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(54) **A PROTECTIVE HEADBAND**

(57) The present disclosure relates to a protective headband (1) comprising a front portion (2) comprising at least one first end (2a), a back portion (3) comprising at least one second end (3a) and at least one connection element (4a). Each one of the first and the second ends (2a, 3a) comprises one of a first and a second mating interface, wherein the protective headband (1) comprise

at least one first mating interface and at least one second mating interface. Further, each of the first mating interfaces is secured, at least partially by one of said at least one connection elements (4a) to a corresponding second mating interface, thereby forming at least a first mating pair.

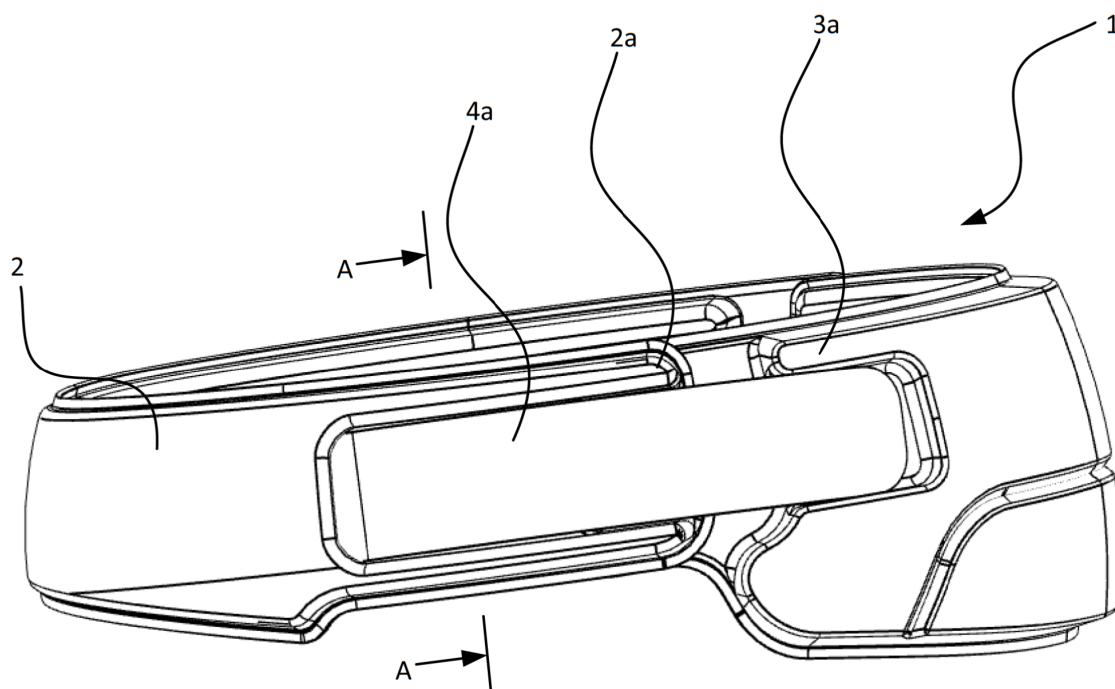


Figure 1

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a protective headband.

BACKGROUND

[0002] Protective headbands are used by athletes in some sports such as football to enhance player safety and reduce the risk of head injuries. These headbands are specifically adapted to provide additional protection to the athlete's head during physical contact and collisions that are inherent in the sport.

[0003] Accordingly, the protective headbands may serve to absorb and distribute force of impacts. Usually, the headbands may comprise padding or other materials to absorb and distribute force of impacts.

[0004] A common disadvantage with headbands in the present art is that they fail to provide sufficient adjustability around the head of a user and/or sufficient protection, especially during oblique impact.

SUMMARY

[0005] It is therefore an object of the present disclosure to provide a protective headband that alleviates at least some of the mentioned drawbacks to provide a headband which is more efficient than previous solutions in terms of adjustability and/or protection, specifically protection against oblique impact forces.

[0006] The present disclosure relates to a protective headband comprising a front portion comprising at least one first end and a back portion comprising at least one second end. Further, comprising at least one connection element. Each one of the first and the second ends comprises one of a first and a second mating interface, wherein the protective headband comprise at least one first mating interface and at least one second mating interface. Each of the first mating interfaces is secured, at least partially by one of said at least one connection elements to a corresponding second mating interface, thereby forming at least a first mating pair.

[0007] The front portion and the back portion may jointly be arranged to circumscribe/surround a head of a user intended to wear the headband. The headband may be in one-piece such that the front and back portion form an integral structure.

[0008] The front portion may be dimensioned to fit a front head of a user and the back portion may be dimensioned to fit a back head of a user such that the at least one end portion is arranged to be positioned at a side of the head of a user.

[0009] In some aspects, the front portion comprises opposite first ends, wherein the back portion comprises opposite second ends. The terms "first and second ends" may be interchanged with "first and second end portions".

Further, the at least one connection element is a pair of connection elements, wherein the at least one first mating interface and at least one second mating interface is two first mating interfaces and two second mating interfaces. Accordingly, each of the first mating interfaces is secured, at least partially by a connection element of said pair of connection elements to a corresponding second mating interface, thereby forming a first and a second mating pair. Hence, the protective headband may be a two-piece headband. An advantage of this is that it provides increased flexibility to the headband.

