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

(11) **EP 3 284 359 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.02.2018 Bulletin 2018/08

(51) Int Cl.:
A42B 3/06 *(2006.01)* ***A42B 3/12*** *(2006.01)*
A42C 2/00 *(2006.01)*

(21) Application number: **17171530.3**

(22) Date of filing: **17.05.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **17.08.2016 CN 201620894163 U**

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(54) **STEAM-FORMED DOUBLE-LAYER SHOCK-ABSORPTION SPORTS HELMET**

(57) The present invention discloses a steam-formed double-layer shock-absorption sports helmet, including a helmet body. The helmet body (1) includes a surface hard shell (2), an EPS material layer (3) and an EPP material layer (4) successively mounted together in a fitting manner. The surface hard shell is wrapped on an outer surface of the EPS material layer. The EPP material is wrapped on an inner surface of the EPS material layer.

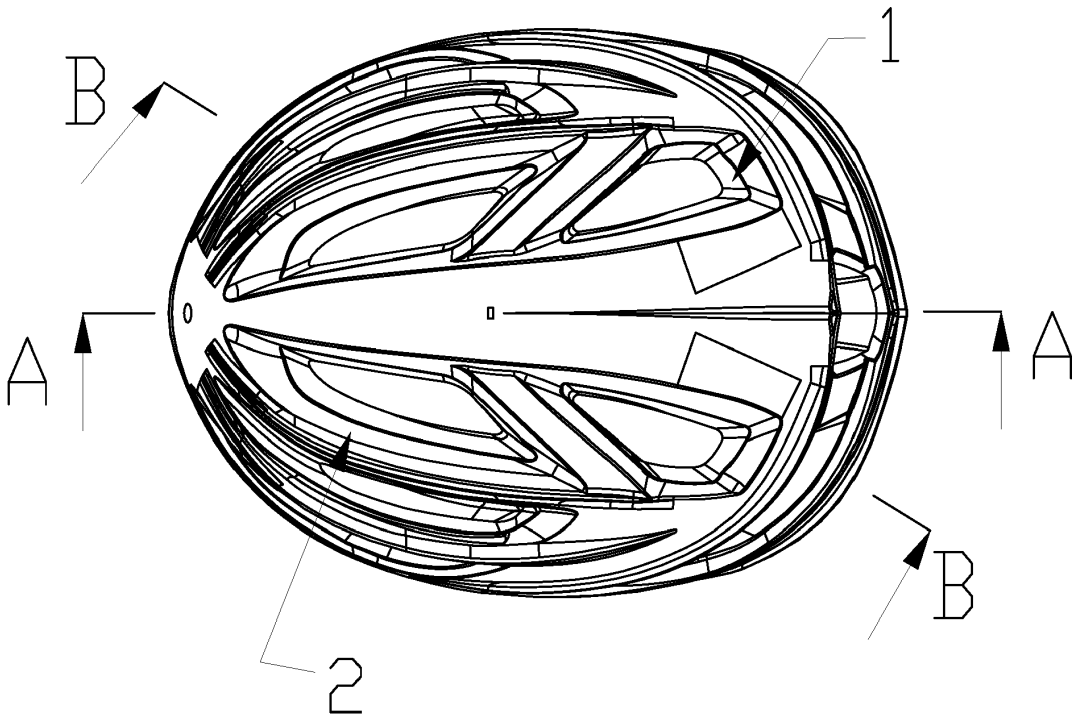

FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a sports helmet, and specifically, to a steam-formed double-layer shock-absorption sports helmet, which belongs to the technical field of sports equipment.

