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(71) Applicant: **GLOBUS (SHETLAND) LTD.** [GB/GB]; T2 Trafford Point, Twining Road, Trafford Park, Manchester M17 1SH (GB).

(72) Inventor: **AGUSTSSON, Haraldur**; T2 Trafford Point, Twining Road, Trafford Park, Manchester M17 1SH (GB).

(74) Agent: **HEINONEN & CO, ATTORNEYS-AT-LAW, LTD**; Fabianinkatu 29 B, 00100 Helsinki (FI).

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(54) Title: PROTECTIVE HEADGEAR WITH VENTILATION

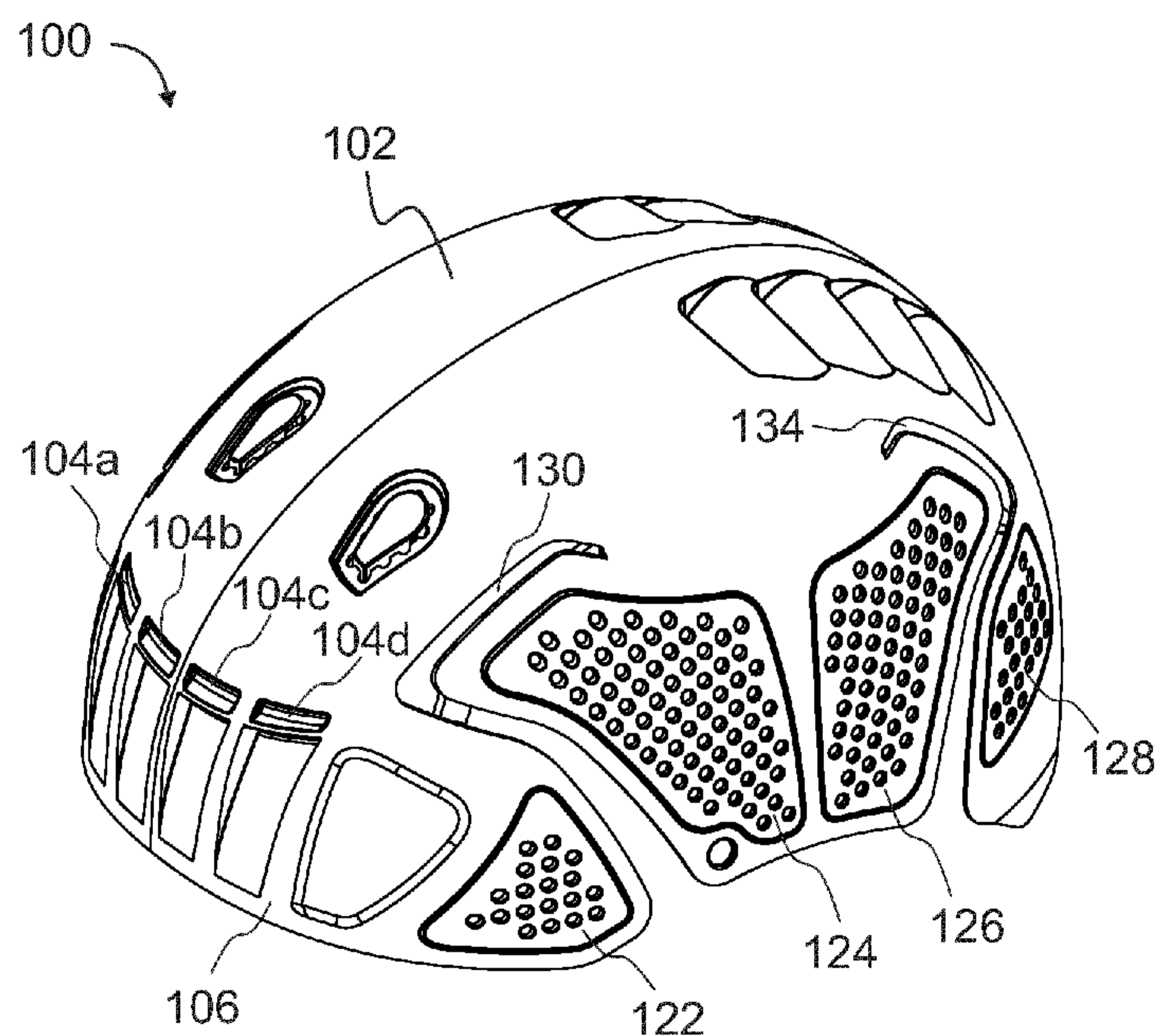


FIG. 1

(57) Abstract: A protective headgear comprising a protective shell comprising at least one inlet in a front section of the protective shell for enabling air flow, and at least one outlet in a rear section of the protective shell for enabling air flow, and an insert comprising at least one channel arranged to guide air from the at least one inlet of the protective shell to the at least one outlet of the protective shell.



## PROTECTIVE HEADGEAR WITH VENTILATION

### FIELD OF THE INVENTION

5

Generally the present invention relates to protective headgears. In particular, the present invention pertains to protective headgears with ventilation.

### 10 BACKGROUND

Today, there exists a wide range of protective headgears. Often these protective headgears are used in environments or tasks that cause stress and require physical activity.

15

Further, during these tasks workers are often equipped with other equipment such as safety garments and tools or machinery. Such equipment may prevent heat from exiting the body and may require the worker to carry an extra load. Safety garments may include overalls that cover most of the human body. Tools and  
20 machinery may be arranged around the waist or may be carried by the worker, for example.

25

The additional equipment required on worksites may increase the stress levels on the human body and even more heat will need to exit the body than in normal conditions. The human body may start sweating when it is exposed to heat or physical stress. Sweating is often uncomfortable and it may affect the worker's performance on a worksite. The risk for mistakes may increase when workers are affected by sweating and stress.

30

Sweating and stress may decrease if the body is cooled. One way to cool the human body is to design protective gears that ventilate the body. Ventilating materials and ventilation holes are proven to facilitate air flow so that cooling may be applied to the human body. However, with protective headgears it has been a challenge to create a design that ventilates enough and provides sufficient protec-  
35 tion for the working environments.

## SUMMARY OF THE INVENTION

The objective is to at least alleviate the problems described hereinabove not satisfactorily solved by the known arrangements, and to provide a feasible protective headgear. One objective is to improve the ventilation in headgears so that cooling air flow may be provided to the head area. Another objective is to provide a protective headgear that protects against bumps and lacerations. A further objective is to provide a headgear that is approved to EN812, industrial bump caps.

The aforesaid objectives are achieved by the embodiments of a protective headgear in accordance with the present invention.

The aforesaid objectives are achieved according to the present invention as claimed in claim 1.

Accordingly, in one aspect of the present invention a protective headgear comprises

- a protective shell comprising,
  - at least one inlet in a front section of the protective shell for enabling air flow, and
  - at least one outlet in a rear section of the protective shell for enabling air flow, and
- an insert comprising,
  - at least one channel arranged to guide air from the at least one inlet of the protective shell to the at least one outlet of the protective shell.

In one embodiment the protective shell comprises at least two inlets in the front section of the protective shell, the at least two inlets being arranged substantially at the same height in line to cover a width of the front section of the protective shell.

In one embodiment the protective shell comprises at least four inlets.

In one embodiment the insert comprises at least two channels, the at least two channels being arranged to connect the at least two inlets of the protective shell to the at least two outlets of the protective shell.

In one embodiment the insert comprises at least four channels, wherein two channels connect from two inlets to one outlet.

- 5 In one embodiment the insert comprises as many channels as there are inlets in the protective shell, the channels being aligned with the inlets of the protective shell.

10 In one embodiment the protective shell comprises at least two outlets, the at least two outlets being arranged substantially at the same height in line in relation to a rear edge of the protective shell.

15 In one embodiment the protective shell comprises at least four outlets, wherein at least two outlets are arranged successively in line in a front to rear direction of the protective shell.

20 In one embodiment the protective shell comprises at least eight outlets, wherein at least four outlets are arranged successively in line in a front to rear direction of the protective shell

In one embodiment the insert comprises at least one outlet, wherein at least one outlet of the insert is aligned with at least one outlet of the protective shell.

25 In one embodiment the insert comprises at least two outlets, wherein at least two outlets of the insert are aligned with at least two outlets of the protective shell.

30 In one embodiment the insert comprises at least eight outlets, wherein at least two outlets are aligned with the channels and with at least two outlets of the protective shell.

In one embodiment the protective headgear comprises attachment means for attaching the insert to the protective shell.

35 In one embodiment the attachment means comprises at least two front attachment holes and at least one rear attachment hole in the protective shell, and respectively at least two front attachment protrusions and at least one rear attachment protrusion in the insert, the at least two front attachment protrusions and at least one

rear attachment protrusion being arranged to attach to the at least two front attachment holes and the at least one rear attachment hole.

5 In one embodiment the protective shell is made of high-density polyethylene (HDPE) plastic. In one embodiment the protective shell is made of polycarbonate, polyamide (e.g. Nylon 6), polyoxymethylene (POM) or acrylonitrile butadiene styrene (ABS).

10 In one embodiment the insert is made of polypropylene foam. In one embodiment the insert is made of polystyrene foam or polyurethane foam.

15 The utility of the present invention follows from a plurality of factors depending on each particular embodiment. Some embodiments of the present invention may improve ventilation in protective headgears so that cooling air flow may be provided to the head area. Some embodiments of the present invention may protect against bumps and lacerations. Some embodiments of the present invention may be approved to EN812, industrial bump caps.

20 The expression “a number of” refers herein to any positive integer starting from one (1), e.g. to one, two, or three.

The expression “a plurality of” refers herein to any positive integer starting from two (2), e.g. to two, three, or four.

25 Different embodiments of the present invention are disclosed in the dependent claims.

## BRIEF DESCRIPTION OF THE RELATED DRAWINGS

30

Next the invention is described in more detail with reference to the appended drawings in which

35 Fig. 1 illustrates an embodiment of a protective headgear in accordance with the present invention.

Fig. 2 illustrates a second view of the protective headgear.

Fig. 3 illustrates a front view of a protective shell of the protective headgear.

Fig. 4 illustrates a top view of the protective shell.

- Fig. 5 illustrates a rear view of the protective shell.  
Fig. 6 illustrates a rear view at an angle of the protective shell.  
Fig. 7 illustrates a first side view of the protective shell.  
Fig. 8 illustrates a cross-section of the protective shell.  
5 Fig. 9 illustrates a second side view of the protective shell.  
Fig. 10 illustrates a bottom view of the protective headgear.  
Fig. 11 illustrates the protective shell and an embodiment of an insert of the protective headgear.  
Fig. 12 illustrates a cross-section of the protective headgear.  
10 Fig. 13 illustrates a front attachment hole of a protective shell.  
Fig. 14 illustrates a rear attachment hole of the protective shell.  
Fig. 15 illustrates an embodiment of the insert of the protective headgear.  
Fig. 16 illustrates a second view of the insert.  
Fig. 17 illustrates a top view of the insert.  
15 Fig. 18 illustrates a front view of the insert.  
Fig. 19 illustrates a rear view of the insert.  
Fig. 20 illustrates a bottom view of the insert.  
Fig. 21 illustrates a side view of the insert.  
Fig. 22 illustrates a cross-section of the insert.  
20

## DETAILED DESCRIPTION OF THE EMBODIMENTS

Referring to figures 1-9, the protective headgear 100 comprises a protective shell  
25 102. The protective shell 102 comprises four inlets 104a-d arranged in the front section 106 of the protective shell 102 and eight outlets 108a-d, 110a-d arranged in the rear section 112 of the protective shell 102. The front half of the protective shell 102 may be considered as the front section 106, and respectively the rear half of the protective shell 102 may be considered as the rear section 112 of the  
30 protective shell 102.

The inlets 104a-d may be arranged substantially at the same height in line so that they cover a significant portion of the width of the protective shell 102. Thus, air may enter in the front of the headgear across the width of the inlets 104a-d.