[0010] Thus, each mating pair may be defined by a connection between one first mating interface and one second mating interface.

[0011] Each mating pair may comprise an interlocking configuration defined by a relationship between corresponding first and second mating interfaces.

[0012] An advantage of this is that it provides additional rigidity to the headband as the mating pairs have and interlocking relationship while having the connection element securing the first and second mating interfaces together. Further, the headband is able to reduce rotational impact applied against a head of a user of the headband. Specifically, the headband is able to reduce oblique impact at a users head.

[0013] The interlocking configuration may comprises that one of the mating interfaces overlaps the other mating interface and/or that the one of the mating interfaces is received in a cavity of the other mating interface. Accordingly, each of the mating interfaces/ends may have an inner (skin-facing) and an opposite outer (ambient-facing) surface. The skin-facing surface may refer to that a normal axis of the surface is directed towards a head of the user during wear of the headband and ambient facing surface may refer to that a normal axis of the surface is directed away from a head of a user during wear of the headband. Thus, for each mating pair, the inner surface of one of the mating interfaces may be arranged to abut the outer surface of the other of the interfaces; and/or, one of the mating interfaces, for each mating pair, may be received in a cavity of the other mating interface. The cavity may be in the form of a pocket or as an indentation in either a skin-facing or ambient facing surface thereof.

[0014] The cavity may comprise a barrier/constraint portion dimensioned to constraint/limit a sliding movement/drift movement of each first mating interface relative the second mating interface. Accordingly, the constraint portion may supplement the connection element in securing each first mating interface to a corresponding second mating interface. The constraint portion may be tapering/angled. The barrier portion may further be dimensioned to enable the front and back portions to slide into each other upon angled impacts, thereby reducing rotational force on the brain of a user.

[0015] Moreover, each connection element may be releasably secured between corresponding first and second mating interfaces. The connection element may be

an elastic/flexible connection element in the form of an elastic band. The elastic band may comprise natural rubber, latex, synthetic rubber or any other suitable material allowing it to be elastic. In other words, the connection element may have the ability to return to its original shape after being stretched or deformed.

[0016] An advantage of having a releasably secured connection element is that the connection element can be replaced upon wear. Thereby, increasing the lifetime of the protective headband.

[0017] Each connection element may comprise a loop portion forming a loop around an opening of a corresponding first mating interface of each mating pair.

[0018] Accordingly, each connection element may be fastened to a corresponding second mating interface and secure the second mating interface to the first mating interface by said loop portion. Each connection element may be fastened to a corresponding second mating interface by snap-fit, Velcro or the like.

[0019] Accordingly, each connection element may comprise a first and a second end being releasably secured to a corresponding second mating interface or to each other.

[0020] An advantage of having a loop portion is that it provides a convenient yet secure connection. Also, manufacturing of the headband will be more convenient as an opening only needs to be provided in the opening for receiving said loop portion.

[0021] Each first mating interface may comprise an inner and an outer surface, wherein each connection element abuts at least a part of said inner surface and said outer surface of said corresponding second mating interface.

[0022] The front portion and said back portion may, by said at least one connection element be adjustable relative each other, preferably to a pre-defined extent defined by at least one barrier comprised in each mating pair.

[0023] Accordingly, each connection element may secure the front and back portion together adjustably having several levels/sizes. However, each mating pair may comprise a barrier/constraint portion, thereby constraining their movement relative each other to a pre-defined extent such that flexibility is not compensated by a less secure connection between the portions.

[0024] Each first mating interface may comprise an inner and an outer surface, wherein each connection element abuts at least a part of said inner surface and said outer surface of said corresponding second mating interface. Accordingly, in a case where the connection element loops the first mating interface. The aforementioned configuration enables a balanced load distribution between the inner and outer surface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] These and other features and advantages of the present disclosure will now be further clarified and de-

scribed in more detail, with reference to the appended drawings;

- 5 Figure 1 illustrates a side view of a protective headband worn by a user;
- Figure 2 illustrates an objective exploded view of a protective headband;
- 10 Figure 3 illustrates an enlarged view of a mating pair;
- Figure 4 illustrates an exploded objective view of a protective headband; and
- 15 Figure 5 illustrates a cross-sectional view A-A of a mating pair.

