped as a circular section
- 40. Cam portion

Claims

1. Crash helmet provided with a visor (1) housed flush, **characterized in that** said visor (1) is provided, at its left and right sides, with a visor-holder (2) substantially shaped as a circular section, which is properly formed and provided with sliding and locking means, said visor-holder (2) being elastically coupled to sliding means which allow said visor (1) to perform simple and continuously combined multidirectional movements, said movements allowing said visor to leave its peripheral seat, rotate rearwards, and clearing the visual field.
2. Crash helmet provided with a visor according to claim 1, **characterized in that** it envisages a lateral profile (4) of said visor-holder (2), in which said lateral profile (4) comprises in its shape a spoiler (5), which is properly formed to deviate the air flow flowing on lateral surfaces, thus forming a detachment area (6) functioning as an insulator and allows reducing rustling noise perceived by the ears and caused by the air flowing on the surface.
3. Crash helmet provided with a visor according to claim 1 or 2, **characterized in that** said visor (1) envisages an upper bevelled profile (7) shaped to match with a corresponding bevel of the upper edge (8) of the crash helmet, so that these, which work urged in contrast with each other, allow both rising and enlarging of the visor (1), which frees from its upper seat and partially also from its lateral seat.
4. Crash helmet provided with a visor according to claim 3, **characterized in that** said edge (8) is made of an anti-friction material and is concurrently the seat of portions of the visor (1), the water-tight seal (9) and the lateral profile (4) of the visor-holder (2).
5. Crash helmet provided with a visor according to claim 4, **characterized in that**, being properly shaped, said edge (8) can also represent and gather into a single piece the upper grid (11) for air suction, and the seat of the coupling (12) for the quill (13) of the removable and washable interior.
6. Crash helmet provided with a visor according any previous claim, **characterized in that** the rising of the visor (1) simultaneously drives a carriage provided with spring means (10) and articulation means (14), in order to move forwards and outwards the visor (1) and visor-holder (2) assembly, thus freeing completely said visor (1) from its left and right lateral seats.
7. Crash helmet provided with a visor according to claim 6, **characterized in that** the spring means (10) and articulation means (14) of said carriage are respectively comprised of a spring (10) ending with wheels (16) at its ends, and an articulated connecting rod (14).
8. Crash helmet provided with a visor according to any previous claim, **characterized in that** said visor (1) and visor-holder (2) assembly has supporting/sliding means (18, 20) which are laid and positioned on a profile (35) shaped as a circular section, on which profile (35) said sliding means (18-20) slide while keeping the visor (1) raised and detached when moving upwards and rearwards.
9. Crash helmet provided with a visor according to claim 8, **characterized in that** said supporting/sliding means (18, 20) provide sliding and locating wheels (18-20) of said visor-holder (2), in which at the end of their travel, the sliding wheels (19) locate into proper seats and keep the raised visor (1) fixed.
10. Crash helmet provided with a visor according to claim 8 or 9, **characterized in that** it provides a cover (17) having a compliant portion (17bis) that, when the visor (1) is closed, is flush to the dome profile and acts to make the carriage with its articulated connecting rod pass and return to the aesthetic position, thus resuming the ideal line flush to the dome.
11. Crash helmet provided with a visor according to claims 7-10, **characterized in that** it provides elastic clips (22) adapted to lock and release the visor (1), anchorages (23) to lock the visor (1), and hooks (24) to fit in the visor (1) without using any tool.
12. Crash helmet provided with a visor according to any previous claim, **characterized in that** it provides a

visor edge made of an elastomeric material which aids raising the visor (1) while acting on the protruding tab applied to the lower edge of the visor (1).

13. Crash helmet provided with a visor according to claim 12, **characterized in that** said visor edge is comprised of a properly thick spongy technopolymer (33), which is sufficiently pliable to the pressure applied by a finger to allow leaning a finger, and sufficiently compliant to resume its originary shape and function. 5
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14. Crash helmet provided with a visor according to claim 12 or 13, **characterized in that** it further provides an edge (34) made of an elastomer or a technopolymer, which includes a nose mask. 15

15. Crash helmet provided with a visor according to claim 12-14, **characterized in that** it further provides a lower edge (29) of the crash helmet visor made of an elastomeric material and designed to be easily pliable to a pressure applied by a finger. 20

16. Crash helmet provided with a visor according to any previous claim, **characterized in that** said carriage provides a single spring wire, which retains at its ends the sliding means and is provided with one or more turns (25) to the right and left sides of its central stem, which push the visor-holder (2) and visor (1) assembly outwards, and keep it in an enlarged position during the opening and closing movements; and **in that** the central stem of said spring (10) firmly couples to a portion (28) made of an anti-friction technopolymer, which is properly shaped to push the visor-holder (2) and visor (1) assembly outwards and receive and retain the spring (10) in a fixed position. 25
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17. Crash helmet provided with a visor according to claim 16, **characterized in that** it provides, into the seat of the coupling pin, a free rotation point (27) with the visor-holder (2), in order to allow the visor-holder (2) to leave laterally, while keeping parallelism to the exit plane. 40

18. Crash helmet provided with a visor according to claim 16, **characterized in that** it provides a spring (10bis) into said carriage, the stem of which spring couples with a portion (28bis) made of an anti-friction technopolymer, where said spring (10bis) is patterned without turns but with a bend (25bis) which is co-moulded with said portion (28bis) by anti-friction technopolimer. 45
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19. Crash helmet provided with a visor according to claim 16, **characterized in that** it provides an elastic coupling comprised of a properly shaped spring (10tris), which couples the visor-holder (2) to the retaining and sliding system of visor (1) and performs 55

the function of retaining runners or wheels in their seat, the function of multidirectional elastic connection and, thanks to its cam shape (40), drives the portion (2tris) outwards and represents a fixed point for connection during rotation phases.















