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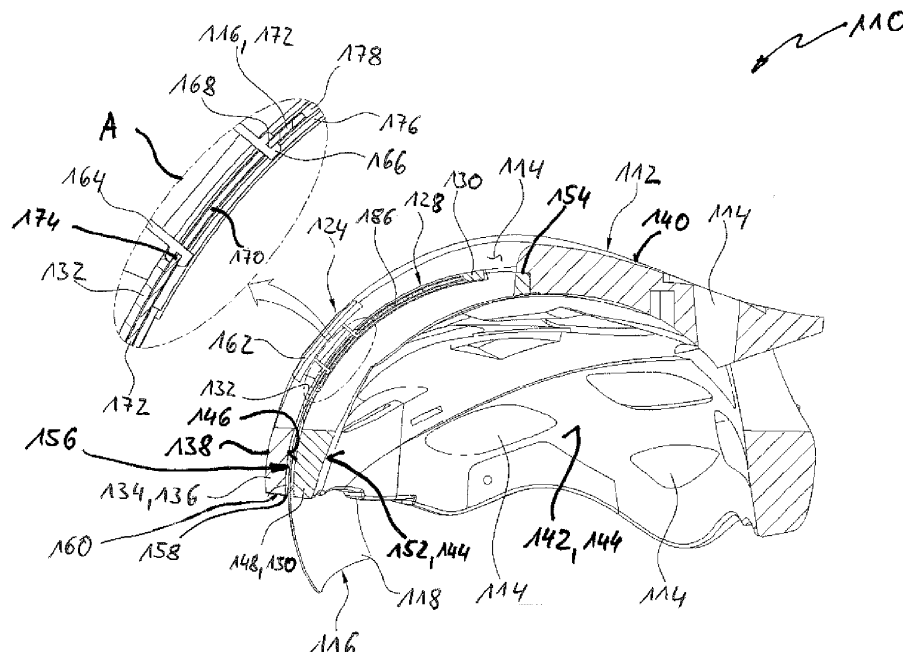
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BA ME(72) Inventor: **Cho, Hakki****Kyonggi-Do (KR)**(74) Representative: **Stößel, Matthias****Herzog Fiesser & Partner****Patentanwälte****Dudenstrasse 46****68167 Mannheim (DE)**(71) Applicant: **J-Tech Corp.****Yongin-Si, Kyonggi-Do 449-834 (KR)****(54) Helmet with movable visor**

(57) A helmet (110), specifically for the protection of a head of a person during leisure activities, is disclosed. The helmet (110) has a shell (112) at least partially made of a deformable material (136). The shell (112) has an interior surface (142) facing the head of a person wearing the helmet (110). The shell (112) comprises a depression (146) in the interior surface (142). An inner lining element (148) is fit into the depression (146), wherein a hollow guiding space (156) is formed between the inner lining

element (148) and the shell (112). The hollow guiding space (156) has a slit (158) at a forehead-sided rim (160) of the shell (112). The helmet (110) further has a visor (116). The visor (116) at least partially is located movably inside the hollow guiding space (156), such that the visor (116) at least partially can be pushed out of the slit (158) into a face region of the person wearing the helmet (110) and can be pulled back into the hollow guiding space (156).

Fig. 2**EP 2 548 462 A1**

Description

Field of the invention

[0001] The invention refers to a helmet, specifically for protection of a head of a person during leisure activities. The invention further relates to a method for producing a helmet. The helmet according to the present invention preferably may be used for leisure activities, such as for cycling, specifically for riding a bicycle, for motorcycling, for horse-riding, for skiing, for snowboarding or other leisure activities. Other potential uses are feasible.

Related art

[0002] The use of protective helmets is becoming more and more popular in leisure activities. In many countries, the use of protective helmets even is mandatory for specific leisure activities and/or specific target groups. Thus, in many countries, the use of a protective helmet is mandatory for motorcyclists. Consequently, various designs and setups of protective helmets are being developed and are known in the art.

[0003] The main purpose of the protective helmets typically consists in protecting the head of the person wearing the helmet against mechanical shocks, such as shocks caused by falling objects and/or shocks caused by an impact during an accident. However, other functionalities may be implemented into the helmet. Thus, specifically in leisure activities in which the person wearing the helmet is moving at high speed and/or in which exposure to increased radiation might occur, such as during mountain climbing, protective functions for the eyes of the person wearing the helmet might be implemented. Consequently, helmets are known which, besides one or more shells protecting the head against mechanical shocks, comprise one or more visors, such as for protecting the eyes against wind, flying objects or sunrays.

[0004] A bicyclist's helmet is disclosed in DE 295 13 463 U1. The helmet comprises a basic body and a decorative outer shell. In between the outer shell and the basic body, an intermediate space is located, in which a visor is movably received. The helmet as disclosed in DE 295 13 463 U1 provides a number of advantages to the user. Thus, the person using the helmet may decide whether or not to use the visor and, thus, might adapt the protection of the eyes to the actual circumstances. However, the setup disclosed by DE 295 13 463 U1 implies several shortcomings and technical disadvantages. Thus, the visor is in hard physical contact with the hard outer decorative shell and, thus, is bound to suffer mechanical abrasion, which might deteriorate the transparency and visual qualities of the visor. Further, due to several design constraints, the space in between the decorative outer shell and the basic body is limited. Consequently, the distance over which the visor might be moved and/or the size of the visor are limited. Further, the visor has to be mounted to several hinges, which implies a

mechanical weakness and a rather complex and costly process for manufacturing the helmet.

Problem to be solved

[0005] It is therefore an objective of the present invention to provide a helmet as well as a method for manufacturing the helmet, which, at least partially, avoid the disadvantages of known helmets and processes. Specifically, it is an object of the present invention to provide a helmet and a method for manufacturing the helmet which may be implemented cost-effectively by simplifying one or more manufacturing steps. Still, the use of the helmet and, specifically, the visor should be convenient and handy.

Disclosure of the invention

[0006] These objectives are accomplished by a helmet, a method for producing a helmet and a use, as disclosed in the independent claims. Preferred embodiments, which may be realized exclusively or in arbitrary combination, are disclosed in the dependent claims.

[0007] As used in the following disclosure, the expressions "have", "contain" and "comprise" as well as grammatical modifications thereof are used in a non-terminatory way. Thus, the expression "A has B", the expression "A comprises B" or "A contains B" may refer to the situation in which A solely consists of B, without containing other components, as well as to the situation in which, besides B, A contains one or more further components.

[0008] In a first aspect of the present invention, a helmet is disclosed. The helmet specifically may be used for the protection of a head of a person during leisure activities. However, other potential uses are possible.

[0009] The helmet has a shell which at least partially is made of a deformable material. As used herein, the term "shell" refers to an element having a curvature, which is formed to at least partially surround a part of the head of the person. Further, as used herein, the term "deformable material" refers to an arbitrary material which may be deformed by forces ordinarily occurring during the intended use. Thus, the deformable material may change its shape by impact of manual forces exerted by a finger of a hand of a person having an adult's ordinary strength. Examples of the deformable material will be given below. Preferably, the deformable material comprises at least one plastic material, preferably a foamed plastic material.

[0010] The shell has an interior surface facing the head of the person wearing the helmet. This interior surface may directly rest on the head of the person during use or, alternatively, one or more intermediate layers, such as one or more layers made of a flexible and/or deformable material, may be interposed in between the interior surface and the head of the person. According to the definition of the expression "shell" as given above, the interior surface may be curved, such as by having a cur-

vature following the outer surface of the head of the person.

[0011] The shell comprises a depression in the interior surface. As used herein, the term "depression" refers to a recess or clearance in the material of the shell which is located in the interior surface. Thus, the interior surface directly or indirectly may rest on the head of the person wearing the helmet, whereas the depression has a depression surface which neither directly or indirectly rests on the surface of the head.

[0012] The helmet further has an inner lining element. This inner lining element is fit into the depression, such that the inner lining element fully or partially is located inside the depression. Thus, the inner lining element may form a cap, which closes the depressions on the side of the head of the person wearing the helmet. The inner lining element may directly or indirectly rest on the head of the person wearing the helmet with at least one surface facing away from the depression.

[0013] A hollow guiding space is formed between the inner lining element and the shell. Thus, the depression may partially be filled by the lining element, wherein the shell has a first surface inside the depression facing towards the guiding space, and wherein the inner lining element has a second surface facing towards the hollow guiding space, such that the hollow guiding space is limited by the first surface of the depression and the second surface of the inner lining element. In other words, the hollow guiding space may be limited by the shell and the inner lining element.

[0014] As used herein, the term hollow guiding space refers to a space, in which a visor of the helmet may fully or partially be accommodated, preferably in a movable way. The hollow guiding space has a slit at a forehead-sided rim of the shell. As used herein, the term slit refers to a lengthy opening, i.e. an opening which may have the shape of a curved line. The term forehead-sided rim of the shell refers to a rim of the shell which, as the person wears the helmet, faces the forehead or the face of the person.

[0015] As discussed above, the helmet further has at least one visor. As used herein, the term visor refers to an element which, in at least one position, fully or partially covers the face of the person wearing the helmet. Thus, in at least one position, the visor may cover the eyes of the person wearing the helmet. The visor may have an opening through which the person may view and/or at least partially may be made of a material which is translucent and through which the person may view.

[0016] The visor at least partially is located movably inside the hollow guiding space. Thus, at least one part of the visor is located inside the hollow guiding space. The term movably refers to the fact that, inside the guiding space, the visor may take at least two different positions. Preferably, in all positions which may be taken by the visor, a part of the visor remains inside the hollow guiding space, even in an outermost position in which the visor is moved as far as possible into a face region of the per-

son wearing the helmet. However, there may be one or more positions in which the visor fully is pushed out of the guiding space. In any case, the visor at least partially can be pushed out of the slit at the forehead-sided rim of the shell, into a face region of the person wearing the helmet and can be pulled back into the hollow guiding space.

[0017] As used herein, the term face region of the person wearing the helmet refers to a region which is located in front of the eyes of the person wearing the helmet, such that the visor is in the field of view of this person. In other words, in the position in which the visor at least partially is pushed out of the slit into the face region, the visor fully or partially may cover the eyes of the person wearing the helmet. This movement into the face region of the person is reversible, such that the visor can be pulled back again into the hollow guiding space. As used herein, the terms "pushed" and "pulled" refer to an arbitrary action in which a force is exerted onto the visor such that the visor moves out of the slit into the face region of the person or moves back into the hollow guiding space, respectively.

