



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**23.11.2011 Bulletin 2011/47**

(51) Int Cl.:  
**A41D 13/11 (2006.01) A62B 18/02 (2006.01)**

(21) Application number: **10163425.1**

(22) Date of filing: **20.05.2010**

(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 SE SI SK SM TR**  
Designated Extension States:  
**BA ME RS**

(72) Inventor: **Teng, Mei Sheng**  
**CHEUNG SHA WAN, KOWLOON (CN)**

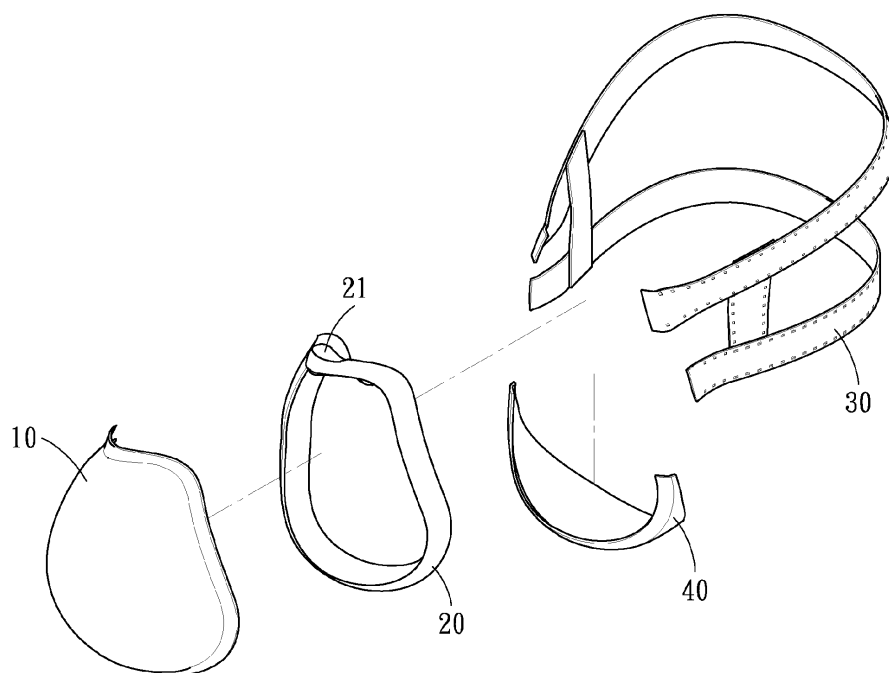
(74) Representative: **Hellmich, Wolfgang**  
**Lortzingstrasse 9**  
**81241 München (DE)**

(71) Applicant: **AOK Tooling Limited**  
**Hong Kong (CN)**

(54) **Three dimensional face mask**

(57) A three dimensional face mask comprises: a three dimensional cup (10), a three dimensional soft rubber washer (20), an elastic tape (30), and an anti-skid band (40); it is characterized in that: the three dimensional cup (10) is made by hot pressing of multilayer of filtration material, the three dimensional soft rubber washer (20) is provided with a soft nose cushion (21) and is bonded to an outer periphery (11) of the three dimensional

cup (10) by hot pressing, the anti-skid band (40) is bonded to a lower edge of the three dimensional cup (10), the elastic tape has two ends symmetrically bonded to both sides of the three dimensional cup. The three dimensional non-woven face mask ensures a good air tightness against the face while leaving a large enough space between the three dimensional cup and the nose and mouth area to ensure conformable wearing, good filtration, making the wearer easy to breathe and talk.



**FIG. 1**

## Description

### BACKGROUND OF THE INVENTION

#### Field of the Invention

[0001] The present invention relates to a face mask, and more particularly to a three dimensional non-woven face mask providing protection from bacteria and dust.

#### Description of the Prior Art

[0002] Non-woven face masks are widely used in medical facilities, food production factories, precision instruments manufacturing industry and other sites requiring high sanitation. Even in public places, more and more people are wearing face mask. Nowadays, face masks are used not only as medical products but also as daily commodities, and peoples' requirements to the face mask is becoming more and more strict. Hence, the practical, economic, safety, aesthetic and comfortable properties of the face mask are very important.

