



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.12.2021 Bulletin 2021/50

(51) Int Cl.:
A41D 13/11 (2006.01)

(21) Application number: **20179061.5**

(22) Date of filing: **09.06.2020**

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

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(30) Priority: **08.06.2020 PT 2020116485**

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(54) **FACE MASK, METHOD FOR MANUFACTURING AND USES THEREOF**

(57) The present disclosure relates to a face mask protection for read lip. Namely a face mask protection that serves as a barrier to the spread of viruses and bacteria by air.

The face mask of present disclosure comprises an elongated fabric portion to cover the face of a user from the nose to the chin and cheeks, a nasal clip and two ear

loops connected to the elongated fabric portion to fix the elongated fabric to the face, wherein the elongated fabric portion comprises a hole in the centre with a transparent polymer portion sewn to the fabric by an embordering seam, a plurality of folds located at the lateral side and below the transparent polymer portion; an elastic material surrounding the edges of said elongated fabric.

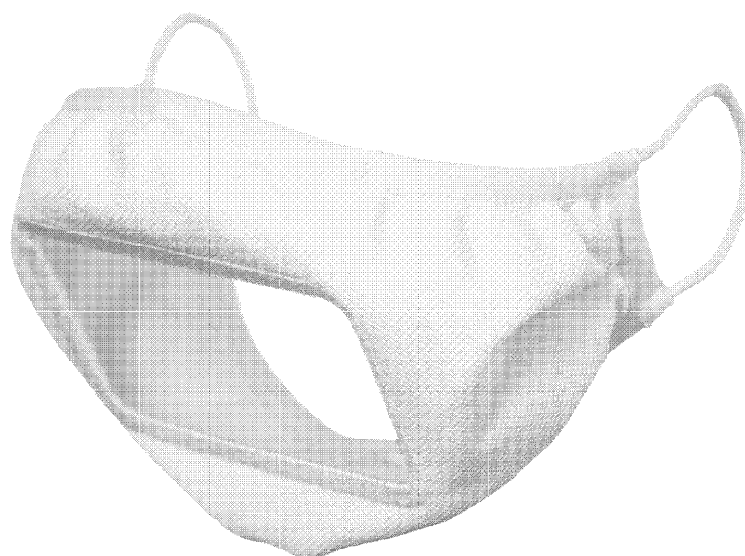


Fig. 1

Description**TECHNICAL FIELD**

5 **[0001]** The present disclosure relates to a face mask protection for read lip. Namely a face mask protection that serves as a barrier to the spread of viruses and bacteria by air.

BACKGROUND

10 **[0002]** Document WO2014189364 discloses a disposable surgical face shield including a flexible liquid-impermeable sheet which is transparent at least in the viewing region and arranged to extend over the forehead region of the wearer and the nostrils and mouth of the wearer. The shield includes a securing means for securing the shield to the head of the wearer, a first spacer attached to the sheet and arranged to abut against the face of the wearer above the eyes, and a second spacer attached to the sheet and arranged to abut against the nose bridge of the wear. The second spacer is inclined such that when the shield is mounted to the head of the wearer a proximal area of the second spacer proximal to the eyes of the wearer is positioned higher than a distal area of the second spacer distal to the eyes of the wearer.

15 **[0003]** Document US20190069615 describe a face mask that may include a transparent plastic piece having a front side, a back side, a top side, a bottom side, a left side, and a right side. A first conformable member may be affixed to a first portion of the back side and disposed parallel to the top side. A second conformable member may be affixed to a second portion of the back side and disposed parallel to the bottom side. The face mask may include straps, ear loops, and/or head bands so that it may be secured to a user.

20 **[0004]** Document US6185740 discloses a tissue face mask similar to that used by a dentist but placed in covering relation over the face of a patient preparatory to an abrasive dental procedure in which mask there are shaping stays that are manually conformed to the facial features of the patient to prevent harm to the patient from the particulate fall out of the abrasive dental procedure.

DESCRIPTION

30 **[0005]** The face mask of the present disclosure, for the obstruction of biological and mechanical impurities from breathed and/or exhaled air, comprises a transparent polymeric layer to allow lip read and a fabric layer to allow the breathability of the mask, wherein both layers acts as a barrier and the fabric layer and a transparent polymeric layer are bond by an embordering seam.

[0006] One of the aims of the face mask of the present disclosure is to allow deaf or hearing-impaired people to read the lips of someone speaking to them.