[0018] Thus, according to the first aspect of the present invention, there is provided a helmet having a shell fully or partially made of a deformable material, wherein a hollow guiding space is formed inside the deformable material and at least partially is surrounded by the deformable material. Preferably, the deformable material may fully or partially be formed of a foamed plastic material or may comprise a foamed plastic material. Preferably, the foamed plastic material may be selected from the group consisting of: a polystyrene foam, preferably expanded polystyrene (EPS); a polyethylene foam; a polypropylene foam; a polyethylene terephthalate foam; a polyurethane foam; a foamed plastic material composed of a plurality of pre-expanded foamed plastic particles, preferably particles having a particle size of 1 mm to 5 mm. Generally, the plastic material may comprise at least one thermoplastic material and/or at least one duroplastic material and/or at least one elastomeric material.

[0019] The deformable material may have elastic properties, such that, when a force is exerted onto the deformable material, the deformable material is deformed and at least partially resumes its original shape after the force is removed. Alternatively or additionally, the deformable material may have at least partial ductile or plastic properties, such that, by exerting the force, the deformable material is deformed and remains in the deformed shape even after the force stops.

[0020] The shell of the helmet preferably may have a thickness of 5 mm to 60 mm, more preferably 10 mm to 30 mm, measured in a direction perpendicular to the surface of the head wearing the helmet, such as measured in the thickest part of the shell. By exerting regular forces which might occur during use, such as forces from 5 Newtons to 100 Newtons, the thickness may optionally be reduced preferably by no more than 75 %, such as by 5

% to 50%.

[0021] The shell preferably may have a multi-layer set-up. The multi-layer setup may comprise a plurality of two or more layers, such as in a cross-sectional view perpendicular to the surface of the head of the person wearing the helmet. One or more layers of this multi-layer setup may comprise the deformable material. Thus, the multi-layer setup may comprise at least one outer lining layer and the deformable material. Thus, there may be provided at least one layer having the deformable material and at least one outer lining layer which directly or indirectly is in contact with the deformable material, i.e. with the layer containing the deformable material. As used herein, the term outer lining layer refers to a layer facing towards an outer side of the helmet, such as to a layer which forms at least one outer surface of the helmet. This outer lining layer may provide additional functionality to the helmet. Thus, the outer lining layer, as discussed below, may have a higher hardness than the deformable material and/or may provide water-repellent properties and/or may provide decorative properties, such as by the outer lining layer partially or fully being made of a colored material.

[0022] In a preferred embodiment of the multi-layer set-up comprising the outer lining layer and the deformable material, the outer lining layer and the deformable material may be connected by an inmold-technique. As used herein, the term inmold-technique refers to a molding technique which is well-known to the skilled person. In the inmold-technique, a mold is used, which may comprise two or more molding parts defining, by their inner surfaces, the shape of the piece formed by the inmold-technique. The outer lining layer and/or a raw material which forms the outer lining layer, such as a sheet material, is inserted into the mold. This material may be held in place inside the mold by means of heating the mold and/or by vacuum techniques. In a subsequent step, the deformable material is filled into the remaining space inside the mold and contacts the material of the outer lining layer. The insertion of the deformable material into the mold may take place at normal pressure, at an underpressure or at an overpressure. The deformable material may be inserted into the mold in a state which corresponds to the final state of the deformable material and/or may be inserted into the mold in a different shape, wherein, during the molding technique, the deformable material is formed. Thus, at least one precursor material of the deformable material may be filled into the mold, followed by at least one curing step, during which the deformable material is formed. Alternatively or additionally, the deformable material may be heated and, thereby, be transformed into a liquid or moldable form and may harden inside the mold. Other alternatives are possible. In any case, when using the inmold-technique, the outer lining layer and the deformable material are brought into contact inside the mold and, thus, may form a tight closure by adhesive force and/or by material engagement. Both the outer lining layer and the deformable material may

be brought into their final shape inside the mold during the inmold-technique.

[0023] The outer lining layer may have a thickness which is significantly lower than the thickness of the shell and/or than the thickness of the deformable material. Thus, the outer lining layer may have a thickness of 0.2 mm to 5 mm, preferably of 0.3 mm to 4 mm and most preferably of approximately 0.5 mm to 1.0 mm. The outer lining layer may comprise at least one layer being composed of a plastic material. Thus, the plastic material may be a thermoplastic material, more preferably a non-foamed thermoplastic material and even more preferably a thermoplastic material selected from the group consisting of: polycarbonate, polyethylene; polypropylene; polyethylene terephthalate. Further, as discussed above, the outer lining layer may have water-repellent properties. Additionally or alternatively, the outer lining layer may be colored and may provide decorative elements, such as by providing a color of the helmet as seen from the outside.

[0024] In a further preferred embodiment, the helm has an outer surface facing away from the person wearing the helmet. The shell may have a guiding slit extending from the outer surface into the hollow guiding space. Thus, the guiding slit preferably may be located perpendicular to the slit at the forehead-sided rim of the shell. The guiding slit may have a length of 10 mm to 250 mm, more preferably a length of 30 mm to 200 mm and, most preferably, a length of 50 mm to 150 mm. The length of the guiding slit may define the extent to which the visor may be pushed out of the slit at the forehead-sided rim of the shell into the face region of the person wearing the helmet.

[0025] A guiding element may be mounted to the visor and may extend through the guiding slit such that the guiding element is operable from the outer surface. A position of the visor may be adjustable by using the guiding element. As used herein, the term guiding element may refer to an arbitrary element which mechanically may act onto the visor, which extends through the guiding slit and which may be used by a person to move the visor into the face region of the person wearing the helmet. The term "is mounted to the visor" may refer to an embodiment in which the guiding element is an integral element of the visor, such as to an embodiment in which the guiding element is a protrusion from the visor, and/or to an embodiment, in which the guiding element is formed as an element separate from the visor and in which the guiding element reversibly and/or fixedly is mechanically connected to the visor.

[0026] The guiding element may comprise at least one lever and/or at least one handle which may be operated by the person wearing the helmet and/or by another person from the outer surface, thereby influencing the position of the visor. The guiding element may take at least two different positions inside the guiding slits, wherein these positions may define the position of the visor. Thus, there may be an uppermost position, in which the guiding

element abuts a first end of the guiding slit and in which the visor is pulled back into the hollow guiding space as far as possible. Further, there may be a lowermost position of the guiding element, in which the guiding element abuts a lower end of the guiding slit and in which the visor may be pushed out of the slit at the forehead-sided rim of the shell into the face region of the person wearing the helmet, as far as possible. The guiding element may be moved between these extreme positions in one or more steps and/or in a stepless manner. Thus, by positioning the guiding element, a position of the visor may be adjustable by using the guiding element, such as by adjusting the visor to two or more positions.

[0027] The helmet further may have a plurality of venting openings. Specifically in bicyclists' helmets, venting openings are rather common. Typically, venting openings in the form of one or more steps are formed. These venting openings may extend from the outer surface of the helmet through the shell to the interior surface of the shell. The venting openings may fully or partially be filled and/or covered by a protective material, such as a net and/or a filter material, which prevents dirt and/or bugs from entering the venting holes.

[0028] The guiding slit itself may have a double-function and may at least partially be identical to one of the venting holes.

[0029] As discussed above, the guiding element may form an integral part of the visor or may be formed by a separate element which is connected to the visor in an arbitrary way. Most preferably, the guiding element may be connected to the visor in a reversible way. Preferably, the guiding element may be connected to the visor by one of a force-fit connector and/or a form-fit connector. When using a removable and/or reversible connection between the guiding element and the visor, as discussed below, a mounting of the visor and/or a removal of the visor, such as for cleaning purposes and/or for the purpose of exchanging the visor, may be simplified. Thus, firstly, the visor may be pushed into the slit at the forehead-sided rim of the shell, into the hollow guiding space, with the guiding element removed from the visor. Then, such as by introducing the guiding element through the guiding slit, the guiding element may be connected to the visor. This allows for a simple and user-friendly mounting technique, which may even be performed by the person wearing the helmet, such as for cleaning the visor and/or for mounting a different type of visor, such as for mounting a new visor and/or for mounting a visor having different spectral properties.

[0030] In a preferred embodiment, the visor may have at least one opening. This opening preferably may be located at an upper rim of the visor, which is located as far as possible inside the hollow guiding space. Other embodiments are possible. The guiding element may extend through the opening and may be connected to a rim of the opening, such as by the above-mentioned force-fit connector and/or by the above-mentioned form-fit connector.

[0031] Thus, the guiding element may have a simple clip, which may be connected to the rim of the opening, thereby engaging the visor and enabling an operation of the visor by the person wearing the helmet and/or another person.

[0032] As outlined above, the guiding element may be formed in several ways. Thus, the guiding element may have at least one handle and/or at least one lever. The handle may have at least one anatomically formed outer surface which may easily be gripped by the person wearing the helmet and/or another person in order to operate the guiding element. This surface preferably may have one or more grips, which may prevent the fingers of the person operating the guiding element slipping across the guiding element.

[0033] The visor generally may have a curved shape, such as in order to at least partially cover the curved surface of the face of the person wearing the helmet. The hollow guiding space and the visor at least more or less may have the same curvature. Preferably, the visor may have a uniform thickness. Preferably, the visor may have a thickness of 1 mm to 10 mm, preferably of 2 mm to 5 mm.

[0034] The visor at least partially may be made of a plastic material, preferably a thermoplastic material. The visor may be formed in a separate molding process, such as by injection molding of the plastic material. Preferably, the visor at least partially may be made of polycarbonate. However, alternatively or additionally, other materials may be used. As discussed above, preferably, the visor at least partially may have transparent properties, in order to allow for the person wearing the helmet looking through the visor. However, the material of the visor may provide protection from specific rays, such as by providing at least one filter material which filters at least part of the solar spectrum of light, such as light in the ultraviolet spectral region. Thus, the visor may have a transmission of 20-100 % in at least one spectral range within the visible spectrum.

