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(54) **HELMET**

(57) A helmet (1) includes a helmet body (11), at least one bone conduction sounding device (13) and at least one cushion unit (14). The helmet body (11) includes a lining (111) and a fixing layer (113) disposed on inner side of the helmet body (11). The lining (111) is disposed on inner side of the fixing layer (113). The lining (111) has at least one receiving space (112) formed on one side of the lining (111) in adjacency to a wearer's ear. The bone conduction sounding device (13) and the cushion unit (14) are received in the receiving space (112). The cushion unit (14) is positioned between the fixing layer (113) and the bone conduction sounding device (13). Via the cushion unit (14), the bone conduction sounding device (13) is movable within the receiving space (112) in a cushioned state.

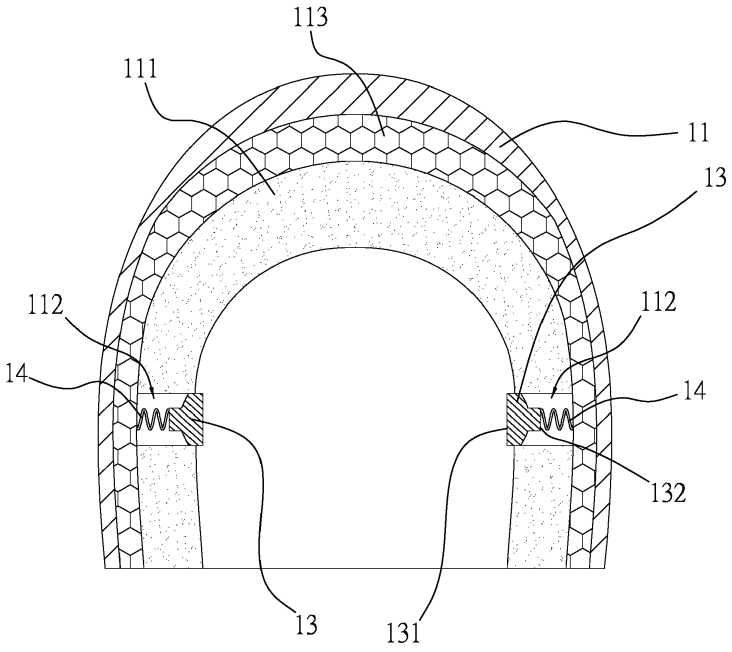

Fig. 3

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to a helmet, and more particularly to a helmet, which is able to protect a wearer's face. Moreover, the wearer can comfortably wear the helmet.

2. Description of the Related Art

[0002] In modern life, along with the promotion of safety concept of peoples, various helmets have become more and more important to provide protection effect for the users. Various helmets are inevitable safety devices and widely applied to motorcycles, bicycles and head protection for those persons working in dangerous sites.

[0003] An ordinary helmet only has the function of head protection or neck protection. Therefore, when a wearer or a motorcycle rider wants to listen to audio signals (such as a music or communication content), the wearer or motorcycle rider often plugs an earphone into his/her ear and then fits the helmet onto his/her head. Under such circumstance, the earphone in the wearer's ear will be compressed by the lining of the helmet to make the wearer's ear feel painful and uncomfortable. In addition, when wearing the helmet and riding a motorcycle with the earphone plugged in the wearer's ear, the wearer can hardly hear the sound of the environment. This is quite dangerous to the wearer. Moreover, in case the wearer is hit in riding, an external impact force will be applied to the earphone and the earphone will be compressed by the lining to cause injury of the wearer's ear.

SUMMARY OF THE INVENTION

[0004] It is therefore a primary object of the present invention to provide a helmet including a bone conduction sounding device and a cushion unit. Via the cushion unit, the bone conduction sounding device is movable in a cushioned state so as to protect a wearer's face.

[0005] It is a further object of the present invention to provide the above helmet, in which the cushion unit can automatically adjust the position of the bone conduction sounding device in the helmet body in accordance with the size of the wearer's head. Therefore, the wearer can comfortably wear the helmet.

[0006] To achieve the above and other objects, the helmet of the present invention includes a helmet body, at least one bone conduction sounding device and at least one cushion unit. The helmet body includes a lining and a fixing layer disposed on inner side of the helmet body. The lining is disposed on inner side of the fixing layer. The lining has at least one receiving space formed on one side of the lining in adjacency to a wearer's ear. The bone conduction sounding device and the cushion unit are received in the receiving space. The cushion unit is positioned between the bone conduction sounding device and the fixing layer. One side of the cushion unit is adjacent to the fixing layer. The other side of the cushion unit is connected with one side of the corresponding bone conduction sounding device. Via the cushion unit, the bone conduction sounding device being movable within the receiving space in a cushioned state. By means of the above design of the present invention, the face of the wearer is effectively protected and the wearer can more comfortably wear the helmet.

[0007] In the above helmet, the bone conduction sounding device has a contact side and an abutment side. The contact side is attached to the wearer's face in a position around and in adjacency to the wearer's ear. The abutment side is connected with inner side of the cushion unit.

[0008] In the above helmet, the fixing layer is made of expandable polystyrene.

[0009] In the above helmet, the cushion unit is a spring member, a hydraulic structure or a soft structure made of soft material.

[0010] In the above helmet, the lining is made of soft material.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein:

Fig. 1 is a perspective exploded view of the present invention;

Fig. 2 is a perspective assembled view of the present invention;

Fig. 3 is a front sectional view of the present invention;

Fig. 4A is a side schematic diagram showing that a wearer wears the helmet of the present invention;

Fig. 4B is a front sectional view showing that a wearer wears the helmet of the present invention;

Fig. 4C is a front sectional view showing that a wearer wears the helmet of the present invention and is hit;

Fig. 5A is a front sectional view of another embodiment of the helmet of the present invention;

Fig. 5B is a front sectional view according to Fig. 5A, showing that a wearer wears the helmet of the present invention; and

Fig. 5C is a front sectional view according to Fig. 5B, showing that a wearer wears the helmet of the present invention and is hit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] Please refer to Figs. 1 and 2 and supplementally to Figs. 3, 4A and 4B. Fig. 1 is a perspective exploded view of the present invention. Fig. 2 is a perspective assembled view of the present invention. Fig. 3 is a front sectional view of the present invention. Fig. 4A is a side schematic diagram showing that a wearer wears the helmet of the present invention. Fig. 4B is a front sectional view showing that a wearer wears the helmet of the present invention. The helmet 1 of the present invention includes a helmet body 11, at least one bone conduction sounding device 13 and at least one cushion unit 14. The helmet body 11 includes a lining 111 and a fixing layer 113. In this embodiment, the fixing layer 113 is made of expandable polystyrene (EPS) and has impact absorption and cushioning effect. The fixing layer 113 is disposed on inner side of the helmet body 11. The lining 111 is made of a soft material. The lining 111 has at least one receiving space 112. The receiving space 112 is formed on one side of the lining 111 in adjacency to the ear of a wearer 2. In this embodiment, there are two receiving spaces 112 respectively formed on two sides of the lining 111 in adjacency to the ears of a wearer 2 for illustration purposes.