[0003] So far, the existing non-woven face masks are mostly two dimensional, and in order to ensure a good filtration effect, the ends of the two dimensional face masks have to be fastened tightly to the wearer's ears or head, so that the wearer may feel difficult to breathe and talk, the ears may feel unconformable, and the face may feel difficult to sweat. If such a face mask is worn by a wearer wearing glasses, the wearer's breath will flow through the clearance between the upper portion of the face mask and the face of the wearer to the wearer's glasses, causing foggy glasses.

[0004] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

### SUMMARY OF THE INVENTION

[0005] The primary object of the present invention is to provide a three dimensional non-woven face which ensures a good air tightness against the face while leaving a large enough space between the three dimensional cup and the nose and mouth area to ensure conformable wearing, good filtration, making the wearer easy to breathe and talk. To achieve this object, a three dimensional face mask provided by the present invention comprises: a three dimensional cup, a three dimensional soft rubber washer, an elastic tape, and an anti-skid band; it is characterized in that: the three dimensional cup is made by hot pressing of multilayer of filtration material, the three dimensional soft rubber washer is provided with a soft nose cushion and is bonded to an outer periphery of the three dimensional cup by hot pressing, the anti-skid band is bonded to a lower edge of the three dimensional cup, the elastic tape has two ends symmetrically bonded to both sides of the three dimensional cup.

[0006] When the face mask is worn, a large enough space will left between the three dimensional cup and

the nose and mouth area, the soft nose cushion is fixed to a middle of an upper side of the three dimensional soft rubber washer, and a shape of the three dimensional soft rubber washer is similar to an outline of the face of a wearer, plus the three dimensional soft rubber washer has a high elasticity, making the three dimensional soft rubber washer fit snugly against the face and nose bridge of the wearer, while snugly wrapping around the portion of the nose above the nose tip. Furthermore, anti-skid band is bonded to the lower edge of the three dimensional cup to naturally form a pocket-like structure which will fit snugly against the wearer's chin with the help of the elastic tape, so as to prevent the cap from sliding and facilitate comfortable and stable wearing of the face mask.

[0007] As compared with the traditional face mask, the face mask of the present invention provides a good air tightness against the face and comfortable wearing by solving the problem of poor airtightness caused by the uneven outline of the nose and face.

[0008] Obviously, the present invention has the advantages of simple structure, practical, comfortable wearing, good air tightness and infiltration while allowing the wearer to easily breathe and talk.

### BRIEF DESCRIPTION OF THE DRAWINGS

#### [0009]

Fig. 1 is an exploded view of a three dimensional face mask in accordance with a preferred embodiment of the present invention;

Fig. 2-1 is a side view of the three dimensional face mask in accordance with the present invention;

Fig. 2-2 is a perspective view of the three dimensional face mask in accordance with the present invention;

Fig. 3-1 is a perspective view of a three dimensional cap of the three dimensional face mask in accordance with the present invention;

Fig. 3-2 is a top view of the three dimensional cap of the three dimensional face mask in accordance with the present invention;

Fig. 3-3 is a side view of the three dimensional cap of the three dimensional face mask in accordance with the present invention;

Fig. 4-1 is a side view of a three dimensional soft rubber washer in accordance with the present invention;

Fig. 4-2 is a top view of the three dimensional soft rubber washer in accordance with the present invention;

Fig. 4-3 is a perspective view of the three dimensional soft rubber washer in accordance with the present invention; and

Fig. 5 is a perspective view of an elastic tape of the three dimensional soft rubber washer in accordance with the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0010]** The present invention will be clearer from the following description when viewed together with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment in accordance with the present invention.