[0035] In addition to the visor and the guiding element, the helmet may comprise further elements which may support the movement of the visor inside the hollow guiding space. Thus, in a preferred embodiment, the helmet may further comprise at least one guide rail element. The guide rail element may at least partially be located inside the hollow guiding space and may provide a guide rail for a movement of the visor. As used herein, the term guide rail refers to the property of providing at least one guiding surface, along which the visor and/or the guiding element may glide or move, thereby providing increased stability to the movement of the visor. Thus, the guide rail may define a trajectory and/or path of the movement of the visor.

[0036] In a preferred embodiment, the guide rail element may comprise an upper stopper element and a lower stopper element. The upper stopper element and the lower stopper element may limit the movement of the visor. Thus, the lower stopper element may stop the

movement of the visor in a position in which the visor is pushed out of the slit into the face region of the person wearing the helmet to the farthest extent, such as by providing at least one abutment surface which abuts the visor and/or an element connected to the visor, such as the guiding element. Similarly, the upper stopper element may provide an upper abutment surface, to which the visor and/or an element connected to the visor, such as the guide element, may abut, thereby defining the uppermost position of the visor inside the hollow guiding space.

[0037] As discussed above, the visor may take two or more positions. As further discussed above, in case more than two positions are provided, intermediate positions may be taken in one or more steps and/or in a stepless fashion. In a preferred embodiment, the guide rail element may have a plurality of rest elements, wherein the rest elements are located in predefined rest positions, such that the visor may be adjusted to a plurality of predefined positions. These rest positions may be defined by specific mechanical rests in the guide rail element, such as by one or more dents and/or depressions in the guide rail element. Thus, the guide rail element may provide one, two, three or more teeth and/or dents and/or depressions, which may interact with the visor and/or another element connected to the visor, such as the guide element, in order to preliminarily stop a movement of the visor, such as by a mechanical engagement which may only be overcome by an increased force.

[0038] As discussed above, the shell and the inner lining element commonly may define and/or delimit the hollow guiding space which accommodates the visor. The inner lining element may be connected to the shell in an arbitrary way, such as by using a form-fit connection and/or by using a force-fit connection and/or, most preferably, by using a closure by adhesive force and/or by using an engagement by material. Most preferably, the inner lining element is glued to the shell, such as along a rim of the inner lining element, along which the inner lining element rests on the shell, preferably along a rim of the depression. The interior surface of the shell and an inner surface of the inner lining element, the inner surface facing the head of the person wearing the helmet, may commonly form a resting surface, which directly or indirectly rests on the head of the person wearing the helmet. Thus, the resting surface may be formed by the interior surface of the shell in a region outside the inner lining element and/or outside the depression, and, further, may be formed by the inner surface of the inner lining element in the region of the inner lining element and/or in the region of the depression. The resting surface may directly rest on the head of the person wearing the helmet. Alternatively, one or more intermediate layers may be formed between the resting surface and the head of the person wearing the helmet, such as one or more flexible layers, which may be removable, such as for cleaning purposes. Thus, one or more fabric layers may be interposed between the resting surface and the head of the person wearing the helmet. Further, one or more

soft layers for increasing the comfort of wearing the helmet may be provided in between the resting surface and the head of the person wearing the helmet.

[0039] Further preferred embodiments relate to the material of the inner lining element. Thus, preferably, the inner lining element at least partially may be made of a further deformable material. Thus, the resting surface which may commonly be formed by the interior surface and the inner surface of the inner lining element may completely be formed of deformable materials, such as of the deformable material and the further deformable material. The further deformable material of the inner lining element may be identical or non-identical to the deformable material of the shell. With regard to potential embodiments of the further deformable material, reference may be made to the description of deformable material of the shell as disclosed above. However, other embodiments are possible. The further deformable material preferably may comprise a foamed plastic material. Preferably, the foamed plastic material may be selected from the group consisting of: a polystyrene foam; a polypropylene foam; a polyethylene terephthalate foam; a polyurethane foam; a foamed plastic material composed of a plurality of pre-expanded foamed plastic particles, preferably particles having a particle size of 1 mm to 5 mm, more preferably of 1.5 mm to 2 mm.

[0040] As discussed above, the inner lining element preferably may be mounted to the shell. Thus, the inner lining element preferably may be mounted to the shell in at least one rim region adjacent to the hollow guiding space. This rim region preferably may be a flat region having a U-shape and/or another shape which may surround the hollow guiding space at least partially. The inner lining element preferably may be glued to the shell.

[0041] As discussed above, the shell may have a thickness of several mm. Preferably, the shell may have a thickness of 5 mm to 70 mm, more preferably of 10 mm to 30 mm.

[0042] As mentioned above, the visor preferably may have a non-planar shape, such as a curved shape. The visor preferably may comprise a face shield, wherein the face shield can be pushed out of the slit into the field of view of the person wearing the helmet. The face shield preferably may be made of a transparent material. As used herein, the term transparent refers to a material, which at least partially is transparent to visible light. However, the transparent material may have filter properties, preferably in the ultraviolet region and/or in the blue spectral region of the visible spectrum.

[0043] The face shield, on a lower rim facing away from the slit at the forehead-sided rim of the shell preferably may have a dent following the shape of the nose of the person wearing the helmet.

[0044] Besides the face shield, the visor further may comprise an elongated frame element, wherein the elongated frame element extends from the face shield into the hollow guiding space. As opposed to the face shield, the elongated frame element may remain inside the hol-

low guiding space in all positions which may be taken by the visor during use. Thus, the elongated frame element may comprise one or more fingers which extend into the hollow guiding space. The guiding element, which extends through the guiding slit, may be mounted to one or more of the elongated frame elements.

[0045] In a further aspect of the present invention, a method for producing a helmet is disclosed. The helmet preferably may be a helmet according to the present invention, such as a helmet as discussed above and/or as disclosed in more detail in the preferred embodiments shown below. Thus with regard to potential embodiments of the helmet producible by the method, reference may be made to the disclosure of the helmet according to the present invention, as discussed above or as disclosed in further potential details below. However, other embodiments are possible. In turn, with regard to potential embodiments of the helmet, reference may be made to the method according to the present invention, as disclosed below and as disclosed in more detail in the preferred embodiments discussed below.

[0046] The method comprises the following method steps. Preferably, the method steps are performed in the given order. However, a different order is possible. Further, it may be possible to perform one or more of the method steps in a time-parallel fashion and/or in a time-overlapping fashion. Further, the method may comprise one or more additional method steps, which are not disclosed below.

[0047] The method comprises the following method steps:

a) a shell is formed by using at least one deformable material, wherein the forming of the shell is performed such that the shell has an interior surface facing a head of a person wearing the helmet, wherein during forming of the shell a depression is created in the interior surface,

b) an inner lining element is fit into the depression, wherein a hollow guiding space is formed between the inner lining element and the shell, the hollow guiding space having a slit at a forehead-sided rim of the shell,

c) a visor is provided, wherein the visor at least partially is located movably inside the hollow guiding space, such that the visor at least partially can be pushed out of the slit into a face region of the person wearing the helmet and can be pulled back into the hollow guiding space.

[0048] With regard to the definition of the terms used in these method steps, reference may be made to the above-mentioned disclosure of the helmet.

[0049] The visor may be inserted into the hollow guiding space after performing step b) of the method, i.e. after fitting the inner lining element into the depression. Alter-

natively, after performing step a) of the method, the visor may be inserted into the depression and, subsequently, step b) may be performed.

[0050] The shell and the inner lining element may be formed in the same step or process or may be formed in one or more separate process steps. Thus, as discussed below, the shell preferably may be formed in a molding process, preferably by using at least one first mold, wherein the mold may be formed such that the depression is created in the interior surface. Thus, an inner surface of the first mold may have a shape which is suited to create the depression in the inner surface. Similarly, a second mold may be used for forming the inner lining element. After performing the two molding processes for forming the shell and the inner lining element, the shell and the inner lining element may be assembled, by at least partially fitting the inner lining element into the depression, thereby creating the hollow guiding space in between the shell and the inner lining element.

[0051] Preferably, the helmet may have an outer surface facing away from the person wearing the helmet. Step a) may be performed such that the shell may have a guiding slit extending from the outer surface into the hollow guiding space. Further, after performing steps b) and c), a guiding element may be mounted to the visor, such that the guiding element extends through the guiding slit and such that the guiding element is operable from the outer surface. Thereby, a position of the visor may be adjustable by using the guiding element. For further details, reference may be made to the disclosure of the helmet above.

[0052] As discussed above, the inner lining element may be connected to the shell in various ways. Most preferably, in method step b), the inner lining element may be glued to the shell.

[0053] As discussed above, several techniques may be used for forming the shell, thereby providing the desired shape to the deformable material of the shell. Most preferably, a molding technique is used. As used herein, the term molding technique refers to a technique using at least one mold, wherein the mold provides at least one cavity having inner surfaces corresponding to the desired outer shape of the element to be manufactured by the molding technique, wherein at least one raw material is inserted into the cavity in a deformable form. The raw material may be hardened and/or set inside the cavity and, thereafter, be removed from the cavity of the mold.

[0054] Most preferably, as discussed above, the deformable material may comprise at least one foamed material. In the molding technique, a mold having at least one cavity may be used, wherein one or more of the following method steps may be used:

- the foamed material may be inserted into the cavity, e.g. in a pre-foamed shape; and/or
- a material being capable of being foamed is inserted into the cavity and is foamed inside the cavity. Thus,

the foaming may take place outside the cavity, before inserting the foamed material into the cavity, or may be performed inside the cavity.

[0055] As discussed above, the shell may comprise a multi-layer setup having two or more layers. The multi-layer setup preferably may comprise at least one outer lining layer and the deformable material. In step a), an inmold-technique may be used to create the multi-layer setup.

[0056] In a third aspect of the present invention, a use of the helmet according to the present invention is proposed. According to this aspect, a use of the helmet is proposed, for a purpose selected from the group consisting of: cycling, specifically riding a bicycle; motorcycling; horse-riding; skiing; snowboarding; water skiing.

[0057] The helmet, the method and the use according to the present invention provide a large number of advantages over known helmets, methods and uses. Thus, the method of manufacturing significantly may be simplified as compared to known methods, since a well-defined movement of the visor may be provided without the need of complex hinges, which are typically rather difficult with regard to their assembly procedure. Despite of this implication, the movement of the visor may be smooth, since the visor may completely or at least partially be surrounded by the deformable material and/or the further deformable material. Thus, the hollow guiding space may completely be surrounded by the deformable material and, optionally, the further deformable material, such that the visor, inside the hollow guiding space, preferably may not get into contact with any hard materials. Thus, according to the present invention, a highly durable setup having a high lifetime may be provided, which prevents the visor from being scratched, even when frequently used.