35 **[0007]** The present disclosure relates to a face mask that allows the visibility of the mouth and, consequently, the lip reading, in order to assist and facilitate interpersonal communication for individuals with disabilities such as deafness and other hearing disorders and intellectual disabilities. Surprisingly, the face mask of the present disclosure fulfils the requirements of the EN 149:2001+A1:2009 and resist to at least 5 washing cycles.

40 **[0008]** Surprisingly, the mask of the present disclosure protects against particles, allows breathability, does not fog up in the transparent area, and resists to at least 5 washing cycles. This synergetic effect is achieved by the design and structure of the mask of the present disclosure.

45 **[0009]** An aspect of the present disclosure relates to a face mask comprising an elongated fabric portion to cover the face of a user from the nose to the chin and cheeks, a nasal clip and two ear loops connected to the elongated fabric portion to fix the elongated fabric to the face, wherein the elongated fabric portion comprises a hole in the centre with a transparent polymer portion sewn to the fabric by an embordering seam, a plurality of folds located at the lateral side and below the transparent polymer portion; an elastic material surrounding the edges of said elongated fabric.

50 **[0010]** In an embodiment, the transparent polymer portion material is selected from different plastic thickness and opacity and it was selected the PET polyethylene terephthalate.

[0011] In an embodiment, the material is polymer is polyethylene terephthalate, PET.

[0012] In an embodiment, the elasticity material is elastic for sewing.

[0013] In an embodiment, the number of folds are between 4-6.

[0014] In an embodiment, the number of folds are two in each part.

55 **[0015]** In an embodiment, the fabric layer is a woven textile; preferably the woven textile is selected from a list consisting of: cotton, elastane, poliamide or mixture thereof. In particular, poliamide and cotton or elastane and cotton. Preferably, a fabric with 100% polyamide due barrier proprieties against particles and breathability of the fabric.

[0016] In an embodiment, the nonwoven fabric of the elongated fabric portion is woven pique fabric.

[0017] In an embodiment, the woven pique fabric is made of cotton, polyamide, or combinations thereof.

[0018] Pique fabric refers to a weaving style, normally used with cotton yarn, which is described by raised parallel cords or geometric designs in the fabric. Pique fabrics vary from semi-sheer dimity to heavy weight waffle cloth.

[0019] In an embodiment, the ear loops are made of soft rounded elastic, preferably comprising 70% polyamide and 30% elastane.

[0020] In an embodiment, this mask allows that the air that a person breath is previously filtered by the fabric itself, which guarantees the absence of leaks and the entry of unfiltered air, which is not neither guaranteed nor assured by the common masks that are present in the market. Furthermore, the elastic band is strategically placed around the edge of the elongated fabric portion, which guarantees the absence of air as well as the constant flow of droplets in and out of the user face, without filtration.

[0021] In an embodiment, the plurality of folds allows to create an air reservoir to prevent the mask from being in direct contact with the face, which allows the air present in this space to be filtered and available for breathing.

[0022] In an embodiment, the face mask of the present disclosure is reusable.

[0023] In an embodiment, the materials use in face mask of the present disclosure are recycled materials.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] The following figures provide preferred embodiments for illustrating the disclosure and should not be seen as limiting the scope of invention.

Figure 1 - shows a schematic representation of an embodiment of the face mask.

Figure 2 - shows a schematic representation of an embodiment of the face mask with a specific view of the hole in the elongated fabric portion and the transparent polymer portion.

Figure 3 - shows a schematic representation of an embodiment of the face mask with the application of the transparent polymer portion and the embroidery.

Figure 4 - shows a schematic representation of an embodiment of the face mask with the folds.

Figure 5 - shows a schematic representation of an embodiment with the elastic material surrounding the elongated fabric portion.

Figure 6 - shows a schematic representation of an embodiment of the face mask with the ear loops.

DETAILED DESCRIPTION

[0025] The present disclosure relates to a face mask protection for read lip, that serves as a barrier to the spread of viruses and bacteria by air and also allows the user to show their lip expressions.

[0026] The present invention relates to a face mask comprising an elongated fabric portion to cover the face of a user from the nose to the chin and cheeks, a nasal clip and two ear loops connected to the elongated fabric portion to fix the elongated fabric to the face, wherein the elongated fabric portion comprises a hole in the centre with a transparent polymer portion sewn to the fabric by an embordering seam;

a plurality of folds located at the lateral side and below the transparent polymer portion; and
an elastic material surrounding the edges of said elongated fabric.

