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(54) **PROTECTIVE HELMET AND FACE-SHIELD**

SCHUTZHELM UND GESICHTSSCHUTZ

CASQUE DE PROTECTION ET ÉCRAN FACIAL

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EP 2 806 760 B1

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates generally to breathing masks and helmets for use in various situations and environments, and in particular to a protective helmet equipped with a moveable face-shield.

Description of the Related Art

[0002] Some persons, e.g., firefighters, are required to wear a helmet for protection. A helmet typically includes a shell to protect the head, which has a face opening opposite the wearer's face, and a face-shield to protect the face. The face-shield is generally mounted on the shell so that it is moveable between a lowered position in which the face-shield extends opposite the face opening, and a raised position in which the face opening is substantially bared. The wearer is therefore able to place the face-shield in the raised position when circumstances do not require protection for the face, or when it is desired to remove the helmet. Conversely, the face-shield can be lowered when the face must be protected.

[0003] The face-shield is conventionally mounted on the shell so that it pivots about an axis transverse to the helmet, located in the vicinity of the wearer's ears when in position of use. US 3 543 308 and FR 2 595 921 disclose examples of such helmets equipped with pivoting face-shields. However, such existing arrangements have a certain number of disadvantages.

[0004] First, the mounting and removing operations of the face-shield most often require tooling, time, and some experience in the operation. Dissassembly of the helmet itself may even be necessary to remove the face-shield and to mount another in its place. These operations, which for firefighters are performed by the technical department of the fire station, are therefore restrictive, in particular, in terms of time.

[0005] In addition, the assembly of the face-shield onto the shell about a pivot axis translates as a relatively cumbersome mechanism located within the helmet at the wearer's ear level. It follows that the space free for housing ear protections is reduced which may cause discomfort in some situations. Further, the face-shield must be located at a sufficient distance away from the face so that its pivoting movement about an axis is possible. As a result, in some situations, the face-shield may not efficiently protect the wearer, in particular, from upward projections in the direction of the face, which pass through the relatively large space existing between the face and the bottom of the face-shield.

SUMMARY OF THE INVENTION

[0006] Generally, provided is a protective helmet and

face-shield that addresses and/or overcomes some or all of the potential drawbacks associated with existing helmets utilizing or including face-shields and similar arrangements.

[0007] For this purpose, and according to a first preferred and non-limiting embodiment, provided is a protective helmet according to claim 1.

[0008] Therefore, according to this preferred and non-limiting embodiment, the connection of the face-shield in relation to the shell allowing the movement of the face-shield between raised and lowered positions is obtained by the sliding of connecting members in two lateral slides. With this arrangement, it is possible to limit the number of parts in the connecting arrangement and therefore to simplify the assembly of the face-shield with the shell both on the assembly line and later when a face-shield is replaced. In addition to faster assembly, another advantage is that the risk of improper mounting of the face-shield is considerably reduced.

[0009] In one preferred and non-limiting embodiment, the helmet facilitates the replacement of a face-shield (i.e., removing an existing face-shield and mounting a new one) that is easier, quicker, and more intuitive, and which may not require tooling. This replacement can therefore be performed by users themselves. Advantageously, since there are no losable parts, this operation is further facilitated. Also, the connecting arrangement is not cumbersome and allows significant space to be freed at the side portions of the shell, of which advantage can be drawn to preferably house ear protection inside the shell. Still further, a reduction in the volume outside the shell is provided, primarily due to the fact that there are no projecting connections, thereby reducing risks that the helmet may catch on various outside elements.

[0010] In a further preferred and non-limiting embodiment, the inventive helmet proves to be more robust and more reliable than existing helmets, in particular, during face-shield replacement operations, and the risks of loss of parts and/or damage to the face-shield being considerably reduced.

[0011] As discussed hereinafter, and in one preferred and non-limiting embodiment, the phrase "symmetric relative to the longitudinal plane of symmetry" indicates that the slides are of identical shape and are arranged opposite one another. In particular, the slides, which may cross through the shell transversely, may globally be in the form of an arc of a circle. For example, at least part of the slide and preferably the majority of the slide, substantially forms a quarter circle whose center lies substantially opposite a wearer's ear, when in position of use.

[0012] In one preferred and non-limiting embodiment, the connecting members can include at least one main portion extending substantially transversally towards the shell. As regards the slides, they can open substantially transversally towards the face-shield, which allows reducing the number of component parts of the slide.

[0013] Having the face-shield mounted inside the shell and the connecting members projecting outwardly from

the side wings of the face-shield is advantageous in that the face-shield, when in raised position, is protected inside the shell and there is therefore less risk that it may be damaged.

[0014] The face-shield may be designed so that it can be elastically deformed in order to modify the cross distance between the two side wings. In the particular case in which the face-shield is mounted inside the shell, the face-shield can be designed to allow the two side wings to be drawn near to each other. The face-shield can be elastically deformed by a user to allow the engaging of the connecting members of the face-shield into the slides of the shell. Elastic deformation of the face-shield can also be obtained when moving the face-shield between its raised and lowered positions. This can be obtained by choosing a suitable face-shield thickness and/or constituent material. In another preferred and non-limiting embodiment, provided are connecting members which retract when being placed in position and then return to their projecting position.

[0015] In one preferred and non-limiting embodiment, each slide includes an upper part and a lower part, with the lower part being arranged in the continuity of the upper part, meaning that the upper end portion of the lower part substantially coincides with a theoretical prolongation of the lower end portion of the upper part.

[0016] The rear end of the slide upper part is preferably located substantially above the user's ear, when the helmet in the position of use, i.e., in the position it occupies when placed on the head of a wearer standing straight, said slide upper part not extending further rearward.

[0017] Provision may be made for the upper part of the slide and the main portion of the lower part of the slide to form substantially a quarter circle whose center lies substantially opposite one ear of the wearer, in position of use. However, it is to be noted that the upper part and the main portion of the lower part are not necessarily coaxial, or even of the same radius.

[0018] Providing an upper connecting member and a lower connecting member which are separate and which are received respectively in an upper part and a lower part of the slide is advantageous in that it makes it possible to appropriately design the shape of the slide upper and lower parts in order to get the desired movement of the face-shield. A wider range of movements are therefore possible for the face-shield, depending on the slide configuration.

[0019] According to a preferred and non-limiting embodiment, each slide includes an upper part intended to receive the upper connecting member, and a lower part intended to receive the lower connecting member, where the upper and lower parts of the slide are separated by a bridge of material, which is capable of cooperating with the upper connecting member when the face-shield is in lowered position and/or with the lower connecting member when the face-shield is in raised position. The bridge of material may therefore form an abutment member and/or locking member for at least one of the connecting

members.

[0020] At least one upper connecting member may be mobile between a locking position in which this member cooperates with the shell so as to prevent this member from moving out of the corresponding slide, and a released position allowing this member to move out of the slide. For example, this member may cooperate with the bridge of material if such is provided. The movement of this member towards and/or from its locking position may require a tool. This may be useful in some cases in which it is desired to prevent non-authorized persons from removing the face-shield.

[0021] For example, the upper connecting member may have an end face forming an inclined ramp able to cooperate with the bridge of material when the upper connecting member is in released position and the face-shield is lowered, in order to cause the corresponding side wing of the face-shield to be drawn away from the shell, and thereby to cause the upper connecting member to move out of the slide. In this manner, "automatic" disengaging of the face-shield is obtained. If the face-shield is mounted inside the shell, the end face faces outwardly and the two wings of the face-shield are drawn together under the action of the drawing away of a wing from the shell caused by the ramp.

[0022] Provision may be made for the upper connecting member to include a pin projecting substantially orthogonally from the side wing of the face-shield in the direction of the shell when in position of use, and an end lug substantially orthogonal to the pin, the upper connecting member being pivotally mounted on the face-shield about the axis of the pin so that, in locked position, one region of the shell adjacent the slide is substantially gripped between the said end lug and the side wing of the face-shield. The region of the shell is thereby sandwiched for locking and can be formed of the bridge of material if such is provided.

[0023] It is possible, for example, to make provision so that the upper connecting member is able to pivot by about 180° between its released and locked positions, while remaining substantially within the axis of the upper part of the slide in the said two positions. In one aspect, with a face-shield mounted inside the shell, the pin projects outwardly and the inclined ramp if provided corresponds to the side of the end lug lying opposite the side wing, hence outside.

[0024] Advantageously, the lower part of each slide includes an additional portion which extends the main portion of the slide from its lower end towards the rear. This makes it possible to move the face-shield towards the wearer's face at the end of the face-shield lowering movement. In this way, face protection is improved. However, the helmet remains adapted to the wearing of glasses. Similarly, a user may wear a mask with the helmet of the invention. In this case, the user may place the face-shield in an intermediate position opposite the face but not drawn close to the face.

[0025] Provision can be made for the lower connecting

member to include a pin projecting substantially orthogonally from the side wing of the face-shield in the direction of the shell when in position of use, and an end lug which is substantially orthogonal to the pin and arranged so that, in mounted position of the face-shield (substantially irrespective of the position of the lower connecting member on its sliding pathway in the slide when the face-shield is moved between its raised and lowered positions) one region of the shell adjacent the slide is substantially gripped between the said end lug and the side wing of the face-shield. This sandwiched region of the shell may be formed of the peripheral region of the lower part of the slide. For mounting and removing the face-shield, it must be provided to orient the lug substantially parallel to the slide for example so that this lug is no longer in contact with the shell.

[0026] According to one preferred and non-limiting embodiment, the lower connecting member may be fixedly mounted on the face-shield. By making provision so that the orientation of the face-shield relative to the shell changes when mounting the face-shield, the lower connecting member can be substantially oriented parallel to the slide when it is engaged in the slide, and then progressively turned so that it comes to cooperate with the region adjacent the slide. In addition, the helmet may include an arrangement for holding the face-shield in the position it occupies, so that the face-shield does not fall when it is in raised or intermediate position. Said face-shield holding arrangement is preferably distinct from the upper and lower connecting members and from the slides. Typically, the face-shield holding arrangement includes abutment, friction and/or deformation members capable of cooperating with at least one of the connecting members. The face-shield holding arrangement may include an elastic return member or arrangements, for example, arranged to maintain at least one connecting member in contact by friction against an edge of the corresponding slide.

[0027] For example, the helmet may include at least one spring mounted on a side portion of the shell, behind the slide, the spring having a front portion, which extends along the rear edge of the slide and which is arranged to push the corresponding lower connecting member forwardly against the front edge of the slide, substantially irrespective of the position of the lower connecting member on its sliding pathway in the slide when the face-shield is moved between its lowered and raised positions.

[0028] As a variant, this holding of the face-shield's position could be ensured at least partially through the use of an elastomer or elastomeric member, for example. Provision may be made so that shell, in each of its side portions, includes a recess in which the slide is arranged, at least in part, the shell additionally in the form of a plate covering this recess at least in part.

[0029] In a further preferred and non-limiting embodiment, provided is a method for placing a face-shield in position on a shell of a protective helmet such as previously described, the method including the steps of: the

face-shield being tilted forwardly relative to the shell, engaging the lower connecting members in the corresponding slide; sliding the lower connecting members downwardly into the said slide; tilting the upper part of the face-shield backwards towards the shell; and engaging the upper connecting members in the corresponding slides. A subsequent locking step may also be provided.

[0030] In one preferred and non-limiting embodiment, provided is a protective helmet, including: a shell defining a face opening and having left and right side portions; a slide arranged on each of the side portions of the shell, wherein the slides are symmetrical relative to a longitudinal plane of symmetry of the shell; a face-shield having a central portion and mounted on the shell and configured to move between a lowered position in which the face-shield extends opposite the face opening and a raised position in which the face opening is substantially bared; and two side wings on the face-shield, each having at least one upper connecting member and at least one lower connecting member; wherein the connecting members are configured to engage in a corresponding slide of the shell to guide the movement of the face-shield between the lowered position and the raised position.

[0031] In another preferred and non-limiting embodiment, provided is a method for placing a face-shield in position on a shell of a protective helmet including: a shell defining a face opening and having left and right side portions; a slide arranged on each of the side portions of the shell, wherein the slides are symmetrical relative to a longitudinal plane of symmetry of the shell, wherein a face-shield having a central portion and mounted on the shell and configured to move between a lowered position in which the face-shield extends opposite the face opening and a raised position in which the face opening is substantially bared; and two side wings on the face-shield, each having at least one upper connecting member and at least one lower connecting member; and wherein the connecting members are configured to engage in a corresponding slide of the shell to guide the movement of the face-shield between the lowered position and the raised position. The method includes: tilting the face-shield forwardly relative to the shell; engaging the lower connecting members in a corresponding slide; sliding the lower connecting members downwardly in the slide; tilting the upper part of the face-shield towards the rear to place it close to the shell; and engaging the upper connecting members in the corresponding slides.

