(19) Europäisches Patentamt
European Patent Office
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(11) **EP 2 781 167 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.09.2014 Bulletin 2014/39

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

(21) Application number: **13305354.6**

(22) Date of filing: **22.03.2013**

(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

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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) **Hood for cleanroom gown and corresponding cleanroom gown**

(57) This hood (6) for cleanroom gown (2) comprises a base body (8) defining an outside (O) and an inside (I) adapted to receive a head (10), the base body having a visor opening (12). The hood comprises a visor (16) and fixing means (18) adapted to releasably fix the visor to the base body over the visor opening.

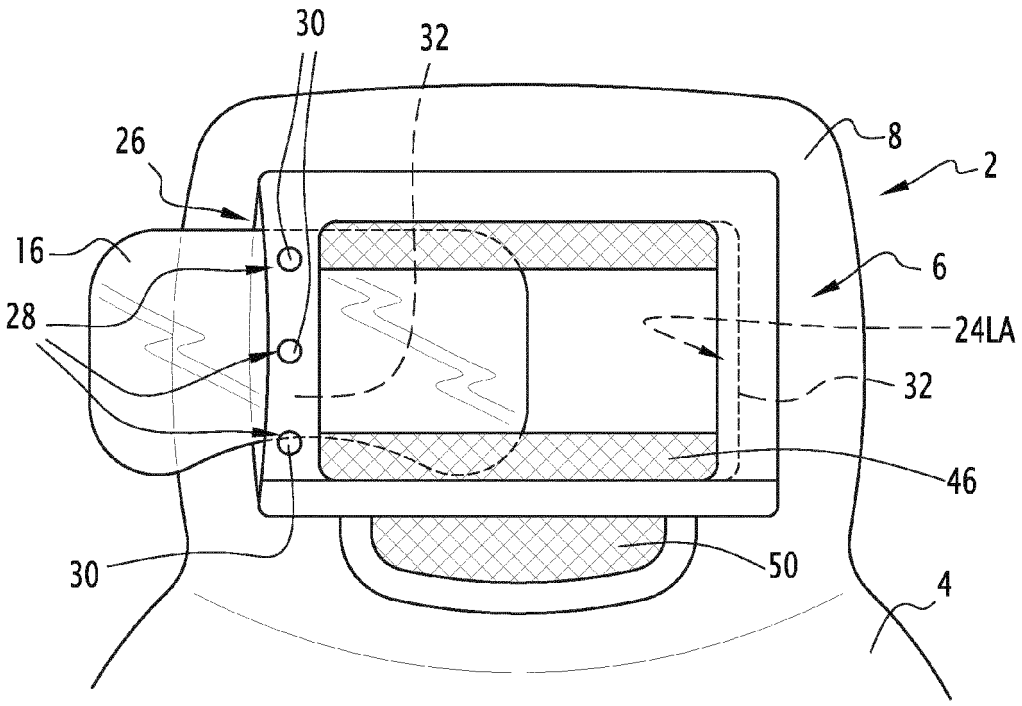

FIG.4

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Description

[0001] The present invention concerns a hood according to the preamble of claim 1 as well as a corresponding cleanroom gown according to the preamble of claim 11.

[0002] Cleanroom gowns are used in cleanrooms for protecting the object to be manipulated by an operator from dust and other microscopic particles carried by the operator. Example of cleanrooms are: packaging facilities for medicine items and manufacturing plants for microelectronic products, such as microchips.

[0003] The known cleanroom gowns comprise a hood having a visor opening. The visor is usually strapped around the head and is in the form of a goggle. The goggles are difficult to manipulate and tend to not seal the head completely off the outside.

[0004] Furthermore, goggles are not comfortable to wear by an operator and tend to get foggy.

[0005] The present invention intends to overcome one or more of these drawbacks and to create a hood for a clean room gown which has a high operational security. The hood should also ascertain a clear vision and should be comfortable to wear for the operator. Furthermore, the hood should be easy to clean. The hood should also be economic.

[0006] To this end, the object of the invention is a hood for cleanroom gown according to claim 1 as well as a cleanroom gown according to claim 11.

[0007] Useful embodiments are indicated in the depending claims.

[0008] The invention will be better understood in light of the following specification, which is only intended to be a non limiting example and which refers to the annexed drawings which show:

- figure 1 a schematic front view of the outside of a cleanroom gown according to the invention;
- figure 2 a flat view of the visor of the hood for cleanroom gown according to the invention;
- figure 3 a lateral cross-section of the cleanroom gown of figure 1 and a head of an operator, and
- figure 4 a view of the cleanroom gown similar to the view of figure 1, the visor being in a position during insertion into the fixing grooves.

