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(54) **FACE MASK RETENTION SYSTEM**

(57) The present invention concerns a face mask retention system comprising:

(a) one or more elastic members configured for retaining the face mask on a wearer's head, said elastic members connected to and transferring a face mask retaining force to

(b) earbuds comprising

(i) a main body configured to be lodged in a concha cavity, behind an intertragical notch of a wearer's outer ear, and

(ii) an armlike extension with a shoulder defined between the main body and the armlike extension, said shoulder configured to seat in the intertragical notch of a wearer's ear and the armlike extension configured to protrude from the ear;

wherein the one or more elastic members are connected to said armlike extension, such that the face mask retaining force biases the shoulder of the earbuds against the intertragical notch, which force acts against an upward tilting movement of the armlike extension typically used to remove the earbuds from a wearer's ear.

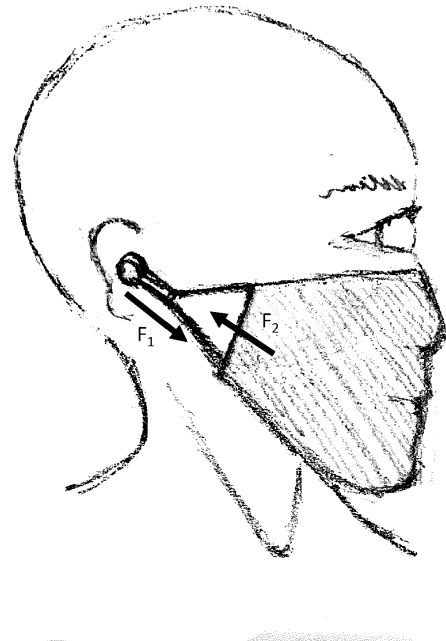


Fig. 4b

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Description**Field of the Invention**

[0001] The present invention concerns a face mask retention system.

Brief Description of the Prior Art

[0002] As is commonly known, wearing a face mask is often considered cumbersome and uncomfortable, especially when the face mask is worn for longer continuous periods.

[0003] Most face masks are retained on a wearer's head by elastic loops designed to fit behind a wearer's outer ear or alternatively, with straps designed to be tied behind a wearer's head.

[0004] While face masks with elastic loops fitting behind a wearer's ear are easy and fast to put on, the elastic loops have the disadvantage that there is no suitable one size, fit all and hence, the length of the loops often needs to be adapted to fit a wearer, wherein such adaptation of the length in most cases results in a knot or a kind of length regulator is present behind the outer ear of a wearer, which knot or regulator is a source of irritation for most people. Moreover, the elastic loops are sensitive to wear and loss of elasticity, resulting in the need to, on a regular basis, (re-)adapt length of the loops in order to retain the face mask in position. Notwithstanding the need for adaptation of the loops, the most often complaints about face masks retained with elastic loops is that the elastic loops exert a pressure on the outer ear, especially at a backside of the outer ear, resulting in irritation of the skin at the contact points between the elastic loops and a wearer's skin and sometimes in pain at the outer ear or even headaches.

[0005] Face masks with straps to be tied behind a wearer's head are far more difficult to apply and remove the face masks with elastic loops and can be painful too when the wearer's hair gets stuck in the knot. Also the knot can loosen when wearing the face mask for longer periods such that the face mask does no longer snugly fits on a wearer's head and hence potentially loses its protection functionality.

[0006] Apart from the above retention types for face masks, US2281181 discloses a face mask with a retention system comprising ear hooks such as common in glasses. Such ear hooks can be considered as a kind of non-elastic version of the elastic loops, and as a face mask, in order to offer optimal protection, preferably snugly fits on a wearer's head, the ear hooks are tensioned around the outer ear of a wearer and hence, as is the case with elastic loops, exert a pressure on the outer ear, especially at a backside of the outer ear, resulting in irritation of the skin at the contact points between the ear hooks and a wearer's skin and sometimes in pain at the outer ear or even headaches.