[0032] In a still further preferred and non-limiting embodiment, provided is a protective helmet, including: a shell defining a face opening and having left and right side portions; a slide arranged on each of the side portions of the shell; a face-shield having a central portion and mounted on the shell and configured to move between a lowered position in which the face-shield extends opposite the face opening and a raised position in which the face opening is substantially bared; and at least one side wing on the face-shield, the at least one wing having at least one upper connecting member and at least one

lower connecting member; wherein the connecting members are configured to engage in a corresponding slide to guide the movement of the face-shield between the lowered position and the raised position.

[0033] These and other features and characteristics of the present invention, as well as the methods of operation and functions of the related elements of structures and the combination of parts and economies of manufacture, will become more apparent upon consideration of the following description and the appended claims with reference to the accompanying drawings, all of which form a part of this specification, wherein like reference numerals designate corresponding parts in the various figures. It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only and are not intended as a definition of the limits of the invention. As used in the specification and the claims, the singular form of "a", "an", and "the" include plural referents unless the context clearly dictates otherwise.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034]

Fig. 1 is a side view of a shell for a helmet according to the principles of the present invention;

Fig. 2 is a front view of a face-shield according to the principles of the present invention;

Fig. 3 is a side view of the face-shield of Fig. 2;

Fig. 4 is a cross-sectional view of a helmet along the median longitudinal plane, from the inside, showing the shell and the face-shield in lowered position, and the connecting arrangement between the shell and the face-shield, according to the principles of the present invention;

Fig. 5 is a detailed view of the side portion of the shell of Fig. 4;

Figs. 6-8 are side views illustrating successive steps for mounting the face-shield on the shell according to the principles of the present invention;

Fig. 9a is a side view of an assembled helmet according to the principles of the present invention, with the face-shield being in a lowered, non-locked position;

Fig. 9b is a detailed view of a portion of the assembled helmet of Fig. 9a;

Fig. 10a is a side view of a mounted helmet according to the principles of the present invention, with the face-shield being in a lowered, locked position;

Fig. 10b is a detailed view of a portion of the mounted helmet of Fig. 10a;

Fig. 11 is a side view of a helmet according to the principles of the present invention, where the face-shield is in a raised position;

Fig. 12 is a side view of the helmet of Fig. 11, where the face-shield is in a first intermediate position;

Fig. 13 is a side view of the helmet of Fig. 11, where the face-shield is in a second intermediate position;

Fig. 14 is a side view of the helmet of Fig. 11, where the face-shield is in a lowered position; and

Fig. 15 is a side view of a part of a slide intended to be mounted on a shell of a helmet according to the principles of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0035] For purposes of the description hereinafter, the terms "end", "upper", "lower", "right", "left", "vertical", "horizontal", "top", "bottom", "lateral", "longitudinal" and derivatives thereof shall relate to the invention as it is oriented in the drawing figures. However, it is to be understood that the invention may assume various alternative variations and step sequences, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following specification, are simply exemplary embodiments of the invention. Hence, specific dimensions and other physical characteristics related to the embodiments disclosed herein are not to be considered as limiting.

[0036] The present invention relates to a helmet and a face-shield and a method of positioning a face-shield on the shell of a helmet, as illustrated in certain preferred and non-limiting embodiments in Figs. 1-14.

[0037] A helmet 1 according to one preferred and non-limiting embodiment includes a rigid shell 2 and a face-shield 3. The helmet 1 may also include an eye shield and an impact cap, headgear intended for wearer comfort, an adjustable head band and a chin strap (not illustrated). The shell 2 illustrated in Fig. 1 is intended to cover the wearer's head, and is made for example from a composite or thermoplastic material. The shell 2 has a longitudinal plane of symmetry P.

[0038] According to one preferred and non-limiting embodiment, the helmet 1 in the position of use, i.e., in the position it occupies when placed on the head of a wearer standing straight, is illustrated in Fig. 14. The transverse direction Y is defined as the direction orthogonal to plane P, this direction therefore being substantially horizontal. The longitudinal direction X is defined as the direction orthogonal to Y and is substantially horizontal, and direction Z is the vertical direction. As used hereinafter, the term "inner" is used to designate an element nearest the wearer's head, as opposed to the term "outer". The terms "upper", "lower", "top", and "bottom" are used with reference to direction Z. The terms "front" and "rear" are used with reference to direction X, and the terms "side", "left", "right", and "transverse" are used with reference to direction Y.

[0039] According to one preferred and non-limiting embodiment, the shell 2 is of general spherical shape and has a face opening 4 for the wearer's face. The shell 2 includes a front portion 5 located above the face opening 4, an upper portion 6, a rear portion 7 extending from the upper portion 6 as far as the wearer's neck, and a left

side portion and a right side portion 8, each extending from the upper portion 6 either side of the face opening 4.

[0040] As can be seen in Fig. 1, each side portion 8 has an inward recess 9. In addition, a plate 10 is fixed on each side portion 8 of the shell 2 so as to cover this recess 9 at least in part. In the other figures, the plate 10 is not illustrated so that the connecting arrangement can be more easily seen.

[0041] In one preferred and non-limiting embodiment, provision may be made for the plates 10 to lie substantially flush with the regions of helmet 1 located around the recess 9 so that the shell 2 in this region has an outer surface that is substantially unbroken. The plate 10 may also be used to hang a connecting device of a respiratory mask.

[0042] The face-shield 3 includes a central portion 11 through which the wearer is able to see the surroundings, and two side wings 12 used to mount the face-shield 3 on the shell 2. The rear edge 13 of each side wing is preferably in the form of an arc of a circle whose center lies substantially at the level of the wearer's ears, in the position of use of the helmet 1.

[0043] In this embodiment, the face-shield 3 is mounted on the shell 2, from inside the shell 2 via a connecting arrangement, such that it is moveable between a lowered position (Fig. 14) in which the face-shield 3 extends opposite the face opening 4, and a raised position (Fig. 11) in which the face opening 4 is substantially bared. The face-shield 3 has a longitudinal plane of symmetry P' substantially merging with the plane P in the mounted position of the helmet 1.

[0044] In one preferred and non-limiting embodiment, the connecting arrangement between the shell 2 and the face-shield 3 includes two slides 15 each arranged in a side portion 8 of the shell 2, and an upper connecting member 16 and a lower connecting member 17 arranged on each side wing 12 of the face-shield 3. The two connecting members 16, 17 of each wing 12 are arranged so that they can be engaged in the corresponding slide 15 of the shell 2 and so that they can slide in the said slide 15 to guide the movement of the face-shield 3 between its lowered and raised positions.

[0045] In one preferred and non-limiting embodiment, and with reference to Figs. 4 and 5, the slides 15 are arranged in the shell 2. It is to be noted that the slides 15 can be fabricated on the shell 2 itself, typically by molding, or they can be fabricated at least in part on intermediate parts secured to the shell 2. The slides 15 are symmetric relative to the longitudinal plane of symmetry P and are preferably arranged at least in part in the recess 9 of the corresponding side portion 8. Further, and in one preferred and non-limiting embodiment, the width of the slide 15 (between its rear edge 27 and its front edge 28) is substantially constant.

[0046] In the illustrated embodiment, each slide 15 includes an upper part 18 and a lower part 19 separated by a bridge of material 20. The lower part 19 located in the recess 9 passes laterally through the shell 2, but can-

not be seen from outside the helmet 1 since it is masked by the corresponding plate 10. The upper part 18 is intended to receive the upper connecting member 16 of the face-shield 3 and is of curved shape with the concavity directed downwardly. This upper part 18 generally extends horizontally, while being slight curved and slightly tilted downwardly from the rear towards the front. It includes a rear end 21, located, for example substantially above the wearer's ears, and a front end 22 adjacent the bridge of material 20.

[0047] In the illustrated embodiment, in the vicinity of the front end 22, the upper part 18 is located in the recess 9 and crosses through the shell 2 laterally, but cannot be seen from the outside of the helmet 1, since it is masked by the corresponding plate 10. On the other hand, the remainder of the upper part 18 of the slide 15 is located outside the recess 9 and does not pass through the shell 2. In this region, the upper part 18 of the slide 15 is formed by an upper wall 50 and a lower wall 51 projecting inwardly and between them guiding the upper connecting member 16. When the face-shield 3 is moved, the upper connecting member 16 sliding in the upper part 18 of the slide 15 passes through an orifice 52 arranged in the surface 53 lying between the recess 9 and the remainder of the side portion 8 of the shell 2. For example, in the illustrated embodiment, this surface 53 may lie substantially along the plane (X, Y).

[0048] The lower part 19 is intended to receive the lower connecting member 17 of the face-shield 3. It includes a main portion 23, which extends in the continuity of the upper part 18, on the other side of the bridge of material 20, and an additional portion 24, which extends the main portion 23 from its lower end towards the rear. The main portion 23 of the lower part 19 is of curved shape with the concavity directed towards the rear. This main portion 23 generally extends vertically, while being slightly curved and slightly tilted towards the front, from the top towards the bottom. The additional portion 24 is substantially rectilinear and slightly tilted downwardly from the front towards the rear. The lower part 19 is substantially of an up-turned L-shape. It includes an upper end 25 adjacent the bridge of material 20, and a lower end 26, which located in front of (and underneath) the rear end 21 of the upper part 18 of the slide 15.

[0049] In the illustrated embodiment, the upper part 18 of the slide 15 and the main portion 23 of the lower part 19 of the slide 15 substantially form a quarter of a circle with a center located substantially opposite the wearer's ear, in position of use. This arc of a circle formed by the slide 15 and the arc of a circle formed by the rear edge 13 of the corresponding side wing 12 of the face-shield substantially have the same center and the same radius, which means that they substantially mate in the assembled position of the helmet 1.

[0050] As discussed, and in one preferred and non-limiting embodiment, connecting members 16, 17 are provided on the face-shield 3. These connecting members 16, 17 project from the side wings 12 of the face-

shield 3 towards the outside i.e. in the direction of the corresponding side portion 8 of the shell 2. The lower connecting member 17 is preferably fixedly mounted on the face-shield 3. It includes a pin 30 projecting substantially orthogonally from the side wing 12 of the face-shield 3 towards the outside and an end lug 31, which is substantially orthogonal to the pin 30. The end lug 31 is preferably substantially oriented radially, i.e., orthogonal to the rear edge 13 in the form of an arc of a circle of the side wing 12, towards the rear.

[0051] The upper connecting member 16 includes a pin 32, which projects substantially orthogonally from the side wing 12 of the face-shield 3 towards the outside, having an axis 33. The upper connecting member 16 secondly includes an end lug 34 substantially orthogonal to the pin 32. The outer face 35 of the end lug 34 forms a ramp inclined outwardly from its base (on the side of the pin 32) in the direction of its free end 36, as can be seen in Fig. 2.

[0052] With relation to the function of this ramp, the upper connecting member 16 is pivot mounted on the face-shield about the axis 33 of the pin 32 between: a released position in which, in mounted configuration, the lug 34 extends in the general direction of the upper part 18 of the slide 15, opposite the bridge of material 20 (i.e., the end lug 34 extends substantially tangent to the slide 15 in upward direction and towards the rear (see Figs. 3, 9a, and 9b)); and a locked position in which the end lug 34 has been turned substantially 180° relative to the released position, and is therefore directed towards the bridge of material 20 (see Figs. 10a and 10b).

[0053] With reference to Figs. 6-10b, and in one preferred and non-limiting embodiment, illustrated are successive steps for mounting the face-shield 3 on the shell 2. First, the face-shield 3 is brought near the shell 2 tilting it forwardly in relation to the shell 2, as illustrated in Fig. 6. The lower connecting members 17 are then each engaged in the corresponding slide 15, as illustrated in Fig. 7. In particular, each lower connecting member 17 is engaged in the main portion 23 of the lower part 19 of the slide 15, in the vicinity of the upper end 25, i.e., in the vicinity of the bridge of material 20.

[0054] In one preferred and non-limiting embodiment, this engagement is implemented through the following arrangements and configurations: (1) the face-shield 3 is designed so that it can be elastically deformed by the user to draw the two side wings 2 towards each other, and once the lower connecting members 17 are engaged in the slides 15, the face-shield returns to its initial shape; and (2) the face-shield 3 is tilted relative to the shell 2 so that the end lugs 31 of the lower connecting members 17 are oriented substantially parallel to the slide 15 and are therefore able to be engaged in this slide 15. Insofar as the upper connecting members 16 are not yet engaged in the slide 15, it is effectively possible for the user to tilt the face-shield 3 at different angles.