[0009] Figure 1 shows a schematic outside view of the cleanroom gown according to the invention. The cleanroom gown has the general reference number 2.

[0010] The cleanroom gown comprises a body portion 4 and a hood 6, as well as non represented arms and legs.

[0011] The hood 6 comprises a base body 8. The base body 8 is preferably formed integrally with the body portion 4 of the gown. Alternatively, the cleanroom gown comprises a body portion and a hood, whereby the hood is separate, i.e. detached, from the body portion. Still alternatively, the body portion is in the form of a coat.

[0012] The hood 6 defines a hood central axis X-X, which extends substantially vertical or along the central axis of the head, when the hood is used by an operator.

[0013] The base body 8 confines an inside I adapted to receive a head 10 of an operator and delimits the inside with respect to an outside O (see Figure 3).

[0014] The base body 8 has also a visor opening 12. The visor opening 12 is substantially rectangular and extends in front of a region of the eyes of the operator when the hood 6 is worn.

[0015] The visor opening 12 defines a visor opening circumference 14, which is the circumference of the visor opening 12 seen from the outside O.

[0016] The hood 6 comprises furthermore a visor 16 and fixing means 18 adapted for releasably fixing the visor 16 to the base body 8 over the visor opening 12.

[0017] As can be seen on figure 2, the visor 16 is a transparent plate which is, in a non constraint configuration, completely flat or plane. The general shape of the visor 16 is rectangular with rounded corners and having a concave cut out 20 in one of the longer sides of the rectangle. The cut out 20 extends over the nose of the operator when the hood 6 is worn. The visor 16 has a visor circumference 22.

[0018] The visor 16 is integrally made, in particular in one piece, from plastic such as polycarbonate. Alternatively, the visor 16 is made from any other material usable for cleanroom use. The visor 16 is flexible and can be bent elastically into a concave shape.

[0019] The fixing means 18 are adapted to fix the visor 16 to the base body 8 substantially along the visor circumference 22 and in particular substantially along the complete visor circumference 22. The fixing means 18 are adapted to fix the visor 16 to the base body 8 along substantially the whole visor opening circumference 14.

[0020] To this end, the fixing means 18 comprise a fixing groove 24 extending around the visor opening 12 and adapted to receive the visor circumference 22, in particular adapted to receive the whole visor circumference 22.

[0021] The fixing groove 24 has an upper fixing groove part 24U, a lower fixing groove part 24LO, and two lateral side fixing groove parts 24LA.

[0022] The fixing means 18 define an insertion opening 26 (figure 4) and closing means 28 or fastening means adapted to close the insertion opening 26. In the fastened state of the closing means, the insertion opening 26 is closed and forms part of the fixing groove 24.

[0023] In the present case, the closing means 28 comprise press snap buttons 30. Alternatively or complementary, the closing means 28 can comprise a zipper and/or a hook-and-pile fastener (Velcro ® fastener) or any other closing means that can be closed and re-opened in a non destructive and reversible manner.

[0024] In the present instance, the insertion opening 26 and the closing means 28 are arranged on a lateral side of the visor opening 12 and extend substantially parallel to the hood central axis X-X.

[0025] The fixing means 18 are adapted to allow an insertion and/or retraction of the visor 16 into/from the

position in which the visor 16 is fixed to the base body 8 over the visor opening 12 by sliding. This can be seen on figure 4. When the closing means 28 are unfastened, the insertion opening 26 is open and the visor 16 is insertable through the insertion opening 26 into the fixing groove 24 by a sliding movement.

[0026] Furthermore, the base body 8 comprises abutments 32 for the visor 16. The abutments 32 are adapted to maintain the visor 16 in a pre-stressed bent configuration around the central axis X-X when the fixing means 18 fix the visor to the base body 8. In this bent configuration, the visor 16 is essentially in a part cylindrical shape. The abutments 32 are on one side defined by the bottom of the fixing groove 24 and on the opposite side by the closing means 28. The two abutments 32 are spaced apart an effective width WB, which is smaller than an effective width WV of the visor 16 when in the non constraint configuration. Consequently, when the closing means 28 are closed, the visor 16 is held in the pre-stressed bent configuration. Thus, the hood 6 has an ergonomic shape and is comfortable to wear.