[0007] It is clear from the above that there remains a

need for face mask retention system that is comfortable to wear and easy to put on or take off.

Brief Summary of the Invention

[0008] The present invention concerns a face mask retention system comprising:

- (a) one or more elastic members configured for retaining the face mask on a wearer's head, said elastic members connected to and transferring a face mask retaining force to
- (b) earbuds comprising

- (i) a main body configured to be lodged in a concha cavum, behind an intertragical notch and or tragus of a wearer's outer ear, and
- (ii) an armlike extension with a shoulder defined between the main body and the armlike extension, said shoulder configured to seat in the intertragical notch of a wearer's ear and the armlike extension configured to protrude from the ear;

wherein the one or more elastic members are connected to said armlike extension, such that the face mask retaining force biases the shoulder of the earbuds against the intertragical notch and/or tragus, which force acts against an upward tilting movement of the armlike extension typically used to remove the earbuds from a wearer's ear.

Brief Description of the Figures

[0009]

Fig. 1 illustrates a face mask with a face mask retention system in accordance with the present invention;

Fig. 2 illustrates earbuds as part of a face mask retention system of the present invention

Fig. 3 illustrates the parts of a human outer ear.

Fig. 4-7 illustrate an alternative embodiments of a face mask retention system in accordance with the present invention;

Fig. 8 illustrates the face mask retention system according to the present invention in use.

Detailed Description

[0010] As illustrated in Fig. 1, a face mask is retained on a wearer's face by a face mask retention system according to the present invention.

[0011] The face mask is preferably made of a gauze or non-woven fabric and has a predominantly rectangular or trapezium like outline designed to cover both mouth and nose of a wearer. The material wherein the face mask is manufactured can be either elastic (=stretching) or

non-elastic. The face mask has two longitudinal side edges, extending predominantly horizontally when correctly worn by a wearer that is in upright position and two transversal side edges extending between the longitudinal side edges. The gauze or non-woven fabric may have a multiple layer build-up and/or can comprise a pocket for receiving a filter element as is known in the art. Providing a pocket for receiving a filter element is especially desired for face masks made in an elastic gauze, as when putting the gauze under tension by stretching the material might result in increased pore sizes in the gauze. The face mask can be made in transparent material or comprise a transparent section, in particular to not block sight on a wearer's mouth.

[0012] In a first embodiment, the gauze or non-woven fabric has a predominantly rectangular outline or with a trapezium like outline wherein the longitudinal side edges extend substantially parallel and differ slightly in length. The face mask retention system in this case comprises elastic members connected to on the one hand, the face mask and on the other hand, earbuds, wherein for the sake of the current invention, the earbuds are part of the face mask retention system.

[0013] In a most basic execution, four elastic members are provided, each connected to, on the one hand, a different corner of the face mask and, on the other hand to an earbud, wherein the elastic members connected to the corners of a same transversal edge of the face mask are connected to the same earbud, thereby defining a two triangles, the angles of which are the corners of one transversal side edge and the connection between the concerned elastic members and the earbuds.

[0014] The earbuds, illustrated in Fig. 2, comprise a main body configured to be lodged in a concha cavum, behind an intertragical notch and/or tragus of a wearer's outer ear, and an armlike extension with a shoulder defined between the main body and the armlike extension, said shoulder configured to seat in the intertragical notch of a wearer's ear and the armlike extension configured to protrude from the ear. The earbuds can be either disposable and designed for single or limited use, or made more rigidly for multiple uses and are preferably made in pressed paper or a plastic material and have an outer surface, at least in zones where the earbuds are designed to contact human skin, that either has a very low surface roughness or is cushioned by a layer of tissue or is made from a highly elastic material.