[0055] The user then slides the lower connecting members 17 downwards into the slide 15, substantially as far

as the lower end 26 of the additional portion 24 of the lower part 19 of the slide 15 (see Fig. 8). Throughout this movement, the lower connecting members 17 remain engaged in the slides 15. This is due to the following: (1) the face-shield 3 has returned under elasticity to its initial shape, preventing undue movement of these members 17 out of the slides 15; and (2) the end lugs 31 are no longer oriented along the slide 15 and come to cooperate with the region of the shell 2 peripheral to the slide 15, thereby ensuring retaining of the face-shield 3.

[0056] The user then tilts the upper part 60 of the face-shield 3 towards the rear to draw it close to the shell 2, the lower connecting members 17 remaining engaged in the slides 15. Finally, the upper connecting members 16 are each engaged in the corresponding slide 15, more particularly in the upper part 18 of the slide 15, in the vicinity of the front end 22, i.e., in the vicinity of the bridge of material 20. So that such engaging is possible, the upper connecting members 16 are placed in a released position, as illustrated in Figs. 9a and 9b. In addition, it may be necessary to elastically deform the face-shield 3.

[0057] When the upper connecting members 16 are in the released position, the movement of these members outside the slide 15 is possible and a last locking step can be performed. For this purpose, the upper connecting members 16 can be rotated, relative to the face-shield 3 and about axis 33, towards their locking position. This operation may require a tool, such as a screwdriver, which the user inserts in the imprint of the upper connecting member 17, from inside the helmet 1. In the locked position, the face-shield 3 being in lowered position as illustrated in Figs. 10a and 10b, the end lug 34 cooperates with the bridge of material 20, which is sandwiched between this lug 34 and the side wing 12. Therefore, the upper connecting member 16 is unable to move outside the corresponding slide 15.

[0058] Once the helmet 1 is mounted, the face-shield 3 can be moved relative to the shell 2 between a raised position and a lowered position. For this purpose, the upper connecting members 16 slide in the upper part 18 of the slides 15 substantially from the rear end 21 as far as the front end 22, while the lower connecting members 17 slide in the lower part 19 of the slides 15, substantially from the upper end 25 as far as the lower end 26. Throughout this sliding, the upper connecting members 16, in locked position remain oriented along the slide 15 and therefore do not hamper this movement.

[0059] With reference to the lower connecting members 17, these allow maintaining of the face-shield 3 in the mounted position, optionally, in combination with other members or arrangements, such as the elasticity of the face-shield 3 in particular. On account of its radial orientation towards the rear, the end lug 31 of each lower connecting member 17 is arranged so that, irrespective of the position of the lower connecting member 17 on its sliding pathway in the slide 15 when the face-shield 3 is moved between its lowered and raised positions, the region of the shell 2 lying peripheral to the slide 15, on the

rear side, is sandwiched between this lug 31 and the side wing 12.

[0060] It will be appreciated that the end lug 31 must be of sufficient length (from its base to its free end) that is longer than the width of the slide 15 to allow the aforementioned maintaining, and that the width of this end lug 31 (perpendicular to the direction of the length) is smaller than the width of the slide 15 to allow the engaging of the lower connecting member 17 in the slide 15. Fig. 11 shows the helmet 1 with the face-shield 3 in raised position. The abutting of the face-shield 3 in the upward direction can be obtained by cooperation between the upper connecting members 16 and the rear end 21 of the slide 15 and/or by cooperation between the lower connecting members 17 and the bridge of material 20.

[0061] The face-shield 3 can be lowered to a greater or lesser extent, according to the needs of the wearer of the helmet 1. Figs. 12 and 13 illustrate two possible intermediate positions. In Fig. 13, the lower connecting members 17 are located substantially at the junction between the main portion 23 and the additional portion 24 of the lower part 19 of the slide 15. Starting from the position illustrated in Fig. 13, the face-shield 3 can be further lowered down to its bottom position illustrated in Fig. 14. When performing this last step of the movement, the face-shield 3 is not only lowered but also drawn near to the wearer's face, on account of the additional portion 24 of the lower part 19 of the slide 15. During this last step of the movement, the face-shield 3 pivots about the axis 33. This allows improved protection of the face to be obtained since the space existing between the face and the face-shield 3 is reduced, which considerably limits entry of elements from underneath the face-shield 3. However, if the user is wearing a mask, this prevents the face-shield 3 from being moved too near the face. In this case, the user can maintain the face-shield in the intermediate position shown in Fig. 13 for example.

[0062] The abutting of the face-shield 3 downwardly can be obtained by cooperation between the upper connecting members 16 and the bridge of material 20 and/or by cooperation between the lower connecting members 17 and the lower end 26 of the slide 15. According to one preferred and non-limiting embodiment, an arrangement for maintaining the face-shield 3 in its current position is provided. In the illustrated embodiment, a spring 40 is mounted on each side portion 8 of the shell 2 behind the lower part 19 of the slide 15. The springs 40 are preferably symmetrical relative to the longitudinal plane of symmetry P.

[0063] The spring 40 may be in the form of a strip of metal open at the back, whose ends 41 are retained in a tongue 42 arranged on the shell 2, preferably in the recess 9 (see Fig. 9b). The spring 40 can be fixed by two studs 44 secured to the shell 2. The spring 40 has a front portion 43 that extends along the rear edge 27 of the slide 15, preferably in the immediate vicinity thereof. This front portion 43 pushes the corresponding lower connecting member 17 forwardly against the front edge 28 of the

slide 15. Therefore, the lower connecting member 17 is held in contact by friction with the front edge 28 of the corresponding slide 15, substantially irrespective of the position of the lower connecting member 17 on its sliding pathway within the slide 15 when the face-shield 3 is moved between its lowered and raised positions.

[0064] In another preferred and non-limiting embodiment, the spring 40 includes an upper part 45 that bulges forwardly allowing a greater thrust force to be applied to the lower connecting member 17 when the face-shield is in the raised position. This ensures increased maintaining and/or the setting up of a hard point for the lower connecting member 17, which acts as abutment. Similarly, the spring 40 may have a lower part 46 that bulges forwardly cooperating with the lower connecting member 17 when the face-shield is in the lowered position, to act as abutment.

[0065] To remove the face-shield 3 from the shell 2, and in one preferred and non-limiting embodiment, the procedure is substantially the reverse of the mounting procedure. First, the face-shield 3 is lowered until each of the upper connecting members 16 comes into contact with the corresponding bridge of material 20. Then this member 16 is placed in released position by rotation of 180°. The bridge of material 20 then cooperates with the outer face 35 of the end lug 34 that is ramp-shaped. By continuing the downward displacement of the face-shield 3, this causes the corresponding side wing 12 of the face-shield 3 to draw away from the shell 2 by elastic deformation of the face-shield 3, and thereby causes the said upper connecting member 16 to move out of the slide 15. The lower connecting members 17 can then be caused to slide upward in the slides 15 and/or the face-shield 3 can be tilted relative to the shell 2 so as to disengage the lower connecting members 17 from the slides 15. A certain elasticity of the face-shield 3 may be useful for this disengaging.

[0066] With reference to Fig. 15, there is shown the lower part 19 of a slide 15 including another embodiment of a face-shield holding arrangement, for holding the face-shield either in the upper position or in the lower position. In the embodiment depicted, said lower part 19 of the slide 15 is an intermediate part intended to be secured to the shell 2. However, alternatively, such lower parts could be fabricated on the shell 2 itself.

[0067] As shown in Fig. 15, the face-shield holding arrangement includes abutment members capable of cooperating with the connecting members.

[0068] There is provided one set of upper projections 70, near the upper end 25 of the lower part 19 of the slide 15, which are capable of cooperating with the lower connecting member 17 in order to hold the face-shield 3 in the upper position. There is further provided one set of lower projections 71, near the lower end 26 of the lower part 19 of the slide 15, which are capable of cooperating with the lower connecting member 17, in order to hold the face-shield 3 in the lower position. The projections 70, 71 extend from a rear edge 27 or a front edge 28 of

the lower part 19 of the slide 15 towards the opposite edge. The projections of one set are located facing one another.

[0069] Preferably, each upper projection 70 includes an inclined face 73 forming a ramp for guiding the lower connecting member 17 towards its upper position, where the face-shield 3 is held in the upper position, and a straight face 74, facing the upper end 25, for retaining the lower connecting member 17 in its upper position. When the wearer moves the face-shield 3 upwardly, he feels a resistance to this movement when the lower connecting member 17 contacts the inclined faces 73 of the projections 70. Continuing this movement results in locking the lower connecting member 17 against the straight faces 74. Unlocking the lower connecting member 17 can only be achieved by a sufficient effort exerted by the wearer on the face-shield 3. The projections 70 are dimensioned so that this effort is high enough to avoid untimely movement of the face-shield 3 and low enough to be exerted by the wearer.

[0070] Similarly, each lower projection 71 includes an inclined face 75 and a straight face 76, facing the lower end 26 of the lower part 19 of the slide 15, for retaining the lower connecting member 17 in its lower position.

[0071] In this manner, the present invention represents an improvement over existing arrangements by providing a helmet that allows the face-shield to be changed quickly and easily, while ensuring excellent protection for the head and more particularly for the face. The invention is evidently not limited to the embodiment described above as an example, but encompasses all technical equivalents and variants of the described means, and combinations thereof.

[0072] Although the invention has been described in detail for the purpose of illustration based on what is currently considered to be the most practical and preferred embodiments, it is to be understood that such detail is solely for that purpose and that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover modifications and equivalent arrangements that are within the scope of the appended claims.

Claims

1. A protective helmet comprising:

- a shell (2) having a longitudinal plane of symmetry (P) and comprising a face opening (4) and left and right side portions (8), a slide (15) being arranged in each of the side portions (8) of the shell (2), the slides (15) being symmetrical relative to the longitudinal plane of symmetry (P);
- a face-shield (3) mounted on the shell (2) and moveable between a lowered position in which the face-shield (3) extends opposite the face opening (4) and a raised position in which the face opening (4) is substantially bared, the face-

shield (3) comprising a central portion (11) and two side wings (12), at least one connecting member (16, 17) being arranged on each side wing (12) of the face-shield (3) so that it can be engaged in the corresponding slide (15) of the shell (2), and so that it can slide in said slide (15) to guide the movement of the face-shield (3) between its lowered and raised positions,

characterized in that:

- the face-shield (3) is mounted inside the shell (2);
- on each side wing (12), the face-shield (3) comprises at least one upper connecting member (16) and one lower connecting member (17) which project outwardly from the side wings (12) of the face-shield (3);
- and each slide (15) comprises:
 - an upper part (18) intended to receive the upper connecting member (16), the said upper part (18) of the slide (15) extending generally horizontally, in the position of use, and having a curved shape with the concavity directed downwardly;
 - and a lower part (19) intended to receive the lower connecting member (17), the said lower part (19) of the slide (15) having at least one main portion (23) which generally extends vertically, in the position of use, and which has a curved shape with the concavity directed towards the rear.

2. The helmet according to claim 1, **characterized in that** the face-shield (3) is designed so that it can be elastically deformed so as to modify the cross distance between the two side wings (12).

3. The helmet according to claim 1 or 2, **characterized in that** the upper part (18) of the slide (15) and the main portion (23) of the lower part (19) of the slide (15) substantially form a quarter circle whose center lies substantially opposite an ear of the wearer, in the position of use.

4. The helmet according to one of claims 1 to 3 **characterized in that** each slide (15) comprises an upper part (18) intended to receive the upper connecting member (16), and a lower part (19) intended to receive the lower connecting member (17), and **in that** the upper (18) and lower (19) parts of the slide (15) are separated by a bridge of material (20) capable of cooperating with the upper connecting member (16) when the face-shield (3) is in lowered position and/or with the lower connecting member (17) when the face-shield (3) is in raised position.