35

The outlets 108a-d, 110a-d may be arranged successively in two lines 114, 116 in the rear section 112. The first line may comprise four outlets 108a-d arranged

successively in line. The second line may comprise four outlets 110a-d arranged successively in line.

5 The first and second line of outlets 114, 116 may be arranged respectively on a first and second side 118, 120 of the protective shell 102. The first and second lines of outlets 114, 116 may be arranged so that one outlet in each line is arranged substantially at the same height. The first and second lines of outlets 114, 116 may be arranged at a distance from each other.

10 Sections of ventilation holes 122a-d, 124a-d may be arranged to the first and second side 118, 120 of the protective shell 102. Four sections of ventilation holes 122a-d may be arranged to the first side 118 of the protective shell 102, and respectively four sections 124a-d of ventilation holes may be arranged to the second side 120 of the protective shell 102.

15

A first and second front cut 130, 132 may be arranged to the front section 106 of the protective shell 102. A first and second rear cut 134, 136 may be arranged to the rear section 112 of the protective shell 102. The first and second front cuts 130, 132 may enable the expansion and contraction of at least part of the front section, and respectively the first and second rear cuts 134, 136 may enable the expansion and contraction of at least part of the rear section 112.

20

The protective shell 102 may be made of high-density polyethylene (HDPE) plastic, polycarbonate, polyamide (e.g. Nylon 6), polyoxymethylene (POM) or acrylonitrile butadiene styrene (ABS), for example.

25

Referring also to figures 10-22, the protective headgear 100 comprises a protective shell 102 and an insert 140.

30 The protective shell 102 may comprise attachment means such as two front attachment holes 142, 144 and one rear attachment hole 146 for attaching the insert 140 to the protective shell 102.

35 Respectively, the insert 140 may comprise attachment means such as two front protrusions 148, 150 and one rear protrusion 152 for attaching the insert 140 in the two front attachment holes 142, 144 and one rear attachment hole 146 of the protective shell 102. The front and rear protrusions 148, 150, 152 may be fitted so that the protrusions attach with the front and rear attachment holes 142, 144,

146 of the protective shell 102. Thus, the insert 140 may be attached on the inside of the protective shell 102.

The insert 140 comprises four channels 154a-d to guide air from the inlets 104a-d of the protective shell 102 to the outlets 108a-d of the protective shell 102. The channels 154a-d may be arranged so that the channels align with the inlets 104a-d of the protective shell 102. Each channel 154a-d connects with one inlet 104a-d. Further, the channels 154a-d may be arranged so that two channels 154a, 154b connect with a first outlet 158a of the insert 140. Similarly, two further channels 154c, 154d may connect with a second outlet 156a of the insert 140.

The channels 154a-d form a passage between the insert 140 and the protective shell 102 for air flow. The channels 154a-d may be arranged as grooves in the insert 140.

The insert 140 comprises eight outlets 156a-d, 158a-d. The outlets 156a-d, 158a-d of the insert 140 may be arranged so that the outlets of the insert align with the outlets 108a-d, 110a-d of the protective shell 102. The outlets 156a-d, 158a-d of the insert 140 may be arranged successively in two lines 160, 162. The first line 160 may comprise four outlets 156a-d arranged successively in line. The second 162 line may comprise four outlets 158a-d arranged successively in line.

Additionally, the channels 154a-d may comprise holes 164a-h to provide further ventilation in the protective headgear.

The insert 140 may be made of polypropylene foam, polystyrene foam or polyurethane foam, for example.

The protective shell 102 may have a height of approximately 119.5mm, a width of approximately 168.8mm, and a length of approximately 206.2mm. Referring to figure 8, the protective shell 102 may have a thickness of approximately 2mm. The thickness may vary in different parts of the protective shell 102. In some parts of the protective shell 102 the thickness may be 1.14mm, 1.2mm or 1.5mm, for example.

The insert 140 may have a height of approximately 99.1mm, a width of approximately 126.6mm, and a length of approximately 207.8mm. Referring to figure

22, the insert 140 may have a thickness of approximately 9.2mm. The thickness may vary in different parts of the insert 140.

5 Referring to figure, 12, the insert 140 and the protective shell 102 may form a thickness of approximately 11.5mm when attached together. The thickness may vary in different parts of the protective headgear 100.

10 Consequently, a skilled person may on the basis of this disclosure and general knowledge apply the provided teachings in order to implement the scope of the present invention as defined by the appended claims in each particular use case with necessary modifications, deletions, and additions.

## Claims

1. A protective headgear comprising,
  - 5 -a protective shell comprising,
    - at least one inlet in a front section of the protective shell for enabling air flow, and
    - at least one outlet in a rear section of the protective shell for enabling air flow, and
  - 10 -an insert comprising,
    - at least one channel arranged to guide air from the at least one inlet of the protective shell to the at least one outlet of the protective shell.
- 15 2. The protective headgear of claim 1, wherein the protective shell comprises at least two inlets in the front section of the protective shell, the at least two inlets being arranged substantially at the same height in line to cover a width of the front section of the protective shell.
- 20 3. The protective headgear of claim 2, wherein the protective shell comprises at least four inlets.
4. The protective headgear of claim 2, wherein the insert comprises at least two channels, the at least two channels being arranged to connect the at least two  
25 inlets of the protective shell to the at least two outlets of the protective shell.
5. The protective headgear of claim 3, wherein the insert comprises at least four channels, wherein two channels connect from two inlets to one outlet.
- 30 6. The protective headgear of any preceding claim, wherein the insert comprises as many channels as there are inlets in the protective shell, the channels being aligned with the inlets of the protective shell.
7. The protective headgear of any preceding claim, wherein the protective  
35 shell comprises at least two outlets, the at least two outlets being arranged substantially at the same height in line in relation to a rear edge of the protective shell.

8. The protective headgear of claim 7, wherein the protective shell comprises at least four outlets, wherein at least two outlets are arranged successively in line in a front to rear direction of the protective shell.
- 5 9. The protective headgear of claim 8, wherein the protective shell comprises at least eight outlets, wherein at least four outlets are arranged successively in line in a front to rear direction of the protective shell
- 10 10. The protective headgear of any preceding claim, wherein the insert comprises at least one outlet, wherein at least one outlet of the insert is aligned with at least one outlet of the protective shell.
- 15 11. The protective headgear of claim 10, wherein the insert comprises at least two outlets, wherein at least two outlets of the insert are aligned with at least two outlets of the protective shell.
- 20 12. The protective headgear of claim 10 or 11, wherein the insert comprises at least eight outlets, wherein at least two outlets are aligned with the channels and with at least two outlets of the protective shell.
- 25 13. The protective headgear of any preceding claim, comprising attachment means for attaching the insert to the protective shell.
- 30 14. The protective headgear of claim 13, wherein the attachment means comprises at least two front attachment holes and at least one rear attachment hole in the protective shell, and respectively at least two front attachment protrusions and at least one rear attachment protrusion in the insert, the at least two front attachment protrusions and at least one rear attachment protrusion being arranged to attach to the at least two front attachment holes and the at least one rear attachment hole.
- 35 15. The protective headgear of any preceding claim, wherein the protective shell is made of high-density polyethylene (HDPE) plastic.
16. The protective headgear of any preceding claim, wherein the insert is made of polypropylene foam.