DETAILED DESCRIPTION

- 20 **[0026]** In the following detailed description, some embodiments of the present disclosure will be described. However, it is to be understood that features of the different embodiments are exchangeable between the embodiments and may be combined in different ways,
- 25 unless anything else is specifically indicated. Even though in the following description, numerous specific details are set forth to provide a more thorough understanding of the present disclosure, it will be apparent to one skilled in the art that the present disclosure may be practiced without these specific details. In other instances, well known constructions or functions are not described in detail, so as not to obscure the present disclosure.
- 30 **[0027]** It is also to be understood that the terminology used herein is for purpose of describing particular aspects only, and is not intended to be limiting. It should be noted that, as used in the specification and the appended claim, the articles "a", "an", "the", and "said" are intended to mean that there are one or more of the elements unless the context clearly dictates otherwise. Thus, for example,
- 35 reference to "a unit" or "the unit" may refer to more than one unit in some contexts, and the like. Furthermore, the words "comprising", "including", "containing" do not exclude other elements or steps. It should be emphasized
- 40 that the term "comprises/comprising" when used in this specification is taken to specify the presence of stated features, integers, steps, or components. It does not preclude the presence or addition of one or more other features, integers, steps, components, or groups thereof.
- 45 The term "and/or" is to be interpreted as meaning "both" as well and each as an alternative. More specifically, the wording "one or more" of a set of elements (as in "one or more of A, B and C" or "at least one of A, B and C") is to be interpreted as either a conjunctive or disjunctive logic.
- 50 Put differently, it may refer either to all elements, one element or combination of two or more elements of a set of elements. For example, the wording "A, B and C" may be interpreted as A or B or C, A and B and C, A and B,
- 55 and B and C.

Band C, or A and C.

[0028] It will also be understood that, although the term first, second, etc. may be used herein to describe various elements or features, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. For example, a first element could be termed a second element, and, similarly, a second element could be termed a first element, without departing from the scope of the embodiments. The first element and the second element are both elements, but they are not the same element.

[0029] Figure 1 illustrates an side view of a protective headband 1 for being worn by a user, the headband 1 comprising a front portion 2 comprising at least one first end 2a and a back portion 3 comprising at least one second end 3a. Further, the headband 1 comprises at least one connection element 4a. Each one of the first and the second ends 2a, 3a comprises one of a first and a second mating interface, wherein the protective headband 1 comprise at least one first mating interface and at least one second mating interface. In figure 1, there is illustrated one first and one second mating interface, one comprised in each end 2a, 3a. Accordingly, Figure 1 illustrates that each of the first mating interface is secured, at least partially by a connection element 4a to a corresponding second mating interface, thereby forming a first mating pair.

[0030] The term "mating interface" may within the context herein refer to that each first end comprises a part/region that is dimensioned to be associated with (e.g. by fitting with/abutting against) a corresponding second end to e.g. form an interlocking configuration, or vice versa. Thus, each first mating interface may be a region/portion of a first end arranged to be associated with/related to a second mating interface which is a region/portion of a second end. Hence, the term "mating interface" may simply refer to a region of an end, preferably a region of an end which is associated with a connection element or another mating interface. Hence, it may be also be referred to as a mating portion.

[0031] At least one of the front and back portion 2, 3 may comprise padding materials and have a cup-shape dimensioned to fit a head of a user. Moreover, the protective headband 1 may comprise control circuitry configured to monitor a position of the wearer and the control circuitry may further be configured to measure amount of a potential force impacting the headband 1. Moreover, the control circuitry may be configured to, in response to that said potential force exceeds a pre-defined limit. Provide and transmit alert signals to an external electronic device. Preferably, such an external electronic device is handled by a doctor/referee during use which enable them to timely help the wearer of the headband.

[0032] Figure 2 illustrates an exploded view of the protective headband 1. Further, Figure 2 illustrates that the front portion 2 comprises opposite first ends 2a, 2b, wherein the back portion 3 comprises opposite second ends 3a, 3b. Accordingly, each end 2a-b, 3a-b comprises

a mating interface. Moreover, Figure 1 illustrates a pair of connection elements 4a, 4b. The headband 1 comprises two first mating interfaces and two second mating interfaces. Accordingly, the first mating pair may be defined by a connection between a first mating interface of a first end 2a and a second mating interface of a second end 3a. Further, the second mating pair may be defined by a connection between the other first mating interface of the other first end 2b and the other second mating interface of the other second end 3a. Each of the first mating interfaces is arranged to be secured, at least partially by a connection element 4a, 4b of said pair of connection elements 4a, 4b to a corresponding second mating interface, thereby forming a first and a second mating pair. Each mating pair is slidable configured such that each first end 2a, 2b is slidable relative a corresponding second end 3a, 3b.

[0033] Figure 3 illustrates an enlarged part objective view of a first end 2a and a second end 3a, the first end 3a comprising a first mating interface and the second end comprising a second mating interface.

[0034] Figure 3 illustrates that the each mating pair at each end 2a, 3a may comprises an interlocking configuration defined by a relationship between corresponding first and second mating interfaces thereof. Accordingly, the first end 2a and the second end 3a, as illustrated in Figure 3, are interlocked. Specifically, the interlocking configuration of Figure 3 comprises that one of the mating interfaces overlaps the other mating interface and that the one of the mating interfaces is received in a cavity 13 of the other mating interface. This is shown in Figure 3 in which the first end 2a overlaps the corresponding second end 3a. The overlapping enables the headband 1 to have no exposed parts of the head about its circumference as the full circumference of the headband 1 is, at all positions, covered. The connection element 4a may be arranged to be adjustable to a pre-defined extent which maintains said interlocking configuration of each mating pair.