5. The helmet according to one of claims 1 to 4, **characterized in that** at least one upper connecting member (16) is mobile between a locking position in which this member (16) cooperates with the shell (2) to prevent this member (16) from moving out of the corresponding slide (15), and a released position allowing this member (16) to move out of the slide (15). 5
6. The helmet according to claims 4 and 5, **characterized in that** the upper connecting member (16) has an end face (35) forming an inclined ramp capable of cooperating with the bridge of material (20) when the upper connecting member (16) is in released position and the face-shield (3) is lowered, to cause the corresponding side wing (12) of the face-shield (3) to draw away from the shell (2) and thereby to cause the said upper connecting member (16) to move out of the slide (15). 10
7. The helmet according to claim 5 or 6, **characterized in that** the upper connecting member (16) comprises a pin (32) projecting substantially orthogonally from the side wing (12) of the face-shield (3) in the direction of the shell (2) in position of use, and an end lug (34) substantially orthogonal to the pin (32), the upper connecting member (16) being pivotally mounted on the face-shield (3) about an axis (33) of the pin (32) so that, in locked position, a region of the shell (2) adjacent the slide (15) is substantially gripped between the said end lug (34) and the side wing (12) of the face-shield (3). 15
8. The helmet according to one of claims 1 to 7, **characterized in that** the lower part (19) of each slide (15) comprises an additional portion (24) which extends the main portion (23) of the slide (15), from its lower end towards the rear. 20
9. The helmet according to one of claims 1 to 8, **characterized in that** at least one lower connecting member (17) comprises a pin (30) projecting substantially orthogonally from the side wing (12) of the face-shield (3) in the direction of the shell (2), in position of use, and an end lug (31) which is substantially orthogonal to the pin (30) and which is arranged so that, in the mounted position of the face-shield (3) and substantially irrespective of the position of the lower connecting member (17) on its sliding pathway in the slide (15) when the face-shield (3) is moved between its lowered and raised positions, a region of the shell (2) adjacent the slide (15) is substantially gripped between the said end lug (31) and the side wing (12) of the face-shield (3), the lower connecting member (17) being for example fixedly mounted on the face-shield (3). 25
10. The helmet according to one of claims 1 to 9, **characterized in that** it comprises an arrangement (40) 30

for maintaining the face-shield (3) in the position it occupies.

11. The helmet according to claim 10, **characterized in that** the arrangement maintaining the face-shield (3) in position comprises an elastic return arrangement (40) arranged to hold at least one connecting member (16, 17) in friction contact against an edge (28) of the corresponding slide (15), wherein, preferably, the helmet comprises at least one spring (40) mounted on a side portion (8) of the shell (2), behind the slide (15), the spring (40) having a front portion (43) which extends along the rear edge (27) of the slide (15) and which is arranged to push the corresponding lower connecting member (17) forwardly against the front edge (28) of the slide (15), substantially irrespective of the position of the lower connecting member (17) on its sliding pathway in the slide (15) when the face-shield (3) is moved between its lowered and raised positions. 35
12. The helmet according to one of claims 1 to 11, **characterized in that** the shell (2), in each of its side portions (8), comprises a recess (9) in which the slide (15) is arranged at least in part, the shell (2) further comprising a plate (10) covering this recess (9) at least in part. 40
13. A method for placing a face-shield (3) in position on a shell (2) of a protective helmet (1) according to one of claims 1 to 12, **characterized in that** it comprises the steps of: 45
- the face-shield (3) being tilted forwardly relative to the shell (2), engaging the lower connecting members (17) in the corresponding slide (15);
 - sliding the lower connecting members (17) downwardly in said slide (15);
 - tilting the upper part of the face-shield (3) towards the rear to place it close to the shell (2);
 - engaging the upper connecting members (16) in the corresponding slides (15).

Patentansprüche

1. Schutzhelm, der Folgendes umfasst:

- eine Schale (2), die eine Längssymmetrieebene (P) hat und eine Gesichtsoffnung (4) sowie einen linken und einen rechten Seitenabschnitt (8) umfasst, wobei in jedem der Seitenabschnitte (8) der Schale (2) eine Rutsche (15) eingerichtet ist, wobei die Rutschen (15) in Bezug zu der Längssymmetrieebene (P) symmetrisch sind;
- einen Gesichtsschild (3), der auf die Schale (2) montiert und zwischen einer gesenkten Position 50

on, in der sich der Gesichtsschild (3) gegenüber der Gesichtsoffnung (4) erstreckt, und einer gehobenen Position, in der die Gesichtsoffnung (4) im Wesentlichen freigelegt ist, bewegbar ist, wobei der Gesichtsschild (3) einen zentralen Abschnitt (11) und zwei Seitenflügel (12) umfasst, wobei mindestens ein Verbindungselement (16, 17) auf jedem Seitenflügel (12) des Gesichtsschildes (3) derart eingerichtet ist, dass es in die entsprechende Rutsche (15) der Schale (2) eingerastet werden kann, und derart, dass es in der Rutsche (15) gleiten kann, um die Bewegung des Gesichtsschildes (3) zwischen seiner gesenkten und seiner gehobenen Position zu führen,

dadurch gekennzeichnet, dass:

- der Gesichtsschild (3) innerhalb der Schale (2) montiert ist;
- der Gesichtsschild (3) auf jedem Seitenflügel (12) mindestens ein oberes Verbindungselement (16) und ein unteres Verbindungselement (17) umfasst, die von den Seitenflügeln (12) des Gesichtsschildes (3) nach außen vorragen;
- und jede Rutsche (15) Folgendes umfasst:

- einen oberen Teil (18), der dazu bestimmt ist, das obere Verbindungselement (16) aufzunehmen, wobei sich der obere Teil (18) der Rutsche (15) in der Gebrauchposition im Allgemeinen horizontal erstreckt und eine gebogene Form mit der Konkavität nach unten gerichtet hat;
- und einen unteren Teil (19), der dazu bestimmt ist, das untere Verbindungselement (17) aufzunehmen, wobei der untere Teil (19) der Rutsche (15) mindestens einen Hauptabschnitt (23) hat, der sich in der Gebrauchposition im Allgemeinen vertikal erstreckt, und der eine gebogene Form mit der Konkavität nach hinten gerichtet hat.

2. Helm nach Anspruch 1, **dadurch gekennzeichnet, dass** der Gesichtsschild (3) derart konzipiert ist, dass er elastisch derart verformt werden kann, dass der Querabstand zwischen den zwei Seitenflügeln (12) modifiziert wird.
3. Helm nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der obere Teil (18) der Rutsche (15) und der Hauptabschnitt (23) des unteren Teils (19) der Rutsche (15) im Wesentlichen einen Viertelkreis bilden, dessen Mitte im Wesentlichen in der Gebrauchposition gegenüber einem Ohr des Trägers liegt.
4. Helm nach einem der Ansprüche 1 bis 3, **dadurch**

gekennzeichnet, dass jede Rutsche (15) einen oberen Teil (18) umfasst, der dazu bestimmt ist, das obere Verbindungselement (16) aufzunehmen, und einen unteren Teil (19), der dazu bestimmt ist, das untere Verbindungselement (17) aufzunehmen, und dadurch, dass der obere (18) und untere (19) Teil der Rutsche (15) durch eine Materialbrücke (20) getrennt sind, die fähig ist, mit dem oberen Verbindungselement (16) zusammenzuwirken, wenn der Gesichtsschild (3) in der gesenkten Position ist und/oder mit dem unteren Verbindungselement (17), wenn der Gesichtsschild (3) in der gehobenen Position ist.

5. Helm nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** mindestens ein oberes Verbindungselement (16) zwischen einer Verriegelungsposition, in der dieses Element (16) mit der Schale (2) zusammenwirkt, um dieses Element (16) daran zu hindern, sich aus der entsprechenden Rutsche (15) heraus zu bewegen, und einer freigegebenen Position, die es diesem Element (16) erlaubt, sich aus der Rutsche (15) heraus zu bewegen, beweglich ist.
6. Helm nach den Ansprüchen 4 und 5, **dadurch gekennzeichnet, dass** das obere Verbindungselement (16) eine Endseite (35) hat, die eine schräge Rampe bildet, die fähig ist, mit dem Brückenmaterial (20) zusammenzuwirken, wenn das obere Verbindungselement (16) in freigegebener Position ist und der Gesichtsschild (3) gesenkt ist, um den entsprechenden Seitenflügel (12) des Gesichtsschildes (3) zu veranlassen, sich von der Schale (2) weg zu ziehen und dadurch das obere Verbindungselement (16) zu veranlassen, sich aus der Rutsche (15) zu bewegen.
7. Helm nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** das obere Verbindungselement (16) einen Stift (32) umfasst, der im Wesentlichen orthogonal von dem Seitenflügel (12) des Gesichtsschildes (3) in die Richtung der Schale (2) in Gebrauchposition vorragt, und einen Endansatz (34) im Wesentlichen orthogonal zu dem Stift (32), wobei das obere Verbindungselement (16) schwenkend auf dem Gesichtsschild (3) um eine Achse (33) des Stifts (32) derart montiert ist, dass in der verriegelten Position ein Bereich der Schale (2) neben der Rutsche (15) im Wesentlichen zwischen dem Endansatz (34) und dem Seitenflügel (12) des Gesichtsschildes (3) erfasst ist.
8. Helm nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** der untere Teil (19) jeder Rutsche (15) einen zusätzlichen Abschnitt (24) umfasst, der den Hauptabschnitt (23) der Rutsche (15) von seinem unteren Ende nach hinten erstreckt.

9. Helm nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** mindestens ein unteres Verbindungselement (17) einen Stift (30) umfasst, der im Wesentlichen orthogonal von dem Seitenflügel (12) des Gesichtsschilds (3) in die Richtung der Schale (2) in Gebrauchposition vorragt, und einen Endansatz (31), der zu dem Stift (30) im Wesentlichen orthogonal ist und derart eingerichtet ist, dass in der montierten Position des Gesichtsschilds (3) und im Wesentlichen ungeachtet der Position des unteren Verbindungselements (17) auf seinem Gleitweg in der Rutsche (15), wenn der Gesichtsschild (3) zwischen seiner gesenkten und seiner gehobenen Position bewegt wird, ein Bereich der Schale (2) neben der Rutsche (15) im Wesentlichen zwischen dem Endansatz (31) und dem Seitenflügel (12) des Gesichtsschilds (3) erfasst ist, wobei das untere Verbindungselement (17) zum Beispiel ortsfest auf dem Gesichtsschild (3) montiert ist.
10. Helm nach einem der Ansprüche 1 bis 9, **dadurch gekennzeichnet, dass** er eine Anordnung (40) zum Halten des Gesichtsschilds (3) in der Position, die er belegt, umfasst.
11. Helm nach Anspruch 10, **dadurch gekennzeichnet, dass** die Anordnung, die den Gesichtsschild (3) in Position hält, eine elastische Rückstelleinrichtung (40) umfasst, die eingerichtet ist, um mindestens ein Verbindungselement (16, 17) in Reibungskontakt gegen eine Kante (28) der entsprechenden Rutsche (15) zu halten, wobei der Helm bevorzugt mindestens eine Feder (40) umfasst, die auf einem Seitenabschnitt (8) der Schale (2) hinter der Rutsche (15) montiert ist, wobei die Feder (40) einen Frontabschnitt (43) hat, der sich entlang der hinteren Kante (27) der Rutsche (15) erstreckt und der eingerichtet ist, um das entsprechende untere Verbindungselement (17) vorwärts gegen die Frontkante (28) der Rutsche (15) im Wesentlichen ungeachtet der Position des unteren Verbindungselements (17) auf seinem Gleitweg in der Rutsche (15) vorwärts zu drücken, wenn der Gesichtsschild (3) zwischen seiner gesenkten und seiner gehobenen Position bewegt wird.
12. Helm nach einem der Ansprüche 1 bis 11, **dadurch gekennzeichnet, dass** die Schale (2) in jedem ihrer Seitenabschnitte (8) eine Vertiefung (9) umfasst, in der die Rutsche (15) mindestens teilweise eingerichtet ist, wobei die Schale (2) ferner eine Platte (10) umfasst, die diese Vertiefung (9) mindestens teilweise abdeckt.
13. Verfahren zum Platzieren eines Gesichtsschilds (3) in Position auf einer Schale (2) eines Schutzhelms (1) nach einem der Ansprüche 1 bis 12, **dadurch gekennzeichnet, dass** es folgende Schritte um-

fasst:

- Vorwärtsskippen des Gesichtsschilds (3) in Bezug auf die Schale (2), indem die unteren Verbindungselemente (17) in die entsprechende Rutsche (15) eingefügt werden;
- Gleiten der unteren Verbindungselemente (17) in der Rutsche (15) nach unten;
- Kippen des oberen Teils des Gesichtsschilds (3) nach hinten, um ihn nahe der Schale (2) zu platzieren;
- Einfügen der oberen Verbindungselemente (16) in die entsprechenden Rutschen (15).