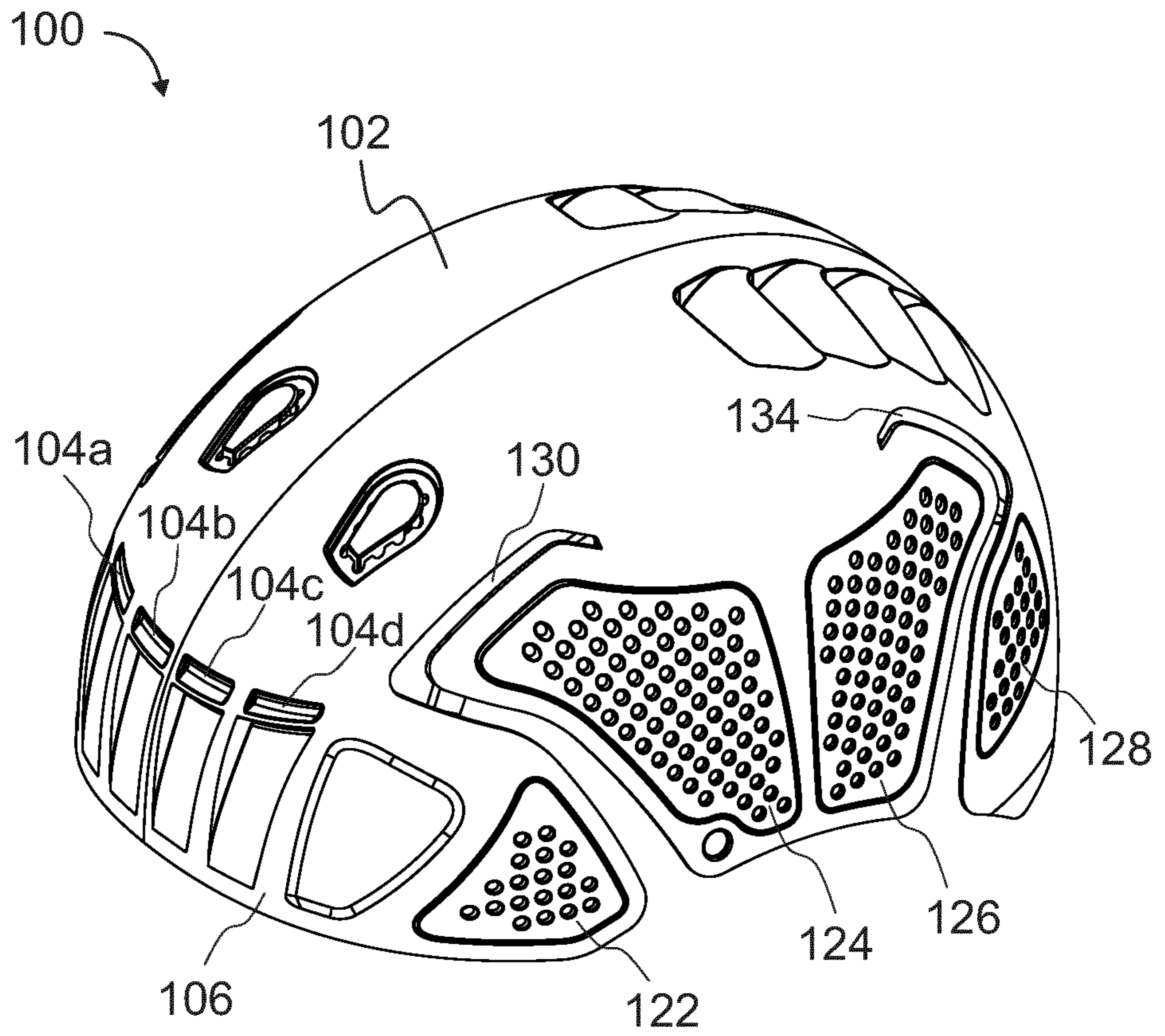


FIG. 1

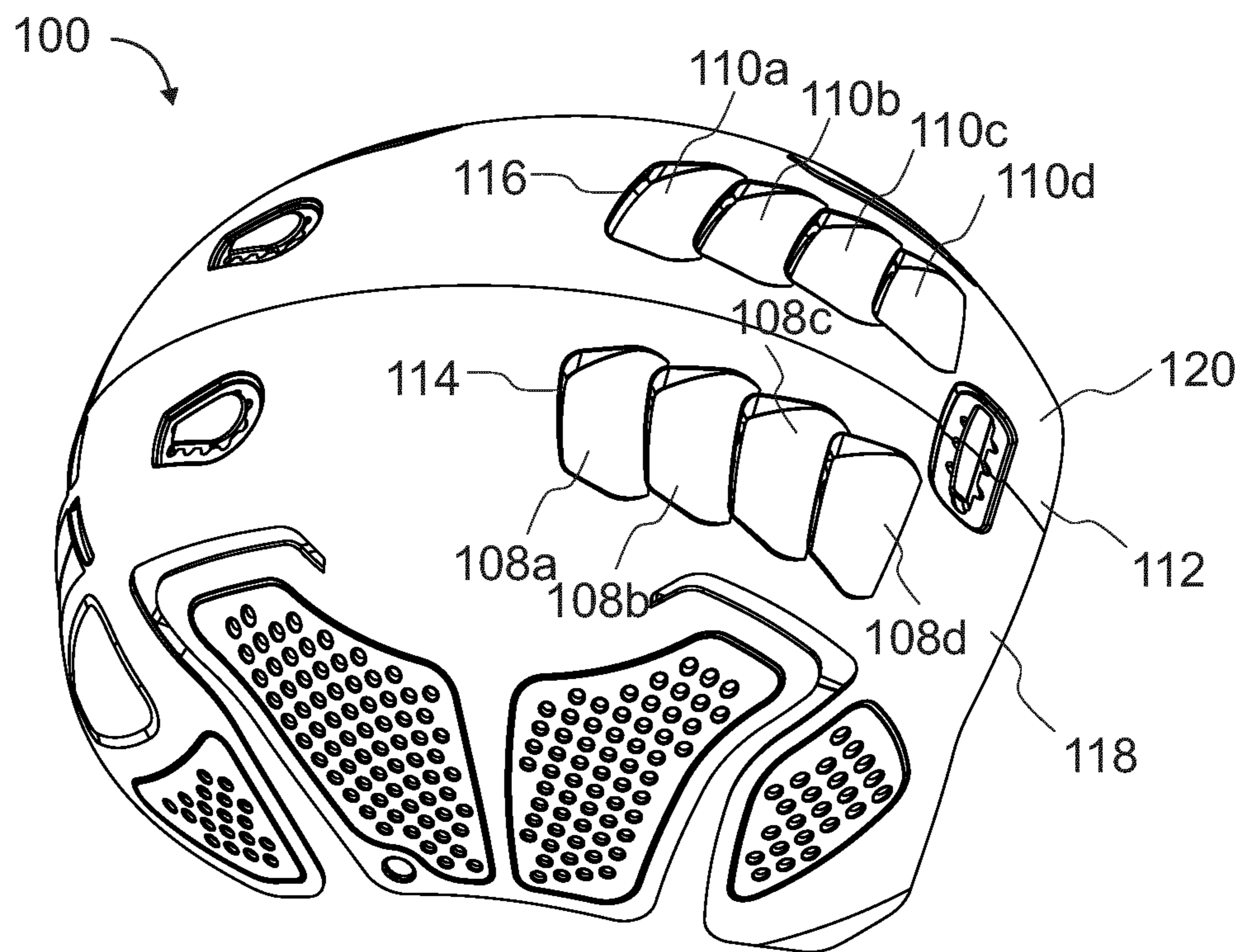


FIG. 2



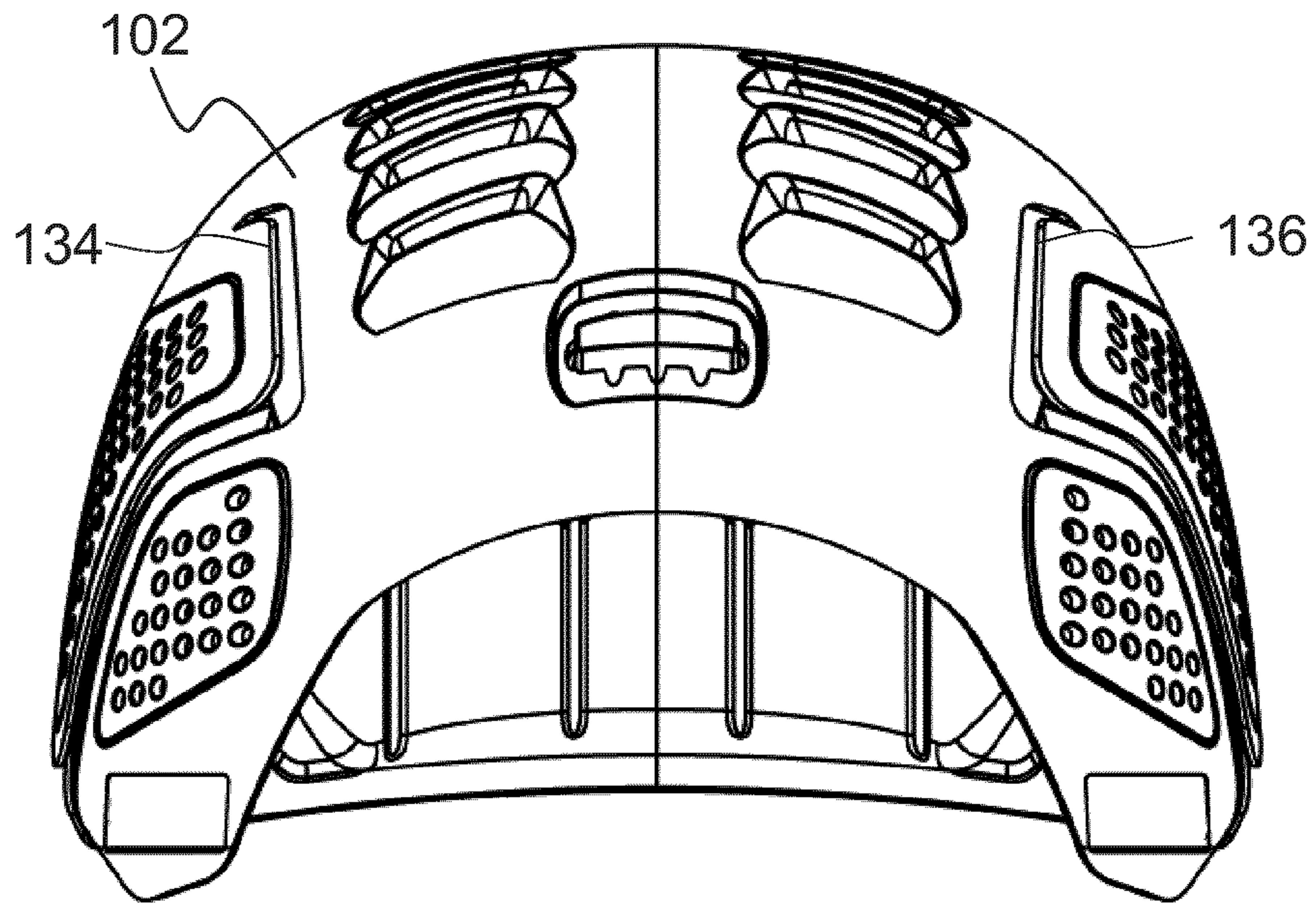


FIG. 5