[0013] In this embodiment, there are two bone conduction sounding devices 13 such as bone conduction speakers. The bone conduction sounding devices 13 are respectively received in the corresponding receiving spaces 112. The bone conduction sounding devices 13 are identical to the conventional structure and thus the structure and effect of the bone conduction sounding devices 13 will not be redundantly described hereinafter. Each bone conduction sounding device 13 has a contact side 131 and an abutment side 132. The contact side 131 is attached to the face of the wearer 2 in a position around and in adjacency to the wearer's ear. The abutment side 132 is in connection and contact with inner side of the cushion unit 14. The bone conduction is sound conduction manner. That is, the sound is converted into different frequencies of mechanical vibration, which passes through human skull, bony labyrinth, endolymph, spiral organ, auditory nerve and auditory center to transmit sonic wave. In comparison with the conventional sound conduction manner through vibration membrane for generating sonic wave, the bone conduction saves many sonic wave transmission steps and is able to clearly recover the sound in a noisy environment. Moreover, the sonic wave will not scatter in the air to affect other people. The bone conduction speaker is able to directly transmit the sonic wave (vibration signal) converted from electronic signal through the bone to the auditory nerve. The bone conduction sounding device 13 can be wirelessly (such as by means of Bluetooth) connected to a corresponding electronic device (such as a mobile phone, an audio electronics, a notebook or an MP3 walkman (not shown)) or wiredly (such as by means of transmission cable) connected to the electronic device for receiving the audio signal (such as a music) transmitted from the electronic device.

[0014] In this embodiment, there are two cushion units 14, which are spring members respectively received in the corresponding receiving spaces 112. Each cushion unit 14 is positioned between the bone conduction sounding device 13 and the fixing layer 113. One side of the cushion unit 14 is adjacent to the fixing layer 113. The other side of the cushion unit 14 is connected with one side (the abutment side 132) of the corresponding bone conduction sounding device 13. Accordingly, via the cushion unit 14, the bone conduction sounding device 13 is movable within the receiving space 112 in a cushioned state. For example, when a force directed to the fixing layer 113 is applied to the bone conduction sounding device 13 to push the bone conduction sounding device 13, the cushion unit 14 will be pushed and compressed by the bone conduction sounding device 13 to elastically contract and deform. Therefore, via the cushion unit 14, the bone conduction sounding device 13 is cushioned and movable within the receiving space 112. In a preferred embodiment, as shown in Figs. 5A, 5B, 5C, the cushion unit 14 is a soft structure made of a soft material (such as ethylene vinyl acetate (EVA), elastic rubber material or elastic plastic material). In another embodiment, the cushion unit 14 can be a hydraulic structure.

[0015] The following an example of application of the present invention for illustrating the use of the present invention:

Please refer to Figs. 2 and 3. Before a wearer 2 wears the helmet 1 on his/her head, the contact sides 131 of the bone conduction sounding devices 13 in the helmet body 11 protrude from the inner side of the lining 111. As shown in Figs. 3, 4A, 4B, when the wearer 2 fits the helmet body 11 onto his/her head, the face of the wearer 2 will push the bone conduction sounding devices 13 in the helmet body 11 and elastically compress and deform the cushion units 14. At this time, the bone conduction sounding devices 13 will move within the receiving spaces 112 toward the fixing layer 113 in a cushioned state. After the helmet body 11 is fully fitted onto the wearer's head, the compressed and deformed cushion units 14 will apply elastic restoring force to the bone conduction sounding devices 13 to push the bone conduction sounding devices 13 outward to the wearer 2. At this time, the contact sides 131 of the bone conduction sounding devices 13 will move to a position flush with the inner side of the lining 111 in contact with the skin surface of the face of the wearer 2. Accordingly, the contact sides 131 of the bone conduction

sounding devices 13 can snugly attach to the skin of the face of the wearer 2 so that the wearer 2 can comfortably wear the helmet 1.

[0016] As shown in Fig. 4C, in case the helmet 1 worn on the wearer's head is hit, an external impact force is applied to the wearer's head. At this time, the wearer's head will apply a force to the lining 111 and push/compress the lining 111 toward the fixing layer 113. Accordingly, the lining 111 will elastically deform to cushion the impact force (absorb the impact force). At the same time, the bone conduction sounding devices 13 are pushed and compressed. Under such circumstance, the cushion units 14 will elastically deform to cushion the push and compression pressure applied to the bone conduction sounding devices 13. Therefore, the bone conduction sounding devices 13 positioned in two inner sides of the helmet body 11 will retract along with the compression/deformation of the cushion units 14 to move within the receiving spaces 112 toward the fixing layer 113 in a cushioned state. At this time, the contact sides 131 of the bone conduction sounding devices 13 will move to a position flush with the inner side of the lining 111 in contact with the skin surface of the face of the wearer 2. Accordingly, the face of the wearer 2 is effectively protected from injury.

[0017] According to the above design of the helmet 1 of the present invention, the face of the wearer 2 is effectively protected and the wearer 2 can comfortably wear the helmet 1. In addition, the cushion units 14 of the helmet 1 of the present invention can automatically adjust the positions of the bone conduction sounding devices 13 in the helmet body 11 in accordance with the size of the head of the wearer 2. Therefore, the bone conduction sounding devices 13 can more snugly attach to the skin of the face of the wearer 2 without compressing the skin of the face of the wearer 2. In this case, the wearer 2 can comfortably wear the helmet 1.