Revendications

1. Casque de protection comprenant :

- une coque (2) présentant un plan de symétrie longitudinal (P) et comportant une ouverture faciale (4) et des portions latérales (8) gauche et droite, une glissière (15) étant ménagée dans chacune des portions latérales (8) de la coque (2), les glissières (15) étant symétriques par rapport au plan de symétrie longitudinal (P) ;
- un écran facial (3) monté sur la coque (2) de façon mobile entre une position basse, dans laquelle l'écran (3) s'étend en regard de l'ouverture faciale (4), et une position haute, dans laquelle l'ouverture faciale (4) est sensiblement dégagée, l'écran (3) comportant une portion centrale (11) et deux ailes latérales (12), au moins un organe de connexion (16, 17) étant ménagé sur chaque aile latérale (12) de l'écran (3) et agencé pour pouvoir être engagé dans la glissière (15) correspondante de la coque (2) et pour pouvoir coulisser dans ladite glissière (15) afin de guider le déplacement de l'écran (3) entre ses positions basse et haute,

caractérisé en ce que :

- l'écran (3) est monté à l'intérieur de la coque (2) ;
- sur chaque aile latérale (12), l'écran (3) comprend au moins un organe de connexion supérieur (16) et un organe de connexion inférieur (17) qui font saillie des ailes latérales (12) de l'écran (3) vers l'extérieur ;
- et chaque glissière (15) comprend :
 - une partie supérieure (18) destinée à recevoir l'organe de connexion supérieur (16), ladite partie supérieure (18) de la glissière (15) s'étendant globalement horizontalement, en position d'utilisation, et possédant une forme courbée avec la concavité

- dirigée vers le bas ;
 - et une partie inférieure (19) destinée à recevoir l'organe de connexion inférieur (17), ladite partie inférieure (19) de la glissière (15) présentant au moins une portion principale (23) qui s'étend globalement verticalement, en position d'utilisation, et qui possède une forme courbée avec la concavité dirigée vers l'arrière.
2. Casque selon la revendication 1, **caractérisé en ce que** l'écran (3) est conçu pour pouvoir être déformé élastiquement afin de modifier l'écartement transversal entre les deux ailes latérales (12).
 3. Casque selon la revendication 1 ou 2, **caractérisé en ce que** la partie supérieure (18) de la glissière (15) et la portion principale (23) de la partie inférieure (19) de la glissière (15) forment sensiblement un quart de cercle dont le centre est situé sensiblement au regard d'une oreille du porteur, en position d'utilisation.
 4. Casque selon l'une des revendications 1 à 3, **caractérisé en ce que** chaque glissière (15) comprend une partie supérieure (18) destinée à recevoir l'organe de connexion supérieur (16), et une partie inférieure (19) destinée à recevoir l'organe de connexion inférieur (17), et **en ce que** les parties supérieure (18) et inférieure (19) de la glissière (15) sont séparées par un pont de matière (20) qui est apte à coopérer avec l'organe de connexion supérieur (16) lorsque l'écran (3) est en position basse et/ou avec l'organe de connexion inférieur (17) lorsque l'écran (3) est en position haute.
 5. Casque selon l'une des revendications 1 à 4, **caractérisé en ce qu'**au moins un organe de connexion supérieur (16) est mobile entre une position de verrouillage, dans laquelle cet organe (16) coopère avec la coque (2) de façon à empêcher que cet organe (16) puisse sortir hors de la glissière (15) correspondante, et une position de libération autorisant la sortie de cet organe (16) hors de la glissière (15).
 6. Casque selon les revendications 4 et 5, **caractérisé en ce que** l'organe de connexion supérieur (16) possède une face d'extrémité (35) formant une rampe inclinée apte à coopérer avec le pont de matière (20) lorsque l'organe de connexion supérieur (16) est en position de libération et que l'écran (3) est abaissé, afin de provoquer l'écartement de l'aile latérale (12) correspondante de l'écran (3) par rapport à la coque (2) et, ainsi, la sortie dudit organe de connexion supérieur (16) hors de la glissière (15).
 7. Casque selon la revendication 5 ou 6, **caractérisé en ce que** l'organe de connexion supérieur (16)
 - comprend un pion (32) faisant saillie sensiblement orthogonalement de l'aile latérale (12) de l'écran (3), en direction de la coque (2) en position d'utilisation, et une patte d'extrémité (34) sensiblement orthogonale au pion (32), l'organe de connexion supérieur (16) étant monté sur l'écran (3) de façon pivotante autour de l'axe (33) du pion (32) de sorte que, en position de verrouillage, une zone de la coque (2) adjacente à la glissière (15) soit sensiblement serrée entre ladite patte d'extrémité (34) et l'aile latérale (12) de l'écran (3).
 8. Casque selon l'une des revendications 1 à 7, **caractérisé en ce que** la partie inférieure (19) de chaque glissière (15) comprend une portion additionnelle (24) qui prolonge la portion principale (23) de la glissière (15) depuis son extrémité inférieure, vers l'arrière.
 9. Casque selon l'une des revendications 1 à 8, **caractérisé en ce qu'**au moins un organe de connexion inférieur (17) comprend un pion (30) faisant saillie sensiblement orthogonalement de l'aile latérale (12) de l'écran (3), en direction de la coque (2) en position d'utilisation, et une patte d'extrémité (31) qui est sensiblement orthogonale au pion (30) et qui est agencée de sorte que, en position montée de l'écran (3), sensiblement quelle que soit la position de l'organe de connexion inférieur (17) sur son trajet de coulisement dans la glissière (15) lorsque l'écran (3) est déplacé entre ses positions basse et haute, une zone de la coque (2) adjacente à la glissière (15) soit sensiblement serrée entre ladite patte d'extrémité (31) et l'aile latérale (12) de l'écran (3), l'organe de connexion inférieur (17) étant par exemple monté sur l'écran (3) de façon fixe.
 10. Casque selon l'une des revendications 1 à 9, **caractérisé en ce que** qu'il comprend des moyens de maintien (40) de l'écran (3) dans la position qu'il occupe.
 11. Casque selon la revendication 10, **caractérisé en ce que** les moyens de maintien de l'écran (3) comprennent des moyens de rappel élastique (40) agencés pour maintenir au moins un organe de connexion (16, 17) en contact avec friction contre un bord (28) de la glissière (15) correspondante, dans lequel, de préférence, le casque comprend au moins un ressort (40) monté sur une portion latérale (8) de la coque (2), à l'arrière de la glissière (15), le ressort (40) possédant une portion avant (43) qui longe le bord arrière (27) de la glissière (15) et qui est agencée pour pousser l'organe de connexion inférieur (17) correspondant vers l'avant, contre le bord avant (28) de la glissière (15), sensiblement quelle que soit la position de l'organe de connexion inférieur (17) sur son trajet de coulisement dans la glissière (15) lorsque

l'écran (3) est déplacé entre ses positions basse et haute.

12. Casque selon l'une des revendications 1 à 11, **caractérisé en ce que** la coque (2) comporte, dans chacune de ses portions latérales (8), un renforcement (9) dans lequel est ménagée, au moins en partie, la glissière (15), la coque (2) comportant de plus une plaque (10) couvrant au moins partiellement ce renforcement (9).

13. Procédé pour mettre en place un écran facial (3) sur une coque (2) d'un casque de protection (1) selon l'une des revendications 1 à 12, **caractérisé en ce qu'il** comprend les étapes consistant à :

- l'écran (3) étant incliné vers l'avant, par rapport à la coque (2), engager les organes de connexion inférieurs (17) dans la glissière (15) correspondante ;
- faire coulisser les organes de connexion inférieurs (17) vers le bas dans ladite glissière (15) ;
- faire basculer la partie supérieure de l'écran (3) vers l'arrière pour la rapprocher de la coque (2) ;
- engager les organes de connexion supérieurs (16) dans les glissières (15) correspondantes.

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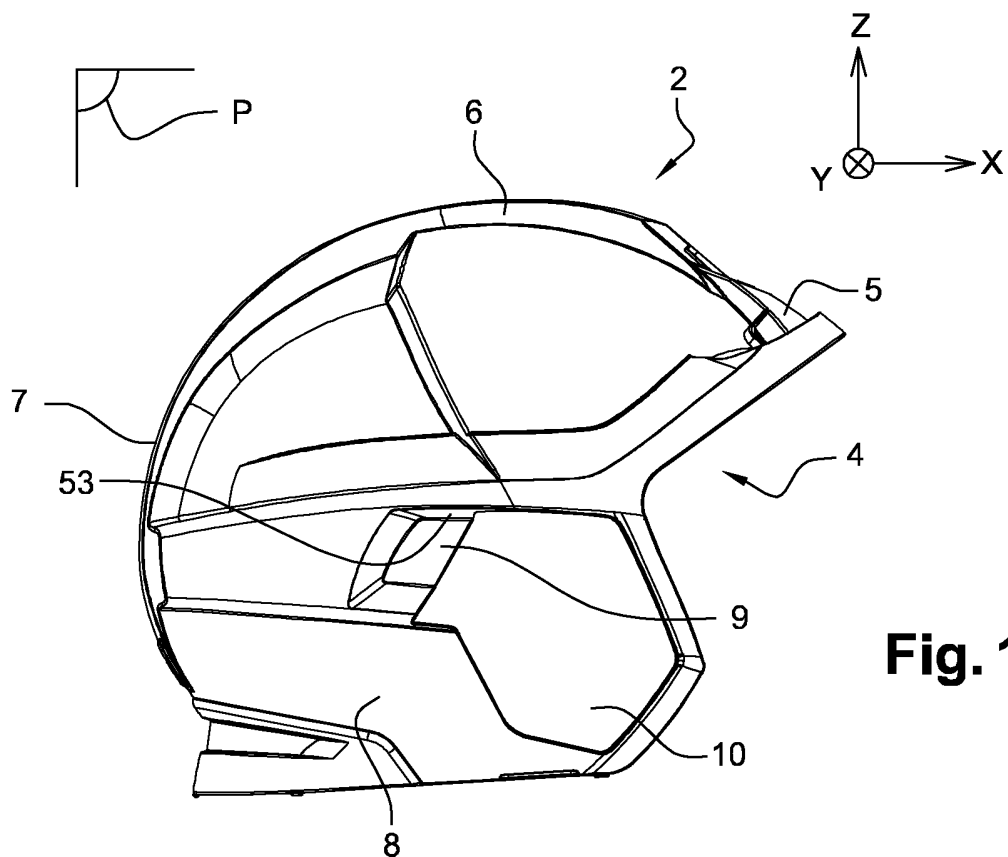