BACKGROUND OF THE INVENTION

[0002] A safety helmet is a fitting for protecting head of people. For example, vehicle-used helmet or baseball sport helmets and other sports helmets are indispensable tools for people in transportations or sports. Most of helmets are generally in a semicircular shape and each includes a shell and a liner. A shock absorption structure is arranged between the shell and the liner. This structure is required to have certain hardness, anti-hitting performance, certain softness and certain cushioning performance. However, the above requirements cannot be realized because a same material has identical density. The existing shock absorption structure employs the following manner: the liner of the structure is made of EPS that is a high-density material. Although the EPS material has a little elasticity, the hardness is high so the shock absorption effect is poor. Since the liner directly contacts the head of people, the helmet is poor in wearing comfort and is uncomfortable to wear because of the high hardness.

SUMMARY OF THE INVENTION

[0003] The present invention aims at solving the technical problems that the helmet cannot have both the anti-hitting capability and the softness and is poor in use comfort by providing a steam-formed double-layer shock-absorption sports helmet.

[0004] In order to solve the above-mentioned technical problems, the present invention provides a technical solution as follows:

> The steam-formed double-layer shock-absorption sports helmet of the present invention includes a helmet body; the helmet body includes a surface hard shell, an EPS material layer and an EPP material layer; the surface hard shell, the EPS material layer and the EPP material layer are successively mounted in a fitting manner; the surface hard shell is wrapped on an outer surface of the EPS material layer; and the EPP material layer is wrapped on an inner surface of the EPS material layer.

[0005] As a preferable technical solution of the present invention, the EPS material layer is made of an EPS material.

[0006] As a preferable technical solution of the present invention, the EPP material layer is made of an EPP material.

[0007] The present invention has the beneficial effects that: the steam-formed double-layer shock-absorption sports helmet consists of the surface hard shell, the middle EPS material layer and the lower EPP material layer, has good anti-hitting performance, water resistance, heat resistance and thermal insulation properties. Moreover, the EPP material layer with good shock resistance and energy absorption properties, high deformation recovery rate, and good heat resistance, oil resistance and thermal insulation properties is used. Furthermore, the EPP material layer has light weight, so that the article weight can be greatly reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The drawings are used to further understand the present invention and constitute a part of the description. The drawings are used to explain the present invention together with embodiments of the present invention but not to limit the present invention. In the drawings:

> Fig. 1 is a top structural schematic diagram of the present invention;
> Fig. 2 is a sectional view at A-A in Fig. 1; and
> Fig. 3 is a sectional view at B-B in Fig. 1.

[0009] In the drawings: 1: helmet body; 2: hard surface shell; 3: EPS material layer; and 4: EPP material layer

DETAILED DESCRIPTION OF THE INVENTION

[0010] Preferred embodiments of the present invention are described below in combination with the drawings. It shall be appreciated that the preferred embodiments described herein are only used to illustrate and explain the present invention rather than limit the present invention.

Embodiment 1

[0011] As shown in Fig. 1 to Fig. 3, a steam-formed double-layer shock-absorption sports helmet includes a helmet body 1; the helmet body 1 includes a surface hard shell 2, an EPS material layer 3 and an EPP material layer 4; the surface hard shell 2, the EPS material layer 3 and the EPP material layer 4 are successively mounted in a fitting manner; the surface hard shell 2 is wrapped on an outer surface of the EPS material layer 3; and the EPP material layer 4 is wrapped on an inner surface of the EPS material layer 3.

[0012] The EPS material layer 3 is made of an EPS material. The EPP material layer 4 is made of an EPP material.

[0013] Specifically, the present invention relates to a helmet used for cycling sports and outdoor sports, and in particular relates to an EPP structure for a helmet, which can achieve a shock-absorption and cushioning effect, and is suitable for vehicle-used helmets, baseball

sports helmet and other sports helmets. The helmet mainly consists of the surface hard shell 2, the middle EPS material layer 3 and the lower EPP material layer 4; the surface hard shell 2 is mainly used to resist the external hit; the EPS material layer 3 is mainly made of an expandable polystyrene material and has functions of water resistance, heat resistance and heat insulation, thereby effectively improving the wearing comfort; the EPP material layer 4 is mainly made of a polypropylene plastic foam material, has good shock resistance and energy absorption performance, high deformation recovery rate and good heat resistance, oil resistance and thermal insulation properties; and furthermore, the EPP material layer has light weight, so that the article weight can be greatly reduced.