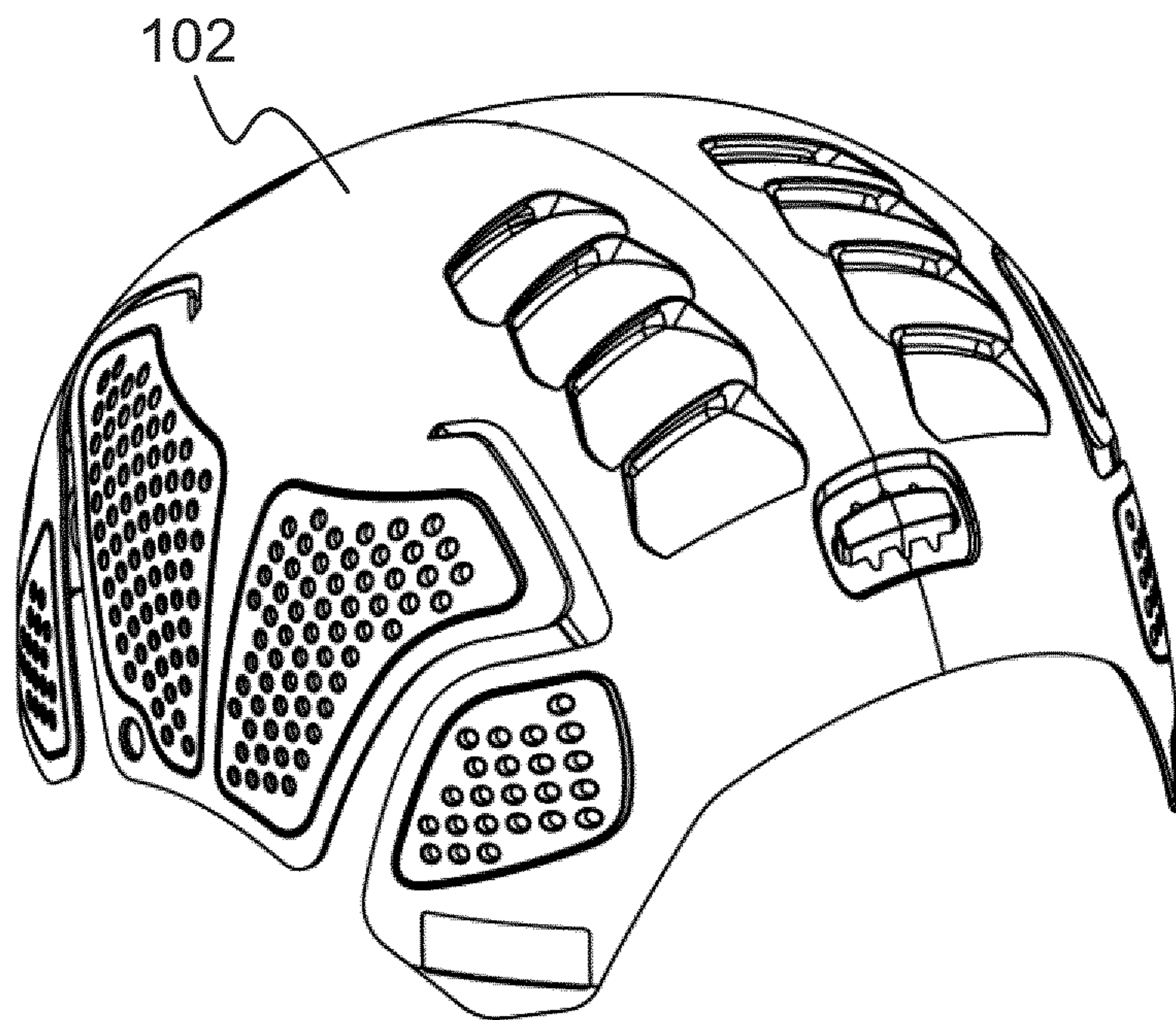


FIG. 6

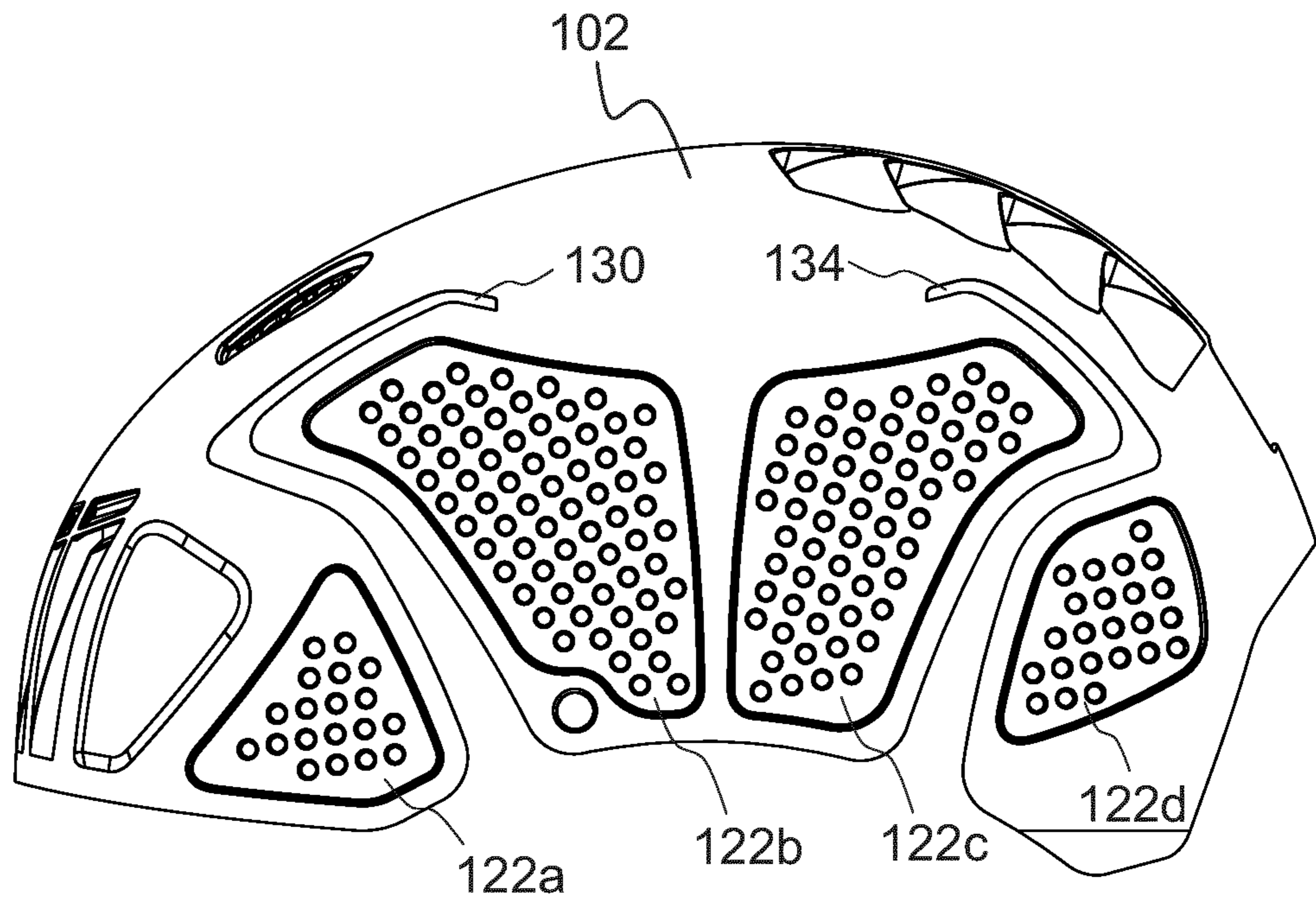


FIG. 7

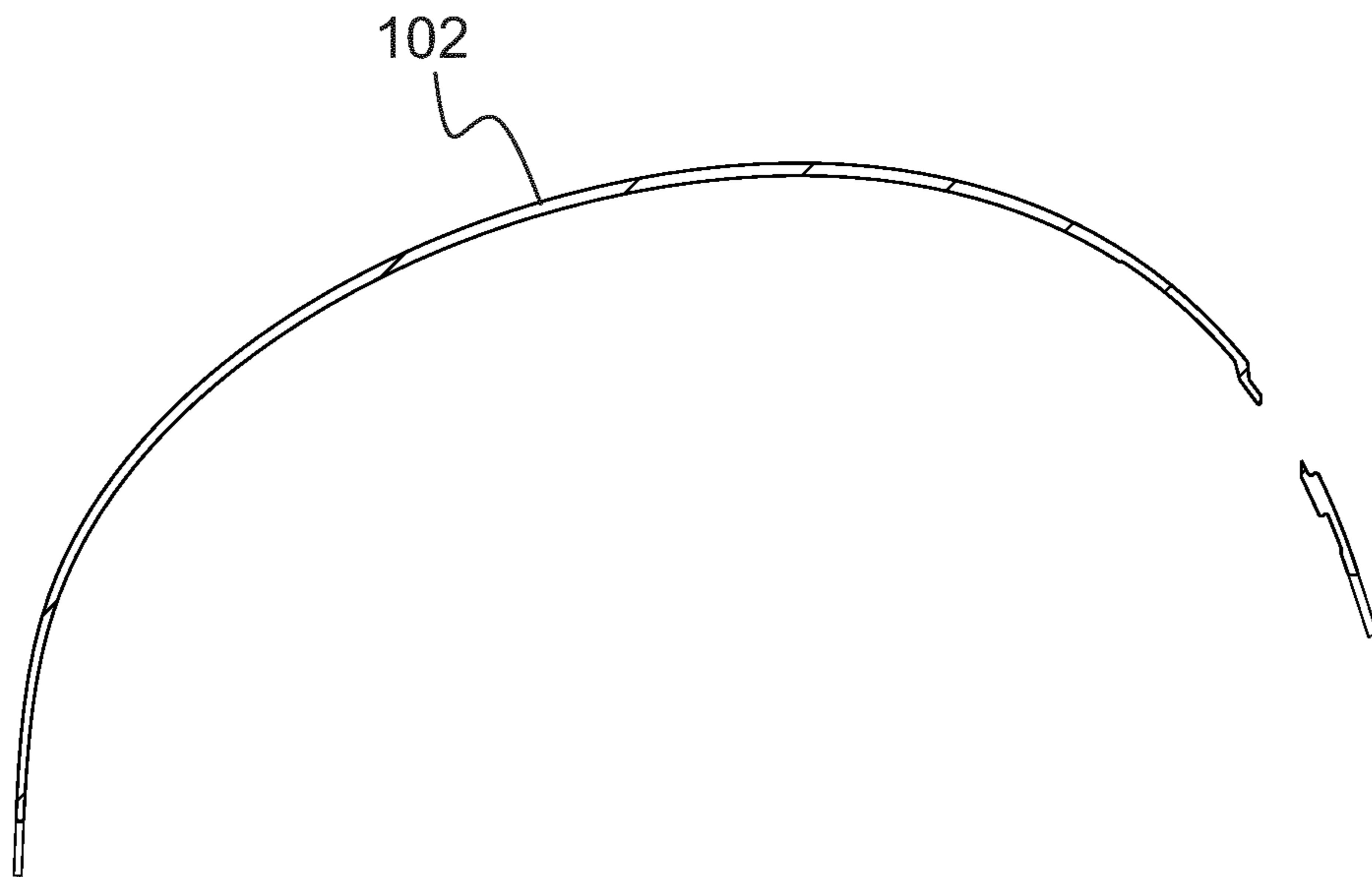


FIG. 8

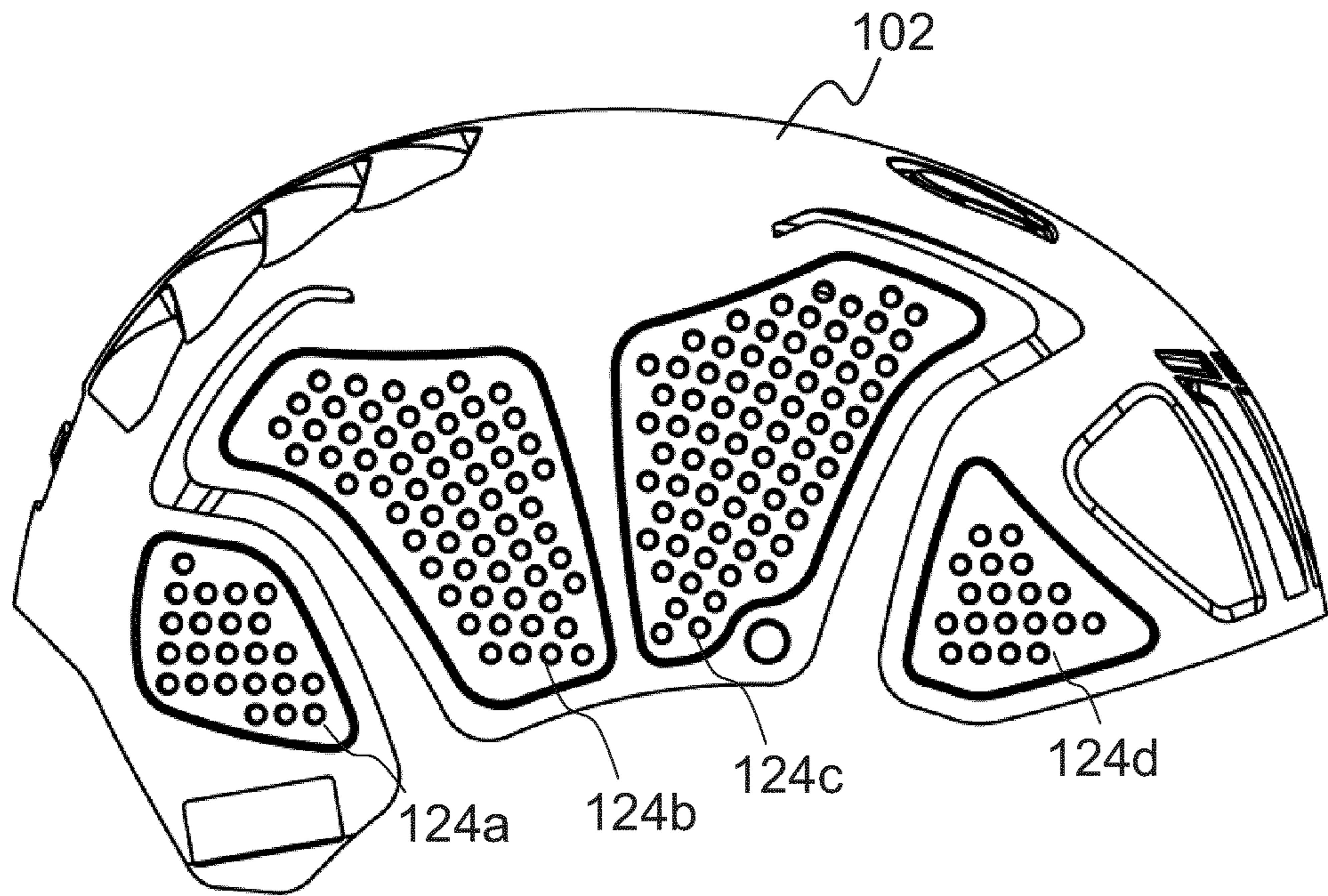