[0027] The base body 8 comprises also one upper cushion 40 arranged on a forehead part of the base body 6. The base body 8 comprises two lower cushions 42 arranged on a cheek part of the base body. The upper cushion 40 and/or the lower cushions 42 is/are arranged on the inside I of the hood 6 with respect to the visor 16. The upper cushion 40 is inserted in a pocket 44 forming an inside part of the upper fixing groove part 24U.

[0028] The lower cushions 42 are each inserted in a pocket 46 forming an inside part of the lower fixing groove part 24LO.

[0029] The fixing groove 24 is at least partially defined by a vapor permeable fabric. In particular, the upper fixing groove part 24U comprises a vapor permeable groove screen 48 and /or the lower fixing groove part 24LO comprises a vapor permeable groove screen 50. The vapor permeable groove screen 48 respectively the vapor permeable groove screen 50 form an outside part of the upper respectively lower fixing groove parts 24U, 24LO. Alternatively, the lower fixing groove part 24LO can be without vapor permeable groove screen 50 and be completely made from the same cleanroom fabric than the remainder of the base body 8

[0030] The base body 8 comprises a vapor permeable nose screen 52 adapted to cover the nose of the operator. The base body 8 comprises also a vapor permeable mouth screen 54 arranged below the lower fixing groove part 24LO.

[0031] The vapor permeable fabric or the vapor permeable screens are made by filament polyester or any other material suitable for cleanroom use. The remainder of base body 8 is made of a fabric that is tighter than the vapor permeable fabric. The body portion 4 of the cleanroom gown is made from the same fabric as the remainder of the base body 8, which is for example cleanroom polyester filament fabric. The cleanroom polyester filament fabric can be with or without carbone. Alternatively, the body portion 4 of the cleanroom gown and the remainder of the base body 8, can be made from any other material suitable for cleanroom use. In any case, the fabrics or materials used are tight to dust.

[0032] The visor 16 is fixed to the base body by means of the following steps.

[0033] In an initial configuration, the visor 16 is in its flat non constraint configuration and completely outside the fixing groove 24. The insertion opening 26 is open and the closing means 28 are unfastened.

[0034] The visor 16 is slid through the insertion opening 26 into the fixing groove 24 until the visor 16 abuts against the abutment 32 opposite the opening 26.

[0035] Then, the visor 16 is bent around the axis X-X until the effective width of the visor 16 is smaller than the effective with WB of the abutments 32. In this configuration of the visor 16, the closing means 28 are closed or fastened.

[0036] Then the visor 16 can be released and the visor rests in the pre-stressed bent configuration against the abutments 32.

[0037] In the present embodiment, the sliding direction of the visor 16 during insertion, i.e. the insertion sliding direction, defined by the fixing means 18 is directed laterally with respect to the central axis X-X, more precisely from right to left when viewed from a user inside the hood (i.e. from left to right on Figure 4). Alternatively, the insertion sliding direction of the visor 16 can be laterally from left to right when viewed from a user inside the hood (i.e. from right to left on Figure 4). In this latter case, the insertion opening 26 and the abutment 32 are exchanged with respect to the embodiment on the figures.

[0038] Still alternatively, the insertion sliding direction defined by the fixing means 18 is directed parallel to the central axis X-X, namely from top to bottom of the hood or from bottom to top of the hood. In this case, the insertion opening 26 is placed either on the top of the visor opening 12 in replacement of the upper fixing groove part 24U or on the bottom of the visor opening in replacement of the lower fixing groove part 24LO.

[0039] The expressions "top" and "bottom" are used with reference of the hood during normal use.

[0040] The hood 6 according to the invention is easy to manufacture and easy to maintain. The base body 8 is easy to clean as the visor 16 can be rapidly released from the base body 8.

[0041] Also, the visor 16 is economic in manufacture and can be readily replaced if damaged.

[0042] As no goggles are necessary and thanks to the cushions 40, 42, the hood 6 is ergonomic.

Claims

1. Hood (6) for cleanroom gown (2), the hood comprising a base body (8) defining an outside (O) and an inside (I) adapted to receive a head (10), the hood defining a hood central axis (X - X), and the base

body having a visor opening (12), **characterized in that** the hood comprises a visor (16) and fixing means (18) adapted to releasably fix the visor to the base body over the visor opening.

2. Hood for cleanroom gown according to claim 1, wherein the visor comprises a visor circumference (22) and the fixing means are adapted to fix the visor (16) to the base body along the visor circumference.