[0035] In Figure 3, the mating interfaces of each end 2a, 3a are defined by that the first end 2a comprises a cavity/indentation 13 and that a corresponding second end 3a is arranged to conform with said cavity 13. Specifically, the cavity 13 may or may not form a barrier 14 which the second end 3a is dimensioned to conform to and fit within. The cavity 13 may be arranged to constraint movement of the second end 3a, relative the first end 2a along a vertical axis y1 and to constraint the movement of the second end 3a towards the first end 3a - accordingly, a more safe headband 1 is provided. At a relaxed state of the headband, a part of the cavity 13 form a gap between the ends 2a, 3a and 2b, 3b as illustrated in Figure 3 in that part of the cavity 13 is visible/exposed. The gap may allow for movement of the parts 2, 3 relative to each other to some extent. In Figure 3, the first end 2a and the corresponding second end 3a define a first mating pair. Accordingly, the headband 1 may comprise another first end 2b and another second end 3b defining a second

mating pair, so to form a two-piece headband (as shown in Figure 2). The first mating pair and the second mating pairs may be identical.

[0036] Figure 3 further illustrates that the connection element 4a is releasably secured (by e.g. Velcro) between corresponding first and second mating interfaces of the first end 2a and the second end 3a.

[0037] Further, Figure 3 illustrates that each connection element 4a may comprise a loop portion 5 forming a loop around an opening 6 of a corresponding first mating interface of each mating pair. Accordingly, in Figure 3, the first end 2a has an opening 6 for receiving the connection element 4a. The connection element 4a forming a loop. Accordingly, the loop portion 5 is arranged to prevent the front portion 2 to be separated/distance from the back portion 3. The connection element 4a may opposite to said loop portion be fastened to the corresponding second end 3a as illustrated in Figure 3. Thus, to release the connection element 4a, the connection element 4a is released from the second end 3a and "un-looped" from the opening 5.

[0038] Figure 4 illustrates an objective exploded view of the headband 1. Figure 4 illustrates that each connection element 4a, 4b may comprises a first end 4a', 4b' and an opposite second end 4a'', 4b'' being releasably secured to a corresponding second mating interface of a corresponding second end 3a, 3b. However, the first and second ends may be secured to each other also.

[0039] Figure 4 further illustrates that each connection element 4a, 4b may be arranged to abut two opposing surfaces of the headband 1. In figure 4, the connection elements 4a, 4b abuts opposing surfaces of the second ends 3a, 3b. Accordingly, each connection element 4a, 4b may abut a skin-facing surface and an ambient facing surface of the protective headband 1. This may be realized by that the connection elements 4a, 4b each loops around the opening in a corresponding first end 2a, 2b. The opening in the first ends 2a, 2b may extend through the thickness of the headband 1 or may extend partially through the thickness of the headband.

[0040] The protective headband 1 according to any aspect herein may be referred to as a protective sports headband. Indicating that it is designed to protect a head of an athlete wearing the headband 1.

[0041] Figure 5 illustrates an exploded cross-sectional view A-A which illustrates an aspect of a mating pair that comprises an interlocking configuration. The cross-section view is depicted in Figure 1 for clarity purposes, even though the interlocking configuration is not the same as the one in Figure 1. In Figure 5, the interlocking configuration is a box joint. However, the interlocking configuration may be a dovetail joint where one of the parts form a trapezoidal protrusion and the other form a corresponding cavity. Accordingly, the mating pairs herein may comprise protrusions and corresponding cavities with play between each other in the range of 0-0.5mm, or 0-0.75mm or 0-1mm. It should be noted that the protruding part p1 and the cavity part c1 (which may correspond

to the cavity 13 in Figures 1-4) that define said interlocking configuration may be integral with, or attached to corresponding end portions of the headband so to define said mating interface. For example, the protruding part p1 and the cavity part c1 may be formed by a plastic material, such as a thermoplastic elastomer or any other suitable substrate material. The protruding part p1 and the cavity part c1 may be sewn onto the corresponding ends of the headband, or may be attached to the ends of the headband by an adhesive.

Claims

1. A protective headband (1) comprising:
 - a front portion (2) comprising at least one first end (2a);
 - a back portion (3) comprising at least one second end (3a);
 - at least one connection element (4a);
 wherein each one of the first and the second ends (2a, 3a) comprises one of a first and a second mating interface, wherein the protective headband (1) comprise at least one first mating interface and at least one second mating interface;
 wherein each of the first mating interfaces is secured, at least partially by one of said at least one connection elements (4a) to a corresponding second mating interface, thereby forming at least a first mating pair.
2. The protective headband (1) according to claim 1, wherein the front portion (2) comprises opposite first ends (2a, 2b), wherein the back portion (3) comprises opposite second ends (3a, 3b),
 - wherein the at least one connection element is a pair of connection elements (4a, 4b), wherein the at least one first mating interface and at least one second mating interface is two first mating interfaces and two second mating interfaces, wherein each of the first mating interfaces is secured, at least partially by a connection element of said pair of connection elements (4a, 4b) to a corresponding second mating interface, thereby forming a first and a second mating pair.
3. The protective headband (1) according to claim 1 or 2, wherein each mating pair comprises an interlocking configuration defined by a relationship between corresponding first and second mating interfaces.
4. The protecting headband (1) according to claim 3, wherein said interlocking configuration comprises that one of the mating interfaces overlaps the other mating interface and/or that the one of the mating

interfaces is received in a cavity (13) of the other mating interface.