[0027] **Figure 1** shows a representation of an embodiment of the face mask developed.

[0028] **Figure 2** shows a representation of an embodiment of the face mask where (1) is the elongated fabric material, (2) is the hole where the transparent polymer portion (3) will be placed. It is shown that the transparent polymer portion is placed in the center of the elongated fabric portion and covers the lip region. In this location, the user can show the movement of the lip as also the facial expression.

[0029] **Figure 3** shows a representation of an embodiment where the transparent polymeric polymer (4) is joined in the elongated fabric portion (1) by embroidery (4).

[0030] **Figure 4** shows a representation of an embodiment where is shown the elongated fabric portion (1) with the transparent polymer portion (3) embroidered (4) comprising the folds (4) applied in the mask.

[0031] **Figure 5** shows a representation of an embodiment of the face mask where the elongated fabric portion (1) further comprises the elastic material (6) in the edges of said elongated fabric portion (1).

[0032] **Figure 6** shows a representation of an embodiment where the face mask comprises ear loops (7) applied in the elongated fabric portion.

[0033] In an embodiment, the transparent polymer portion may have a geometry selected from rectangular, oval, triangular - mouth shape, or combinations thereof, preferably a rectangular form.

[0034] In a preferred embodiment, transparent polymer portion has the edges of the rectangle rounded.

[0035] In an embodiment, the method of production of the mask may comprise the steps of:

cutting with laser a transparent polymer portion and the respective hole in the fabric portion where said transparent polymer portion will be inserted and corresponding to the lip region,
bonding of the polymeric portion in the fabric portion sewing said transparent polymer portion by embroidery seam;
creating the plurality of folds in the elongated fabric portion;
applying the elastic along the edges of the fabric portion; and
applying the ear loops.

[0036] In a preferred embodiment, the laser cutting was the preferred manufacturing process due to the productive capacity and efficiency, thus ensure that the millimetre accuracy of the plate is guaranteed, in manner not to have variations in measurements and deformations or damage of the PET component. With this technique it may be possible to maximize consumption and ensure zero waste.

[0037] In a preferred embodiment, the transparent polymer portion may be applied to the elongated fabric portion in an embroidery machine through multiple points, safely and precisely.

[0038] In a preferred embodiment, the conditions for disinfecting and washing the mask may consist of dipping the mask in soap and water for a minimum period of time from 20 to 40 minutes and at a temperature between 20 to 40 °C, preferably 30 minutes at a temperature of about 30 °C. After the mask should be rinsed and air dried. As it is considered a delicate product, it may be treated in a more careful way to prevent or cause damages to the polymer portion, preferably PET, such as: scratches, or creases which interfere with its quality, jeopardizing the purpose of the present disclosure which is the obstruction of biological and mechanical impurities from breathed and/or exhaled air.

[0039] Experimental tests were done in manner to see if the results were according to the Norm EN 149:2001+A1:2009.

[0040] According to the Norm EN 149:2001+A1:2009 the breathing resistance of the masks must be:

Classification	Maximum resistance allowed (mbar)	
	Inhalation	Expiration
	30 l/min	95 l/min
FFP1	0,6	2,1
FFP2	0,7	2,4
FFP3	1,0	3,0

[0041] It was analysing the breathing resistance of the face mask. It was measured the air flow that cross the mask when a negative pressure of 60 and 210 Pa is driven.

Table 1 – Breathing resistance of the mask of the present disclosure

		Test pressure (Pa)	
		60	210
Inspired air flow (L/min)	Test nº 1	50	113
	Test nº 2	46	103
	Test nº 3	48	113
	Test nº 4	47	115
	Test nº 5	49	114
	Medium value (l/min)	50	128
	Standard deviation	1,6	8,1
	Coefficient of deviation	3%	6%
	Minimal Requirement (l/min)*	30	95

*Results based on the Norm EN 149:2001+A1:2009

[0042] The capacity to retain particles MI142 is given by:

- Woven pique 100% polyamide certified for reusable community masks. Capacity to Retain the Particles (equal or above 3 μm) - 76%
- Transparent polymer portion of polyethylene terephthalate Capacity to Retain the Particles (equal or above 3 μm) -100%.

[0043] The minimal requirement of the capacity to retain the particles for a face mask level 3, for general use, is at least 70%.