[0014] The specific production steps of the present invention are as follows:

1. Preparing the hard shell of the helmet (molding a PC material in a die casting manner), and forming an independent hard shell component;
2. Preparing the EPP material layer (molding the EPP material in a die casting manner), baking the EPP, spraying a treating agent onto the surface layer, and finally brushing a layer of glue (so that the EPP material layer can be well bonded together with the EPS at the next step), thereby forming an independent shock-absorption layer component;
3. Placing the hard shell component and the EPP material layer component into a helmet production mold and separately being fixed at corresponding positions (the hard shell) of the mold, and forming a gap (convenient for pouring the EPS raw material) between the hard shell component and the EPP material layer component;
4. Pouring the EPS raw material into the mold (at the gap between the hard shell component and the EPP material layer component); the hard shell component, the EPP material layer component and the EPS raw material are all in the mold at the moment; then injecting high-temperature steam into the entire mold; fusing and molding the EPS raw material under the effect of high temperature and high pressure to form the EPS material layer; bonding the EPS and the EPP together at the same time; and bonding the EPS with the hard shell component.

[0015] After the above process is completed, the steam is released, the pressure and the temperature are lowered, the mold is stripped, and finally the sports helmet is well produced.

[0016] The steam-formed double-layer shock-absorption sports helmet consists of the surface hard shell, the middle EPS material layer and the lower EPP material layer, has good anti-hitting performance, water resistance, heat resistance and thermal insulation properties. Moreover, the EPP material layer having the characteristics of good shock resistance and energy absorption properties, high deformation recovery rate, and good heat resistance, oil resistance and thermal insulation properties is used. Furthermore, the EPP material layer has light weight, so that the article weight can be greatly reduced.

[0017] Finally, it should be noted that the above are only preferred embodiments of the present invention and are not intended to limit the present invention. Although the present invention is described in detail with reference to the foregoing embodiments, those skilled in the art still can modify the technical solutions described in the foregoing embodiments or make equivalent replacements to some of the technical features. Any modification, equivalent replacements, improvement and the like made within the spirit and the principle of the present invention shall be included in the protection scope of the present invention.

Claims

1. A steam-formed double-layer shock-absorption sports helmet, comprising a helmet body (1), wherein the helmet body (1) comprises a hard surface shell (2), an EPS material layer (3) and an EPP material layer (4); the hard surface shell (2), the EPS material layer (3) and the EPP material layer (4) are successively mounted together in a fitting manner; the hard surface shell (2) is wrapped on an outer surface of the EPS material layer (3), and the EPP material layer (4) is wrapped on an inner surface of the EPS material layer (3).

2. The steam-formed double-layer shock-absorption sports helmet of claim 1, wherein the EPS material layer (3) is made of an EPS material.

3. The steam-formed double-layer shock-absorption sports helmet of claim 1, wherein the EPP material layer (4) is made of an EPP material.