[0018] The present invention has been described with the above embodiments thereof and it is understood that many changes and modifications of the above embodiments can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

Claims

1. A helmet (1) comprising:

a helmet body (11) including a lining (111) and a fixing layer (113), the fixing layer (113) being disposed on inner side of the helmet body (11), the lining (111) being disposed on inner side of the fixing layer (113), the lining (111) having at least one receiving space (112), the receiving space (112) being formed on one side of the lining (111) in adjacency to a wearer's (2) ear;

at least one bone conduction sounding device (13) received in the receiving space (112); and

at least one cushion unit (14) received in the receiving space (112) and positioned between the bone conduction sounding device (13) and the fixing layer (113), one side of the cushion unit (14) being adjacent to the fixing layer (113), the other side of the cushion unit (14) being connected with one side of the corresponding bone conduction sounding device (13), via the cushion unit (14), the bone conduction sounding device (13) being movable within the receiving space (112) in a cushioned state.

2. The helmet (1) as claimed in claim 1, wherein the bone conduction sounding device (13) has a contact side (131) and an abutment side (132), the contact side (131) being attached to the wearer's (2) face in a position around and in adjacency to the wearer's (2) ear, the abutment side (132) being connected with inner side of the cushion unit (14).

3. The helmet (1) as claimed in claim 1, wherein the fixing layer (131) is made of expandable polystyrene.

4. The helmet (1) as claimed in claim 1, wherein the cushion unit (14) is a spring member, a hydraulic structure or a soft structure made of soft material.