FIG. 9

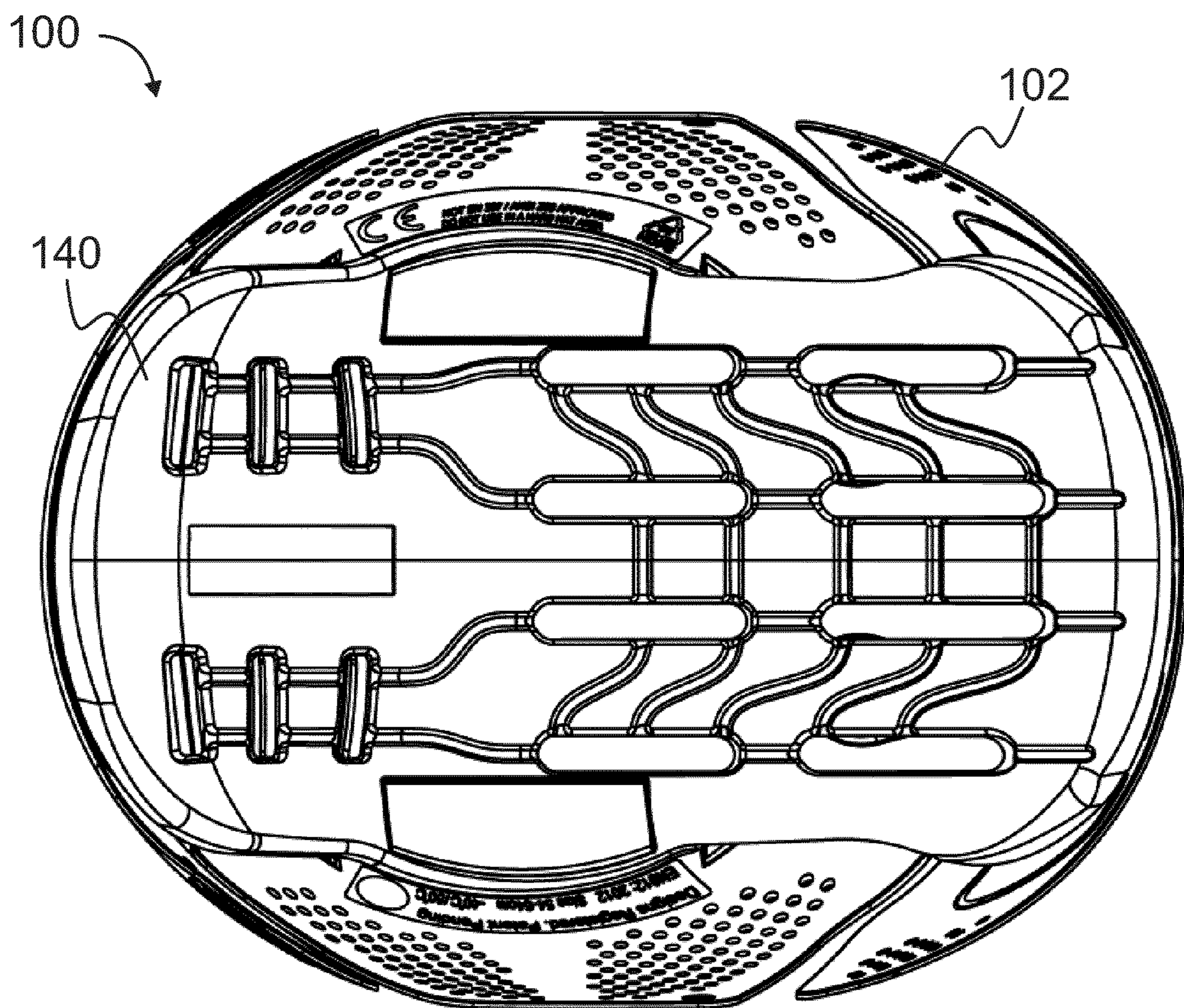


FIG. 10

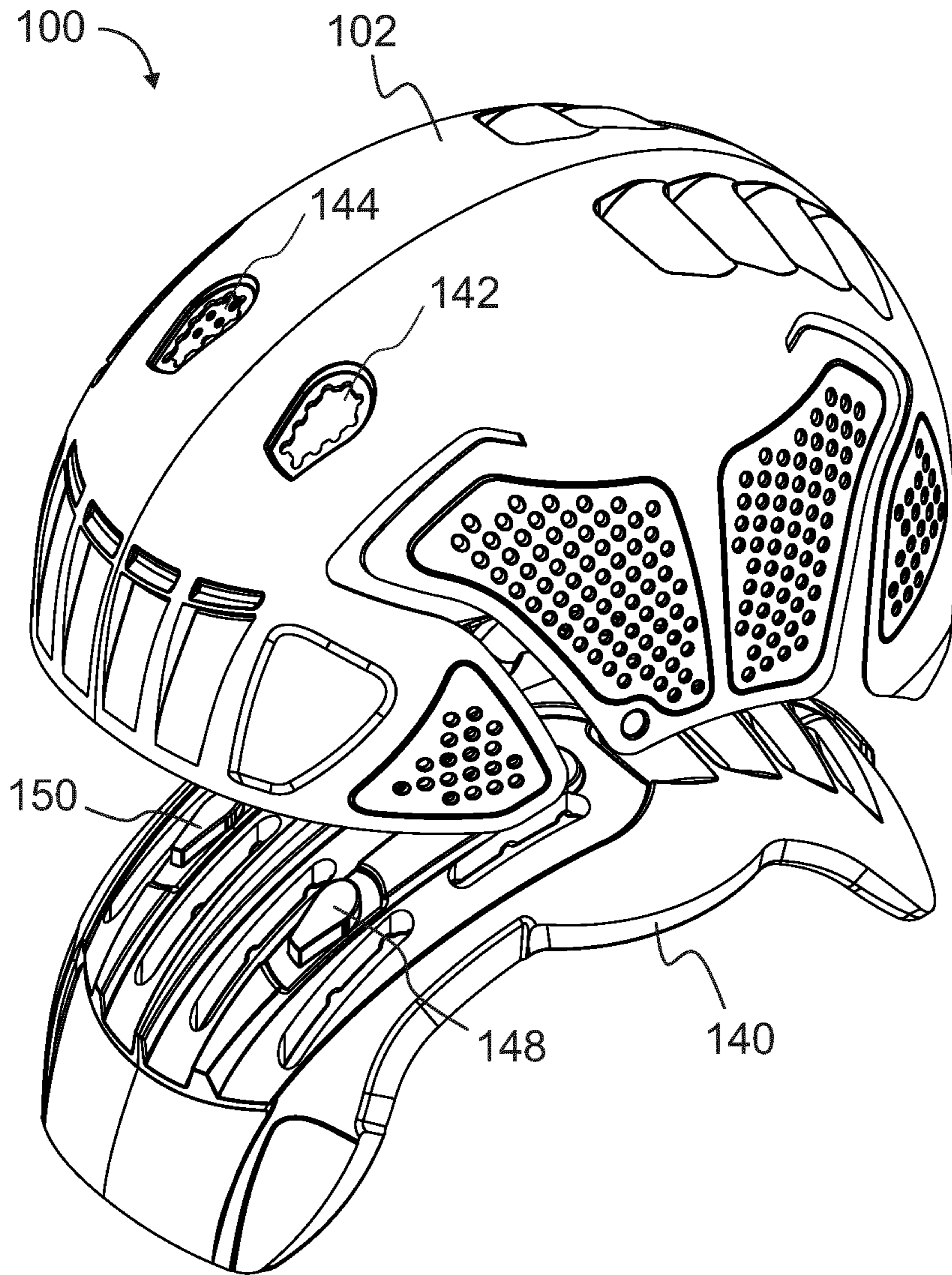


FIG. 11

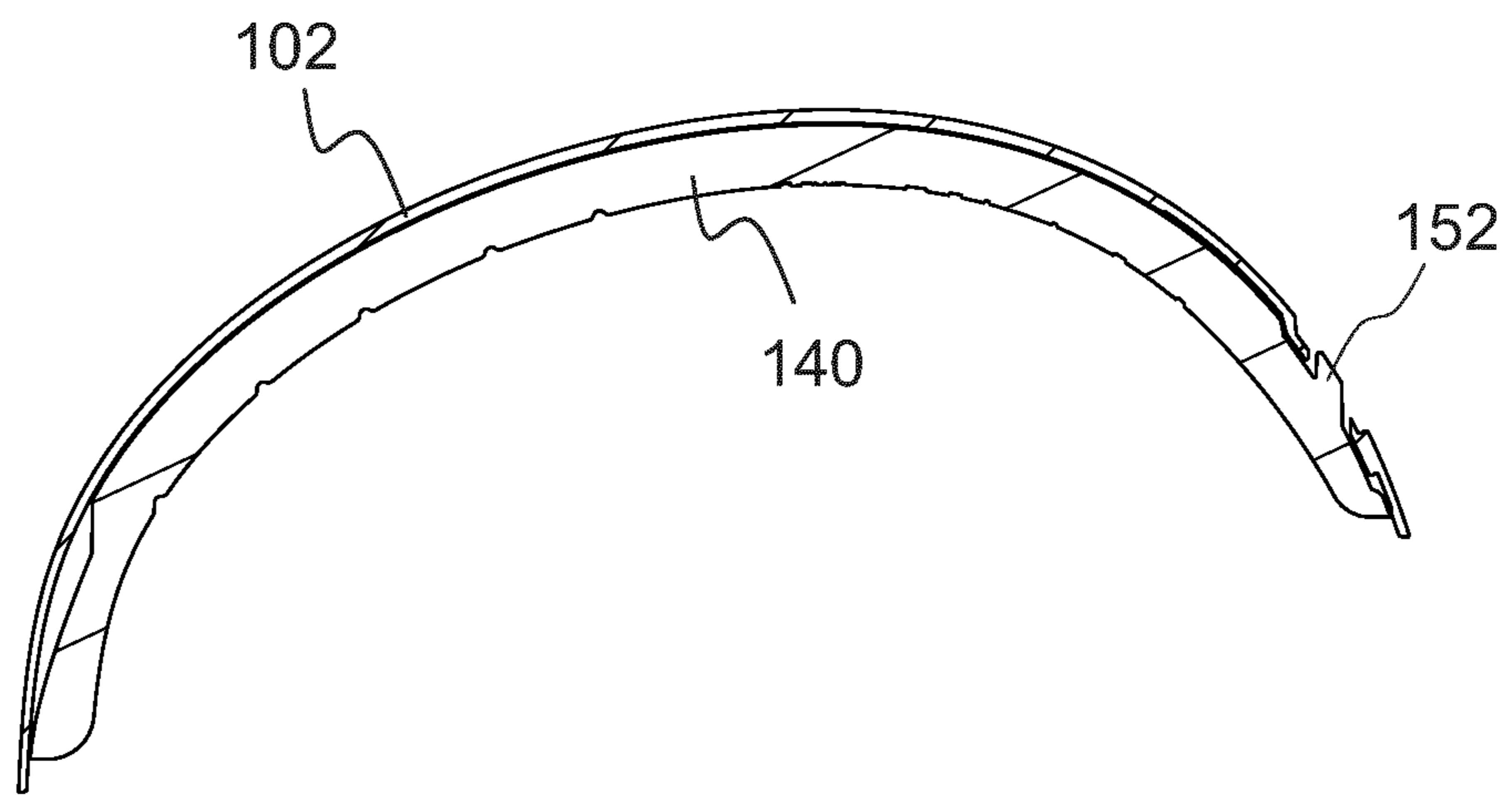


FIG. 12