[0044] In a preferred embodiment, the mask is reusable and before its use, the polymeric portion may be cleaned with an alcohol solution using a soft cloth. This previous treatment before the use of the mask reduces the possibility of fogging the transparent polymer portion.

[0045] In a preferred embodiment, greater adaptability of the mask to the human face may be done through the elastics and the nasal clip which keeps the face mask in a fixed and stable position, providing the opportunity to perform daily activities without the need for constant adjustment.

[0046] In a preferred embodiment, the mask allows accessible and clear communication aimed not only at people with disabilities such as deafness and other hearing disorders and intellectual disabilities but also for health professionals and the general population.

[0047] In a preferred embodiment, the mask further allows the possibility of visualizing the user's facial expression during the communicative process, allowing the receiver to understand the emotional state of the sender from his expression and respond appropriately.

[0048] In a preferred embodiment, the mask allows also a respiratory process performed with less effort, since there is a space between the mask and the user's face, which allows the circulation of filtered air, due to the characteristics of the fabric, the polymer and the folds. Breathability is achieved and guaranteed from the "air box" formed between the skin and the mask, due to the embodiments described previously, that clearly facilitates and minimize the effort made in ordinary masks.

[0049] The disclosure should not be seen in any way restricted to the embodiments described and a person with ordinary skill in the art will foresee many possibilities to modifications thereof.

[0050] The above described embodiments are combinable.

[0051] The following claims further set out particular embodiments of the disclosure.

Claims

- 5 1. A reusable face mask comprising an elongated fabric portion to cover the face of a user from the nose to the chin and cheeks, a nasal clip and two ear loops connected to the elongated fabric portion to fix the elongated fabric to the face, wherein the elongated fabric portion comprises a hole in the centre with a transparent polymer portion sewn to the fabric by an embordering seam;
a plurality of folds located at the lateral side and below the transparent polymer portion;
an elastic material surrounding the edges of said elongated fabric.
- 10 2. The face mask according to previous claim wherein the material is polymer is polyethylene terephthalate.
3. The face mask according to any of the previous claims wherein the elastic material is elastic for sewing.
- 15 4. The face mask according to any of the previous claims wherein the number of folds is between 4 -6.
5. The face mask according to any of the previous claims wherein the number of folds is two in each part.
- 20 6. The face mask according to any of the previous claims wherein the elongated fabric portion is a nonwoven fabric selected from elastane, poliamide, cotton or mixtures thereof, preferably polyamide.
7. The face mask according to any of the previous claims wherein the nonwoven fabric of the elongated fabric portion is woven pique fabric.
- 25 8. The face mask according to any of the previous claims wherein the woven pique fabric is made of cotton, polyamide, or combinations thereof.

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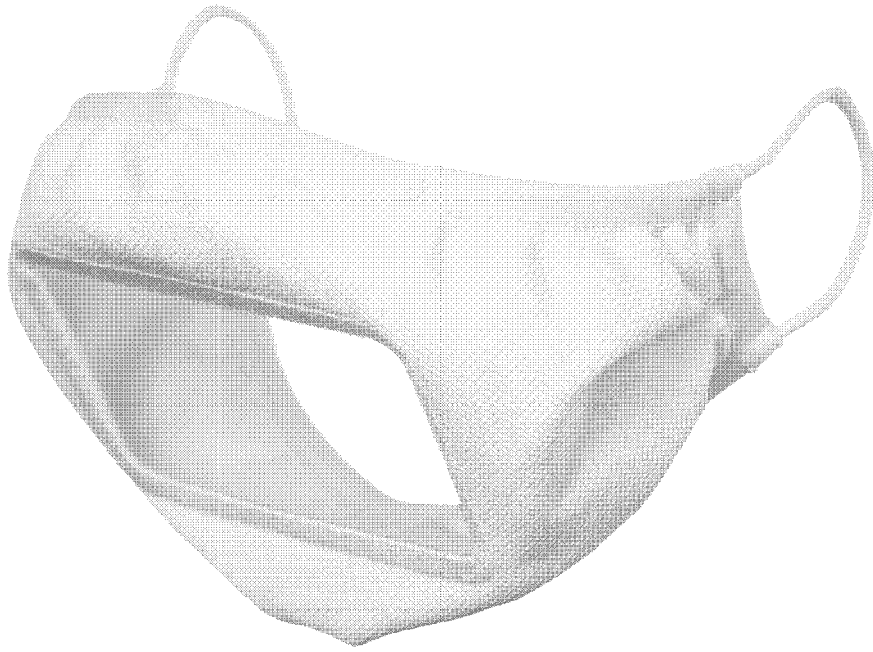