5. The protective headband (1) according to any one of the preceding claims, wherein each connection element (4a, 4b) is releasably secured between corresponding first and second mating interfaces. 5

6. The protective headband (1) according to any one of the preceding claims, wherein each connection element (4a, 4b) comprises a loop portion (5) forming a loop around an opening (6) of a corresponding first mating interface of each mating pair. 10

7. The protective headband (1) according to claim 6, wherein each connection element (4a, 4b) comprises a first and a second end being releasably secured to a corresponding second mating interface or to each other. 15
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8. The protective headband (1) according to claim 7, wherein each connection element (4a, 4b) abuts two opposing surfaces of the protective headband (1).

9. The protective headband (1) according to any one of the preceding claims, wherein said front portion and said back portion (2, 3) are, by said at least one connection element (4a, 4b), adjustable relative each other, preferably to a pre-defined extent defined by at least one barrier (14) comprised in each mating pair. 25
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10. The protective headband (1) according to any one of the preceding claims, wherein the at least one connection element (4a, 4b) is an elastic connection element. 35

11. The protective headband (1) according to any one of the preceding claims, wherein the first mating interface is received in a cavity of the second mating interface, wherein the cavity comprises a constraint portion dimensioned to constraint a sliding movement of the first mating interface relative the second mating interface to a pre-defined extent. 40
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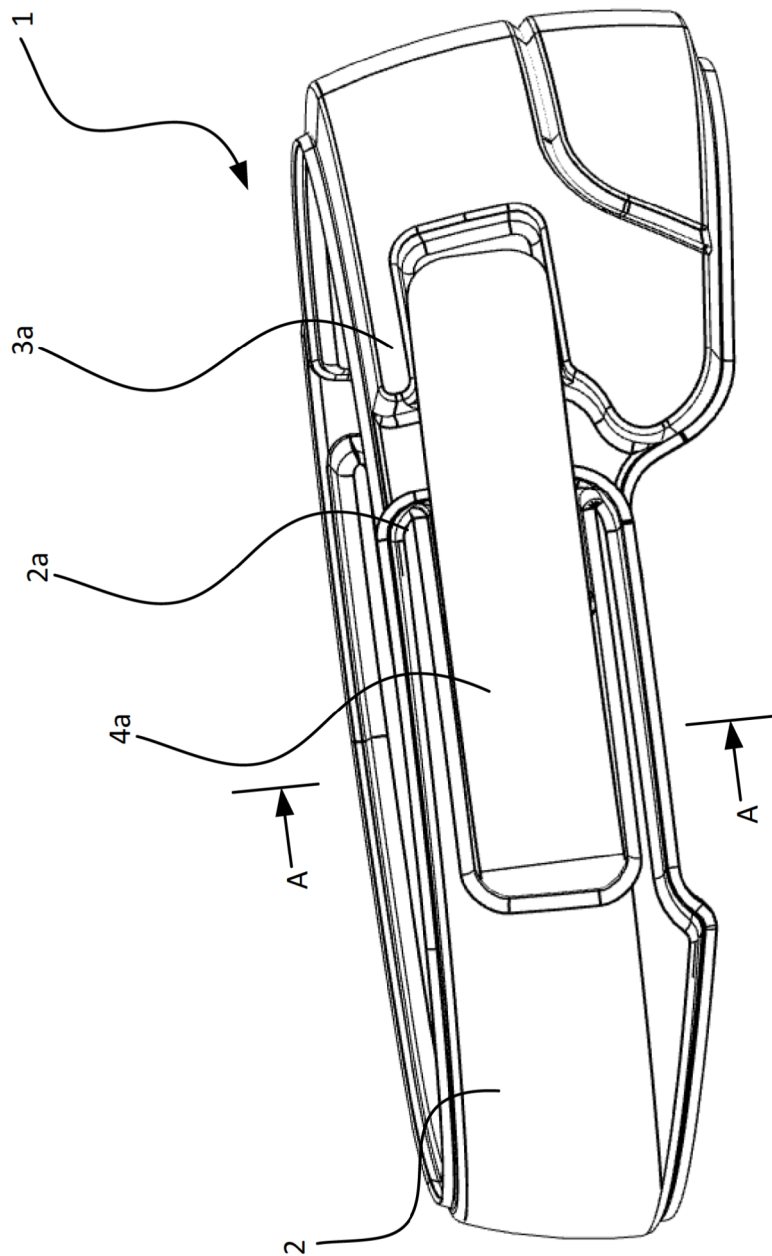