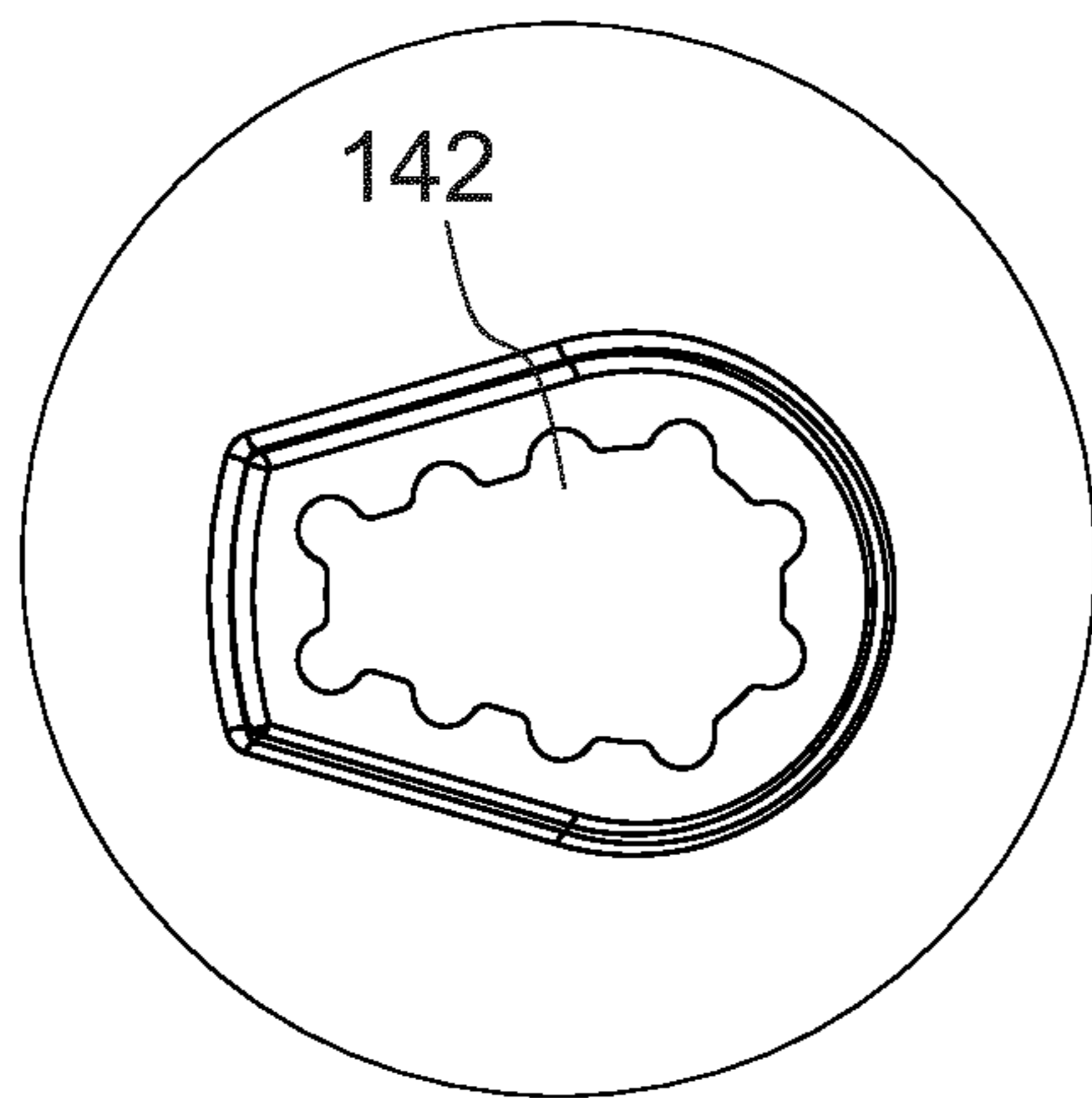


FIG. 13

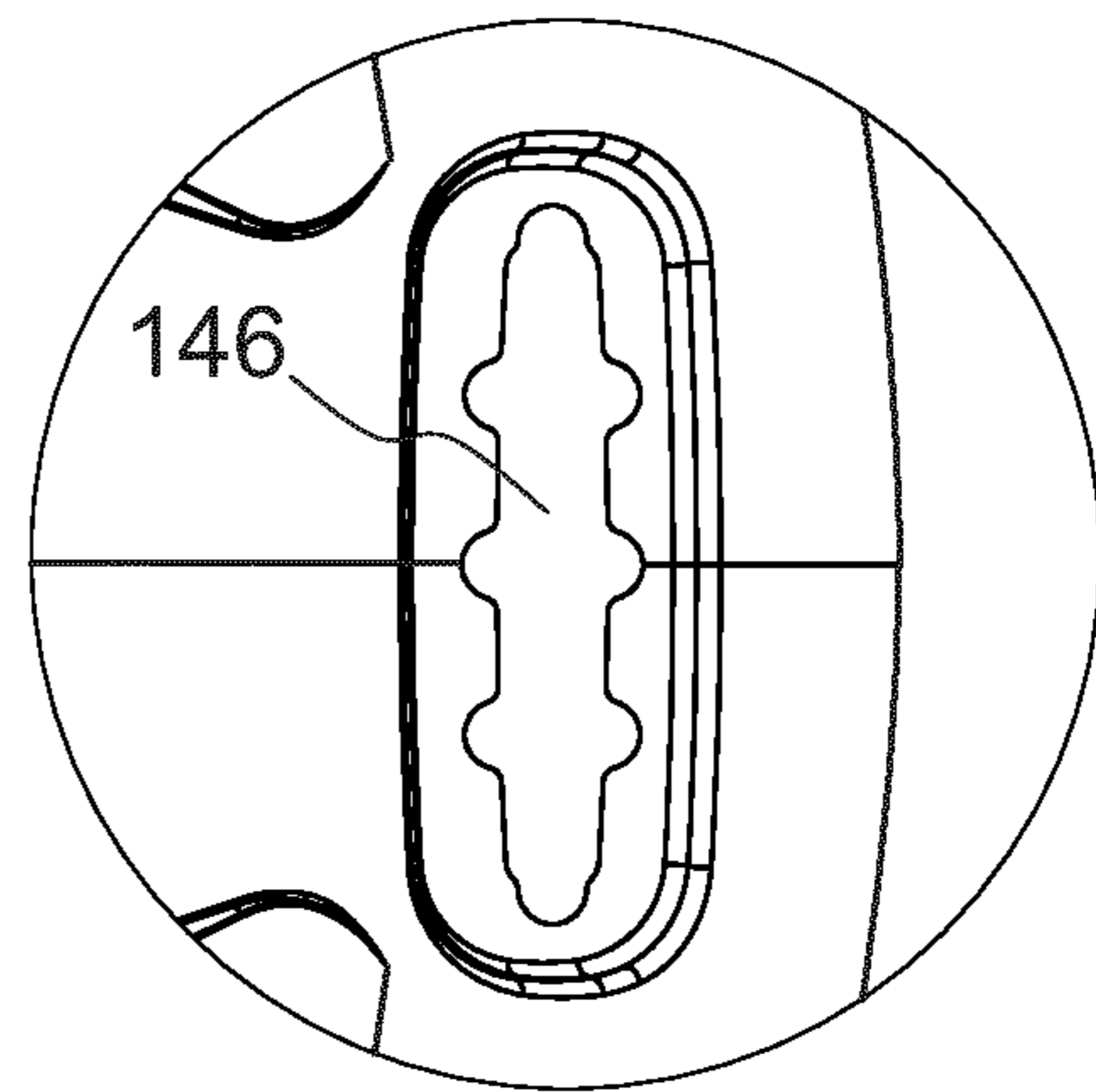


FIG. 14

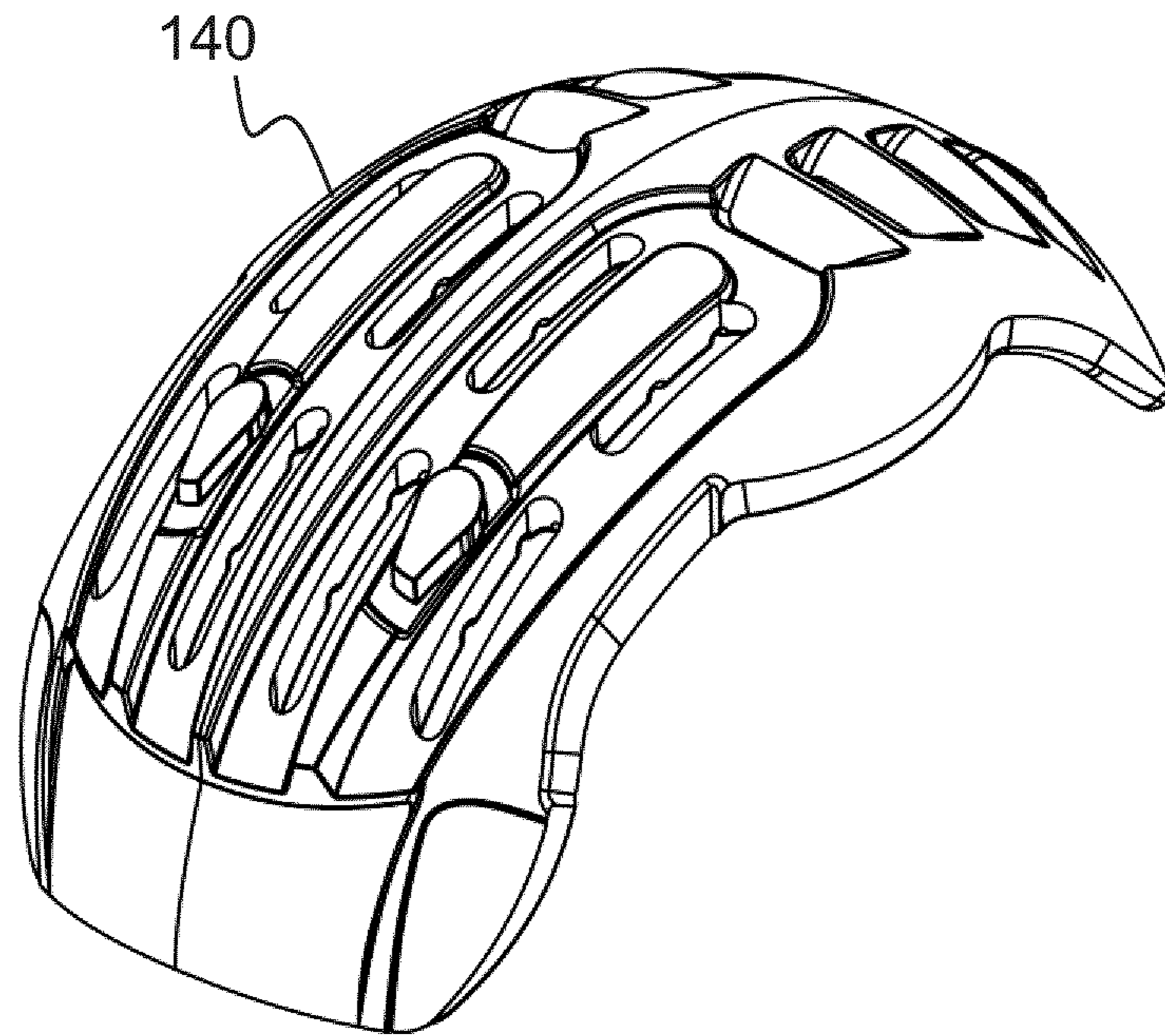


FIG. 15