Fig. 1

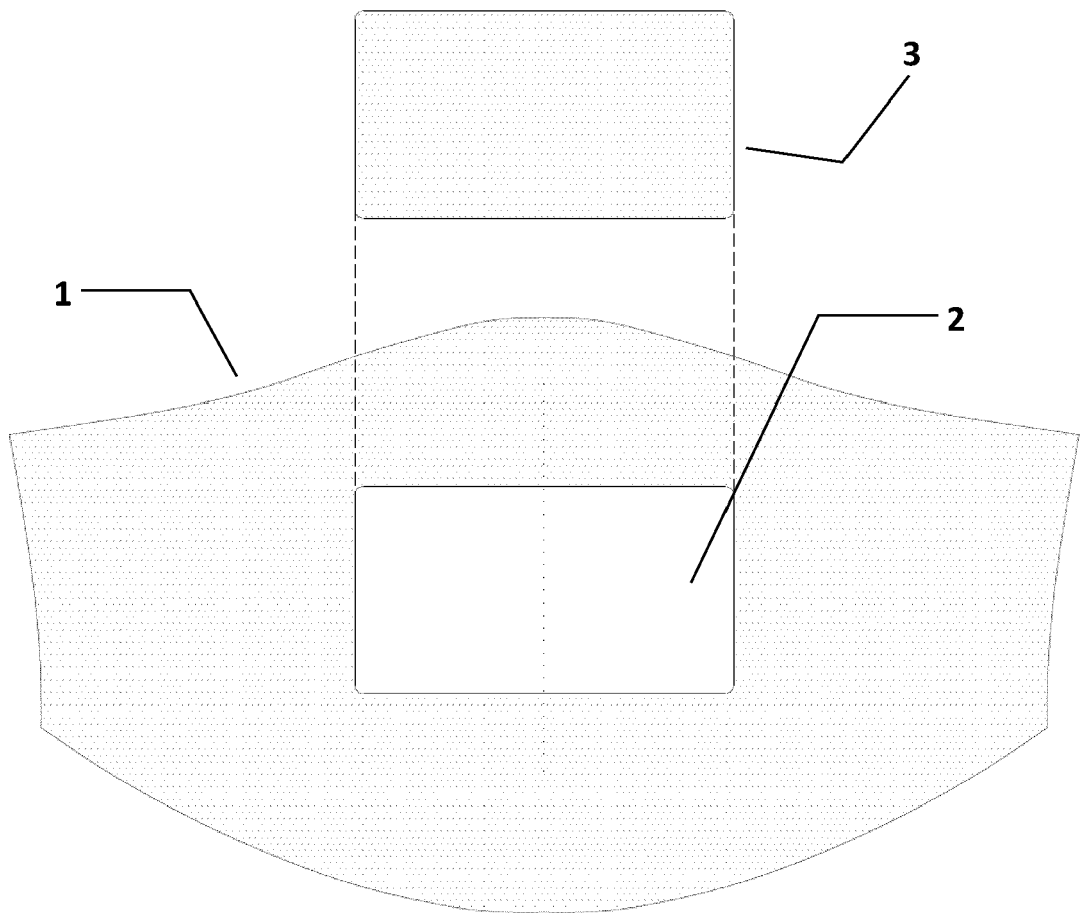


Fig. 2

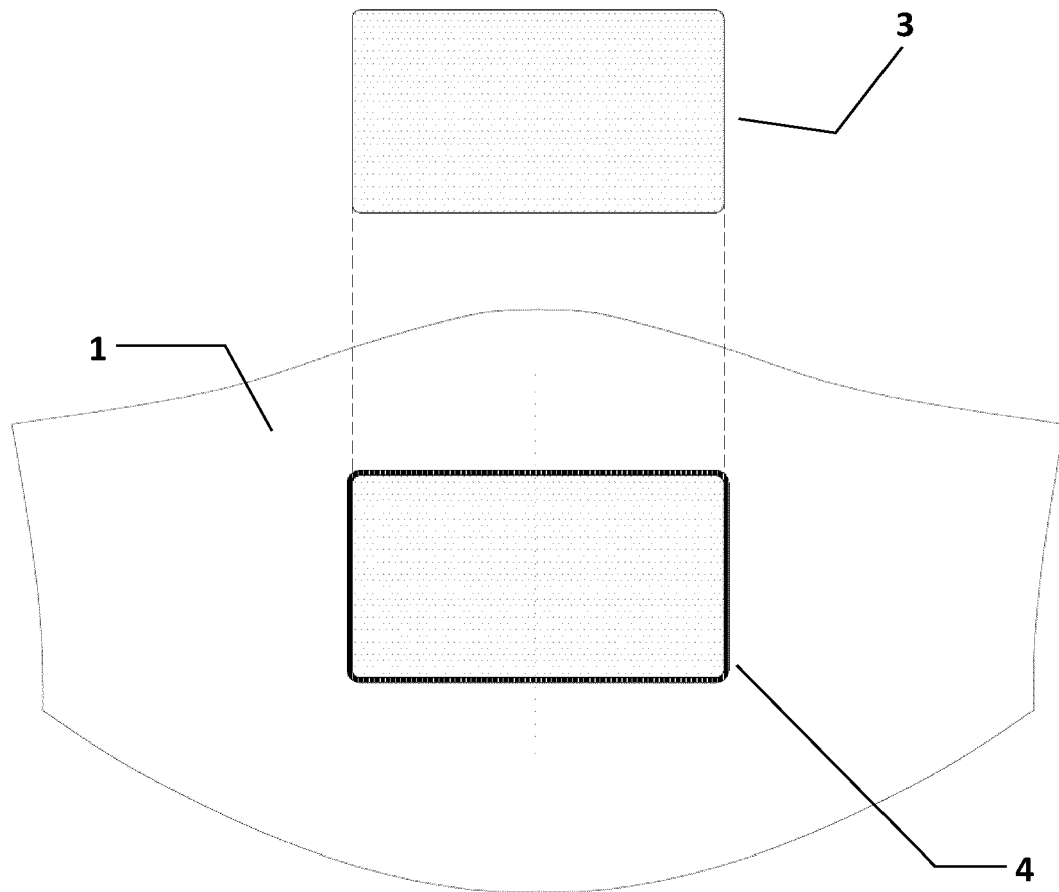


Fig. 3