**[0011]** Referring to Figs. 1, 2-1 and 2-2, a three dimensional face mask in accordance with a preferred embodiment of the present invention comprises a three dimensional cup 10, a three dimensional soft rubber washer 20, an elastic tape 30, and an anti-skid band 40. The outer periphery of the three dimensional cup 10 which is made by hot pressing of multilayer of filtration material, and the three dimensional soft rubber washer 20 are bonded to the periphery of the elastic tape 30 by hot pressing. The anti-skid band 40 is bonded to the lower edge of the three dimensional cup 10. The elastic tape 30 is H-shaped and has two ends symmetrically bonded to both sides of the three dimensional cup 10.

**[0012]** The elastic tape 30 is made of material with high elasticity, so that it can be slightly pulled over the back of the wearer's head. The anti-skid band 40 takes the form of a wide band and is bonded to the lower edge of the three dimensional cup 10 to naturally form a pocket-like structure which will fit snugly against the wearer's chin when the face mask is worn, so as to prevent the cap 10 from sliding and facilitate comfortable and stable wearing of the face mask.

**[0013]** Referring then to Figs. 3-1, 3-2 and 3-3, the three dimensional cup 10 which is made by hot pressing multilayer of non-woven filtration fabric together into a three dimensional shape. From front view, the shape of the three dimensional cup 10 is similar to the shape of the triangular area of the nose and mouth of the wearer, and from side view, the shape of the three dimensional cup 10 conforms to the outline of wearer's nose and mouth. The thickness of the filtration layer is determined by filtration function and the number of layers of the filtration material. The periphery 11 of the three dimensional cup 10 is made by hot pressing, the middle portion 12 of the three dimensional cup 10 is protruded outward, so that the outer peripheral edge of the three dimensional cup 10 is shaped in a three dimensional manner in the outline of the nose and mouth area, leaving a large enough space between the three dimensional cup 10 and the nose and mouth area to ensure conformable wearing, good filtration, making the wearer easy to breathe and talk.

**[0014]** Referring then to Figs. 4-1, 4-2 and 4-3, the three dimensional soft rubber washer 20 in accordance with the present invention is a ring-shaped structure made by plastic injection. From front view, the shape of the three dimensional soft rubber washer 20 is similar to the shape of the triangular area of the nose and mouth of the wearer, and from side view, the shape of the three dimensional soft rubber washer 20 conforms to the outline of wearer's nose and mouth. The outer peripheral edge 23 of the three dimensional soft rubber washer 20 is bonded to the periphery 11 of the three dimensional cup 10 by hot pressing. The structure of the outer peripheral edge 23 and a contacting surface 22 (for contacting the wearer's face) of the three dimensional soft rubber washer 20 conform to the peripheral structure of the nose and mouth of the wearer. When the face mask is worn, the contacting surface 22 fits snugly against the face of the wearer with the help of the elastic tape 30, ensuring an ideal air tightness against the face and a comfortable wearing.

**[0015]** To the middle of the upper side of the three dimensional soft rubber washer 20 is fixed a soft nose cushion 21 which is laminated and made by plastic injection simultaneously with the three dimensional soft rubber washer 20. When the wearer wears the face mask, the soft nose cushion 21 will snugly wrap around the portion of the nose above the nose tip, ensuring a super air tightness effect, solving the problem of poor airtightness caused by the uneven outline of the nose and face and the problem of foggy glasses. Especially, doctors wearing glasses won't have foggy glasses, and thus reducing medical mistakes during operation.

**[0016]** Referring to Figs. 5 and 2-2, the elastic tape 30 is H-shaped and has two ends symmetrically bonded to both sides of the three dimensional cup 10. When the face mask is worn, the elastic tape 30 elastically wraps around the back of the wearer's head, forcing the three dimensional soft rubber washer 20, the nose cushion 21 and the anti-skid band 40 to closely fit against the face, the nose, and the chin of the wearer, respectively.