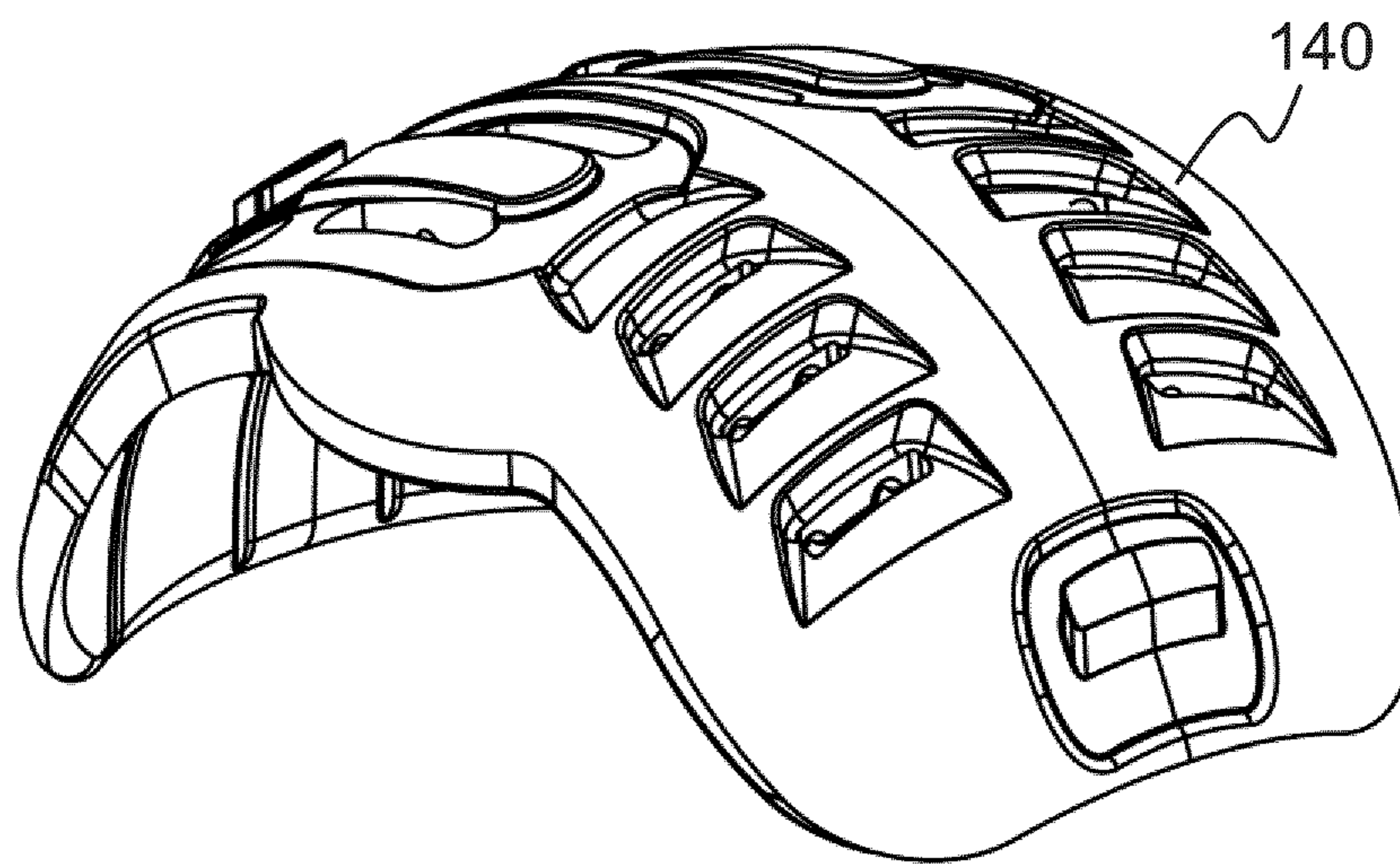


FIG. 16

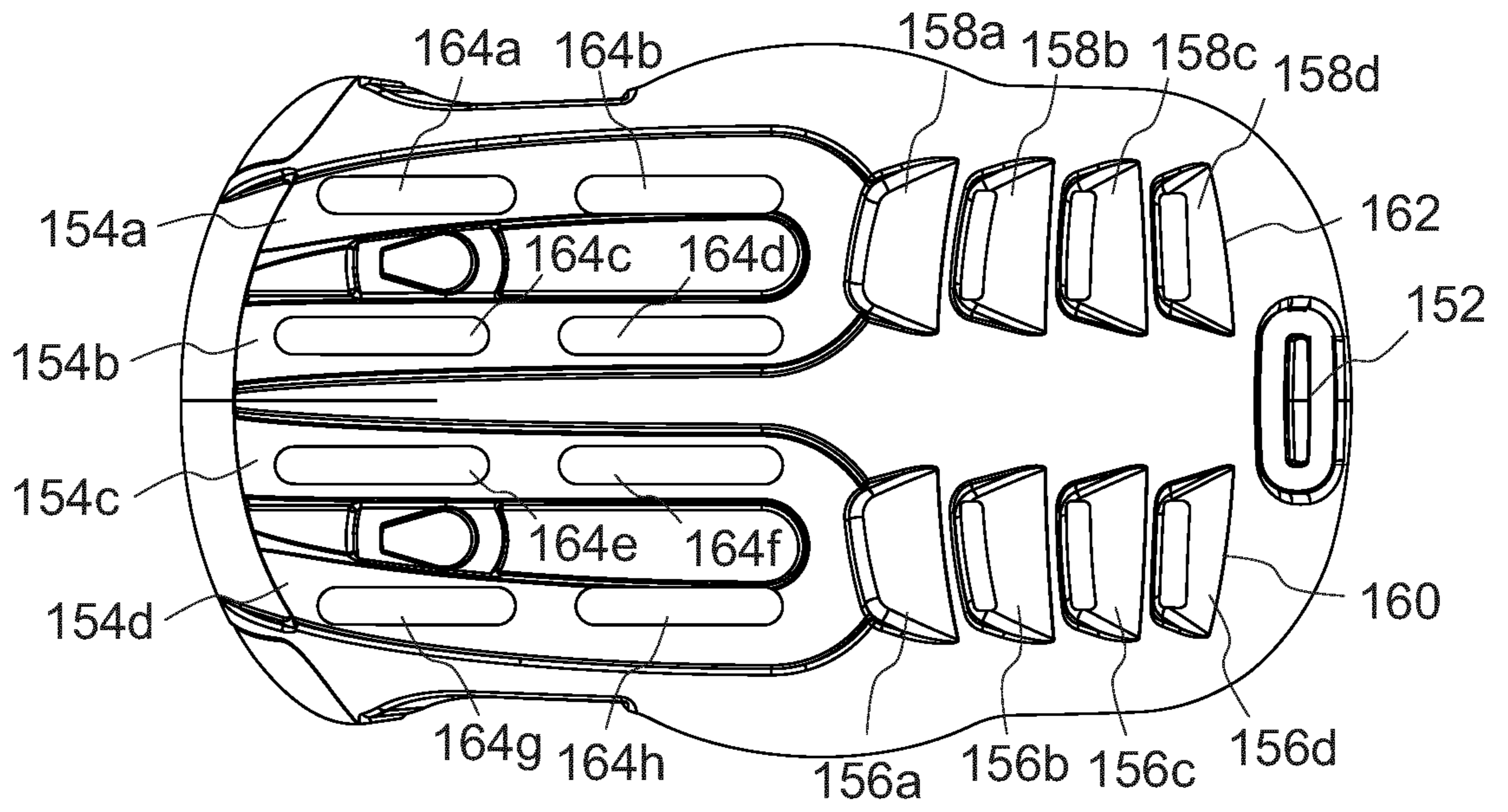


FIG. 17

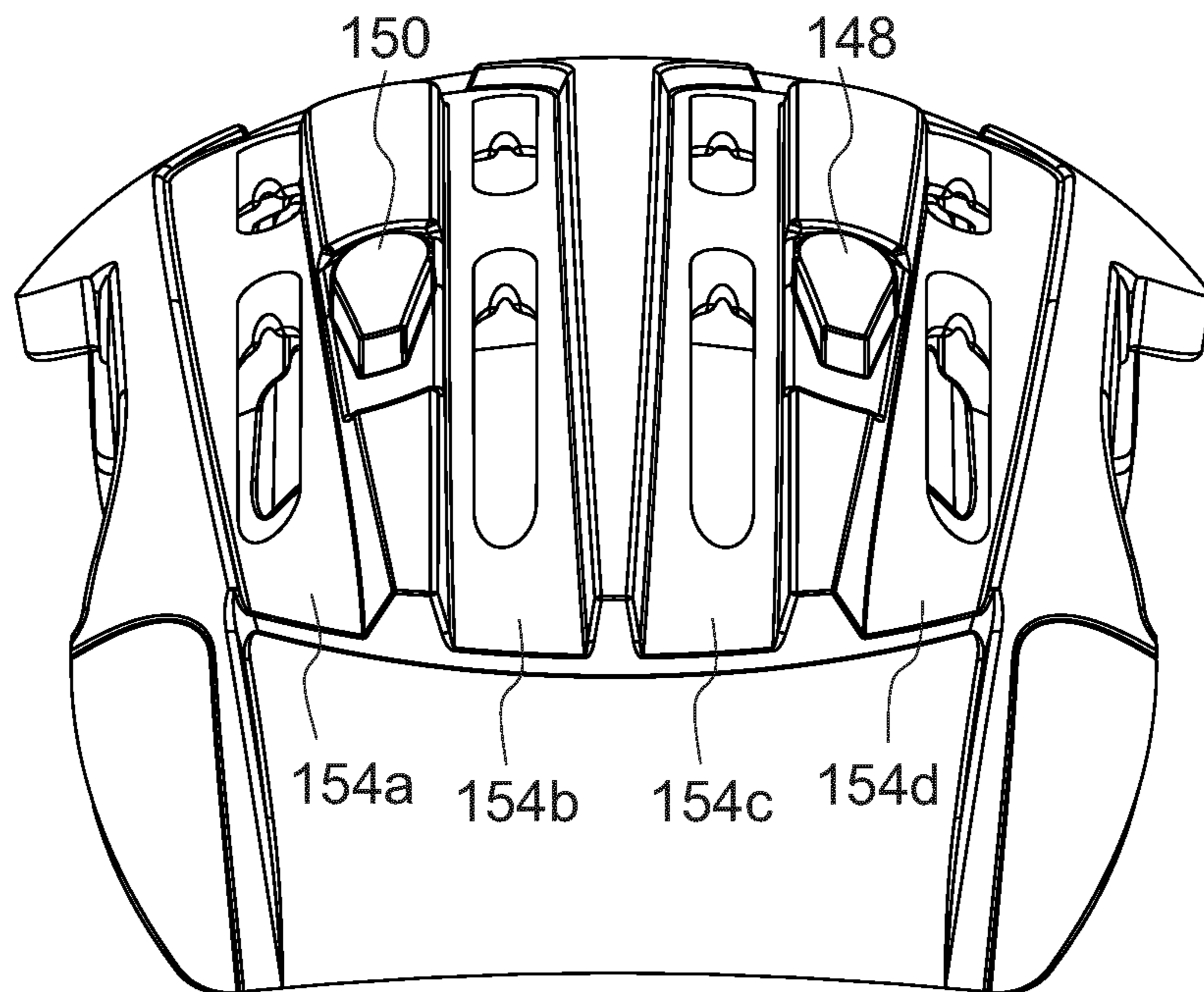


FIG. 18

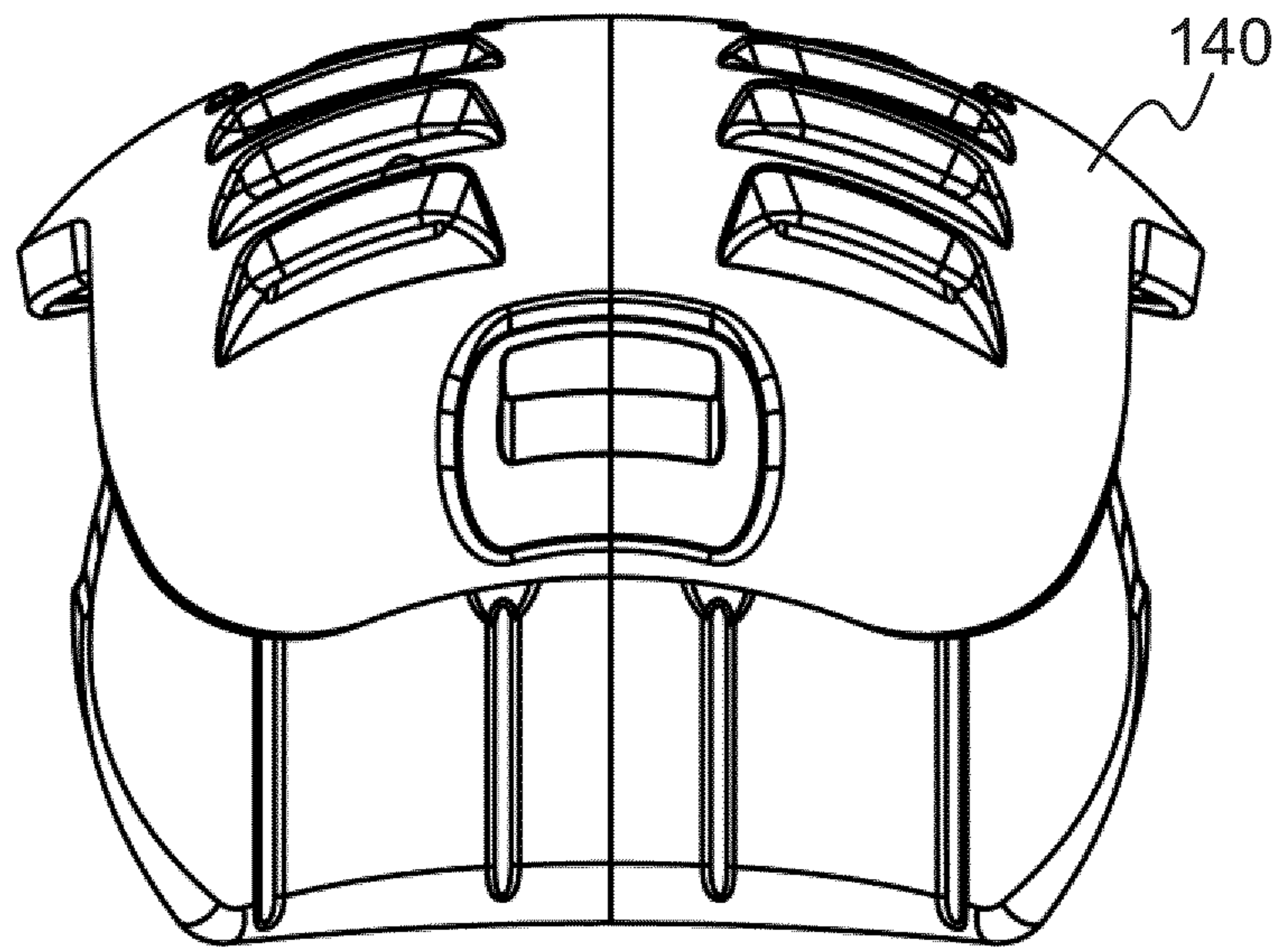