[0058] Further, the handling of the visor may be significantly simplified as compared to known visors. Thus, by providing the guiding element which may be operated by the person wearing the helmet or another person, a user-friendly method of operation may be provided, without the need of touching a face shield of the visor, thereby preventing the visor from being smeared by sweat or dirt sticking to the fingers. Further, the visor may fully be pulled back into the hollow guiding space, without the need of a rim of the visor extending from the slit in this position, in order to allow for a user to operate the visor and push the visor back into the face region, since the visor may easily be operated by the guiding element extending through the guiding slit.

[0059] Further, by using the above-mentioned inmold-technique, a simple and durable manufacturing process may be provided, which may be performed on a large scale in an industrial process. By using inmold-techniques, multi-layer setups may be provided, which may combine decorative purposes and the above-mentioned advantages of the deformable material of the shell.

[0060] The above-mentioned guiding slit may optically

fit into the general design of the helmet, such as the design having one or more venting or ventilation openings. Thus, the guiding list may be formed as groove. The guiding element may form a slide which may be operated by a user. The groove may be located under the slide, and ventilation openings may be built along the groove. The visor, which may be formed as an inner visor, may be inserted under the groove, inside the hollow guiding space, and may slide up and down under the helmet body. As discussed above, one or more guiding elements may be provided to further ensure a smooth movement of the visor. Thus, the guiding element may comprise one or more slide guiding parts, which may be equipped inside the groove and/or inside the hollow guiding space and which may support the visor, specifically the inner visor.

[0061] Further, the visor may be designed to be removable, by a manufacturer and/or by the person wearing the helmet. Thus, the visor may be exchangeable, such as by simply removing the guiding element from the visor and by pulling the visor out of the slit at the forehead-sided rim of the shell. A new visor may be inserted into the slit and may be connected to the guiding element. The visor may slide along the groove when the handle is operated.

[0062] The helmet preferably may be designed as an outdoor sports helmet. Thus, the outer surface of the helmet may provide water-repellent properties. As discussed above, these properties preferably may be provided by one or more outer lining layers. The shell on the other hand may be made of different materials, such as by indoor materials.

[0063] The visor may provide one or more additional functions. Thus, as discussed above, the visor, preferably a face shield of the visor, may provide protective functions and/or filter functions, such as the function of sunglasses. Additionally or alternatively, the visor, preferably the face shield of the visor, may comprise optically corrective elements, such as vision corrective glasses.

[0064] Summarizing the above-mentioned findings, the following items are specifically preferred:

Item 1: A helmet, specifically for the protection of a head of a person during leisure activities, the helmet having a shell at least partially made of a deformable material, the shell having an interior surface facing the head of a person wearing the helmet, wherein the shell comprises a depression in the interior surface, wherein an inner lining element is fit into the depression, wherein a hollow guiding space is formed between the inner lining element and the shell, the hollow guiding space having a slit at a forehead-sided rim of the shell, the helmet further having a visor, wherein the visor at least partially is located movably inside the hollow guiding space, such that the visor at least partially can be pushed out of the slit into a face region of the person wearing the helmet and can be pulled back into the hollow guiding

space.

Item 2: The helmet according to the preceding item, wherein the deformable material comprises a foamed plastic material.

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Item 3: The helmet according to the preceding item, wherein the foamed plastic material is selected from the group consisting of: a polystyrene foam, preferably expanded polystyrene; a polyethylene foam; a polypropylene foam; a polyethylene terephthalate foam; a polyurethane foam; a foamed plastic material composed of a plurality of pre-expanded foamed plastic particles, preferably particles having a particle size of 1 mm to 5 mm.

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Item 4: The helmet according to one of the preceding items, wherein the shell has a multi-layer setup, the multi-layer setup comprising at least one outer lining layer and the deformable material.

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Item 5: The helmet according to the preceding item, wherein the outer lining layer and the deformable material are connected by an in-mold-technique.

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Item 6: The helmet according to one of the two preceding items, wherein the outer lining layer comprises an outer hard protective lining layer and an inner decorative lining layer facing the deformable material.

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Item 7: The helmet according to one of the three preceding items, wherein the outer lining layer has a thickness of 0.2 mm to 5 mm, preferably of 0.3 to 4 mm, more preferably of 0.5 mm to 1.0 mm.

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Item 8: The helmet according to one of the four preceding items, wherein the outer lining layer comprises at least one layer being composed of a plastic material.

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Item 9: The helmet according to the preceding item, wherein plastic material is a thermoplastic material, preferably a non-foamed thermoplastic material and more preferably a thermoplastic material selected from the group consisting of: polycarbonate; polyethylene; polypropylene; polyethylene terephthalate.

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Item 10: The helmet according to one of the preceding items, wherein the helmet has an outer surface facing away from of the person wearing the helmet, wherein the shell has a guiding slit extending from the outer surface into the hollow guiding space, wherein a guiding element is mounted to the visor and extends through the guiding slit such that the guiding element is operable from the outer surface, wherein a position of the visor is adjustable by using

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the guiding element.

Item 11: The helmet according to the preceding item, the helmet having a plurality of venting openings, wherein the guiding slit at least partially is identical to one of the venting openings.

Item 12: The helmet according to one of the two preceding items, wherein the guiding element removably is connected to the visor.

Item 13: The helmet according to the preceding item, wherein the guiding element is connected to the visor by one of a force-fit connector and a form-fit connector.

Item 14: The helmet according to one of the four preceding items, wherein visor has an opening, wherein the guiding element extends through the opening and is connected to a rim of the opening.

Item 15: The helmet according to one of the five preceding items, wherein the guiding element has a handle which is operable by the person wearing the helmet in order to move the visor.

Item 16: The helmet according to one of the preceding items, wherein the visor has a uniform thickness.

Item 17: The helmet according to one of the preceding items, wherein the visor has a thickness of 1 mm to 10 mm, preferably of 2 mm to 5 mm.

Item 18: The helmet according to one of the preceding items, wherein the visor at least partially is made of a plastic material, preferably a thermoplastic material.

Item 19: The helmet according to one of the preceding items, wherein the visor at least partially is made of a polycarbonate.

Item 20: The helmet according to one of the preceding items, the helmet further comprising a guide rail element, wherein the guide rail element at least partially is located inside the hollow guiding space, wherein the guide rail element provides a guide rail for a movement of the visor.

Item 21: The helmet according to the preceding item, wherein the guide rail element comprises an upper stopper element and a lower stopper element limiting the movement of the visor.

Item 22: The helmet according to one of the two preceding items, wherein the guide rail element has a plurality of rest elements, wherein the rest elements are located in predefined rest positions, such that

the visor may be adjusted to a plurality of predefined positions.

Item 23: The helmet according to one of the preceding items, wherein the interior surface and an inner surface of the inner lining element commonly form a resting surface which directly or indirectly rests on the head of the person wearing the helmet. 5

Item 24: The helmet according to one of the preceding items, wherein the inner lining element at least partially is made of a further deformable material. 10

Item 25: The helmet according to the preceding item, wherein the further deformable material comprises a foamed plastic material. 15

Item 26: The helmet according to the preceding item, wherein the foamed plastic material is selected from the group consisting of: a polystyrene foam, preferably expanded polystyrene; a polyethylene foam; a polypropylene foam; a polyethylene terephthalate foam; a polyurethane foam; a foamed plastic material composed of a plurality of pre-expanded foamed plastic particles, preferably particles having a particle size of 1 mm to 5 mm and more preferably particles having a particle size of 1.5 mm to 2 mm. 20 25

Item 27: The helmet according to one of the preceding items, wherein the inner lining element is mounted to the shell in at least one rim region adjacent to the hollow guiding space. 30

Item 28: The helmet according to the preceding item, wherein the inner lining element is glued to the shell. 35

Item 29: The helmet according to one of the preceding items, wherein the shell has a thickness of 5 mm to 70 mm, preferably of 10 mm to 30 mm. 40

Item 30: The helmet according to one of the preceding items, wherein the visor has a non-planar shape. 45

Item 31: The helmet according to one of the preceding items, wherein the visor comprises a face shield, wherein the face shield can be pushed out of the slit into the field of view of the person wearing the helmet. 50

Item 32: The helmet according to the preceding item, wherein the face shield is made of a transparent material. 55

Item 33: The helmet according to one of the two preceding items, wherein the face shield, on a lower rim facing away from the slit, has a dent following the shape of the nose of the person wearing the helmet.

Item 34: The helmet according to one of the three

preceding items, wherein the visor further comprises an elongated frame element, wherein the elongated frame element extends from the face shield into the hollow guiding space.

Item 35: A method for producing a helmet, specifically a helmet according to one of the preceding items, wherein the method comprises the following method steps:

- a) a shell is formed by using at least one deformable material, wherein the forming of the shell is performed such that the shell has an interior surface facing a head of a person wearing the helmet, wherein during forming of the shell a depression is created in the interior surface,
- b) an inner lining element is fit into the depression, wherein a hollow guiding space is formed between the inner lining element and the shell, the hollow guiding space having a slit at a forehead-sided rim of the shell,
- c) a visor is provided, wherein the visor at least partially is located movably inside the hollow guiding space, such that the visor at least partially can be pushed out of the slit into a face region of the person wearing the helmet and can be pulled back into the hollow guiding space.

Item 36: The method according to the preceding item, wherein, after performing step a), the visor is inserted into the depression and, subsequently, step b) is performed.

Item 37: The method according to one of the preceding method items, wherein the helmet has an outer surface facing away from of the person wearing the helmet, wherein step a) is performed such that the shell has a guiding slit extending from the outer surface into the hollow guiding space, wherein, after performing steps b) and c), a guiding element is mounted to the visor, such that the guiding element extends through the guiding slit and such that the guiding element is operable from the outer surface, wherein a position of the visor is adjustable by using the guiding element.

Item 38: The method according to one of the preceding method items, wherein, in step b), the inner lining element is glued to the shell.

Item 39: The method according to one of the preceding method items, wherein, in step a), a molding technique is used, preferably an inmold-technique.