**[0017]** While we have shown and described various embodiments in accordance with the present invention, it is clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

## Claims

1. A three dimensional face mask comprising: a three dimensional cup, a three dimensional soft rubber washer, an elastic tape, and an anti-skid band; **characterized in that:** the three dimensional cup is made by hot pressing of multilayer of filtration material, the three dimensional soft rubber washer is provided with a soft nose cushion and is bonded to an outer periphery of the three dimensional cup by hot pressing, the anti-skid band is bonded to a lower edge of

the three dimensional cup, the elastic tape has two ends symmetrically bonded to both sides of the three dimensional cup.

2. The three dimensional face mask as claimed in claim 1, wherein three dimensional cup is protruded outward, and the outer periphery of the three dimensional cup is shaped in an outline of the face of a wearer, leaving a large enough space between the three dimensional cup and the face of the wearer. 5  
10
3. The three dimensional face mask of one of claims 1 or 2, wherein the soft nose cushion is fixed to a middle of an upper side of the three dimensional soft rubber washer and made by plastic injection simultaneously with the three dimensional soft rubber washer, the three dimensional soft rubber washer is a ring-shaped structure made by plastic injection, and a shape of the three dimensional soft rubber washer is similar to an outline of the face of a wearer. 15  
20
4. The three dimensional face mask of one of the preceding claims, wherein the anti-skid band is bonded to the lower edge of the three dimensional cup to naturally form a pocket-like structure. 25
5. The three dimensional face mask of one of the preceding claims, wherein the elastic tape is H-shaped and has two ends symmetrically bonded to both sides of the three dimensional cup. 30