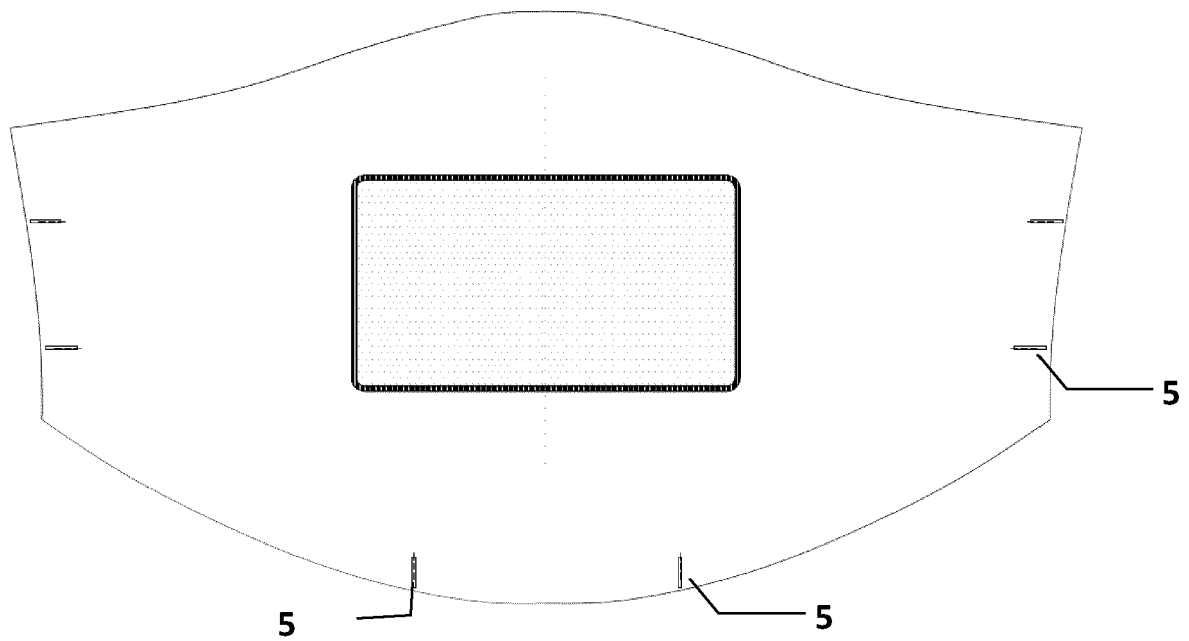


Fig. 4

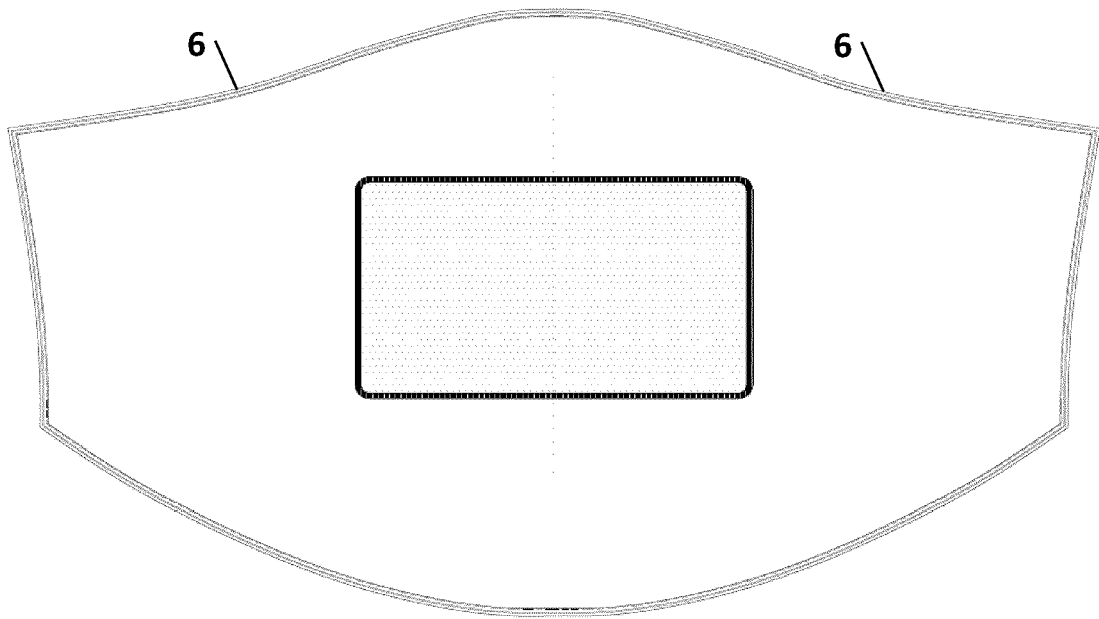


Fig. 5

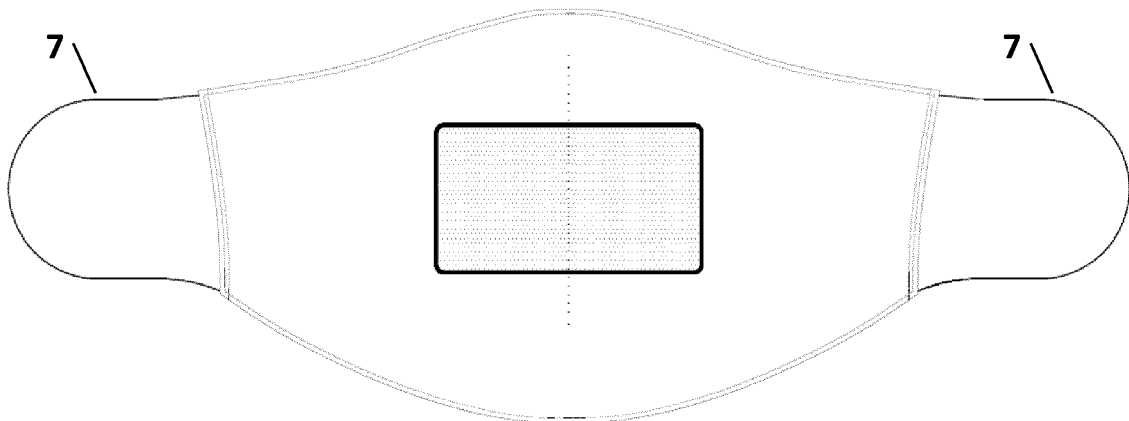


Fig. 6



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EP 20 17 9061

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