[0015] The elastic members are preferably connected to the armlike extension of the earbuds. In accordance with the present invention, the elastic members are dimensioned such that, when a wearer puts on the face mask with the earbuds positioned in the concha cave, a force F_1 , shown in Fig. 3, is exerted on the earbuds that extends substantially parallel to a length direction of the intertragical notch, in other words a force that biases the shoulder of the earbuds against the intertragical notch, said force thus acting against an upward tilting movement of the armlike extension of the earbuds, which upward

tilting movement is typically used to remove the earbuds from a wearer's ear. The forces F_1 , applied on both earbuds, results in maintaining forces F_2 on both sides of the face mask, thereby securing the face mask in place on the wearer's face, as is illustrated in Fig. 8 where the face mask is securely held on a wearer's face by the face mask retention system with the earbuds A and B.

[0016] The connection between the earbuds and the elastic members can be permanent or releasable, eg. by an auxiliary piece that slides over the armlike extension of the earbuds and is kept in place by a friction fit, or by a magnetic connection, a hook and loop connection or the like.

[0017] In an alternative execution of the first embodiment, illustrated in Fig. 4a&b, the aforementioned triangles are defined between the corresponding corners of the lateral side edges of the face mask and an adaptor piece through which at least one of the elastic members extend. In this execution, one of the elastic member of each triangle may be attached to the adaptor piece, whilst the other elastic member extends through it or both elastic member may extend through the adaptor piece. In case both elastic members extend through the adaptor piece, both elastic members extend from the adaptor piece to the earbud onwards, one next to another in a parallel fashion. The adaptor piece preferably comprises a tubular section through which the one or more elastic member extend and which is provided with a clamp or friction fits over the elastic member(s), allowing sliding the adaptor piece along said elastic member(s) and as such adapting the concerned triangle and as a consequence the direction of the force exerted on the earbud.

[0018] The elastic members of a first embodiment of the face mask retention system can be formed by four separate elastic members each connected to a corner of the face mask by sewing or by extending through a hole provided at a corner of the face mask.

[0019] Alternatively, as shown in Fig. 5, two elastic members can be provided, one extending along each longitudinal side edge of the face mask such that each elastic member defines a side edge of the two triangles formed by the face mask retention system. In such case, the elastic members can extend through a channel formed along each longitudinal side edge in the face mask or alternatively can be sewn to a longitudinal side edge of the face mask and create a physical connection between both earbuds.

[0020] Fig. 6a&b illustrate a second embodiment of a face mask retention system that is particularly suited for face masks having a trapezium outline wherein the parallel extending longitudinal side edges substantially differ in length. In this case, the triangle overlaps partially or entirely with the face mask. In the illustrated embodiment of Fig. 6, four elastic members are provided, one along each (slanting) transversal side edge of the mask and two elastic members along the top longitudinal side edge, whereby the elastic members join one another two by two at the top corners of the face mask and extend from

thereon in parallel to the earbuds. Again the triangles created by the elastic members are configured to exert a force on the earbuds that extends substantially parallel to a length direction of the intergratical notch, in other words a force that biases the shoulder of the earbuds against the intergratical notch and/or tragus, said force thus acting against an upward tilting movement of the armlike extension of the earbuds, which upward tilting movement is typically used to remove the earbuds from a wearer's ear.

[0021] In this embodiment, the two elastic members extending along the top longitudinal side edge can be made as a single elastic member that physically connects both earbuds.

[0022] For all embodiments disclosed supra, the earbuds can comprise integrated speakers and serve as headphones/(telephone), either wired or wireless with a Bluetooth connection.

[0023] In case the elastic member create a physical connection between both earbuds, as can be the case in both embodiments described supra, a electric and/or acoustic wire can be embedded in the elastic member physically connecting both earbuds, and as such be part of the wiring of the headphones and/or may comprise a battery for powering the headphones or a microphone connected to the headphones. The electric and/or acoustic wire can be integrated in the elastic members as an electrically isolated yarn or a plurality of electrically isolated yarns or as a standard cable wound around the concerned elastic member as illustrated in Fig. 7. The connection between wiring embedded or guided along the elastic members and the earbuds can be releasable and is preferably of an inductive type.