5. The helmet (1) as claimed in claim 1, wherein the lining (111) is made of soft material.

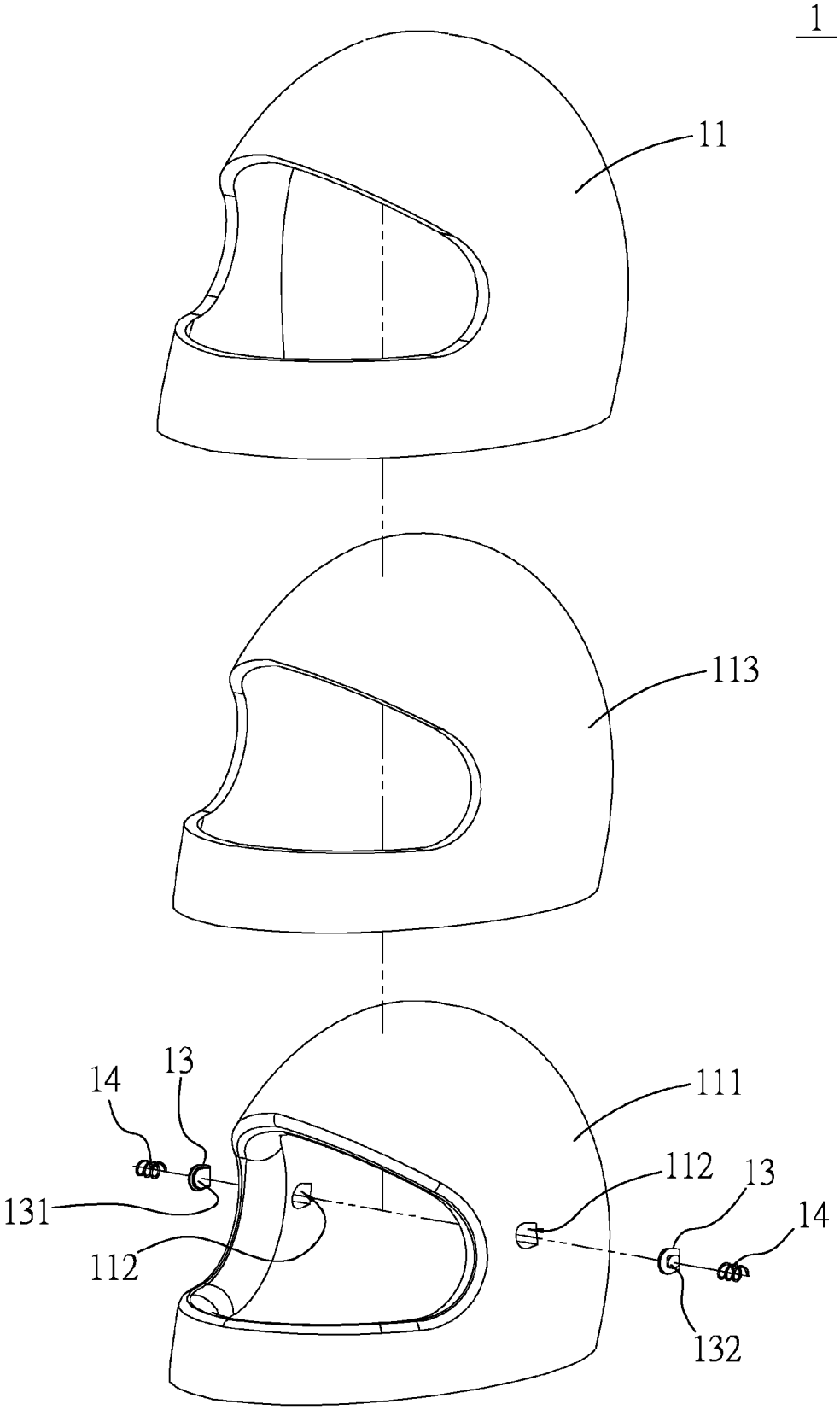

Fig. 1

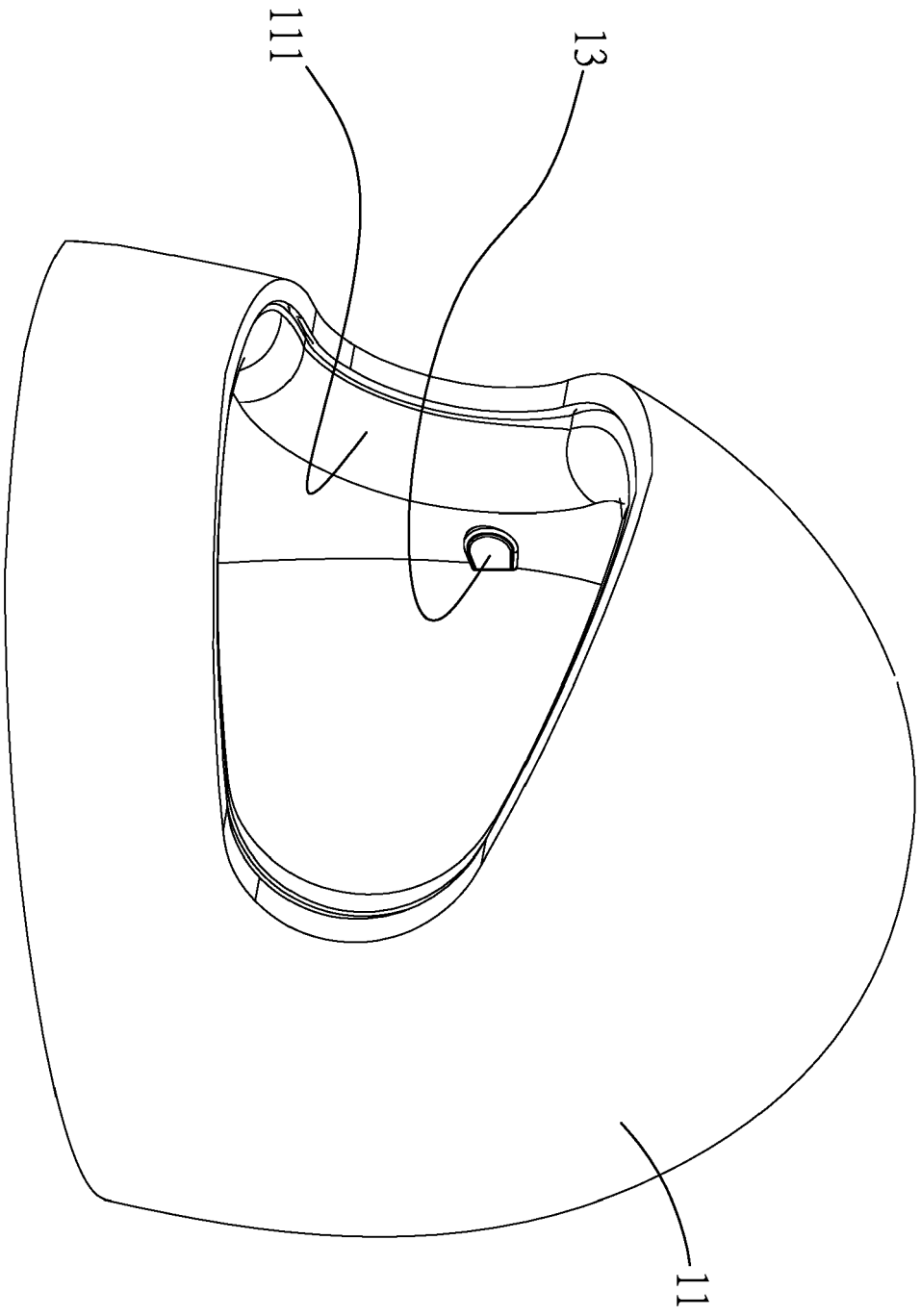

Fig. 2

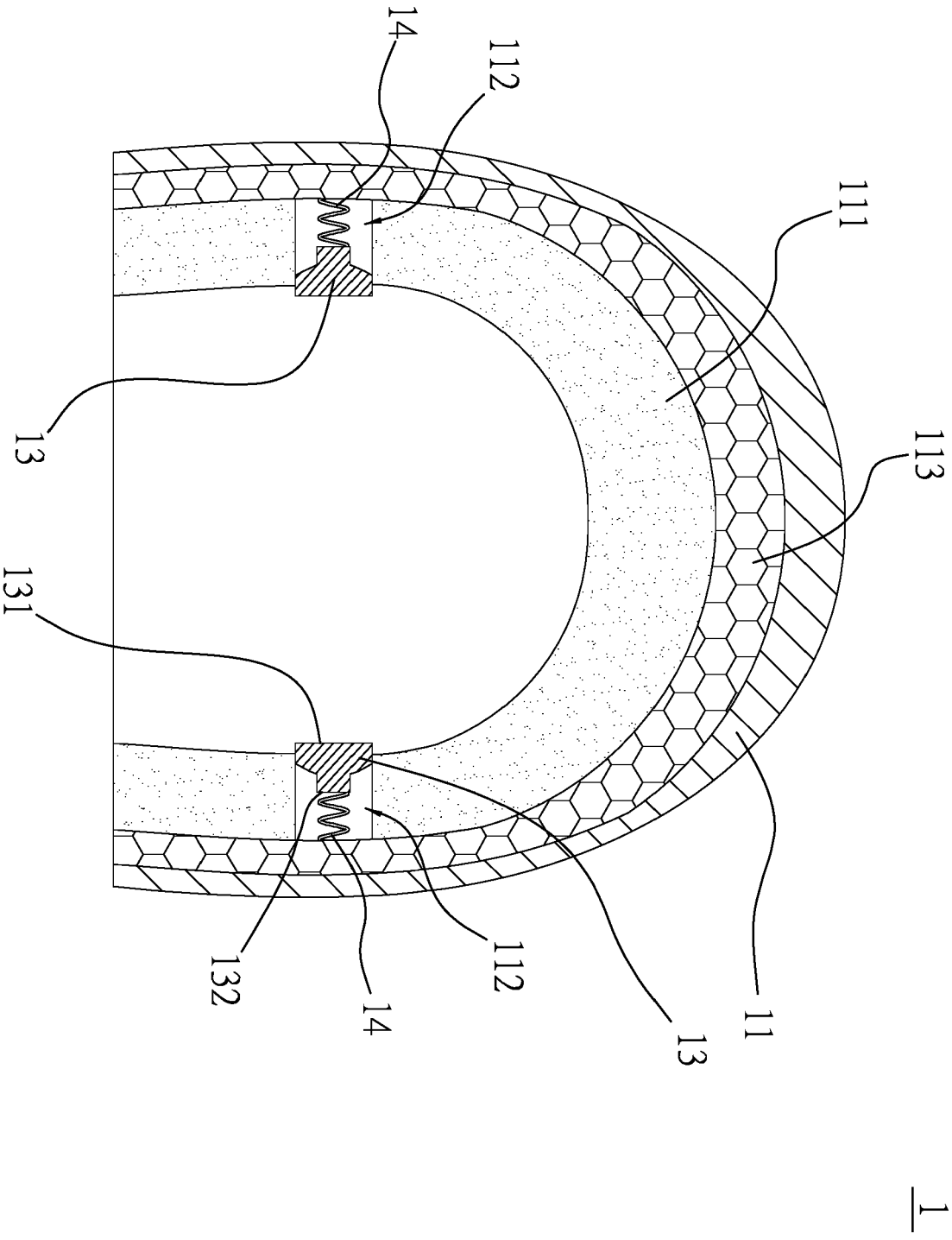

Fig. 3

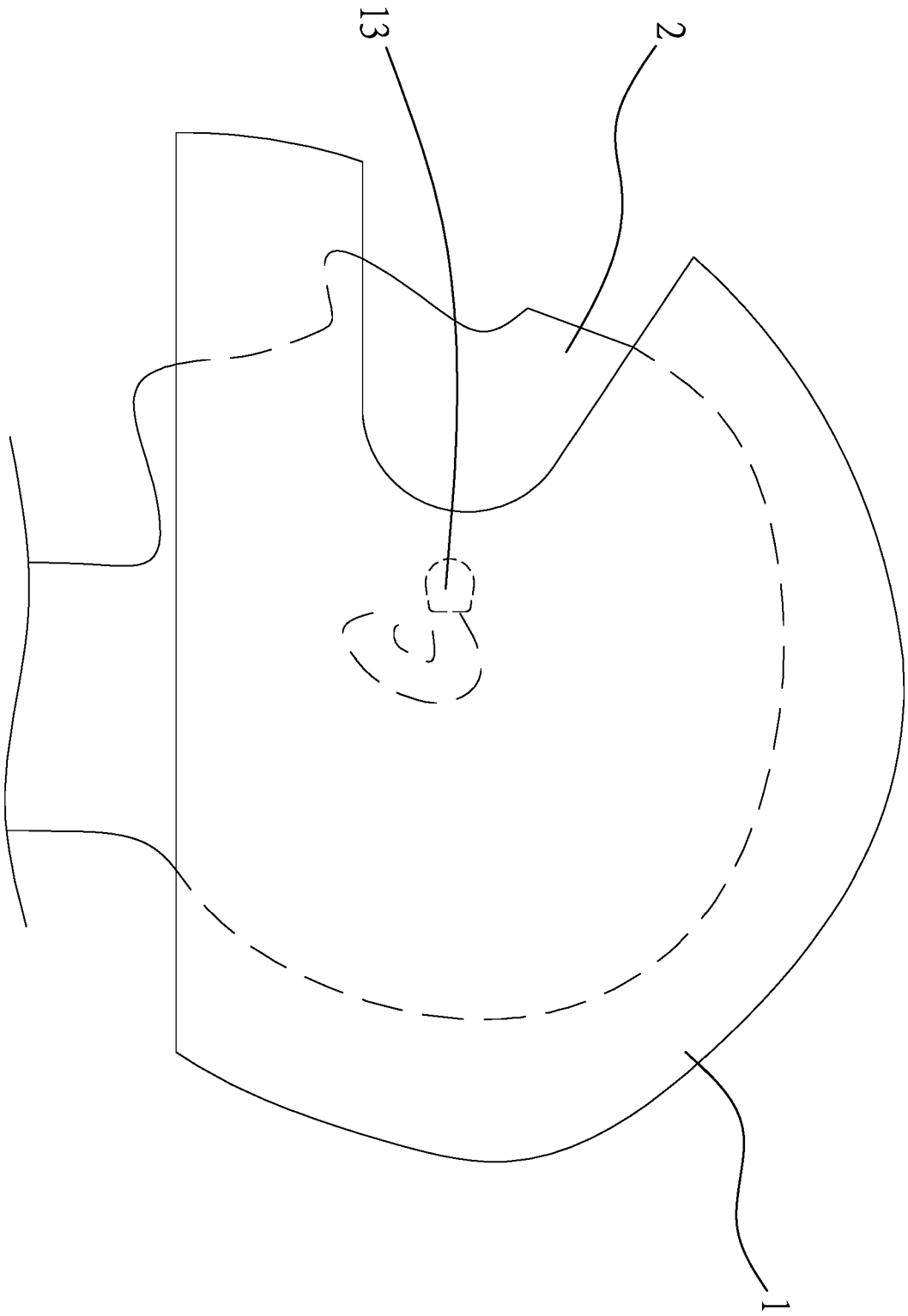

Fig. 4A