Item 40: The method according to the preceding item, wherein the deformable material comprises at least one foamed material, wherein, in the molding technique, a mold having at least one cavity is used,

wherein one of the following method steps is used:

- the foamed material is inserted into the cavity;
- a material being capable of being foamed is inserted into the cavity and is foamed inside the cavity.

Item 41: The method according to one of the preceding method items, wherein step a) is performed such that the shell has a multi-layer setup, the multi-layer setup comprising at least one outer lining layer and the deformable material, wherein, in step a), an in-mold-technique is used to create the multi-layer setup.

Item 42: A use of the helmet according to one of the preceding items referring to a helmet for a purpose selected from the group consisting of: cycling, specifically riding a bicycle; motorcycling; horse-riding; skiing; snowboarding; water skiing.

Short description of the figures

[0065] Further optional details and optional features of the present invention may be derived from the following description of preferred embodiments, preferably in connection with the dependent claims. Therein, the features may be realized on their own or in arbitrary combination. The invention is not restricted to the embodiments. The embodiments are schematically depicted in the figures. Identical reference numbers in the figures refer to identical or similar elements or to elements which correspond to each other with regard to their functions.

[0066] In the figures:

- | | |
|----------------|--|
| Figure 1 | denotes a perspective top view of an embodiment of a helmet according to the present invention; |
| Figure 2 | denotes a cross-sectional view of the helmet according to Figure 1; |
| Figure 3 | shows an assembly of the visor of the helmet of Figure 1; |
| Figures 4 to 9 | show several positions of the visor of the helmet and corresponding positions of an optional guide rail element for guiding the visor; and |
| Figure 10 | shows a removable connection of a guiding element to the visor. |

Preferred embodiments

[0067] In the following, a preferred embodiment of a helmet according to the present invention will be disclosed. The helmet will be shown in various different

views and positions, wherein reference will be made to all figures. The helmet will be denoted by reference number 110. In the embodiments, a helmet for bicyclists is shown. However, other embodiments and/or other uses are possible.

[0068] In Figure 1, a perspective top view of the helmet 110 is shown. As can be seen in this embodiment, the helmet comprises a shell 112, which may function as a helmet body. As pointed out in greater detail below, the shell 112 may be made of one or more materials and, preferably, may comprise a multi-layer setup.

[0069] In the embodiment shown in Figure 1, the shell 112 may comprise one or more venting openings 114 for providing a ventilation to the person wearing the helmet. The venting openings 114 may partially or completely be covered by a net or a filter material, in order to prevent bugs and/or dirt from entering the venting openings 114.

[0070] Further, the helmet 110 as depicted in Figure 1 comprises a visor 116. In the position depicted in Figure 1, the visor 116 is in a lower position, in which the visor 116 or, more precisely, a face shield 118 of the visor 116, partially or fully covers a face region of a person wearing the helmet. As can be seen, the face shield 118, on a lower rim 120, may comprise a dent 122 following the shape of the nose of the person wearing the helmet.

[0071] As will be explained in greater detail below, the visor 116 is movable, wherein the position of the visor 116 may be adjusted by a guiding element 124. The guiding element at least partially may reach through a guiding slit 126 in the shell 112 and may be connected to the visor 116 and/or may be an integral part of the visor 116. The guiding slit 126 may function as a venting opening 114.

[0072] In order to provide a guiding to the movement of the visor 116 and/or in order to control the movement of the visor 116, the helmet 110 further may comprise a guide rail element 128, which may function as a slide guide for the sliding of the visor 116 and/or for the sliding of the guiding element 124 inside the guiding slit 126. The guide rail element 128 may comprise an upper stopper element 130 and/or a lower stopper element 132, which restrict the movement of the guiding element 124 and/or the visor 116. As depicted in Figure 1, the guiding element 124 may be formed as a handle, a lever or in any other design which allows for a user, such as the person wearing the helmet or another person, to operate the visor 116 and to adjust the position of the visor 116.

[0073] In Figure 2, a cross-sectional view of the helmet 110 is depicted. As can be seen in this cross-sectional view, the shell 112 comprises a multi-layer setup. In this multi-layer setup, an outer shell 134 is provided, which is made of a deformable material, such as expanded polystyrene and/or another foamed plastic material. Further, the multi-layer setup of the shell 112 may comprise at least one outer lining layer 138, which may provide water-repellent properties. The outer lining layer 138 may comprise a single-layer setup and/or a multi-layer setup, such as by using a laminate. The outer lining layer 138 may

comprise a decorative lining layer and/or a hard protective lining layer. The outer lining layer 138 may fully or partially be made of a colored material, preferably a colored plastic material.

[0074] In a manufacturing process, the outer shell 134 comprising the deformable material 136 and the outer lining layer 138 may be manufactured in a molding process, such as by using an inmold-technique. For this purpose, the outer lining layer 138 and/or a sheet material, which forms the outer lining layer, may be inserted into a cavity of a mold, and the deformable material 136 and/or at least one precursor material for the deformable material 136 may be inserted into the cavity of the mold, such that the multi-layer setup comprising the deformable material 136 and the outer lining layer 138 is formed inside the cavity.

[0075] The shell 112 has an outer surface 140 facing away from the head of the person wearing the helmet. The shell 112 further has an interior surface 142, which forms a resting surface 144 or part of a resting surface 144, which directly or indirectly rests on the head of the person wearing the helmet. As can be seen in Figure 2, the guiding slit 126 may extend from the outer surface 140 to the interior surface 142 of the shell 112.

[0076] As depicted in Figure 2, the outer shell 134 which comprises the deformable material 136 comprises a depression 146, into which an inner lining element 148 is inserted. This inner lining element 148 preferably is formed of a further deformable material 150. The inner lining element 148 preferably has a curved shape and may be formed in a separate molding process. The inner lining element 148 may comprise an inner surface 152 facing towards the head of the person wearing the helmet, which may form part of the resting surface 144. Thus, as depicted in Figure 2, the resting surface 144, outside the depression 146, is formed by the interior surface 142 of the outer shell 134 comprising the deformable material 136, and, in the region of the depression 146, by the inner surface 152 of the inner lining element 148, which preferably comprises the further deformable material 150, such as expanded polystyrene (EPS).

[0077] The inner lining element 148 preferably may be glued to the deformable material 136 of the outer shell 134 along a rim 154. As can be seen in Figure 2, the inner lining element 148 does not completely fill the depression 146. Contrarily, a hollow guiding space 156 is formed in between the surface of the deformable material 136 inside the depression 146 and a surface of the inner lining element 148. The visor 116 at least partially is accommodated inside this hollow guiding space, which, thereby, may function as a rail or slide assembly rail for guiding the visor 116 or parts thereof. Preferably, the hollow guiding space 156 is fully surrounded by deformable materials, such as the deformable material 136 and the further deformable material 150. Thus, the visor 116, specifically the face shield 118, may slide inside the hollow guiding space 156 smoothly, without touching any hard surfaces, thereby preventing the face shield 118

from being scratched during movement.

[0078] Figure 2 further shows details of a potential embodiment of a mechanism for operating the visor 116 and/or for adjusting the position of the visor 116 along the guiding slit 126. As can be seen in Figure 2, the hollow guiding space 156 has a slit 158 at a forehead-sided rim 160 of the shell 112. The visor 116, specifically the face shield 118 of the visor 116, at least partially can be pushed out of the slit 158 into a face region of the person wearing the helmet and can be pulled back into the hollow guiding space 156. This movement of the visor 116 may be adjusted by a user by means of the guiding element 128, which may be connected to the visor 116 and/or which may be an integral part of the visor 116. In Figure 2, an embodiment is shown, in which the guiding element 124 is connected to the visor 116 in a reversible and/or removable way. Details of this connection are depicted in an enlarged sectional view, which is denoted by "A" in Figure 2.

[0079] As can be seen in this enlarged view, the guiding element 124 may comprise a handle 162 and/or a lever and/or any other element which may be operated by the user from the outer surface 140. This handle 162 may be connected to the visor 116 preferably by one or more connection elements 164, which preferably may have elastic properties, such as by using one or more elasticity support bars. The connection elements 164 preferably may comprise one or more force-fit connectors and/or one or more form-fit connectors. As can be seen in the enlarged view A in Figure 2, the connection elements 164 may comprise assembly pins 166, preferably having a groove 168, wherein the assembly pins 166 may extend through an opening 170 inside the visor 116, preferably inside an elongated frame element 172 of the visor 116, which may extend from the face shield 118 into the interior of the hollow guiding space 156. A rim 174 of the elongated frame element 172, which fully or partially surrounds the opening 170, may snap into the groove 168.

[0080] The embodiment shown in Figure 2 shows further optional details of a guiding of the visor 116. Thus, as discussed above, the visor 116, inside the hollow guiding space 156, may be guided directly by the materials of the shell 112, such as by the deformable material 136 of the outer shell 134 and/or by the further deformable material 150 of the inner lining element 148. In a preferred embodiment, however, as depicted in Figure 2, the guiding of the visor 116 may further be supported by one or more guide rail elements 128, as already discussed in Figure 1. Thus, the visor 116 and/or a part thereof, such as the elongated frame element 172, may fully or partially be surrounded by the guide rail element 128, as can be seen in the enlarged view A in Figure 2. As depicted in Figure 2, the guide rail element 128 may comprise an upper stopper element 130 and a lower stopper element 132. The guide rail element 128 may further comprise a frame 176, which fully or partially surrounds the elongated frame element 172 of the visor 116, and which may provide a guide rail 178 to the elongated frame element

172 and/or another part of the visor 116 to be guided.

[0081] In Figure 3, a potential assembly of the visor 116 is depicted in a perspective explosion view in a partial cross-sectional way. In this view, a potential setup of the guide rail element 128 is depicted. For many details, reference may be made to the description of Figure 2 above.

[0082] As depicted in Figure 3, the guide rail element 128 may comprise one or more assembly elements 180, such as assembly pins, which may prevent the guide rail element 128 from sliding through the hollow guiding space 156 and which may fix the position of the guide rail element 128. The guide rail element 128 may fully or partially be accommodated inside the hollow guiding space 156.

[0083] Further, the helmet 110, specifically the visor 116 and/or the guide rail element 128, may comprise one or more rest elements 182, which may be used to adjust the position of the visor 116 to a plurality of predefined positions. These rest elements 182 may, accordingly, be located in predefined rest positions.