[0024] Alternatively to the embodiment of Fig. 6, the face mask retention system can comprise one or two top elastic members connected to the face mask at a top side edge and a single bottom elastic member, connected to a bottom side edge of the face mask and extending from earbud to earbud. The bottom elastic member is thereby designed to pass under a wearer's chin when worn. Such embodiment is particularly suited for face masks made in an elastic material, whereby the bottom elastic member also functions as a bottom side edge reinforcement for the face mask.

References:

[0025]

1. Face mask
2. Top longitudinal edge of face mask
3. Bottom longitudinal edge of face mask
- 4a&b. Transversal side edges of face mask
5. Face mask retention system
6. Elastic members
7. Earbuds
8. Main body
9. Armlike extension

10. Adaptor piece
11. Electric or acoustic wire

5 **Claims**

1. A face mask retention system comprising:

(a) one or more elastic members configured for retaining the face mask on a wearer's head, said elastic members connected to and transferring a face mask retaining force to
(b) earbuds comprising

(i) a main body configured to be lodged in a concha cavum, behind an intertragical notch and/or tragus of a wearer's outer ear, and

(ii) an armlike extension with a shoulder defined between the main body and the armlike extension, said shoulder configured to seat in the intertragical notch of a wearer's ear and the armlike extension configured to protrude from the ear;

wherein the one or more elastic members are connected to said armlike extension, such that the face mask retaining force biases the shoulder of the earbuds against the intertragical notch, which force acts against an upward tilting movement of the armlike extension typically used to remove the earbuds from a wearer's ear.

2. The face mask retention system according to claim 1, comprising two elastic members, each connected to an opposed side edge of the face mask and each connected to one earbud, both said elastic members defining a triangular shape between the concerned earbud and a concerned side edge of the face mask.

3. The face mask retention system according to any of the preceding claims, comprising a releasable connector between the earbuds and the elastic members.

4. The face mask retention system according to any of the preceding claims, said earbuds comprising a speaker integrated therein.

5. The face mask retention system according to any of the preceding claims, said earbuds comprising an external wiring connected to a power supply, said external wiring guided along or embedded said one or more elastic members.

6. The face mask retention system according to claim 3 to 5, said connector establishing an inductive power connection between the external wiring and the

earbud(s).

- 7. The face mask retention system according to any of claims 3 to 6, said external wiring physically connecting both earbuds to one another. 5
- 8. The face mask retention system according to any of claims 3 to 7, said face mask comprising channels or a guiding for receiving said external wiring. 10
- 9. The face mask retention system according to any of the preceding claims, wherein the face mask is designed to cover both nose and mouth of a wearer.
- 10. The face mask retention system according to any of the preceding claims, wherein the earbuds are made of pressed paper. 15
- 11. Kit in parts comprising a face mask retention system according to any of claims 1 to 10 and a face mask. 20

