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(72) Inventor: **Spriano, Massimo**
15549 Mirabello Monferrato, (Alessandria) (IT)

(74) Representative: **Cicogna, Franco**
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
20122 Milano (IT)

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(71) Applicant: **NEW MAX S.R.L.**
15540 Mirabello Monferrato, (Alessandria) (IT)

(54) **Method for decorating and reinforcing a high strength safety helmet and helmet made thereby**

(57) A method for decorating and reinforcing a high strength safety helmet comprises the steps of providing a helmet cap by layering in a mold a plurality of high strength braided fiber layers, preferably made of carbon and Kevlar fibers, suitably impregnated by resins, providing a thermoplastic material over-cap element and applying said over-cap element to the fiber cap.

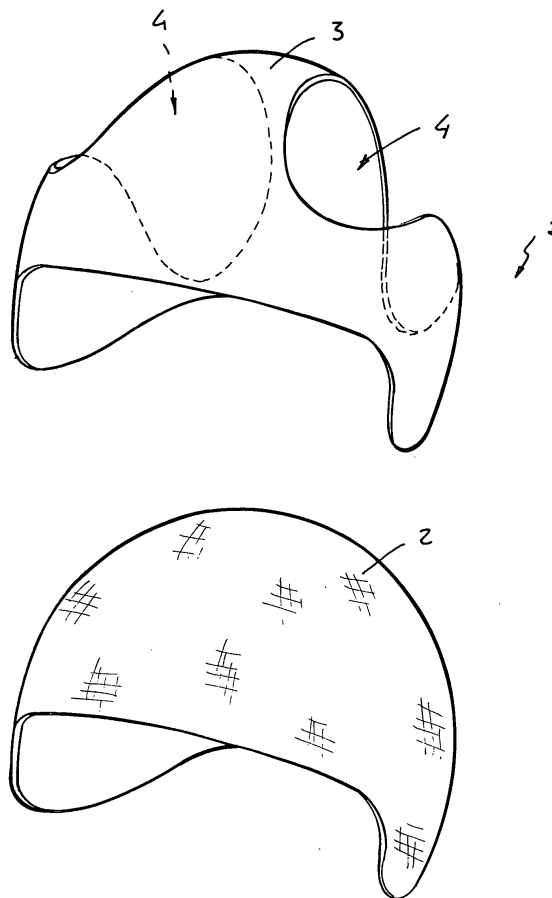


FIG. 1

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a method for decorating and reinforcing a safety helmet of high strength. According to a further aspect thereof, the invention also relates to the safety helmet made by the method.

[0002] As is known, safety or protective helmets of high strength are conventionally made by using a helmet cap which is produced by overlapping or layering onto one another in a mold a plurality of carbon or Kevlar fiber layers, as suitable impregnated by resins.

[0003] In a case in which the helmet cap is made by combining carbon and Kevlar fibers, the outer surface of said helmet will have a "braided" aspect.

[0004] Such a braided aspect through the overall outer surface of the protective helmet may be scarcely pleasant from a mere economic standpoint and, accordingly, the fiber helmets are usually painted by a concealing paint for concealing the helmet cap construction.

SUMMARY OF THE INVENTION

[0005] Accordingly, the aim of the present invention is to provide such a method allowing to make a safety or protective helmet, of high strength, and having very good aesthetic characteristics.

[0006] Within the scope of the above mentioned aim, a main object of the present invention is to provide such a method which can also be carried out by using already existing systems and materials, as conventionally used for making prior protective or safety helmets.

[0007] Yet another object of the present invention is to provide such a method allowing to make a protective helmet having all the required safety and functionality properties.

[0008] Yet another object of the present invention is to provide such a method which is very flexible and allows to make protective helmets having different and differentiated finishing features, according to requirements.

[0009] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a method for decorating and reinforcing a high strength protective or safety helmet, characterized in that said method comprises the steps of providing a helmet cap by layering in a mold a plurality of layers of fibers made of a high strength material, such as carbon and Kevlar fibers, as impregnated by resins, providing a thermoplastic material overcap and applying said thermoplastic material overcap to said fiber helmet cap.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of the invention, which is illustrated, by way of an indicative, but not limitative, example, in the accompanying drawings, where:

Figure 1 is an exploded perspective view of a protective helmet cap and related overcap, as obtained by the method according to the invention;

Figure 2 is a front perspective view of the protective or safety helmet made by the method;

and

Figure 3 is a top perspective view of the protective or safety helmet made by the method.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] With reference to the number references of the above mentioned figures, the safety or protective helmet, according to the present invention, which has been generally indicated by the reference number 1, comprises a helmet cap 2, made by layering, or overlapping, in a mold, a plurality of layers of high strength fibers, preferably carbon and Kevlar fibers, as suitably impregnated by resins.