Fig. 1

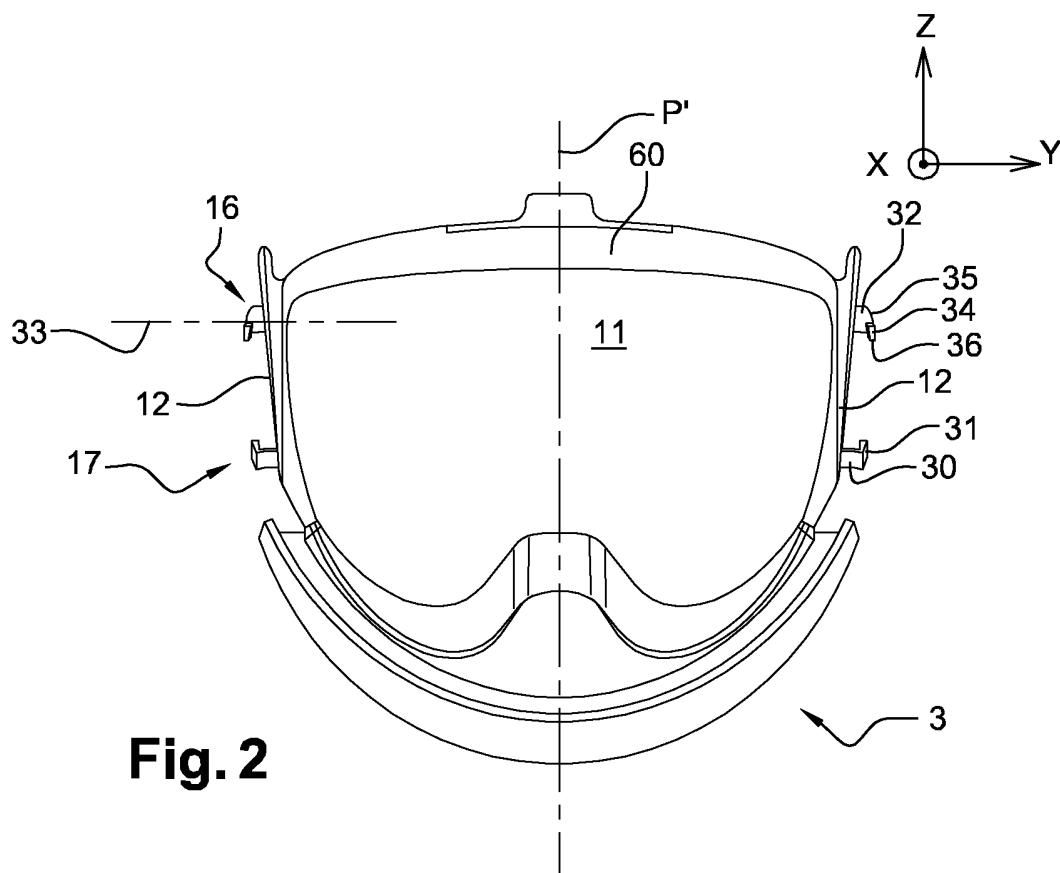
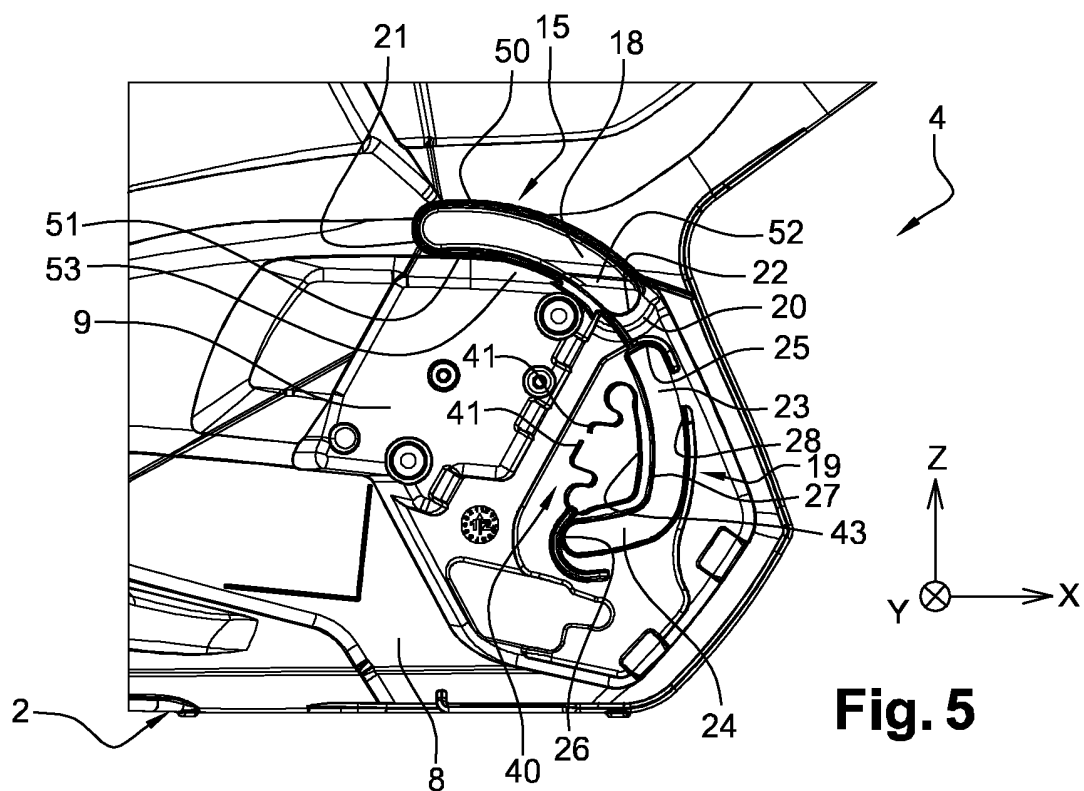
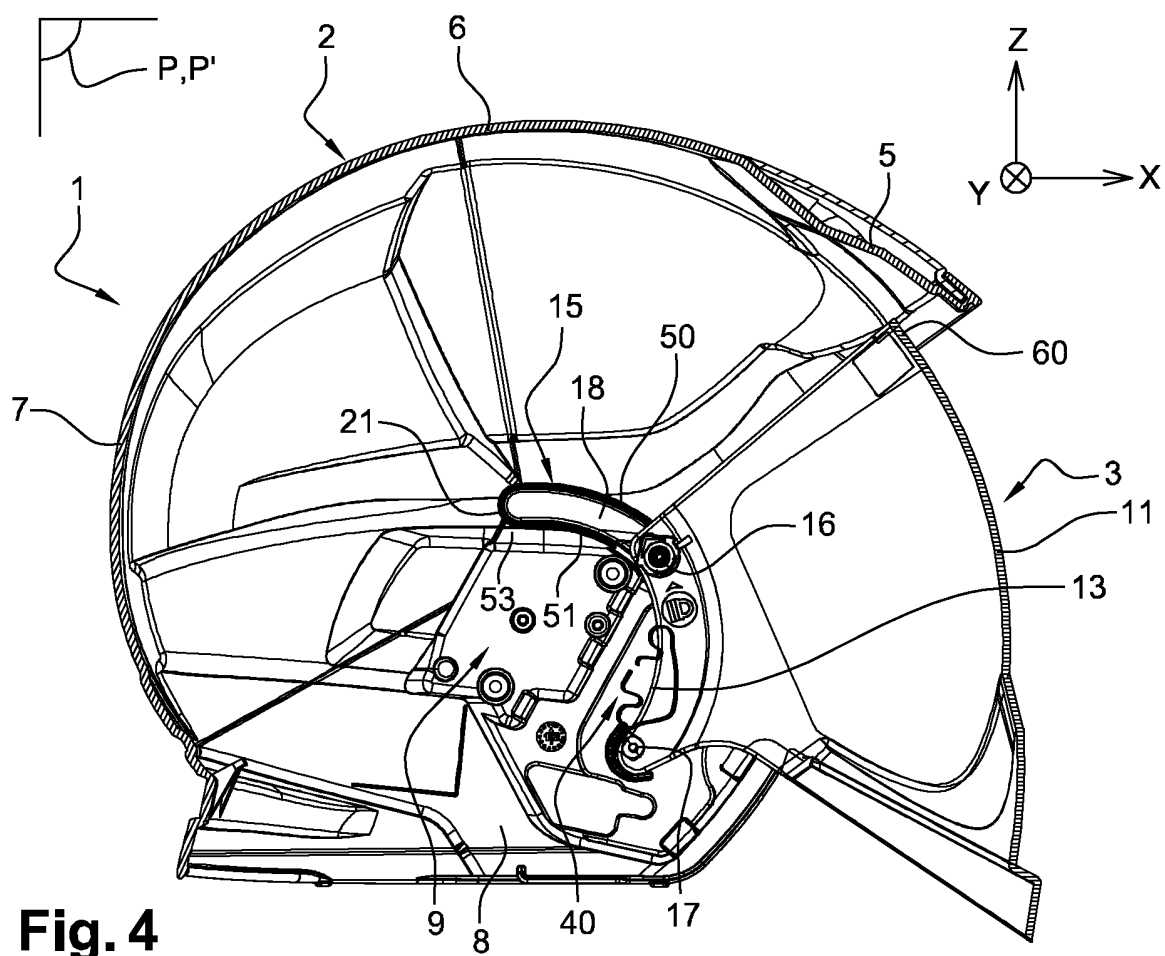
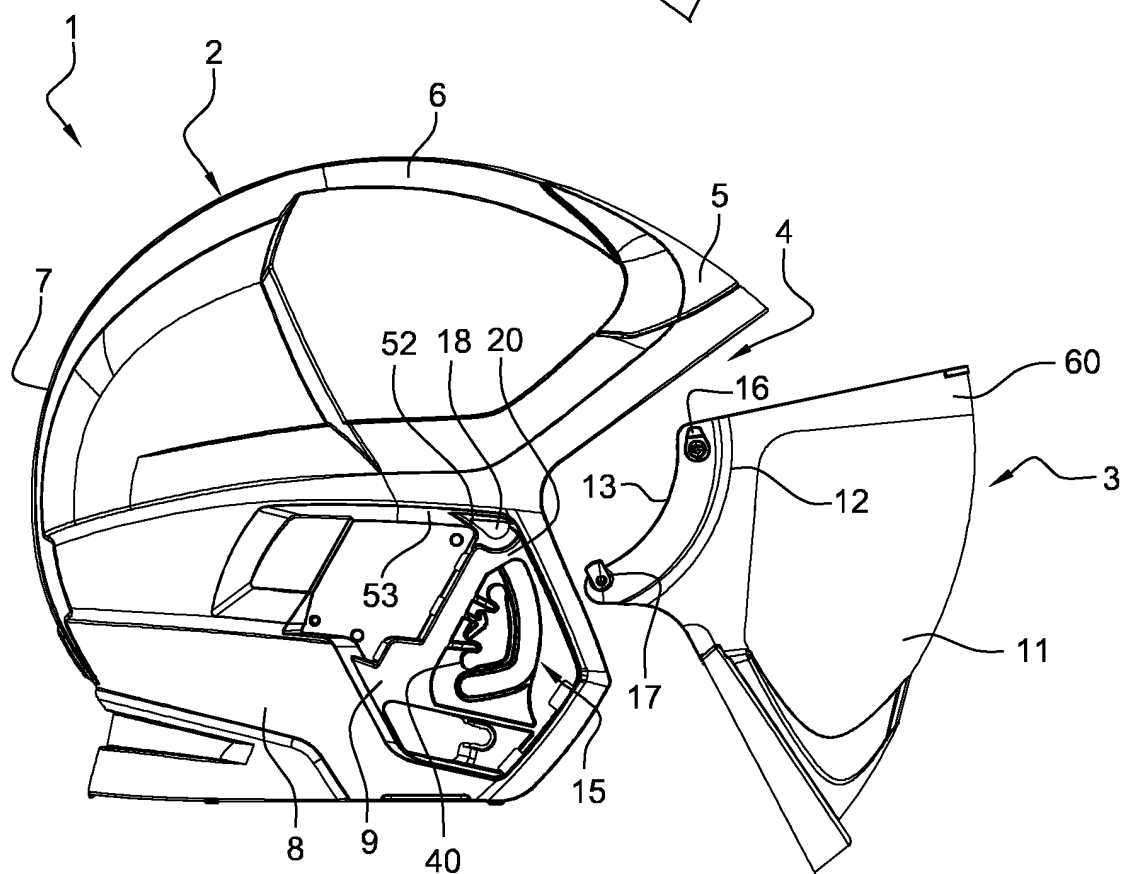
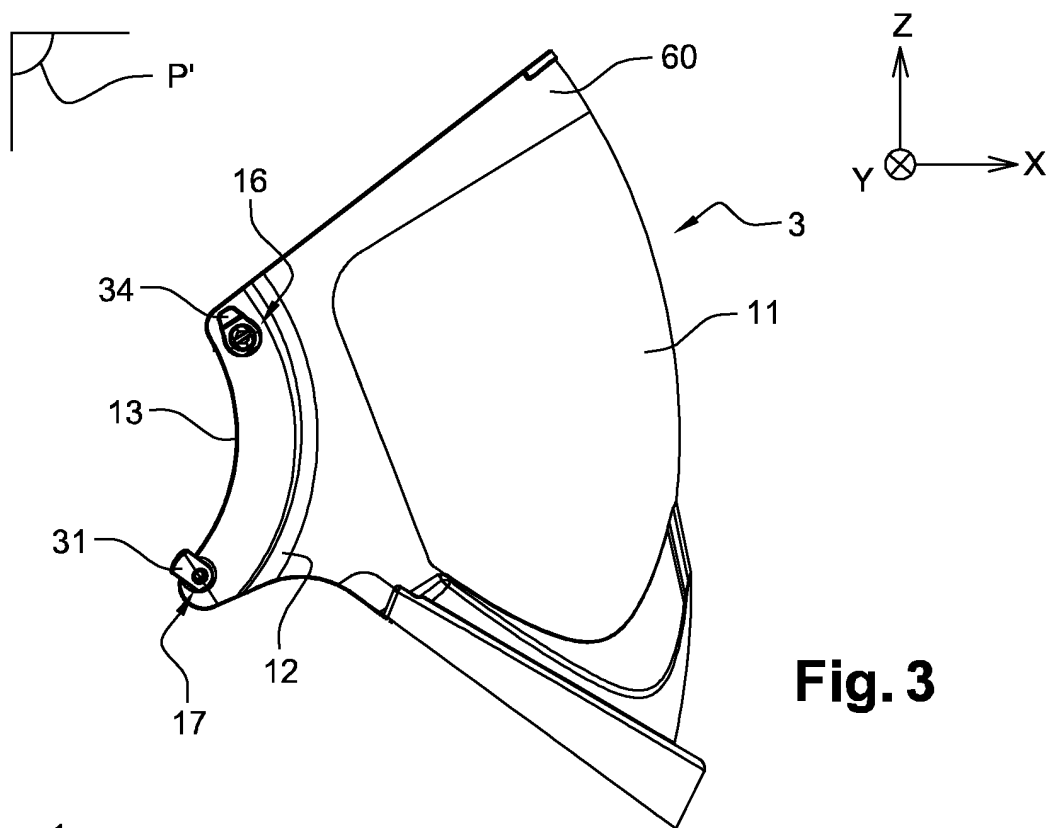