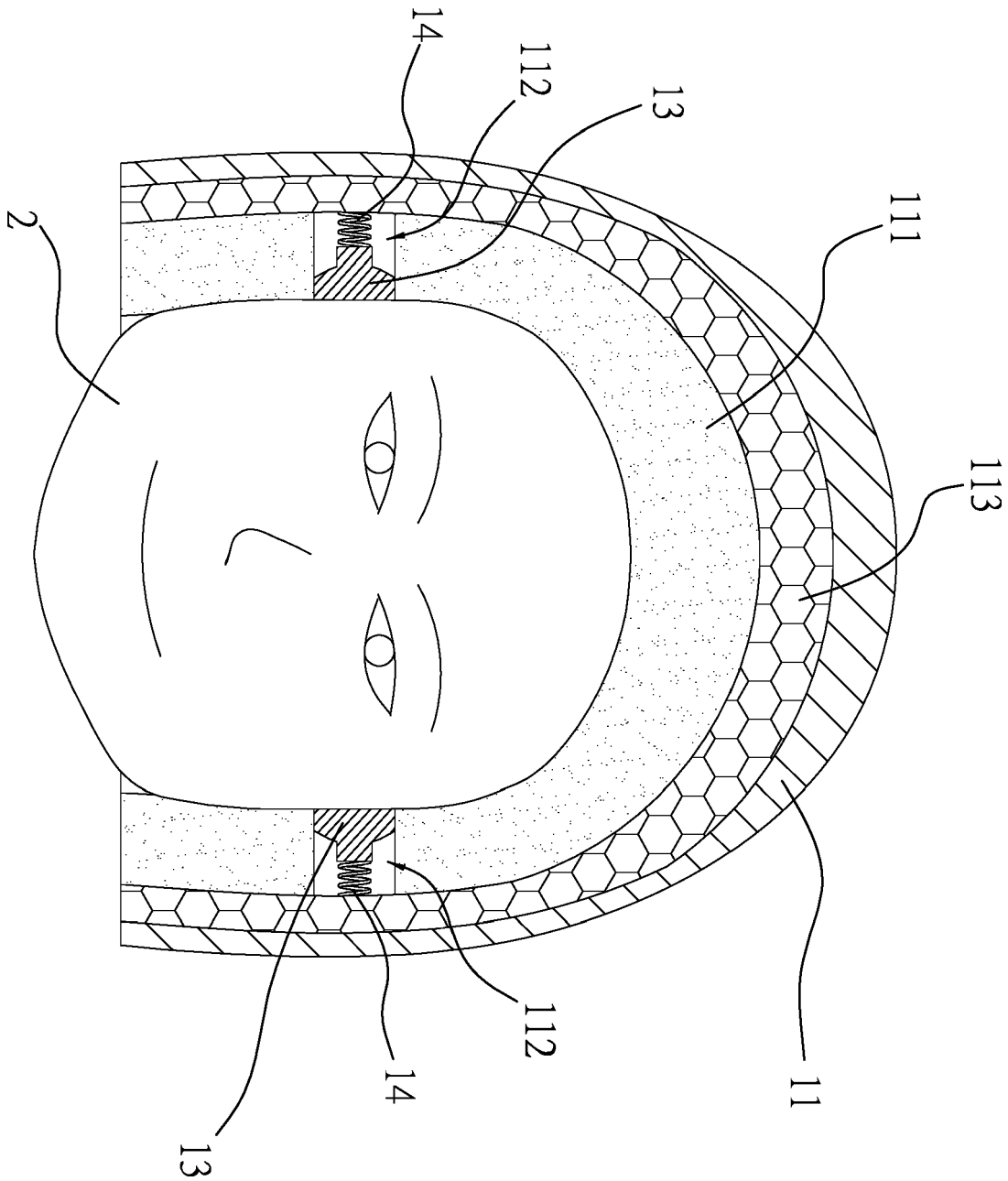

Fig. 4B

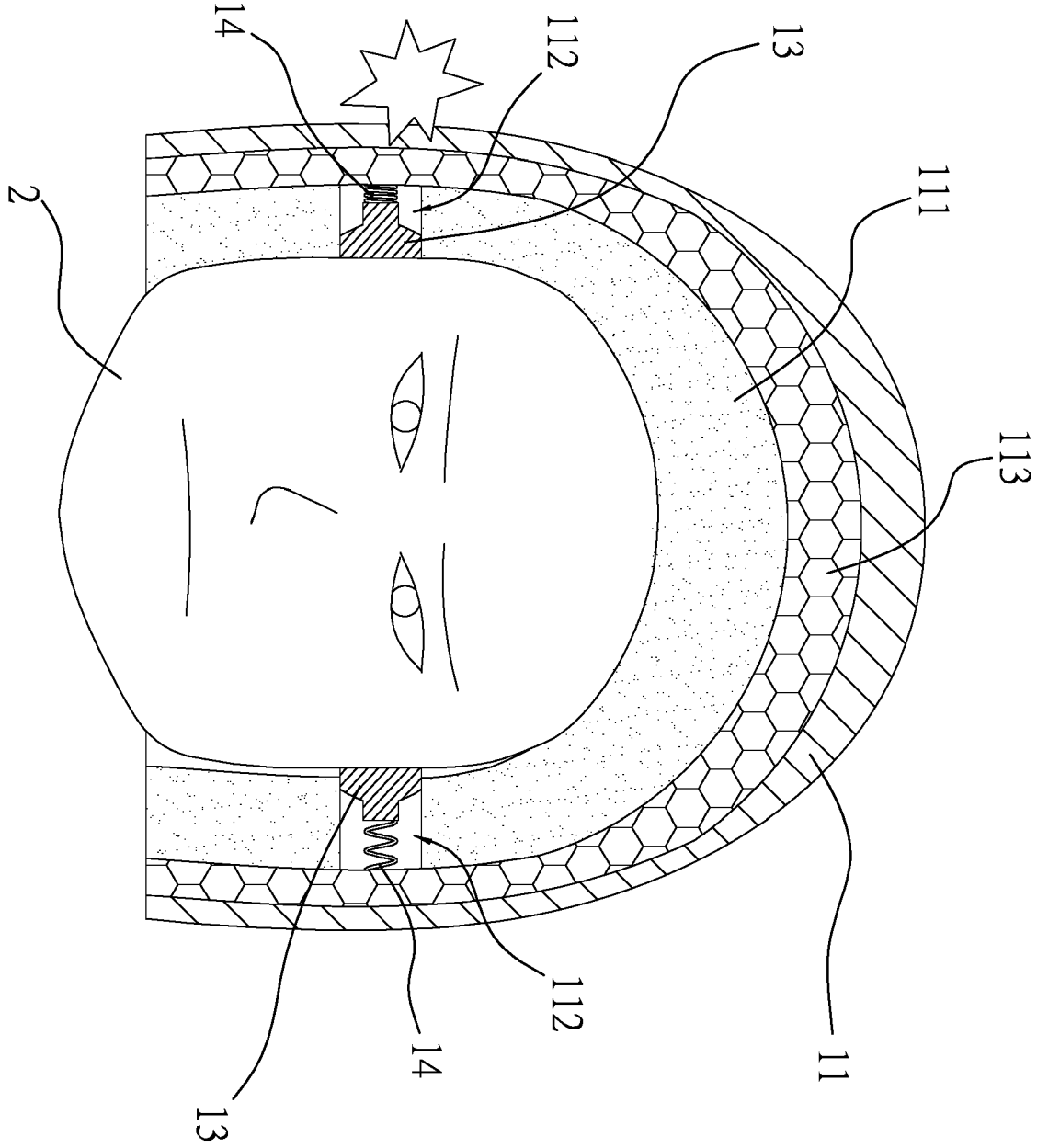

Fig. 4C

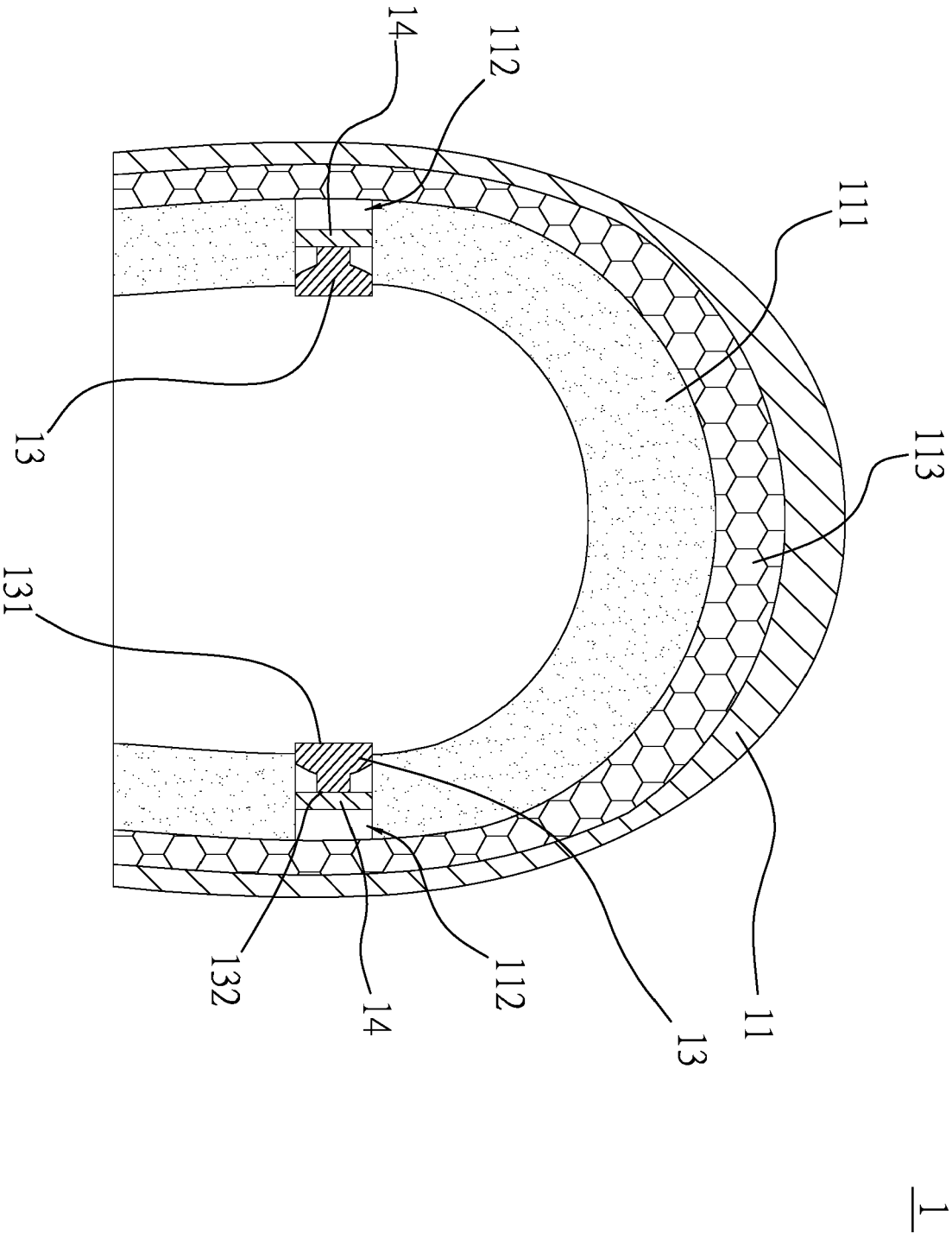

Fig. 5A

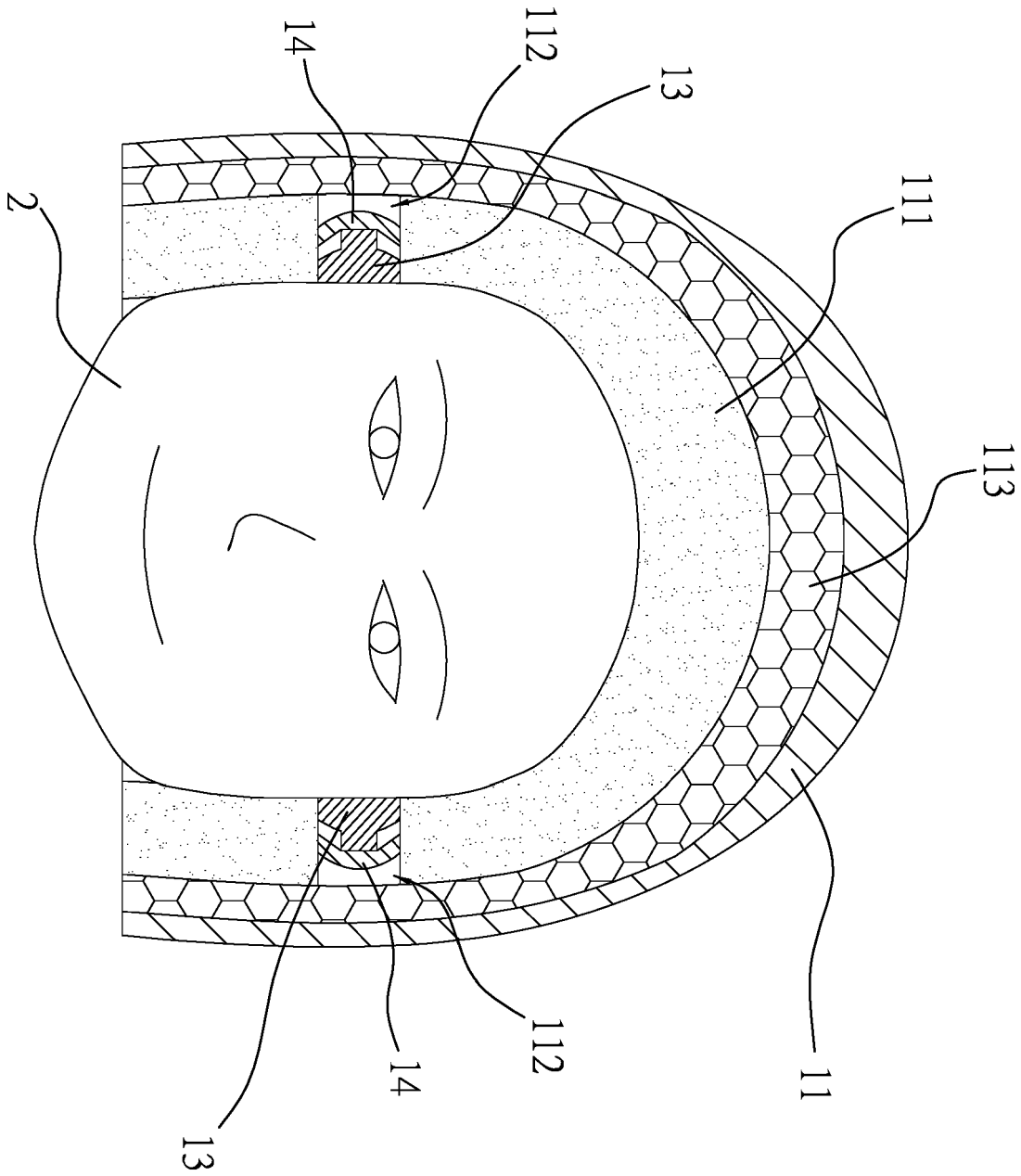

Fig. 5B

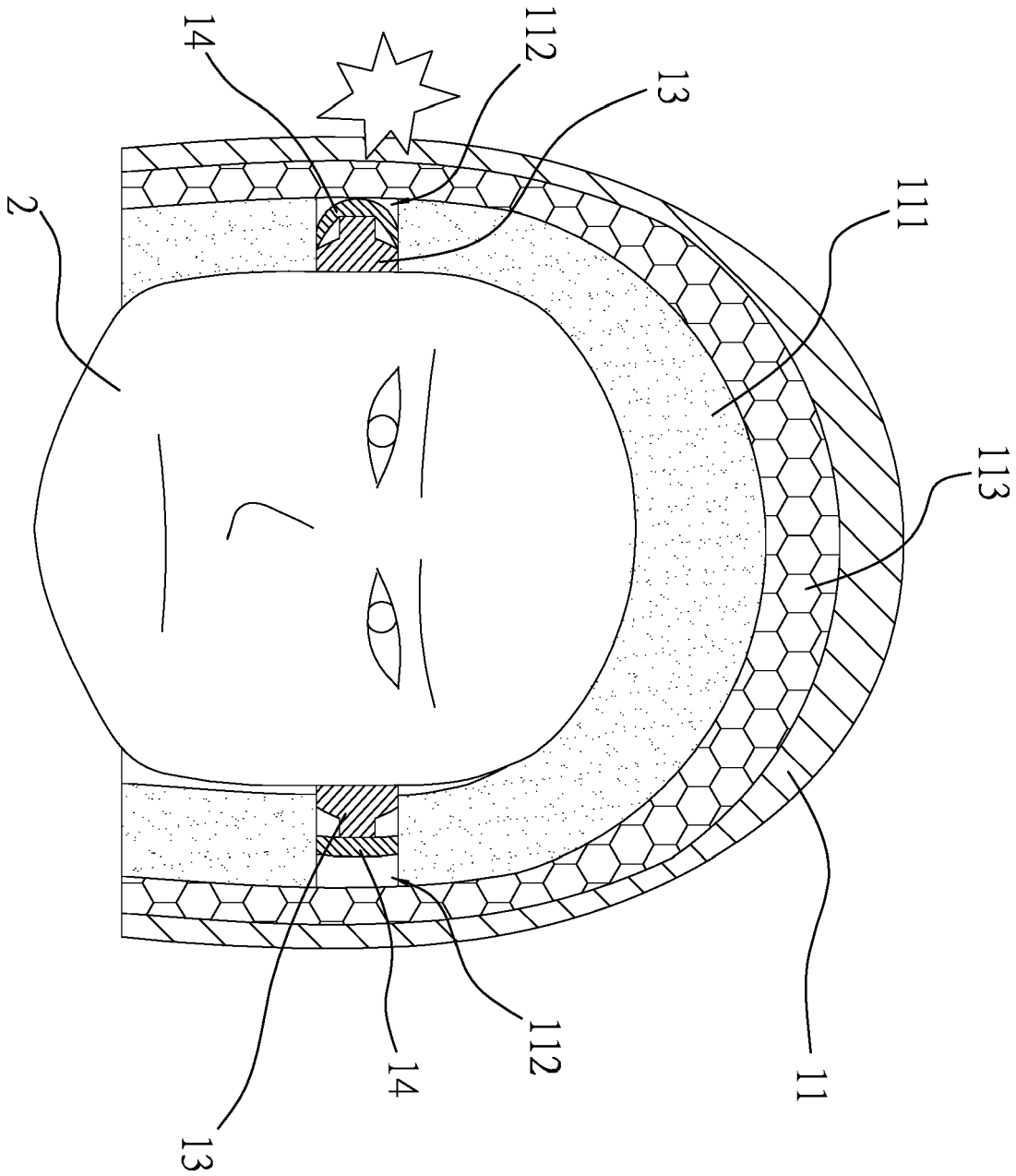

Fig. 5C

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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 0275

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	EP 0 618 751 A1 (CEOTRONICS GMBH ELEKTRONISCHE [DE]) 5 October 1994 (1994-10-05) * column 3, line 17 - line 20 * * column 3, line 43 - line 54 * * column 5, line 25 - line 41 * * figures 1,5 *	1-5	INV. A42B3/30
X	JP 2007 051395 A (NIPPON MMI TECHNOLOGY KK) 1 March 2007 (2007-03-01) * paragraph [0008] - paragraph [0009] * * paragraph [0019] - paragraph [0021] * * paragraph [0023] - paragraph [0026] * * figures 2a,2b,2c,3,5,6 *	1-5	

TECHNICAL FIELDS SEARCHED (IPC)

A42B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 March 2017	Guisan, Thierry

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 19 0275

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23-03-2017

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