[0084] In the embodiment in Figure 3, the rest elements 182 comprise a stopper element 184 along the longitudinal rim of the elongated frame element 172 of the visor 116. As an example, this at least one stopper element 184 may be located next to the opening 170. However, other embodiments are possible. The stopper element 184 may be provided on both sides of the elongated frame element 172. The stopper element 184 may engage one or more grooves or notches 186, which may provide a bumpy guide for the stopper element 184, inside the guide rail 178. A rest position of the visor 116 is defined by an engagement of the stopper element 184 and a corresponding notch 186. By more forcefully pushing the handle 162, the stopper element 184 may be pushed from one notch 186 into a neighboring notch, thereby moving the visor 116 from one rest position to a subsequent rest position.

[0085] This movement of the visor by operating the guiding element 124 is depicted in the series of Figures 4 to 9. In Figure 4, 6 and 8, cross-sectional views of the helmet 110, in analogy to Figure 2 above, are shown, wherein, in each case, the guiding element 124 and, consequently, the visor 116 are located in different rest positions. In Figures 5, 7 and 9, partial views of the elongated frame element 172 of the visor 116 and of the guide rail element 128 are depicted, which correspond to the positions of the visor 116 as depicted in Figures 4, 6 and 8, respectively.

[0086] In Figures 4 and 5, an uppermost rest position is shown, in which the visor 116 is more or less fully located inside the hollow guiding space 156. In this uppermost rest position, the stopper element 184 is located inside the uppermost notch 186, i.e. the notch farthest to the right in Figure 5.

[0087] In Figures 6 and 7, by moving the handle 162 to the left, the visor 116 is in an intermediate position, in which the face shield 118 partially covers a face region of the person wearing the helmet 110. In this position,

the stopper element 184 is located in an intermediate notch 186.

[0088] In Figures 8 and 9, a lowermost position of the visor 116 is depicted, in which the face shield 118 extends into the face region as far as possible. In this position, the guiding element 124 abuts the lower stopper element 132 of the guide rail element 128, as may be seen in Figure 9. Thereby, the lower stopper element 132 prevents the face shield 118 from a further downward movement and, generally, prevents the visor 116 from falling out of the hollow guiding space 156.

[0089] As discussed above, the guiding element 124 preferably is connected to the visor 116, preferably to the elongated frame element 172, in a reversible way. In this regard, reference may be made to the description of Figure 3 above. In Figure 10, a potential embodiment of a disassembly procedure of the visor 116 or, in reverse order, an assembly procedure, is schematically depicted.

[0090] As can be seen in this Figure 10, for removal of the guiding element 124 from the visor 116, the connection elements 164, which preferably may have elastic properties, may be pushed (arrows 188 in Figure 10), thereby removing the assembly pins 166 from the rim 174 of the opening 170. Subsequently, the guiding element 124 may be removed from the opening 170 (arrow 190). Subsequently, the visor 116 may be pulled out of the slit 158 in Figure 2, in order to clean the visor 116 and/or replace the visor 116 by a new and/or different visor 116, such as for repair purposes and/or for providing visors 116 with different optical properties.

[0091] For assembly of the helmet 110 and, specifically, the visor 116, a reversed order may be used. Thus, firstly, the visor 116 may be inserted through the slit 158 into the hollow guiding space 156, such that the elongated frame element 172 and the opening 170 are located underneath the guiding slit 126. Subsequently, the guiding element 124 may be inserted, by inserting the assembly pins 166 into the opening 170.

List of reference numbers

[0092]

110	helmet
112	shell
114	venting opening
116	visor
118	face shield
120	lower rim
122	dent
124	guiding element

126 guiding slit
 128 guide rail element
 130 upper stopper element
 132 lower stopper element
 134 outer shell
 136 deformable material
 138 outer lining layer
 140 outer surface
 142 interior surface
 144 resting surface
 146 depression
 148 inner lining element
 150 further deformable material
 152 inner surface
 154 rim
 156 hollow guiding space
 158 slit
 160 forehead-sided rim
 162 handle
 164 connection element
 166 assembly pin
 168 groove
 170 opening
 172 elongated frame element
 174 rim
 176 frame
 178 guide rail
 180 assembly element
 182 rest element

184 stopper element
 186 notches
 5 188 pushing
 190 removal

10 Claims

1. A helmet (110), specifically for the protection of a head of a person during leisure activities, the helmet (110) having a shell (112) at least partially made of a deformable material (136), the shell (112) having an interior surface (142) facing the head of a person wearing the helmet (110), wherein the shell (112) comprises a depression (146) in the interior surface (142), wherein an inner lining element (148) is fit into the depression (146), wherein a hollow guiding space (156) is formed between the inner lining element (148) and the shell (112), the hollow guiding space (156) having a slit (158) at a forehead-sided rim (160) of the shell (112), the helmet (110) further having a visor (116), wherein the visor (116) at least partially is located movably inside the hollow guiding space (156), such that the visor (116) at least partially can be pushed out of the slit (158) into a face region of the person wearing the helmet (110) and can be pulled back into the hollow guiding space (156).
2. The helmet (110) according to the preceding claim, wherein the deformable material (136) comprises a foamed plastic material.
3. The helmet (110) according to one of the preceding claims, wherein the shell (112) has a multi-layer set-up, the multi-layer setup comprising at least one outer lining layer (138) and the deformable material (136).
4. The helmet (110) according to the preceding claim, wherein the outer lining layer and (138) the deformable material (136) are connected by an in-mold-technique.
5. The helmet (110) according to one of the preceding claims, wherein the helmet (110) has an outer surface (140) facing away from of the person wearing the helmet (110), wherein the shell (112) has a guiding slit (126) extending from the outer surface (140) into the hollow guiding space (156), wherein a guiding element (124) is mounted to the visor (116) and extends through the guiding slit (126) such that the guiding element (124) is operable from the outer surface (140), wherein a position of the visor (116) is adjustable by using the guiding element (124).

6. The helmet (110) according to the preceding claim, wherein the guiding element (124) removably is connected to the visor (116).
7. The helmet (110) according to one of the preceding claims, the helmet (110) further comprising a guide rail element (128), wherein the guide rail element (128) at least partially is located inside the hollow guiding space (156), wherein the guide rail element (128) provides a guide rail (178) for a movement of the visor (116). 5
8. The helmet (110) according to the preceding claim, wherein the guide rail element (128) has a plurality of rest elements (182), wherein the rest elements (182) are located in predefined rest positions, such that the visor (116) may be adjusted to a plurality of predefined positions. 10
9. The helmet (110) according to one of the preceding claims, wherein the interior surface (142) and an inner surface (152) of the inner lining element (148) commonly form a resting surface (144) which directly or indirectly rests on the head of the person wearing the helmet (110). 15
10. The helmet (110) according to one of the preceding claims, wherein the inner lining element (148) at least partially is made of a further deformable material (150), wherein preferably the further deformable material (150) comprises a foamed plastic material. 20
11. A method for producing a helmet (110), specifically a helmet (110) according to one of the preceding claims, wherein the method comprises the following method steps: 25
 - a) a shell (112) is formed by using at least one deformable material (136), wherein the forming of the shell (112) is performed such that the shell (112) has an interior surface (142) facing a head of a person wearing the helmet (110), wherein during forming of the shell (112) a depression (146) is created in the interior surface (142), 40
 - b) an inner lining element (148) is fit into the depression (146), wherein a hollow guiding space (156) (156) is formed between the inner lining element (148) and the shell (112), the hollow guiding space (156) having a slit (158) at a forehead-sided rim (160) of the shell (112), 45
 - c) a visor (116) is provided, wherein the visor (116) at least partially is located movably inside the hollow guiding space (156), such that the visor (116) at least partially can be pushed out of the slit (158) into a face region of the person wearing the helmet (110) and can be pulled back into the hollow guiding space (156). 50
12. The method according to the preceding claim, wherein the helmet (110) has an outer surface (140) facing away from of the person wearing the helmet (110), wherein step a) is performed such that the shell (112) has a guiding slit (126) extending from the outer surface (140) into the hollow guiding space (156), wherein, after performing steps b) and c), a guiding element (124) is mounted to the visor (116), such that the guiding element (124) extends through the guiding slit (126) and such that the guiding element (124) is operable from the outer surface (140), wherein a position of the visor (116) is adjustable by using the guiding element (124). 55
13. The method according to one of the preceding method claims, wherein, in step a), a molding technique is used, preferably an inmold-technique.
14. The method according to one of the preceding method claims, wherein step a) is performed such that the shell (112) has a multi-layer setup, the multi-layer setup comprising at least one outer lining layer (138) and the deformable material (136), wherein, in step a), an inmold-technique is used to create the multi-layer setup.
15. A use of the helmet (110) according to one of the preceding claims referring to a helmet (110) for a purpose selected from the group consisting of: cycling, specifically riding a bicycle; motorcycling; horse-riding; skiing; snowboarding; water skiing.