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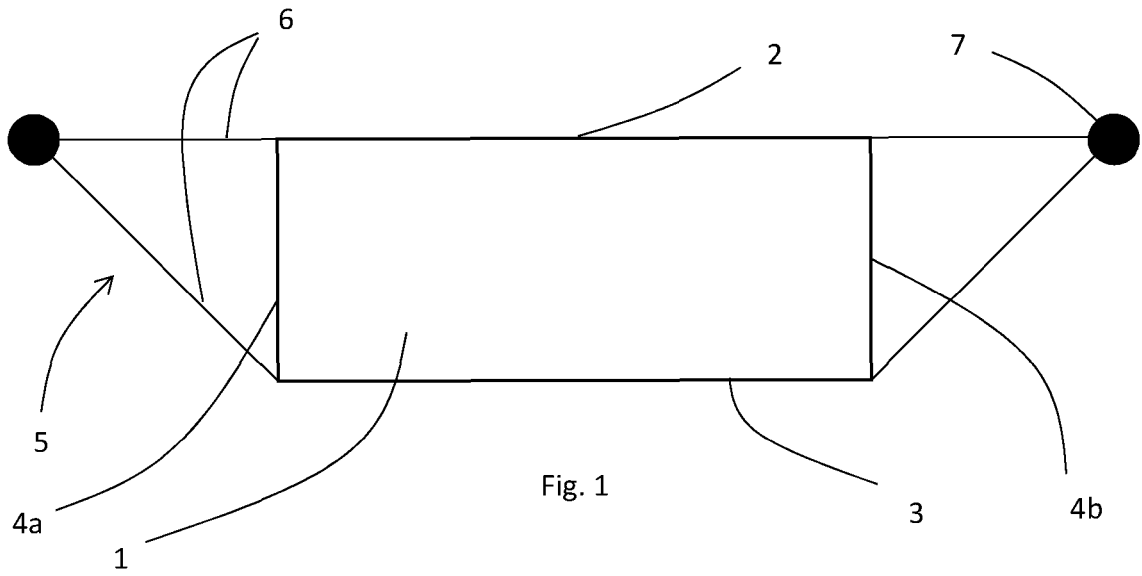