Figure 1

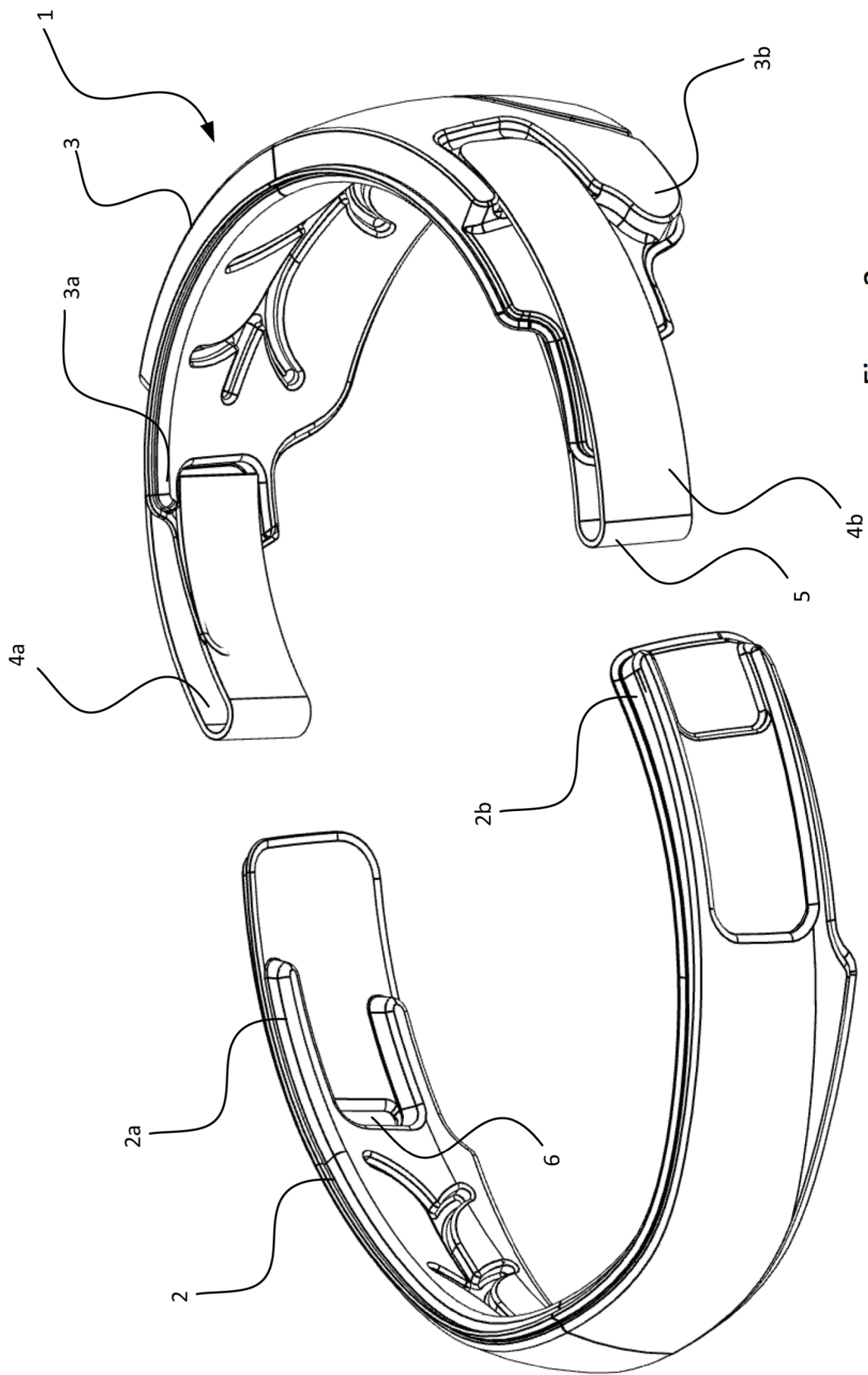


Figure 2

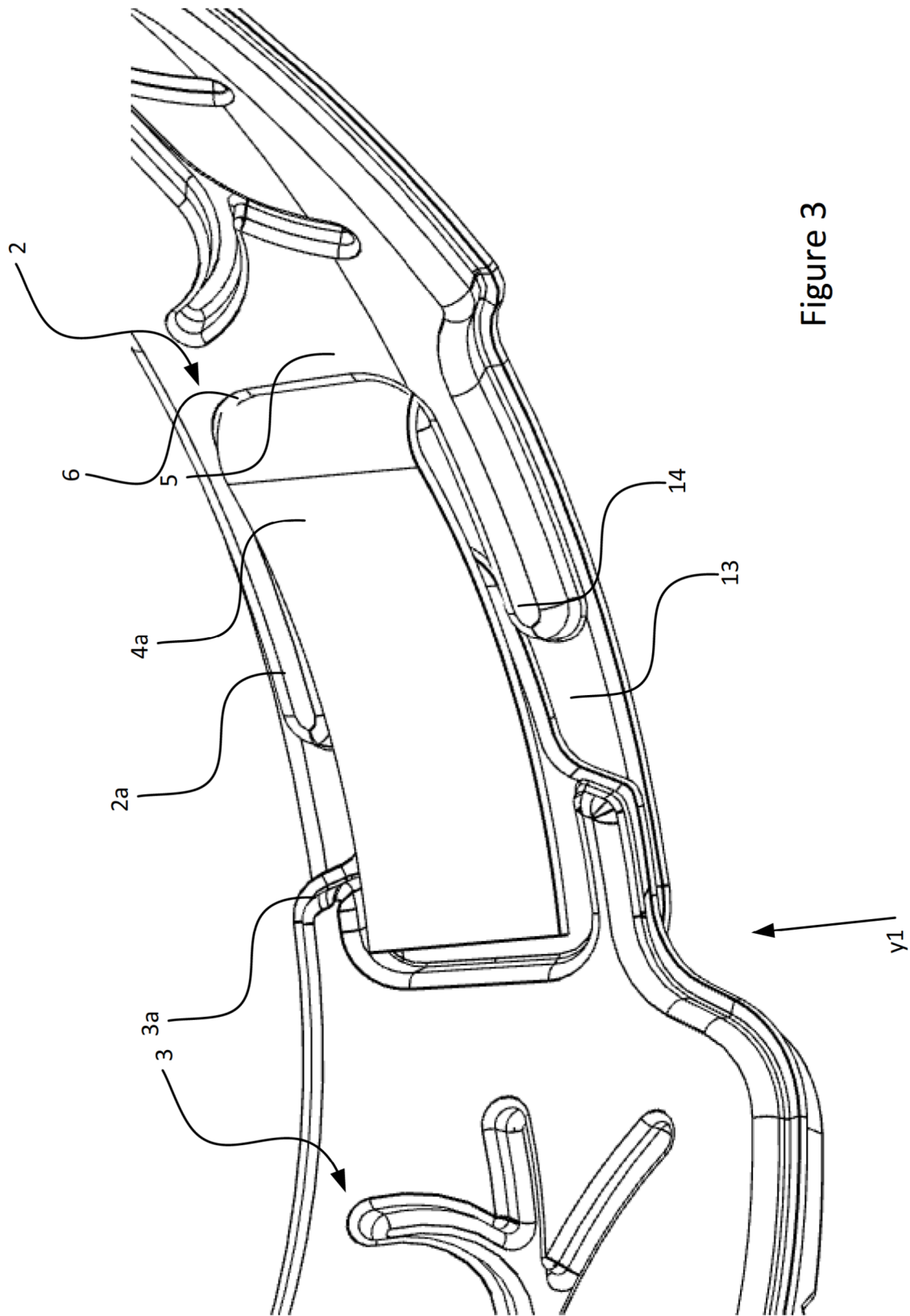


Figure 3

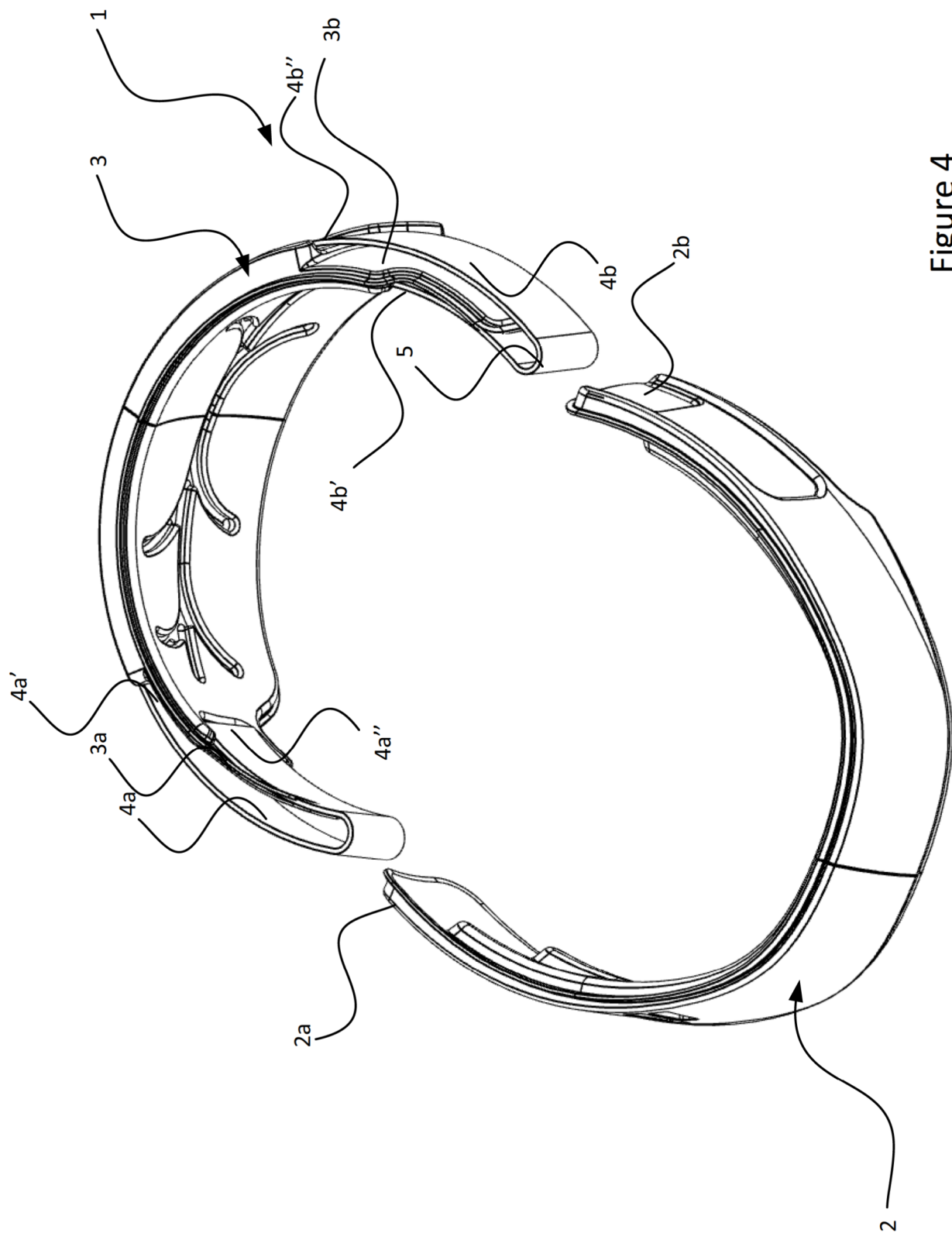


Figure 4

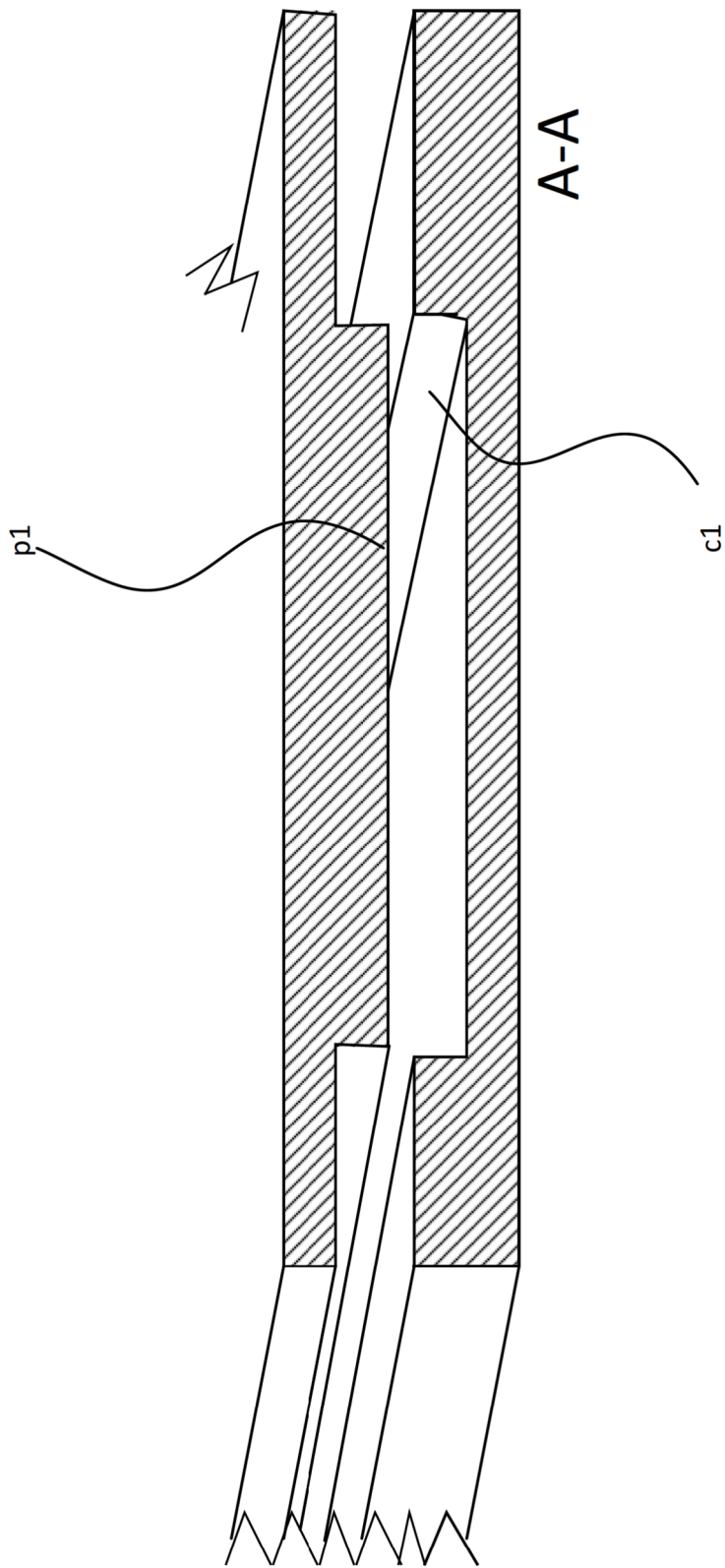


Figure 5



EUROPEAN SEARCH REPORT

Application Number

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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 6 625 820 B1 (LAMPE JOHN K [US]) 30 September 2003 (2003-09-30)	1-10	INV. A42B1/205
A	* column 3, line 64 - column 7, line 45; figures 10, 15 *	11	A42B1/22 A63B71/10 A42B3/00
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A	* column 3, line 45 - column 4, line 36; figures 1-2a *	11	
			TECHNICAL FIELDS SEARCHED (IPC)
			A42B A63B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		17 March 2026	Breuil, Paul
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6625820	B1	30-09-2003	NONE

US 6381760	B1	07-05-2002	NONE

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