Fig. 2





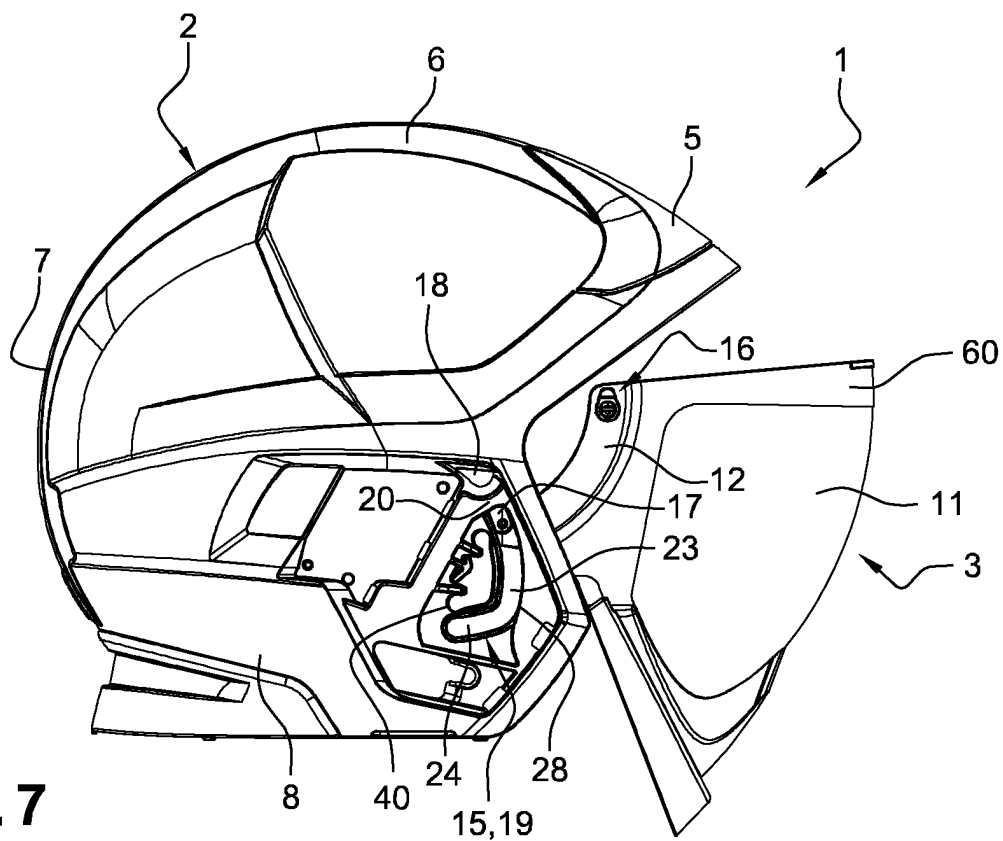


Fig. 7

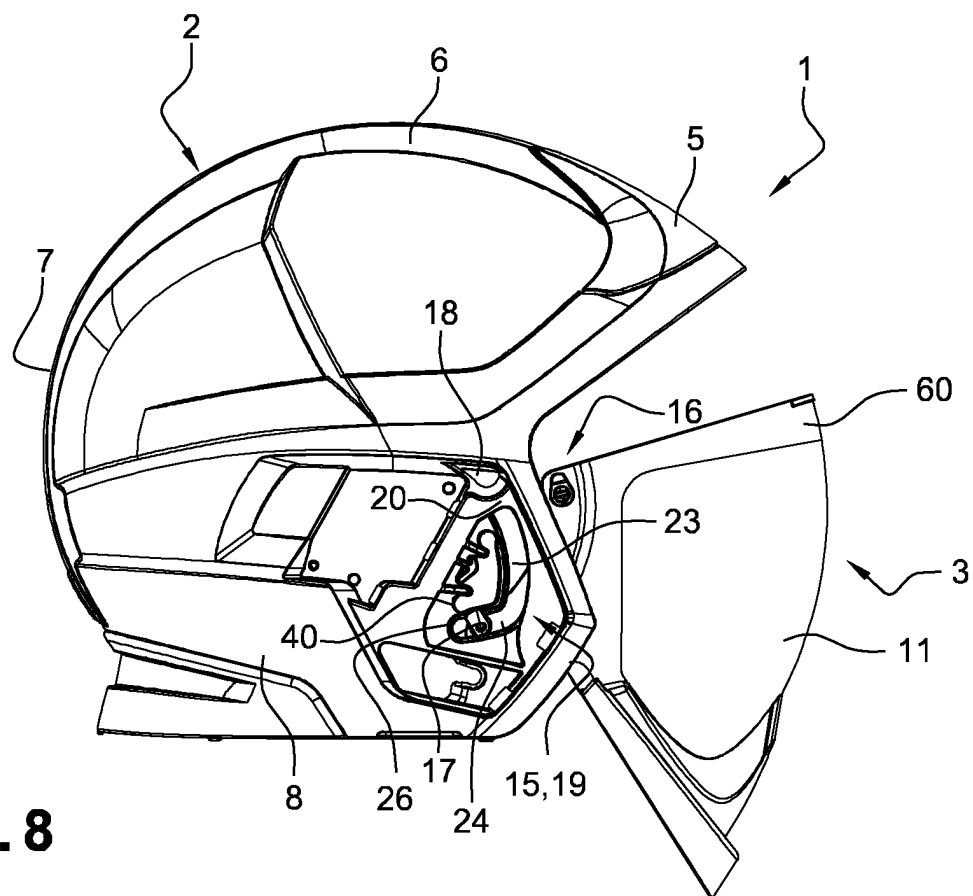


Fig. 8

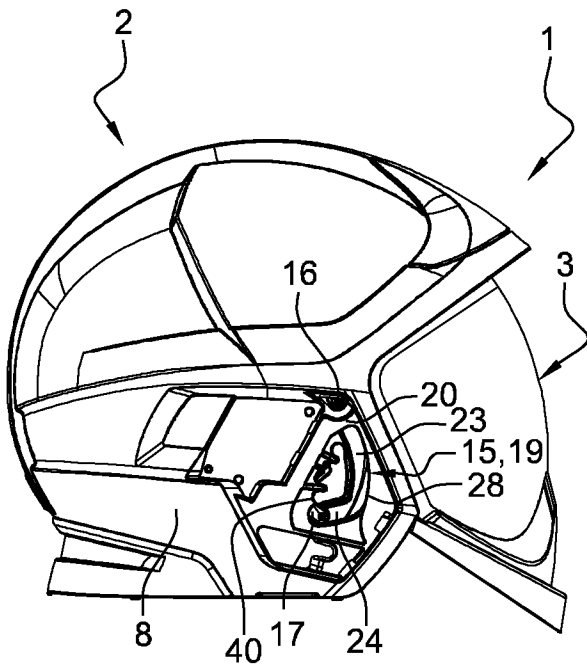


Fig. 9a

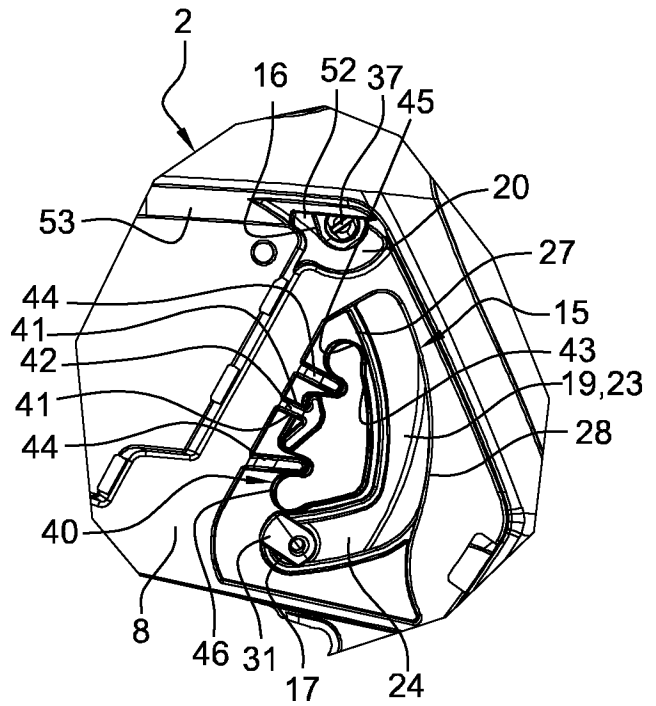


Fig. 9b

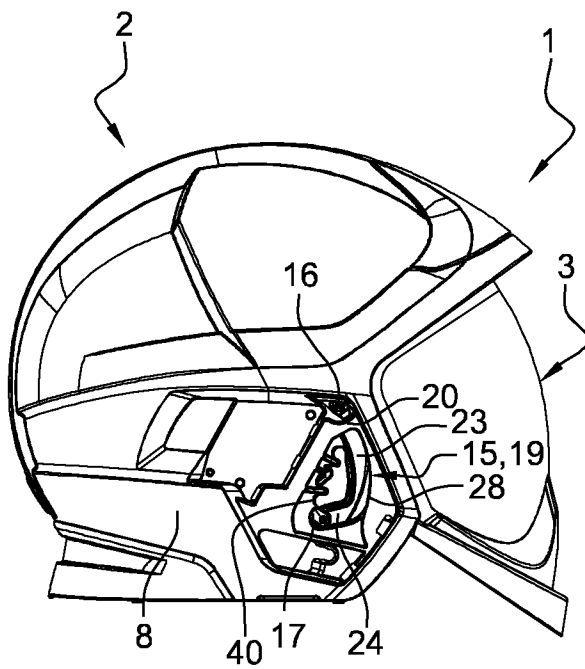


Fig. 10a

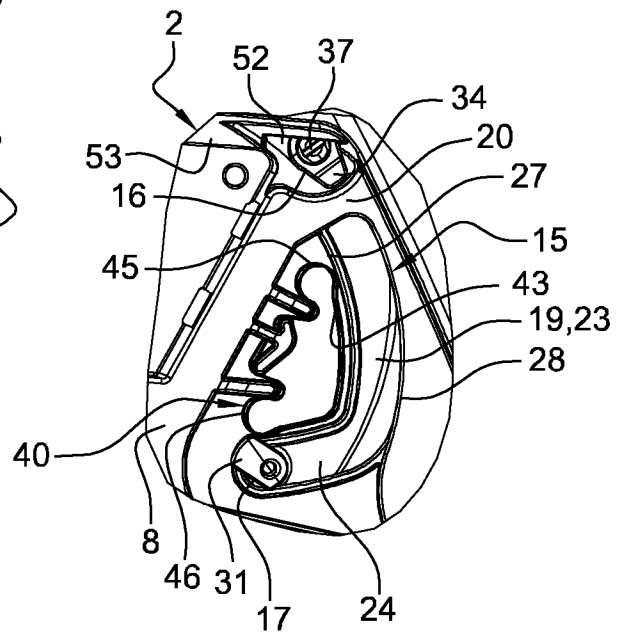


Fig. 10b