Fig. 1

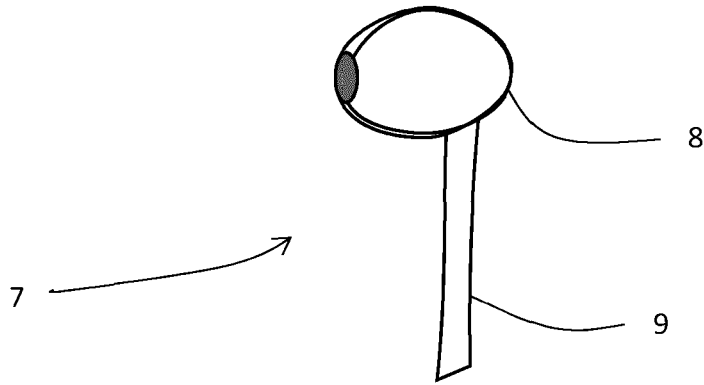


Fig. 2

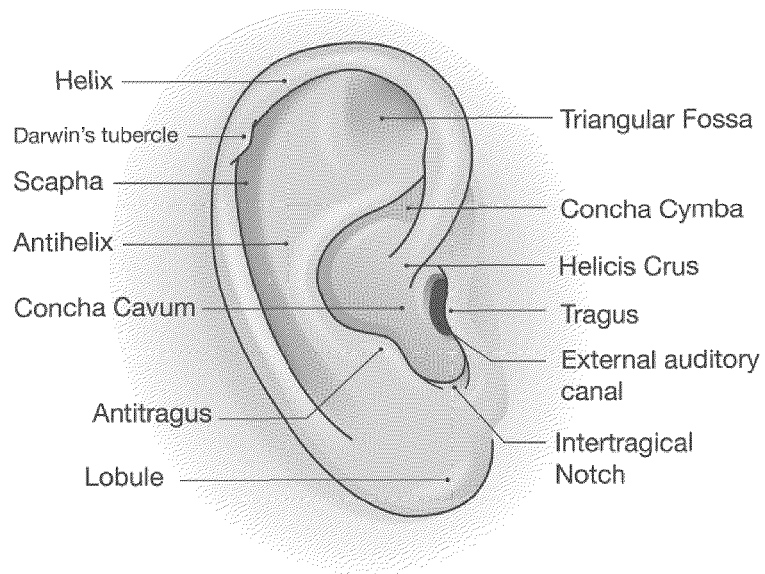
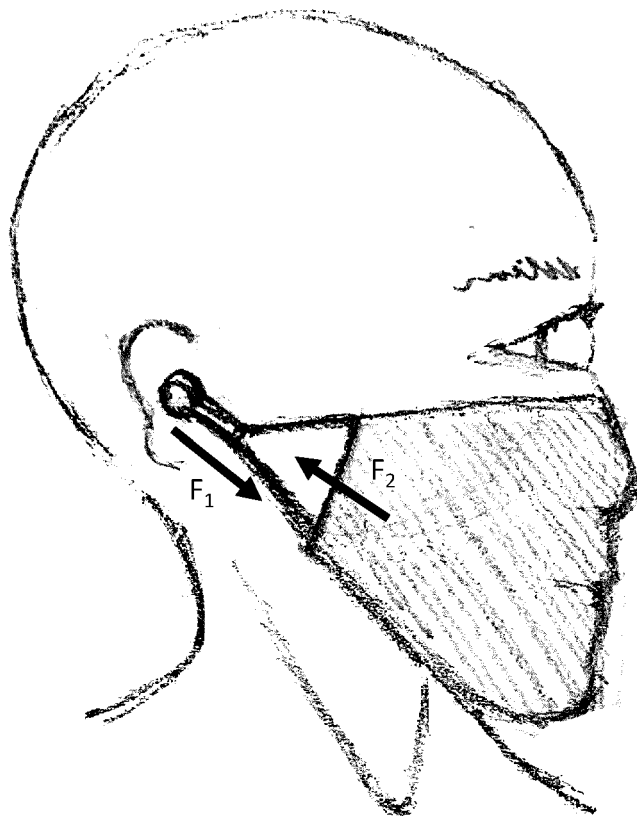
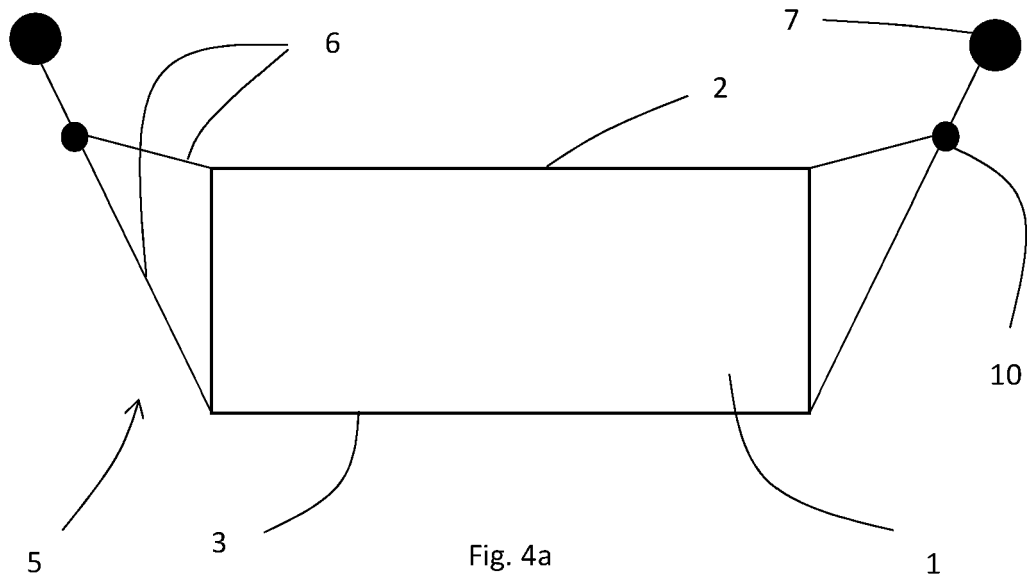