FIG. 19

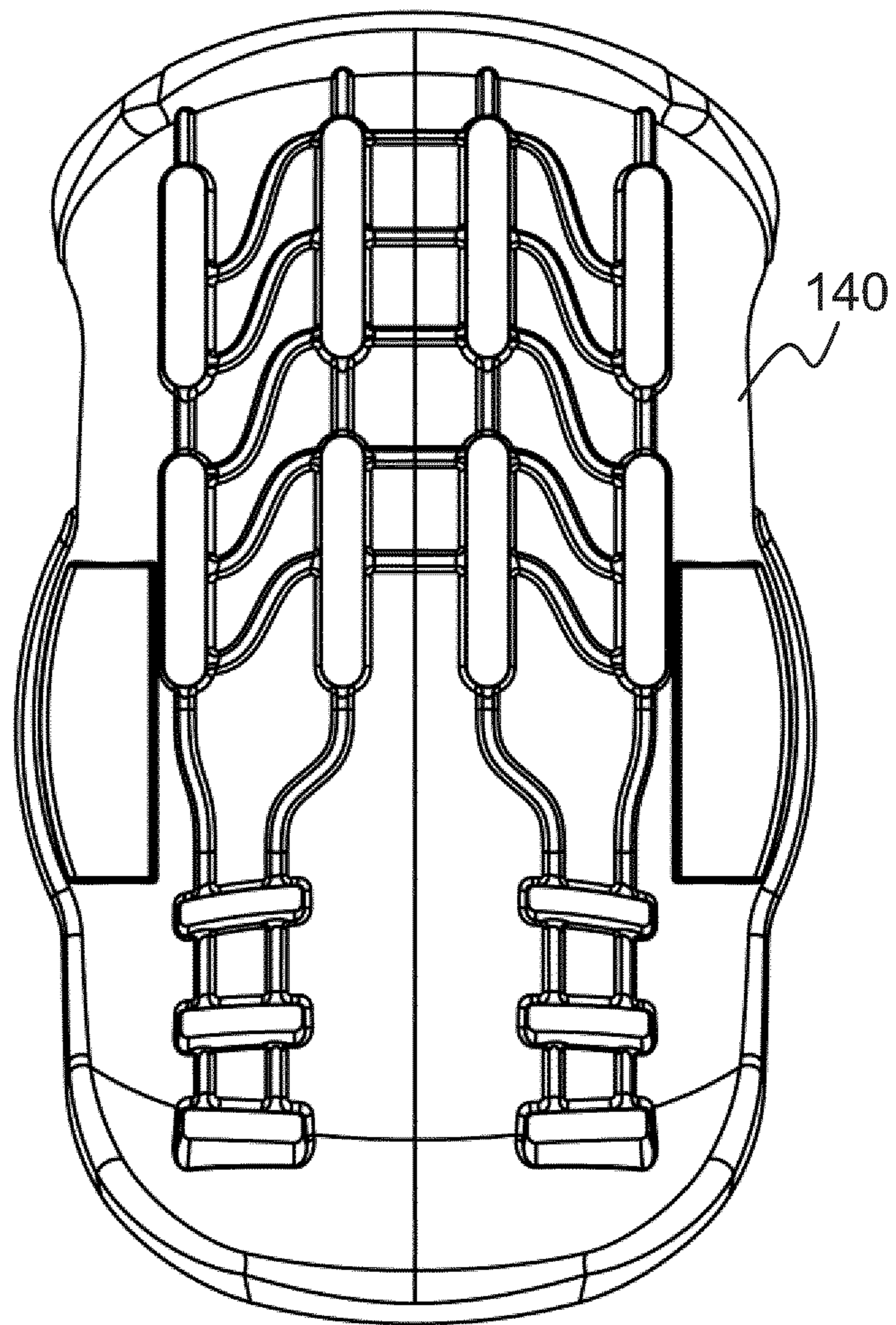


FIG. 20

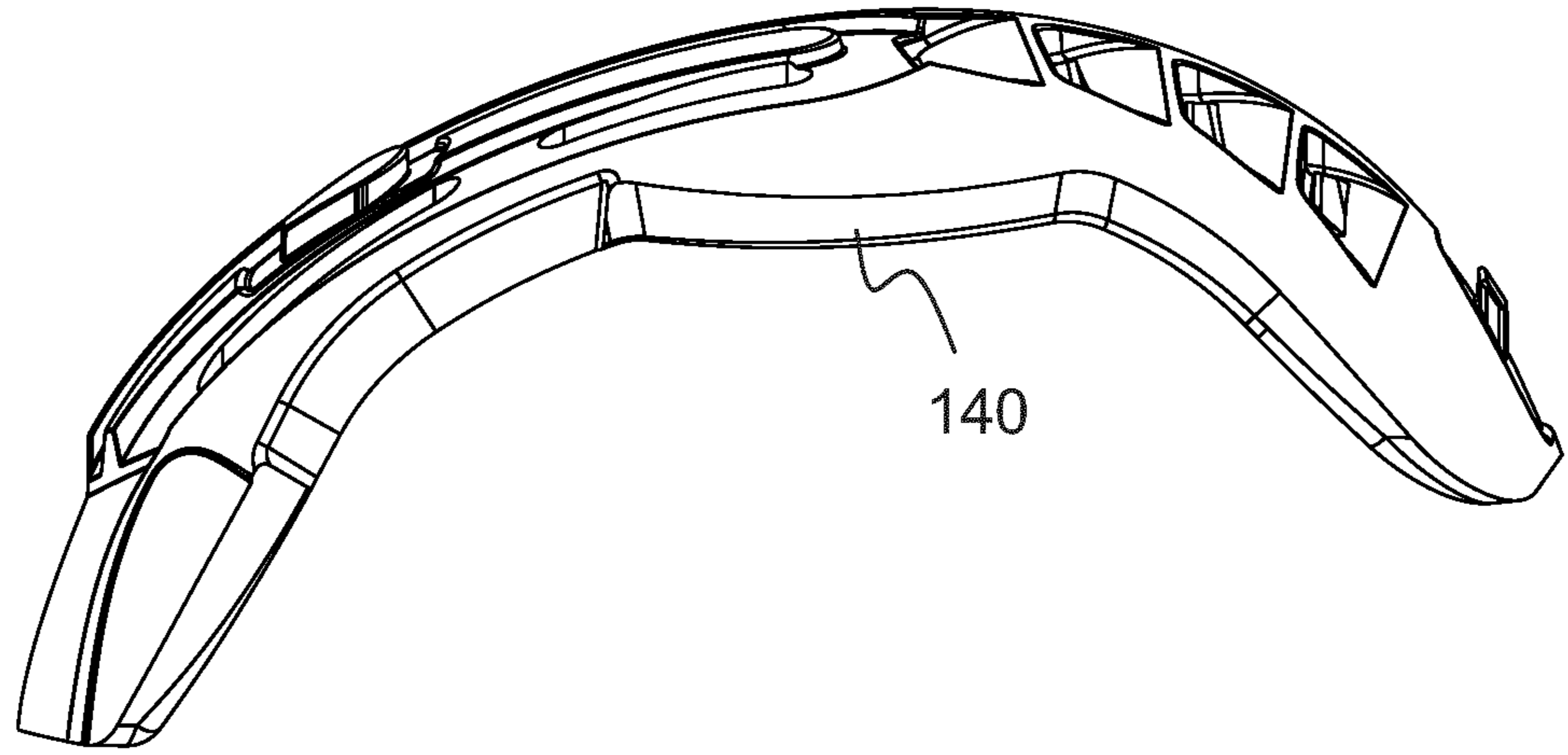


FIG. 21

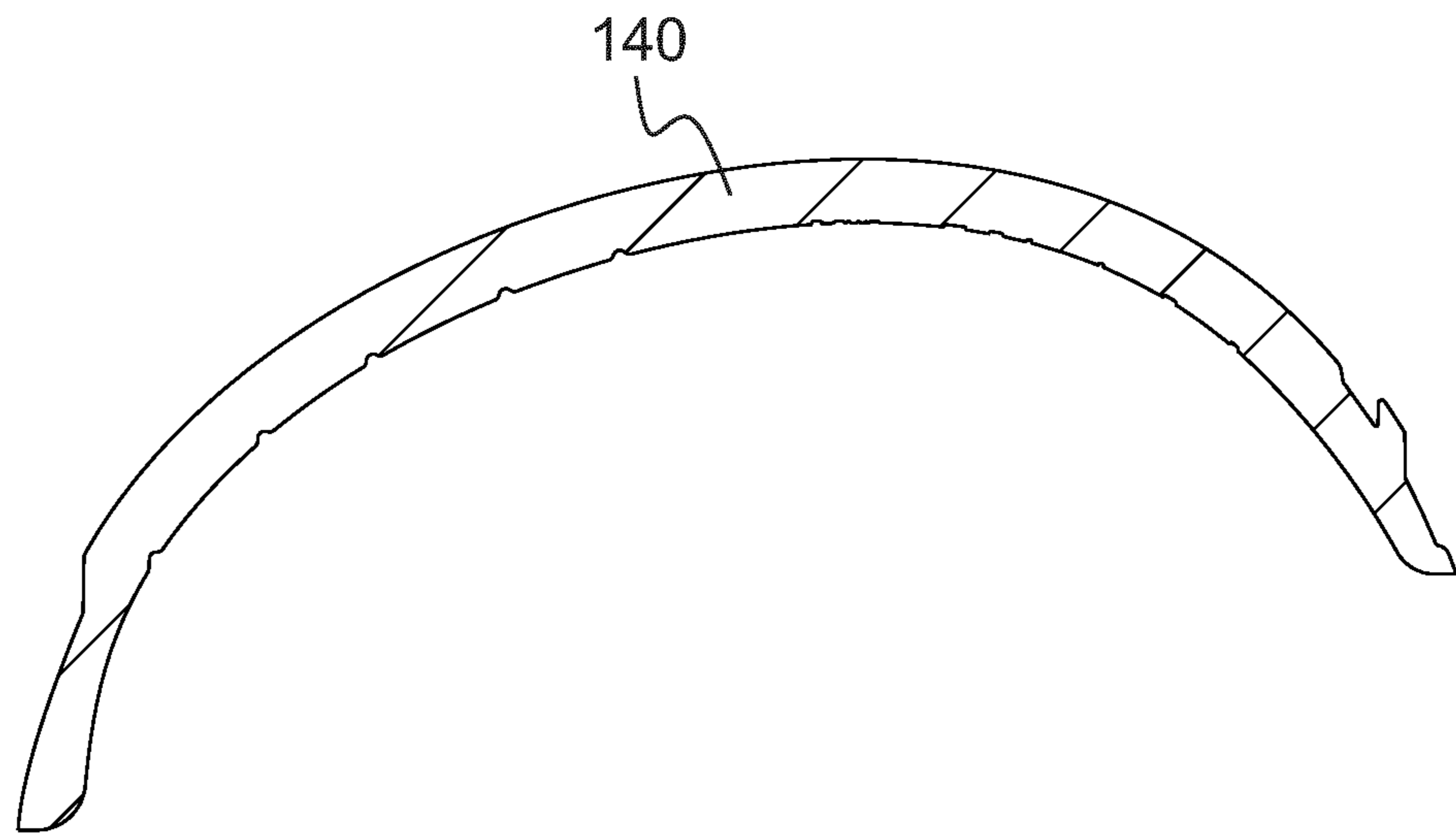


FIG. 22