35

40

45

50

55

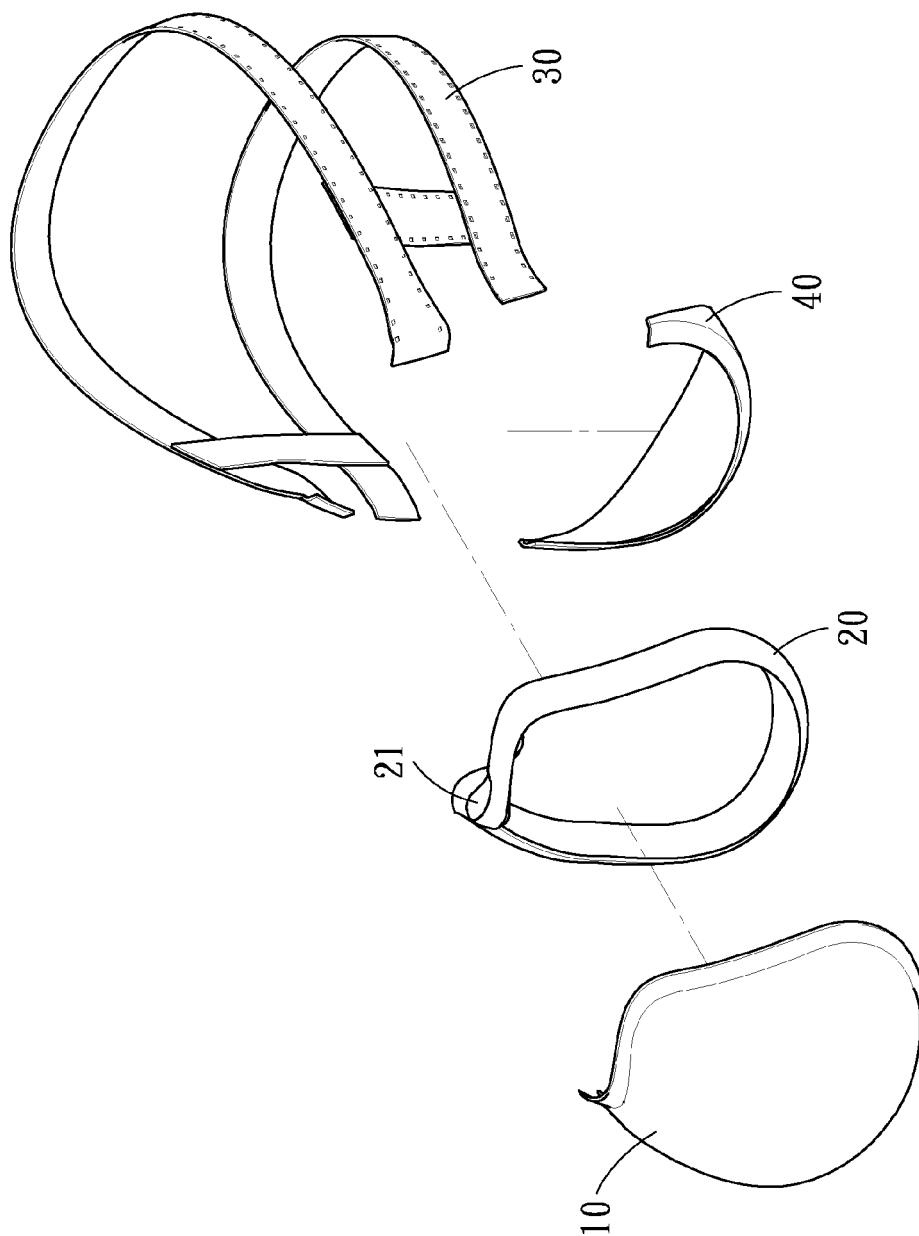


FIG. 1

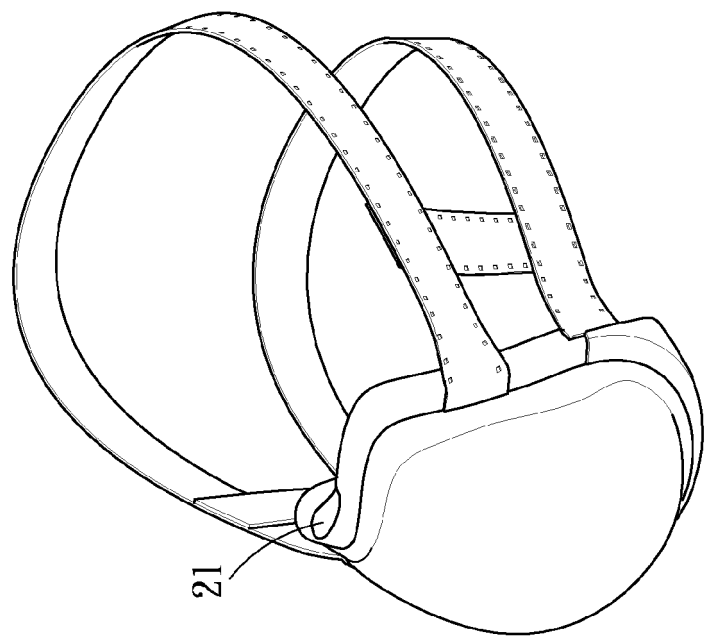


FIG. 2B

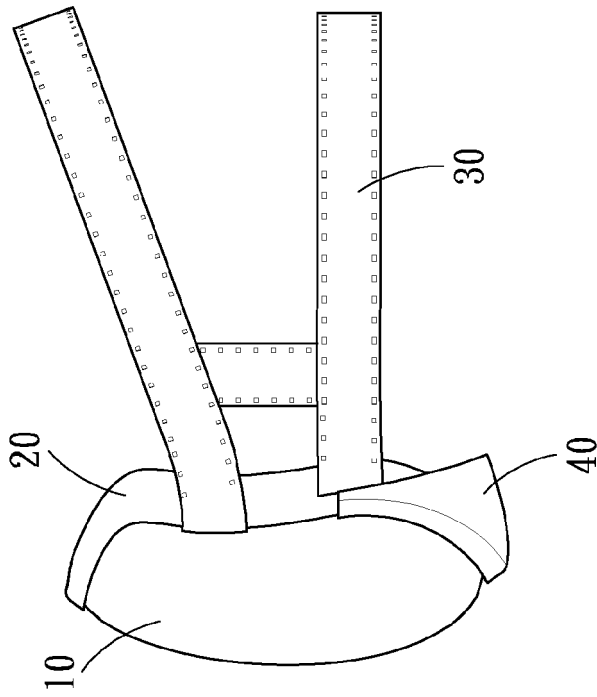


FIG. 2A

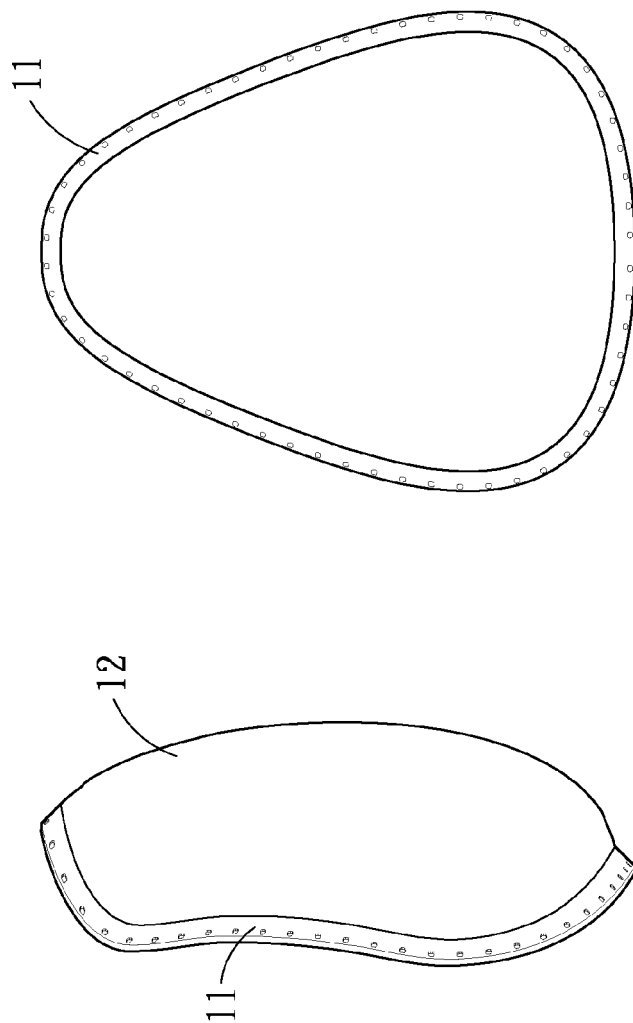


FIG. 3A

FIG. 3B

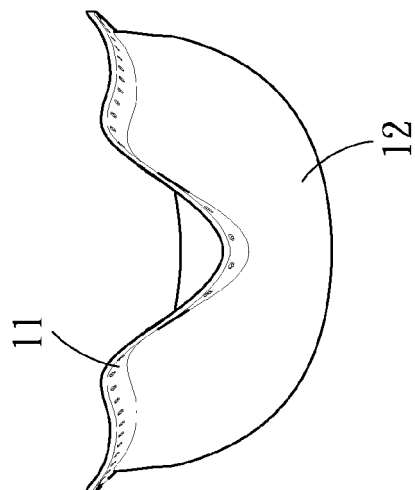


FIG. 3C

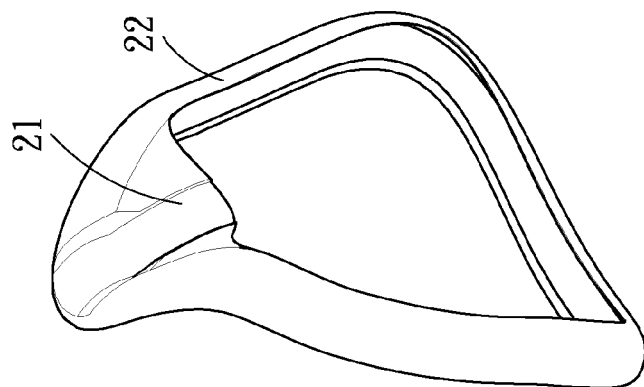


FIG. 4C

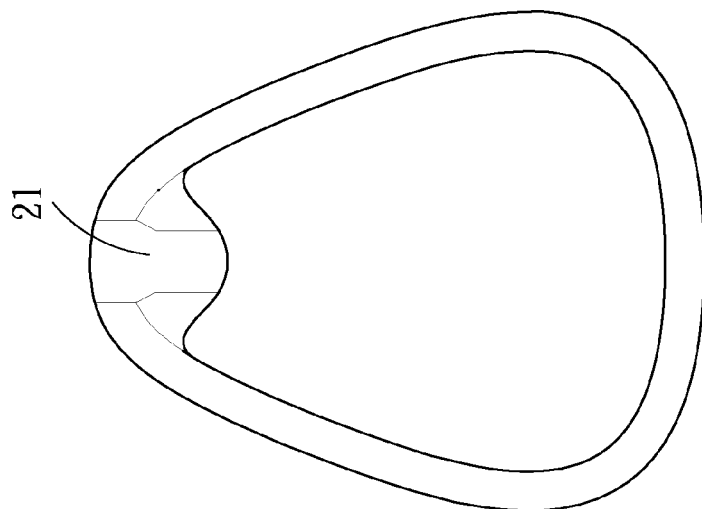


FIG. 4B

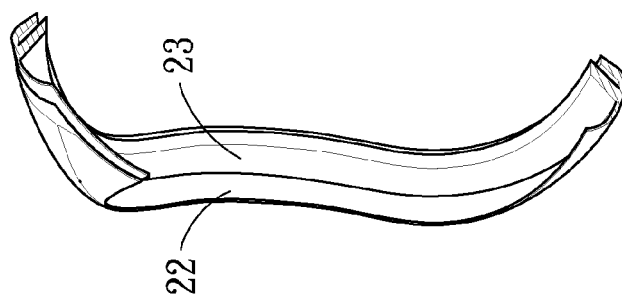


FIG. 4A



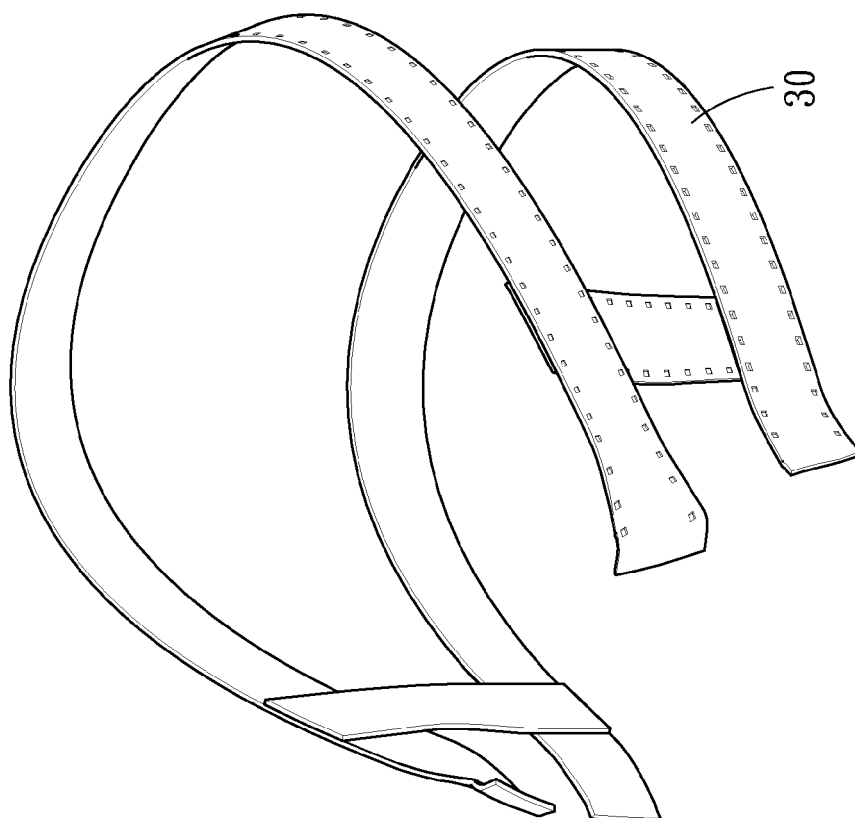


FIG. 5



## EUROPEAN SEARCH REPORT

Application Number  
EP 10 16 3425

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                               |                                                     |                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                                                                                                                                 | Relevant to claim                                   | CLASSIFICATION OF THE APPLICATION (IPC)         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EP 0 515 986 A1 (BETTER BREATHING INC [US]) 2 December 1992 (1992-12-02)<br>* column 3, line 8 - line 51 *<br>* column 4, line 8 - line 26 *<br>* figure 4 *                                                                                  | 1-5                                                 | INV.<br>A41D13/11<br>A62B18/02                  |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | US 2006/266364 A1 (TURDJIAN CREST [US]) 30 November 2006 (2006-11-30)<br>* paragraph [0019] - paragraph [0027];<br>figures *                                                                                                                  | 1-5                                                 |                                                 |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EP 1 614 361 A1 (MOLDEX METRIC INC [US]) 11 January 2006 (2006-01-11)<br>* paragraph [0025] *<br>* paragraph [0028] *<br>* figures 10-12 *                                                                                                    | 1-5                                                 |                                                 |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | WO 00/74509 A1 (3M INNOVATIVE PROPERTIES CO [US]) 14 December 2000 (2000-12-14)<br>* page 6, line 23 - line 29 *<br>* page 7, line 16 - line 20 *<br>* page 8, line 22 - page 9, line 22 *<br>* page 12, line 1 - line 7 *<br>* figures 1,2 * | 1-5                                                 |                                                 |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                               |                                                     | TECHNICAL FIELDS SEARCHED (IPC)<br>A41D<br>A62B |
| Place of search<br>The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                               | Date of completion of the search<br>15 October 2010 | Examiner<br>Nehrdich, Martin                    |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                                                                                                                               |                                                     |                                                 |

2

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 16 3425

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-10-2010

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) |               | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------|---------------------|
| EP 0515986                                | A1 | 02-12-1992          | AU                         | 1708492 A     | 26-11-1992          |
|                                           |    |                     | AU                         | 3901695 A     | 04-04-1996          |
|                                           |    |                     | CA                         | 2068925 A1    | 22-11-1992          |
|                                           |    |                     | DE                         | 69221386 D1   | 11-09-1997          |
|                                           |    |                     | DE                         | 69221386 T2   | 26-02-1998          |
|                                           |    |                     | JP                         | 3274705 B2    | 15-04-2002          |
|                                           |    |                     | JP                         | 5177006 A     | 20-07-1993          |
|                                           |    |                     | US                         | 5419318 A     | 30-05-1995          |
| -----                                     |    |                     |                            |               |                     |
| US 2006266364                             | A1 | 30-11-2006          | NONE                       |               |                     |
| -----                                     |    |                     |                            |               |                     |
| EP 1614361                                | A1 | 11-01-2006          | US                         | 2006005838 A1 | 12-01-2006          |
| -----                                     |    |                     |                            |               |                     |
| WO 0074509                                | A1 | 14-12-2000          | AU                         | 758657 B2     | 27-03-2003          |
|                                           |    |                     | AU                         | 6395599 A     | 28-12-2000          |
|                                           |    |                     | BR                         | 9917342 A     | 19-02-2002          |
|                                           |    |                     | CA                         | 2373032 A1    | 14-12-2000          |
|                                           |    |                     | CN                         | 1352532 A     | 05-06-2002          |
|                                           |    |                     | DE                         | 69919595 D1   | 23-09-2004          |
|                                           |    |                     | DE                         | 69919595 T2   | 15-09-2005          |
|                                           |    |                     | EP                         | 1185181 A1    | 13-03-2002          |
|                                           |    |                     | JP                         | 2003501121 T  | 14-01-2003          |
|                                           |    |                     | US                         | 6332465 B1    | 25-12-2001          |
| -----                                     |    |                     |                            |               |                     |