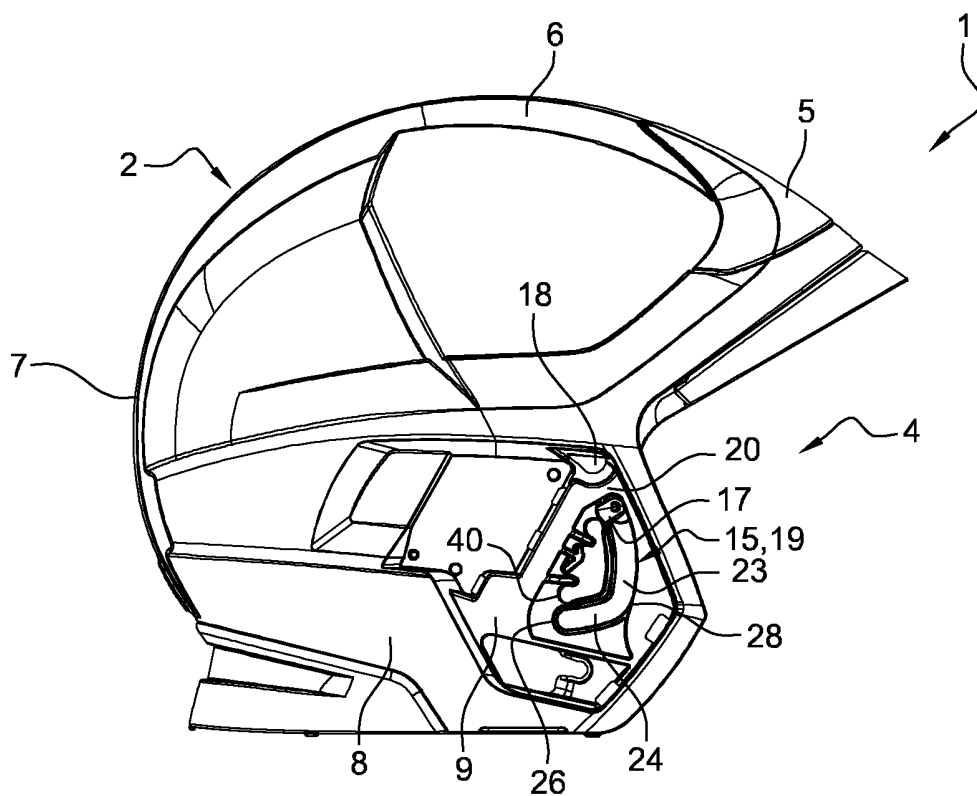


Fig. 11

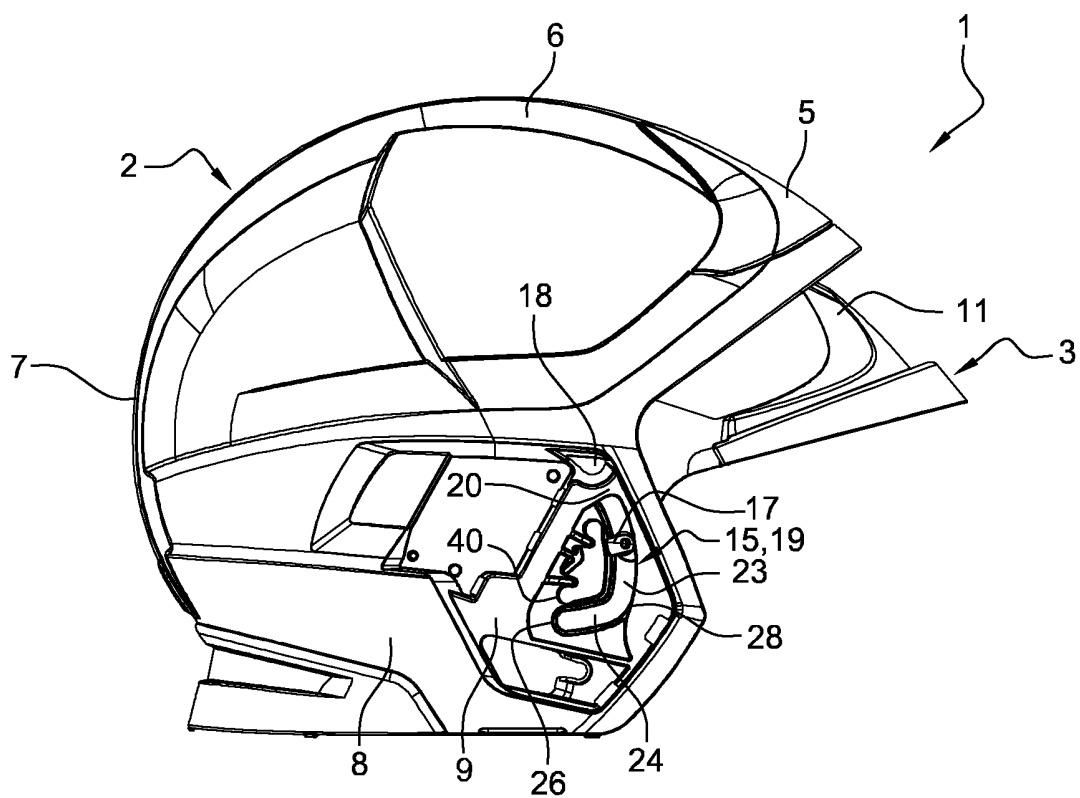


Fig. 12

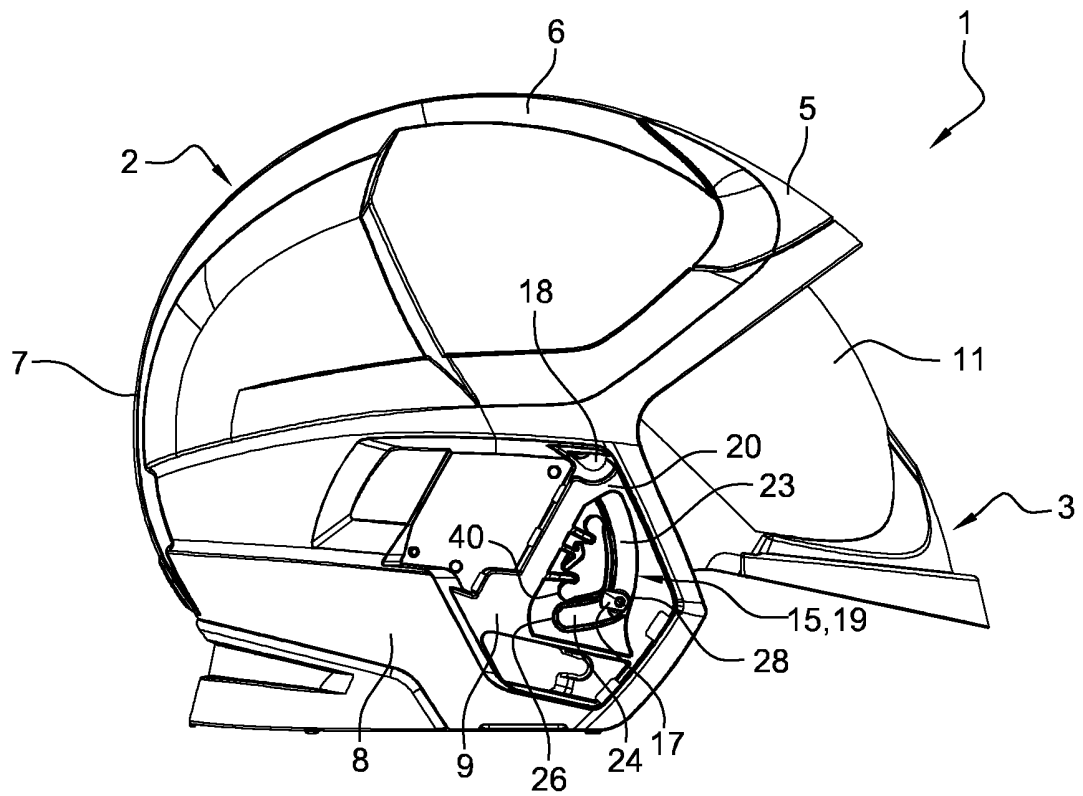


Fig. 13

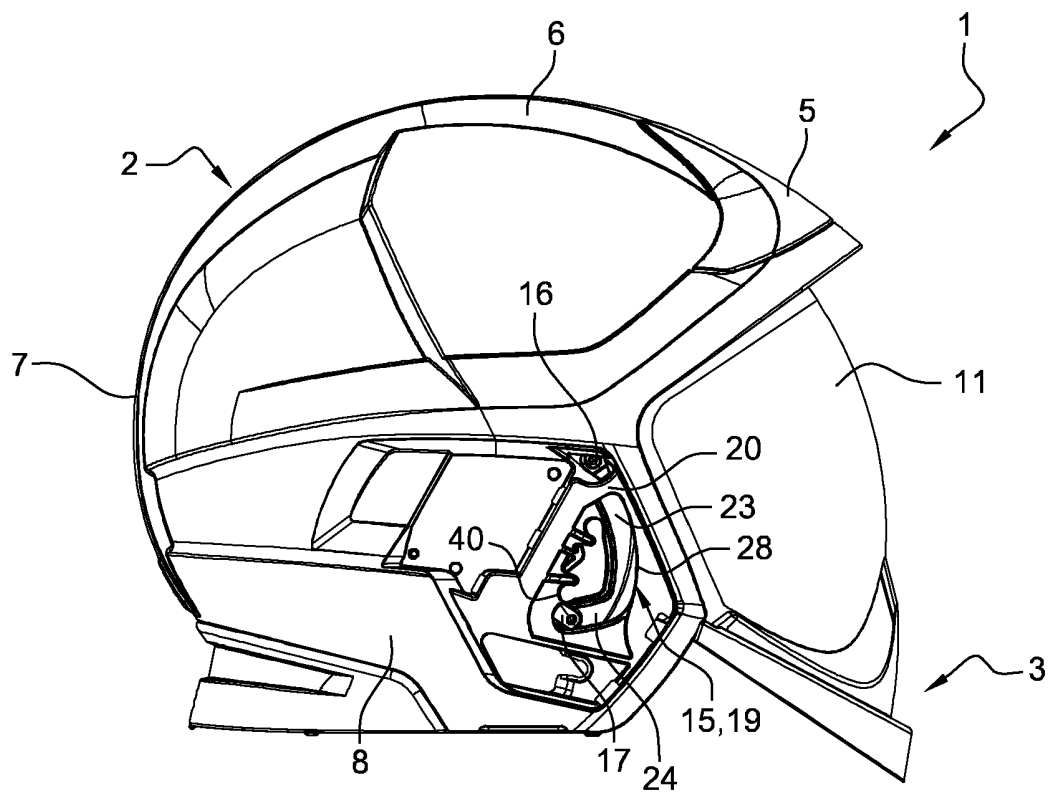


Fig. 14

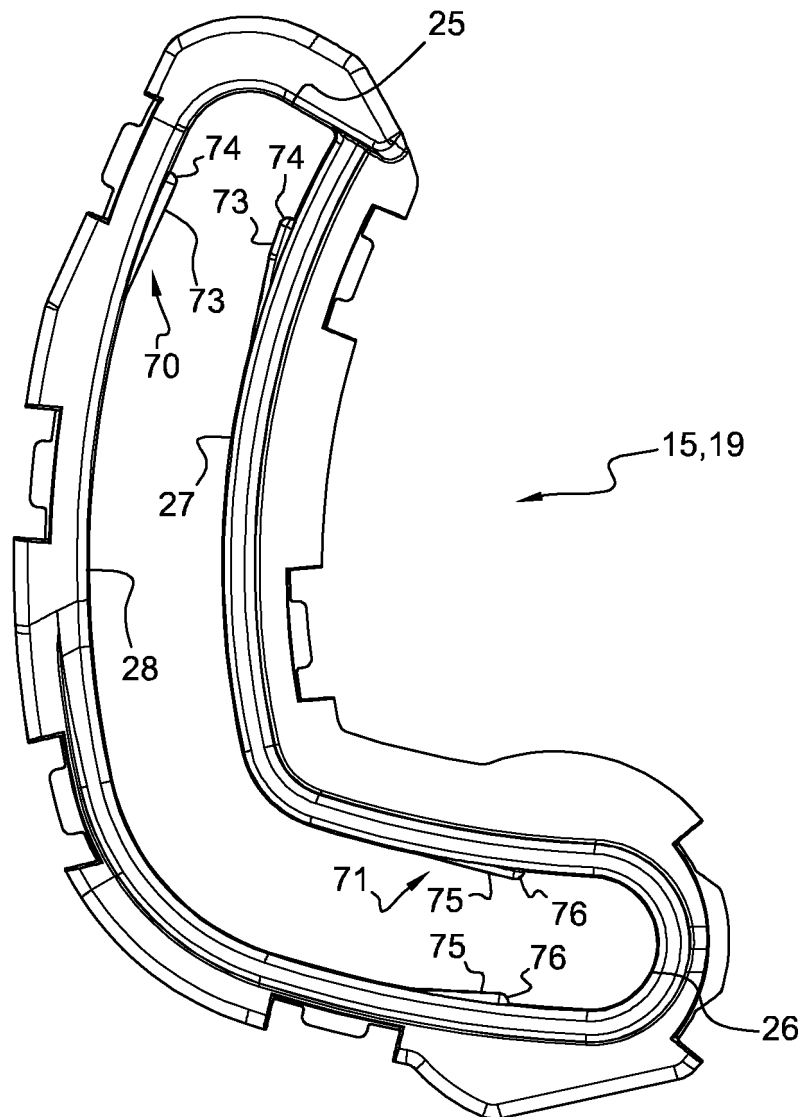


Fig. 15

REFERENCES CITED IN THE DESCRIPTION

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