Fig. 3



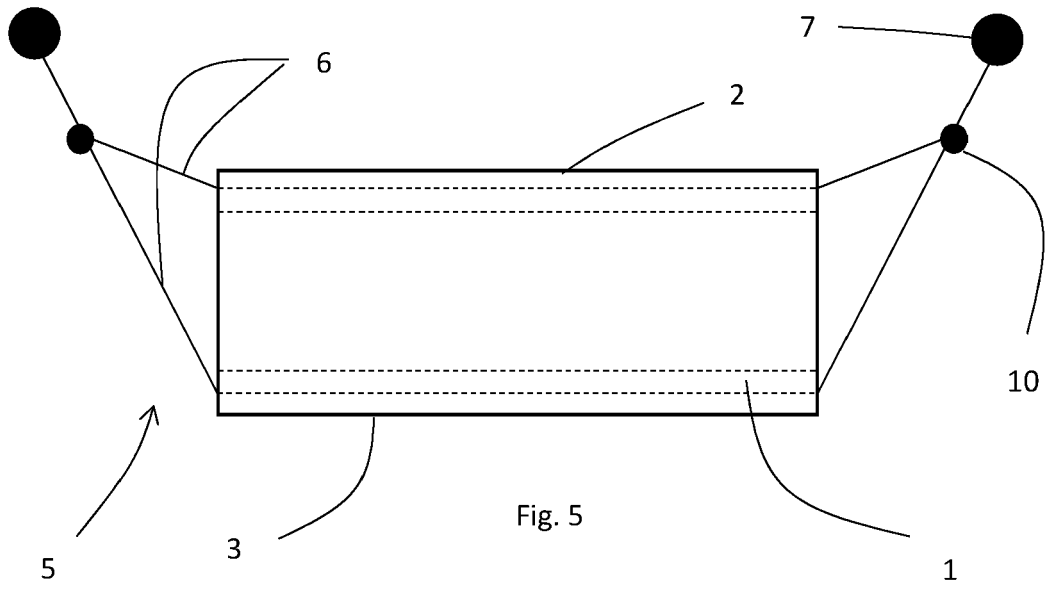


Fig. 5

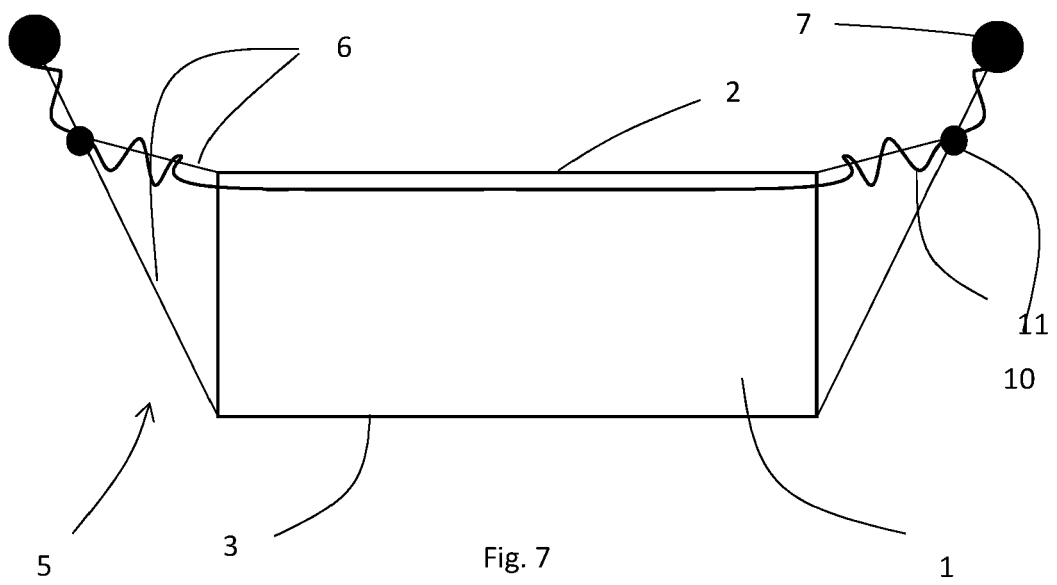


Fig. 7

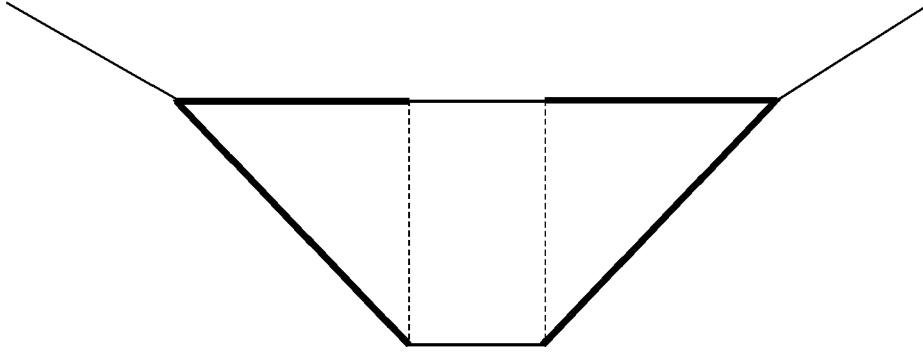


Fig. 6a

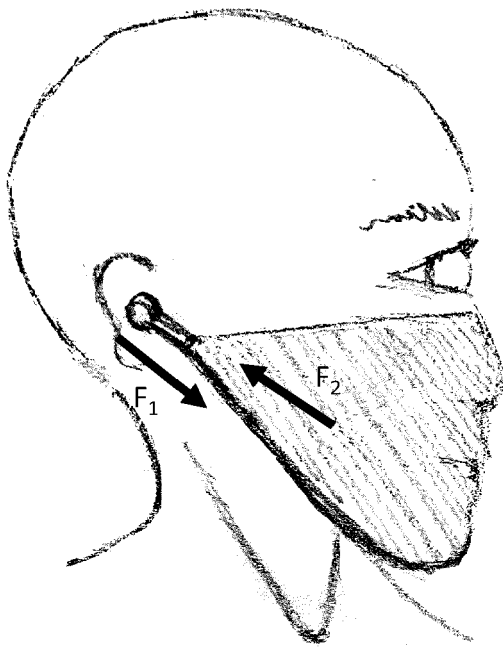


Fig. 6b

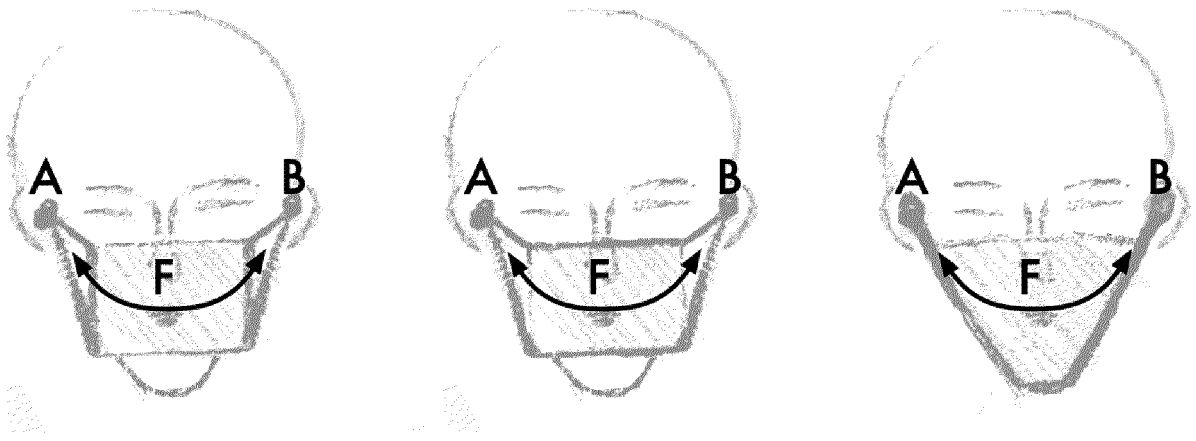


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 20 20 0577

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A	----- KR 2020 0091365 A (SEO CHANG YEON [KR]) 30 July 2020 (2020-07-30) * figure 1 *	4	
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 18 February 2021	Examiner van Voorst, Frank
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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