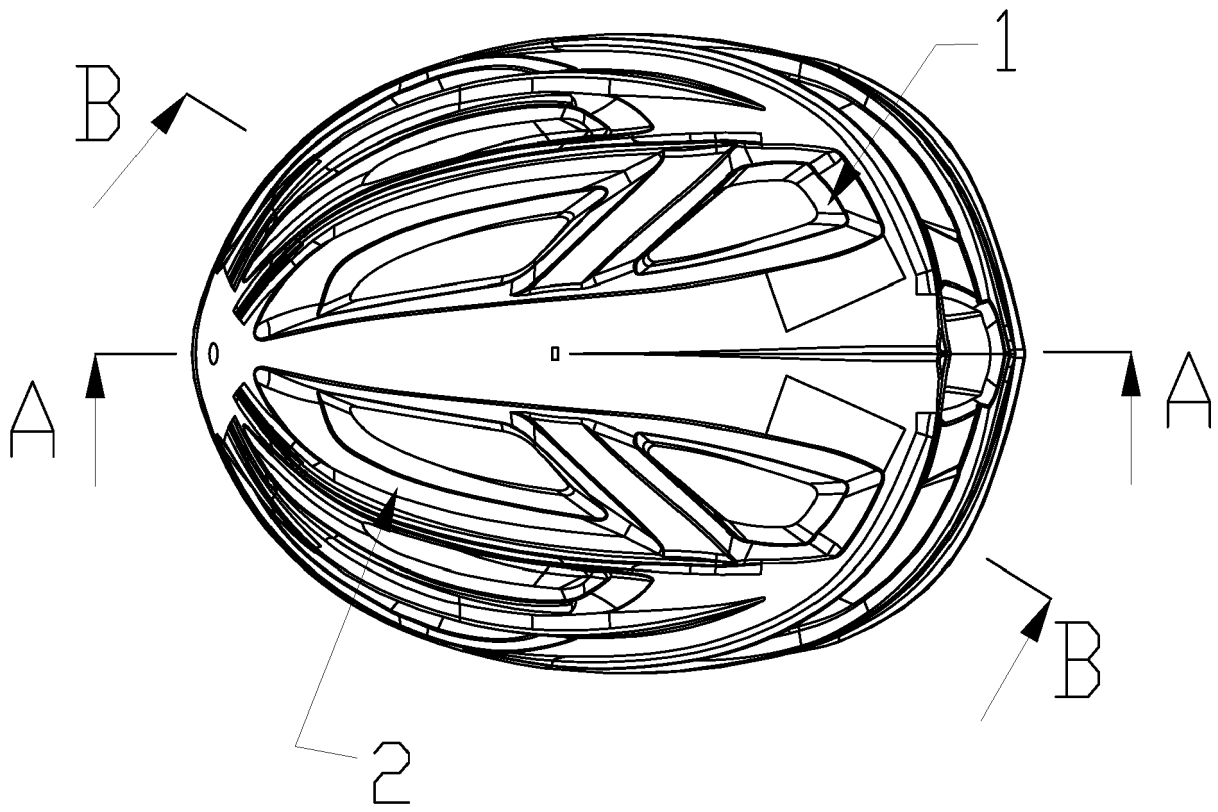

FIG. 1

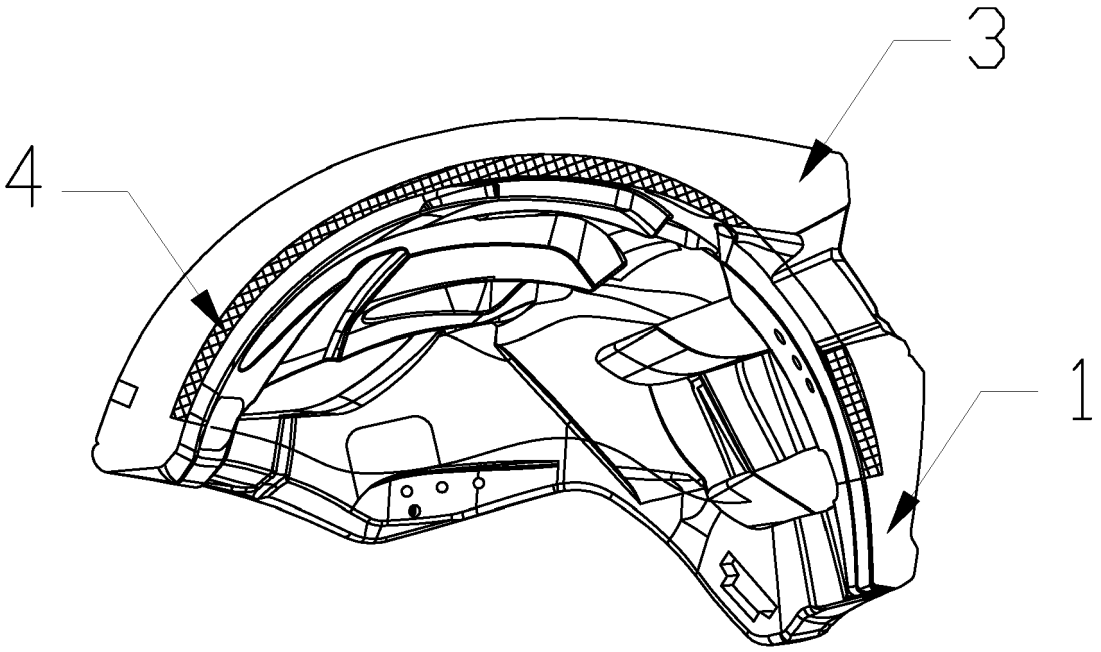

FIG. 2

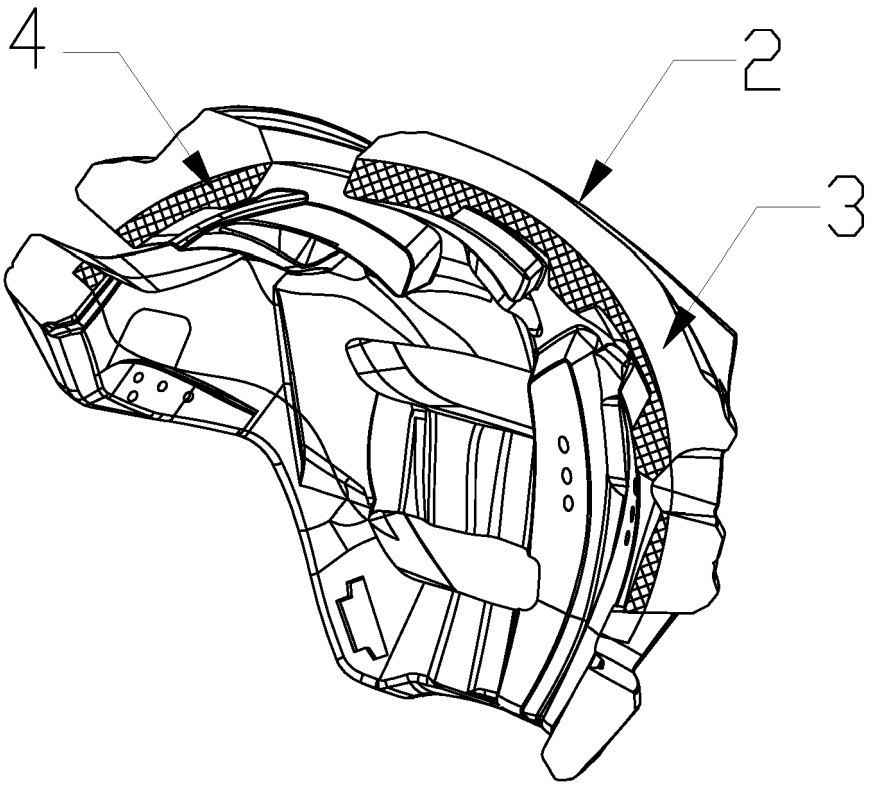

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 17 17 1530

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	FR 2 379 262 A1 (FINQUEL MICHEL [FR]) 1 September 1978 (1978-09-01) * page 2, lines 11-35; figure 1 * -----	1-3	INV. A42B3/06 A42B3/12 A42C2/00
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A	US 2015/113709 A1 (CHENG TIEN HOU [HK]) 30 April 2015 (2015-04-30) * paragraphs [0026] - [0036]; figure 1 * -----	1-3	

TECHNICAL FIELDS SEARCHED (IPC)

A42B
A42C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 November 2017	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
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 17 1530

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