Fig. 1

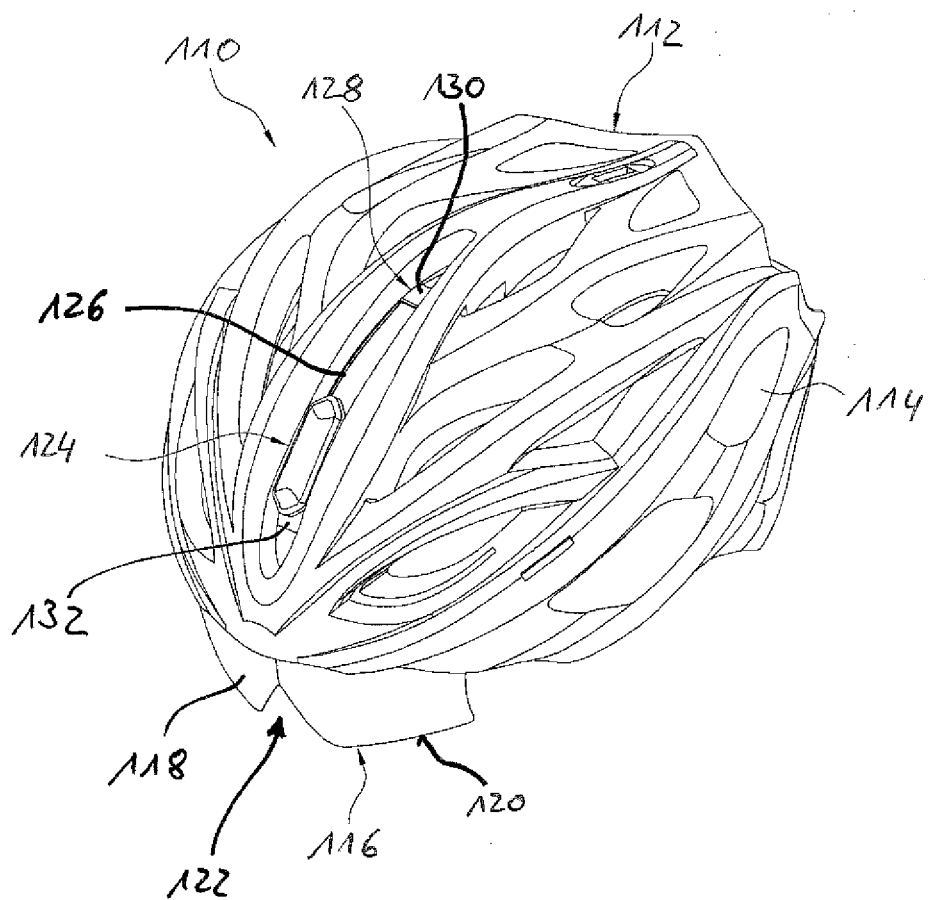


Fig. 2

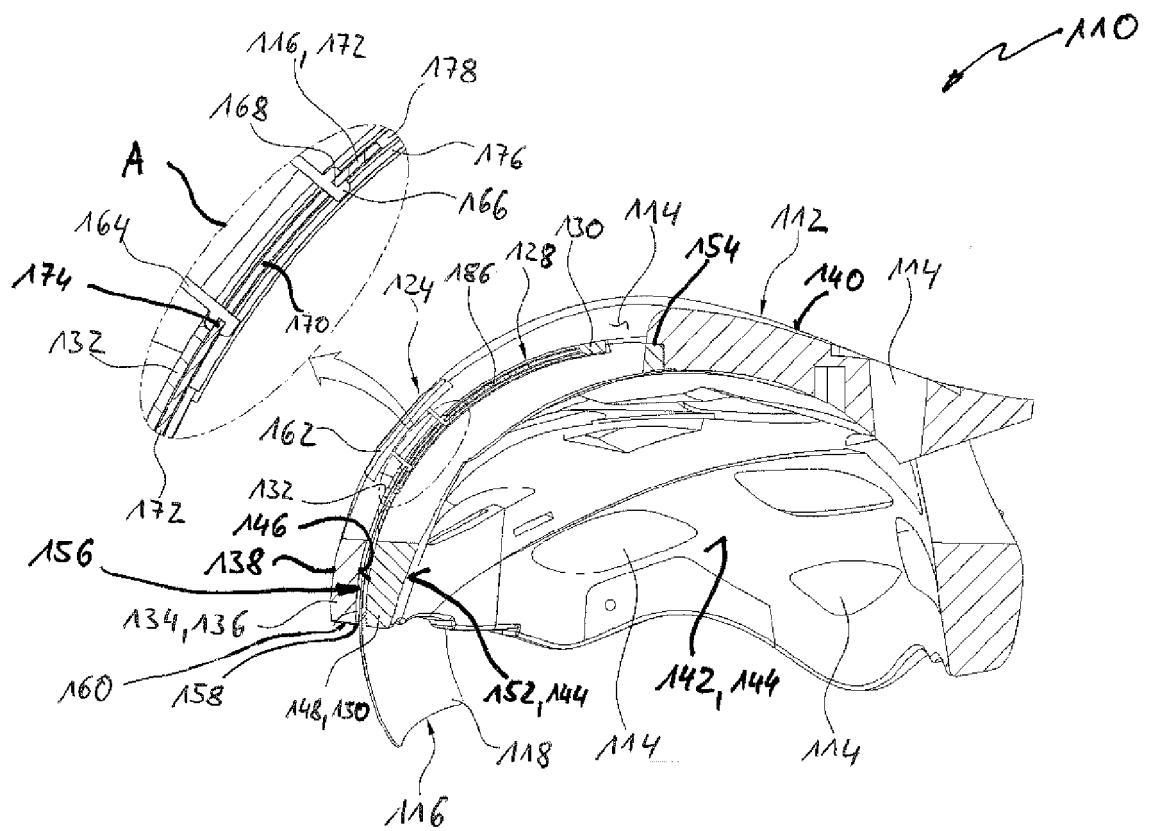


Fig. 3

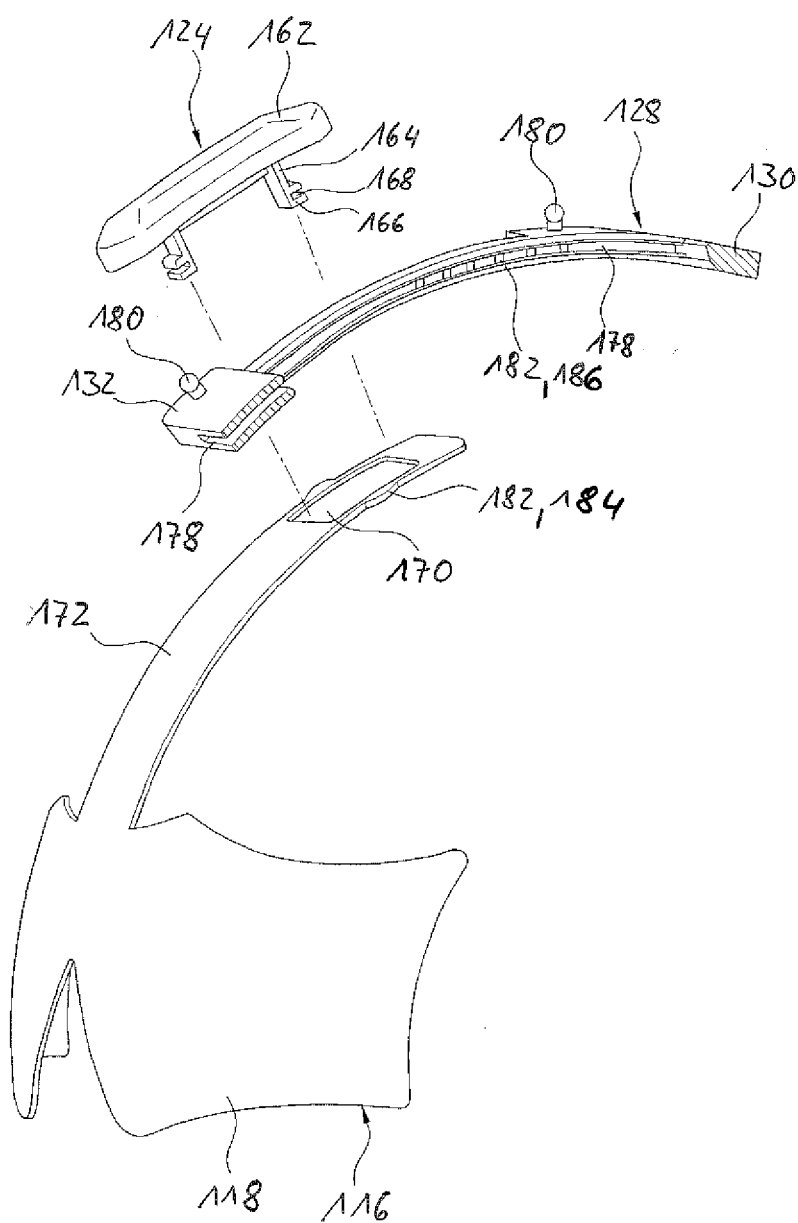


Fig. 4

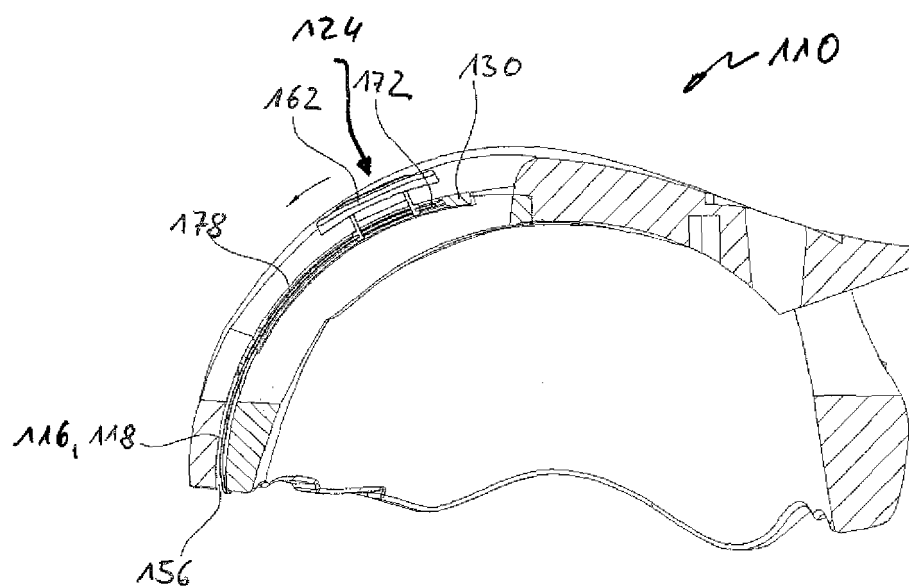


Fig. 5

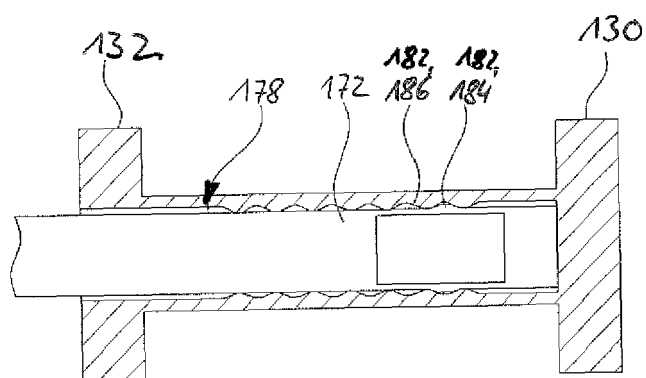


Fig. 6

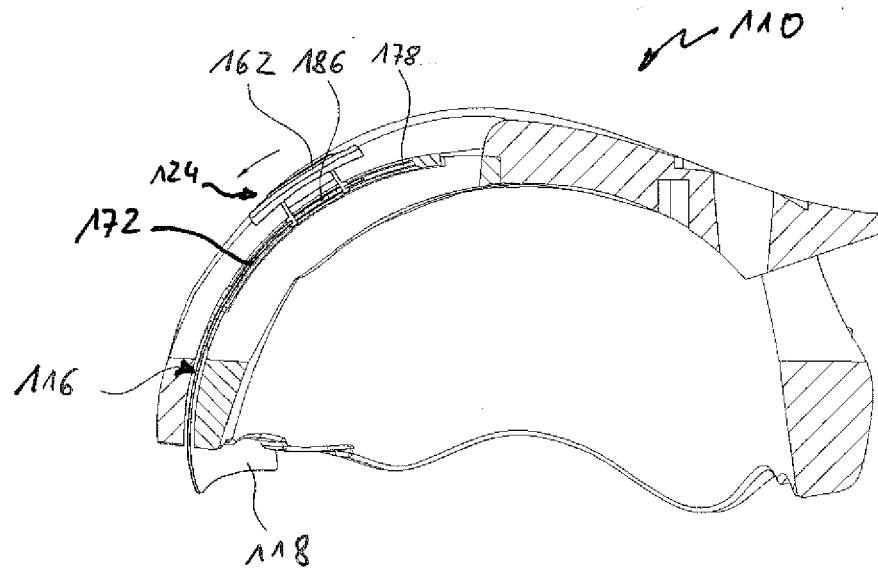


Fig. 7

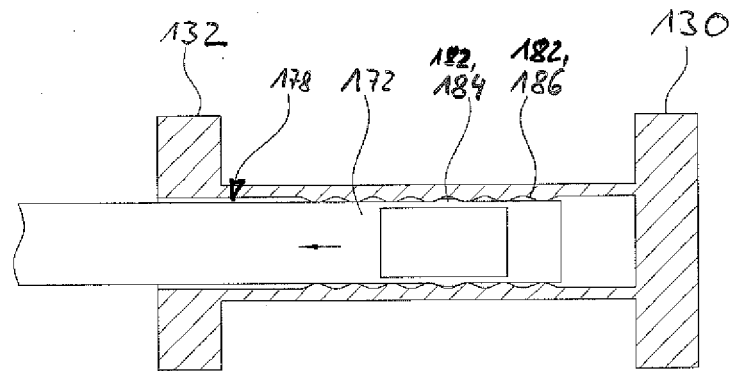


Fig. 8

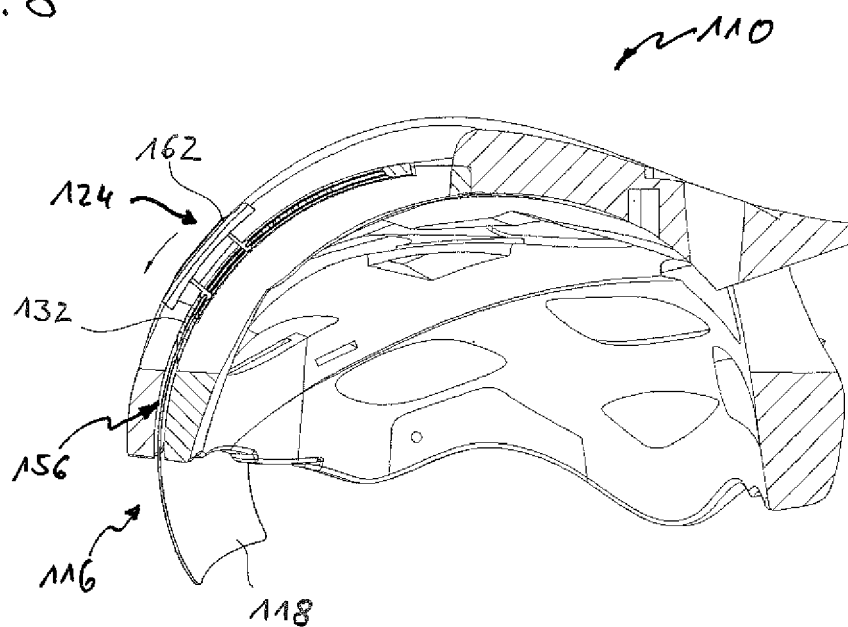


Fig. 9

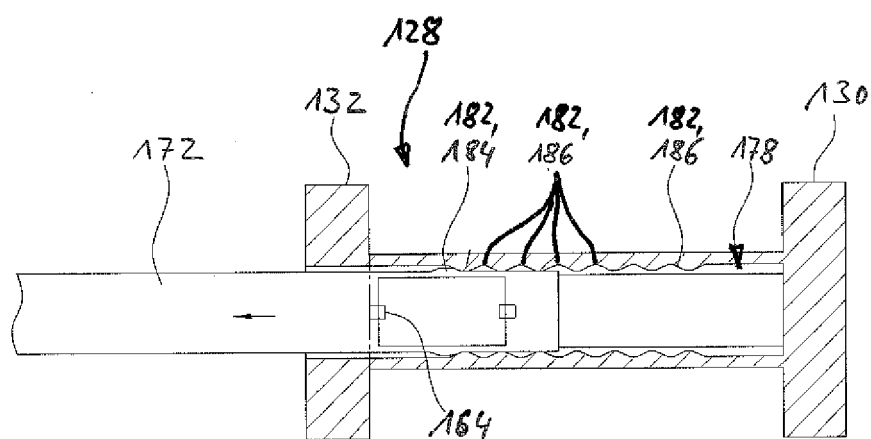
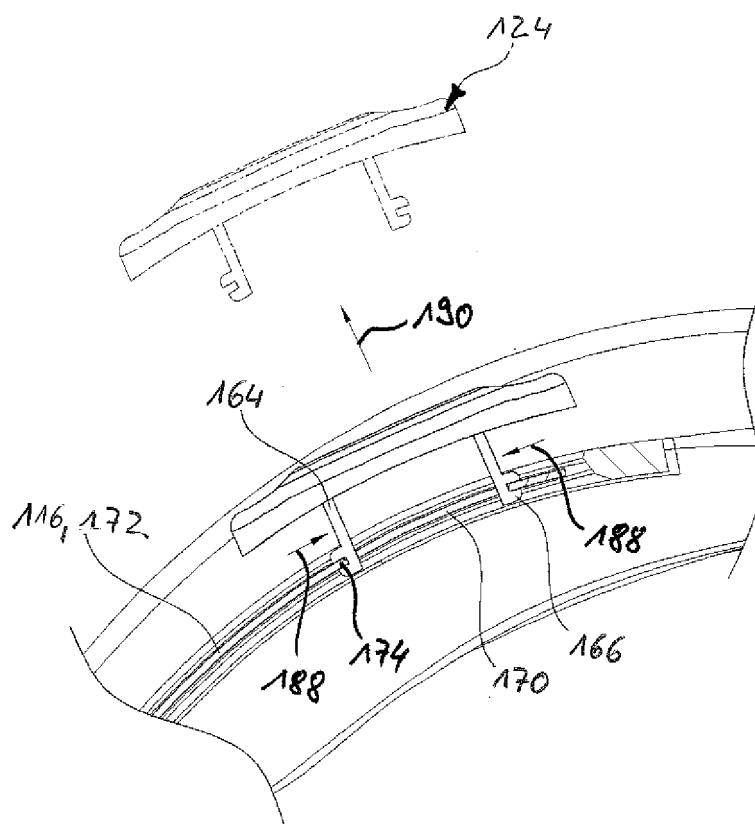


Fig. 10





EUROPEAN SEARCH REPORT

Application Number
EP 11 17 4954

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 287 615 A (MORIN CLAUDE P) 8 September 1981 (1981-09-08) * column 1, line 52 - column 3, line 37; figures 1,2 *	1,5, 9-13,15	INV. A42B3/22 A42B3/06
X	CH 689 532 A5 (PROFI AG [CH]) 15 June 1999 (1999-06-15) * claim 1; figure 1 *	1,9-11, 15	
A		3,4,13, 14	
X,D	EP 0 761 112 A1 (KNAUER HANS GEORG [DE]) 12 March 1997 (1997-03-12) * claim 1; figures 2,3 *	1,9-11, 15	
X	DE 89 05 276 U1 (HANS VOSS KG) 15 June 1989 (1989-06-15) * pages 2,5; figures 4,5 *	1,5-9, 11,12,15	
E	DE 20 2011 101138 U1 (PRORACE S R L [IT]) 26 July 2011 (2011-07-26) * paragraphs [0016], [0023], [0028], [0032], [0033]; figures 1,3 *	1,5-12, 15	TECHNICAL FIELDS SEARCHED (IPC)