[0012] In this connection it should be pointed out that the helmet cap 2 can be also made of boron, glass, polypropylene fibers, as suitably layered by resins.

[0013] According to the invention, to the helmet cap 2 an overcap 3, of a thermoplastic material, such as polycarbonate, or any other suitable thermoplastic materials is applied.

[0014] Advantageously, the overcap 3 comprises open portions 4, thereby the reinforcement function of the overcap will be provided only at given regions, while leaving other regions of the cap 2 exposed to the view.

[0015] The colors, patterns and materials of the overcap 3 would be so designed as to fit the aspect and color of the helmet cap 2 of high strength braided fibers.

[0016] The protective helmet 1 will be finished by including therein the conventional elements constituting the modern safety or protective helmet, such as an inner shell or liner of polystyrene, several inner paddings and coatings, according to the specific requirements.

[0017] The figures show a so-called "jet" type of protective or safety helmet.

[0018] It should be apparent that the method according to the invention can be advantageously applied to any desired type of protective helmets, in particular also to the so-called "integral" or crash helmets.

[0019] It has been found that the invention fully achieves the intended aim and objects.

[0020] In fact, the invention provides a method for making a high strength protective or safety helmet having very good aesthetic features.

[0021] Thus, the method according to the invention achieves two important objects: at first, the method allows to further reinforce or stiffen the fiber helmet cap, which already has per se a comparatively high strength and, moreover, it allows to provide very good aesthetic features to the helmet, while leaving the technologically advanced construction of the helmet to be easily seen.

[0022] A further advantage of the method according to the present invention is that the overcap can be used for applying fittings such as rivets or support elements for visors, and so on, without notching the fiber helmet cap and, accordingly, without reducing the efficient protection provided by this material.

[0023] In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements and the status of the art.

Claims

1. A method for decorating and reinforcing a high strength protective helmet, **characterized in that** said method comprises the step of providing a helmet cap by layering in a mold a plurality of layers of high strength fibers as suitably impregnated in resins, providing a thermoplastic material overcap and applying said thermoplastic material overcap to said fiber helmet cap. 25
2. A method, according to Claim 1, **characterized in that** said overcap comprises opened portions, thereby the reinforcement function of said overcap is provided only at desired regions, while leaving other regions of said helmet cap exposed to the view. 30 35
3. A method, according to Claim 1 or 2, **characterized in that** said overcap is used for applying fitting elements such as pins, rivets and so on. 40
4. A method, according to one or more of the preceding claims, **characterized in that** said method comprises the step of providing a high strength helmet cap by layering, in a mold, a plurality of carbon or Kevlar braided fiber layers, said fibers being suitably impregnated in a resin. 45
5. A high strength protective or safety helmet, **characterized in that** said protective helmet comprises a helmet cap made by layering in a mold a plurality of layers of carbon and Kevlar fibers, as suitably impregnated in or by resins, and a thermoplastic material overcap, applied to said fiber helmet cap. 50
6. A protective helmet, according to the preceding claim, **characterized in that** said overcap comprises open portions, thereby the reinforcement function of said overcap is provided only at desired re-

gions, while leaving other regions of said helmet cap exposed to the view.

7. A protective helmet, according to Claim 4 or 5, **characterized in that** said overcap is used for applying thereto fitting elements such as pins, rivets and the like. 5
8. A protective helmet, according to one or more of the preceding claims, **characterized in that** said high strength helmet cap is made by layering and impregnating by resins a plurality of boron, glass, polypropylene fiber layers, or layers including any desired fibers adapted to provide said protective helmet with a high mechanical strength. 10
9. A protective helmet, according to one or more of the preceding claims, **characterized in that** said protective helmet comprises one or more of the disclosed and/or illustrated features. 15 20
10. A method, according to one or more of the preceding claims, **characterized in that** said method comprises one or more of the disclosed and/or illustrated characteristics. 25