A	FR 2 726 437 A1 (SIMONE NICOLAS [FR]) 10 May 1996 (1996-05-10) * page 7, line 17 - page 8, line 14; figures 1,2,4 * * page 10, lines 1-17 *	1,5-11, 15	A42B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 December 2011	Examiner D'Souza, Jennifer
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

 1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 17 4954

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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21-12-2011

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4287615	A	08-09-1981	CA 1130503 A1	31-08-1982
			DE 3063012 D1	16-06-1983
			EP 0015796 A2	17-09-1980
			FR 2450072 A1	26-09-1980
			JP 1388097 C	14-07-1987
			JP 55116810 A	08-09-1980
			JP 61049404 B	29-10-1986
			US 4287615 A	08-09-1981

CH 689532	A5	15-06-1999	NONE	

EP 0761112	A1	12-03-1997	DE 29513463 U1	19-10-1995
			EP 0761112 A1	12-03-1997

DE 8905276	U1	15-06-1989	NONE	

DE 202011101138	U1	26-07-2011	DE 202011101138 U1	26-07-2011
			IT BG20100032 U1	30-03-2012

FR 2726437	A1	10-05-1996	AU 3707595 A	31-05-1996
			FR 2726437 A1	10-05-1996
			WO 9613993 A1	17-05-1996

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 29513463 U1 [0004]