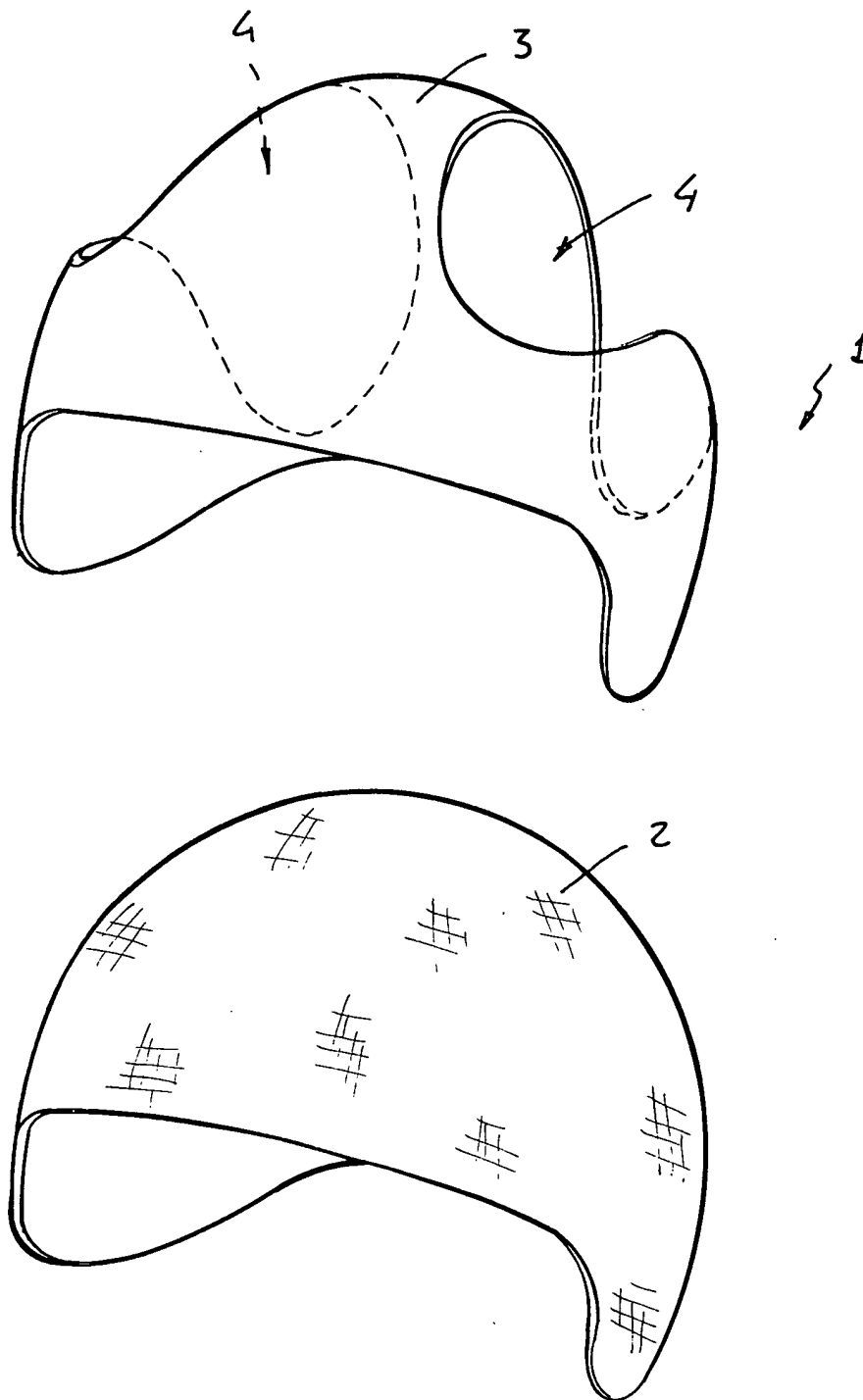


FIG. 1

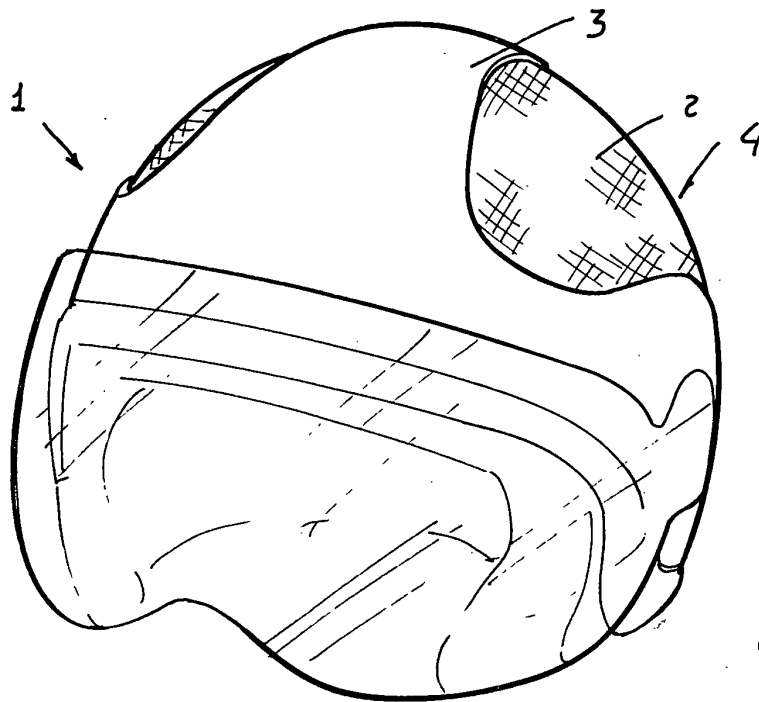


FIG. 2

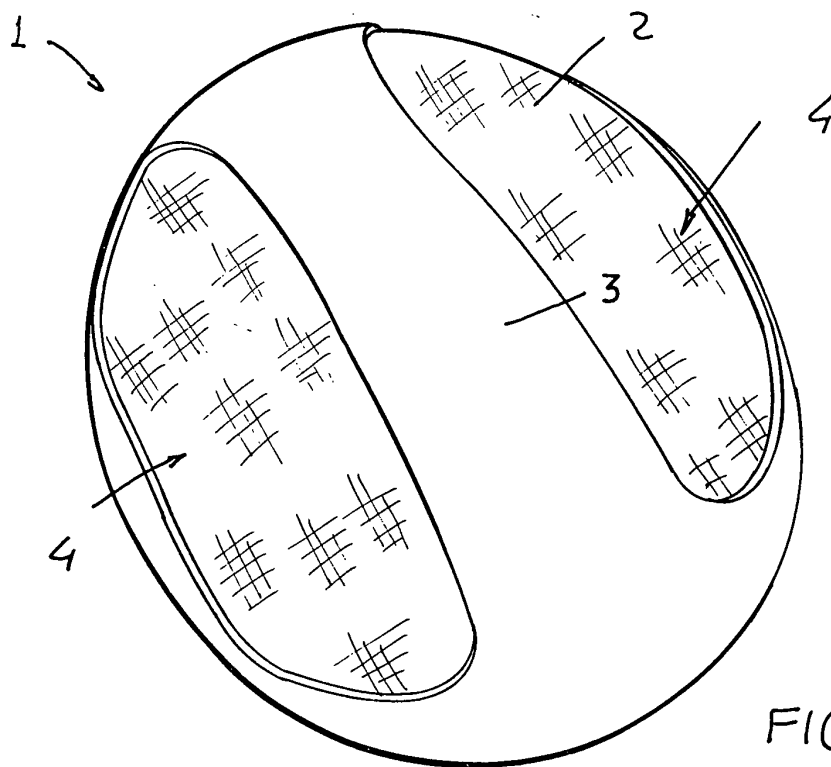


FIG. 3



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PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention EP 02 02 2187 shall be considered, for the purposes of subsequent proceedings, as the European search report

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 472 472 A (SCHULTZ ROBERT J) 18 September 1984 (1984-09-18) * column 3, line 15-35; figure 1 *	1-8	A42B3/06
A	EP 0 673 610 A (GENTEX CORP) 27 September 1995 (1995-09-27) * column 9, line 6-21; figure 6 *	1-8	
A	US 4 475 248 A (L ABBE RICHARD ET AL) 9 October 1984 (1984-10-09) * claim 1; figure 1 *	1-8	
A	GB 1 578 352 A (DU PONT CANADA) 5 November 1980 (1980-11-05) * figure 1 *	2,6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A42B
INCOMPLETE SEARCH			
<p>The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.</p> <p>Claims searched completely :</p> <p>1-8</p> <p>Claims searched incompletely :</p> <p></p> <p>Claims not searched :</p> <p>9,10</p> <p>Reason for the limitation of the search:</p> <p>Claims 9 and 10 contain a reference to the drawings and the description, which in the present case is inappropriate and thus contravenes the EPC requirements.</p>			
Place of search		Date of completion of the search	Examiner
MUNICH		7 January 2003	Dupuis, J-L
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03 82 (P04C07)

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

EP 02 02 2187

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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07-01-2003

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