3. Hood for cleanroom gown according to claim 2, wherein the fixing means comprise a fixing groove (24) extending around the visor opening (12) and adapted to receive the visor circumference (22).

4. Hood for cleanroom gown according to any one of claims 1 to 3, wherein the fixing means define an insertion opening (26) and the fixing means comprise closing means (28) adapted to close the insertion opening, in particular the closing means comprising press snap buttons (30) and/or a zipper and/or a hook-and-pile fastener (Velcro ® fastener).

5. Hood for cleanroom gown according to any one of claims 1 to 4, wherein the fixing means (18) are adapted to allow an insertion and/or retraction of the visor by sliding.

6. Hood for cleanroom gown according to claim 5, wherein the fixing means (18) define an insertion sliding direction, which is the sliding direction of the visor (16) during insertion, this direction being directed either essentially laterally or parallel to the hood central axis, in particular the insertion sliding direction being from left to right, from right to left, from top to bottom or from bottom to top of the hood.

7. Hood for cleanroom gown according to any one of claims 1 to 6, wherein the base body comprises abutments (32) for the visor, the abutments being adapted to maintain the visor (16) in a bent configuration around the hood central axis

8. Hood for cleanroom gown according to any one of the previous claims, wherein the base body (8) comprises at least one cushion (40) arranged on a forehead part of the base body and/or at least two cushions (42) arranged on a cheek part of the base body.

9. Hood for cleanroom gown according to claim 8, wherein one or all of the cushions (40, 42) is/are arranged on the inside of the base body with respect to the visor.

10. Hood for cleanroom gown according to any of the previous claims, wherein the visor (16) is made from plastic, in particular transparent plastic.

11. Cleanroom gown according to any of the previous claims, wherein the cleanroom gown comprises a body portion (4), arms, legs and a hood (6), **characterized in that** the hood is a hood according to any one of claims 1 to 10.

Amended claims in accordance with Rule 137(2) EPC.

1. Hood (6) for cleanroom gown (2), the hood comprising a base body (8) defining an outside (O) and an inside (I) adapted to receive a head (10), the hood defining a hood central axis (X - X), and the base body having a visor opening (12), the hood comprises a visor (16) and fixing means (18) adapted to releasably fix the visor to the base body over the visor opening, the base body comprising abutments (32) for the visor, **characterized in that**
the abutments are adapted to maintain the visor (16) in a bent configuration around the hood central axis and **in that**
the visor rests in the pre-stressed bent configuration against the abutments.

2. Hood for cleanroom gown according to claim 1, wherein the visor comprises a visor circumference (22) and the fixing means are adapted to fix the visor (16) to the base body along the visor circumference.

3. Hood for cleanroom gown according to claim 2, wherein the fixing means comprise a fixing groove (24) extending around the visor opening (12) and adapted to receive the visor circumference (22).

4. Hood for cleanroom gown according to any one of claims 1 to 3, wherein the fixing means define an insertion opening (26) and the fixing means comprise closing means (28) adapted to close the insertion opening, in particular the closing means comprising press snap buttons (30) and/or a zipper and/or a hook-and-pile fastener (Velcro ® fastener).

5. Hood for cleanroom gown according to any one of claims 1 to 4, wherein the fixing means (18) are adapted to allow an insertion and/or retraction of the visor by sliding.

6. Hood for cleanroom gown according to claim 5, wherein the fixing means (18) define an insertion sliding direction, which is the sliding direction of the visor (16) during insertion, this direction being directed either essentially laterally or parallel to the hood central axis, in particular the insertion sliding direction being from left to right, from right to left, from top to bottom or from bottom to top of the hood.

7. Hood for cleanroom gown according to any one

of claims 1 to 6, wherein the visor (16) is a transparent plate which is, in a non constraint configuration, completely flat or plane.

8. Hood for cleanroom gown according to any one of the previous claims, wherein the base body (8) comprises at least one cushion (40) arranged on a forehead part of the base body and/or at least two cushions (42) arranged on a cheek part of the base body.

9. Hood for cleanroom gown according to claim 8, wherein one or all of the cushions (40, 42) is/are arranged on the inside of the base body with respect to the visor.

10. Hood for cleanroom gown according to any of the previous claims, wherein the visor (16) is made from plastic, in particular transparent plastic.

11. Cleanroom gown according to any of the previous claims, wherein the cleanroom gown comprises a body portion (4), arms, legs and a hood (6), **characterized in that** the hood is a hood according to any one of claims 1 to 10.

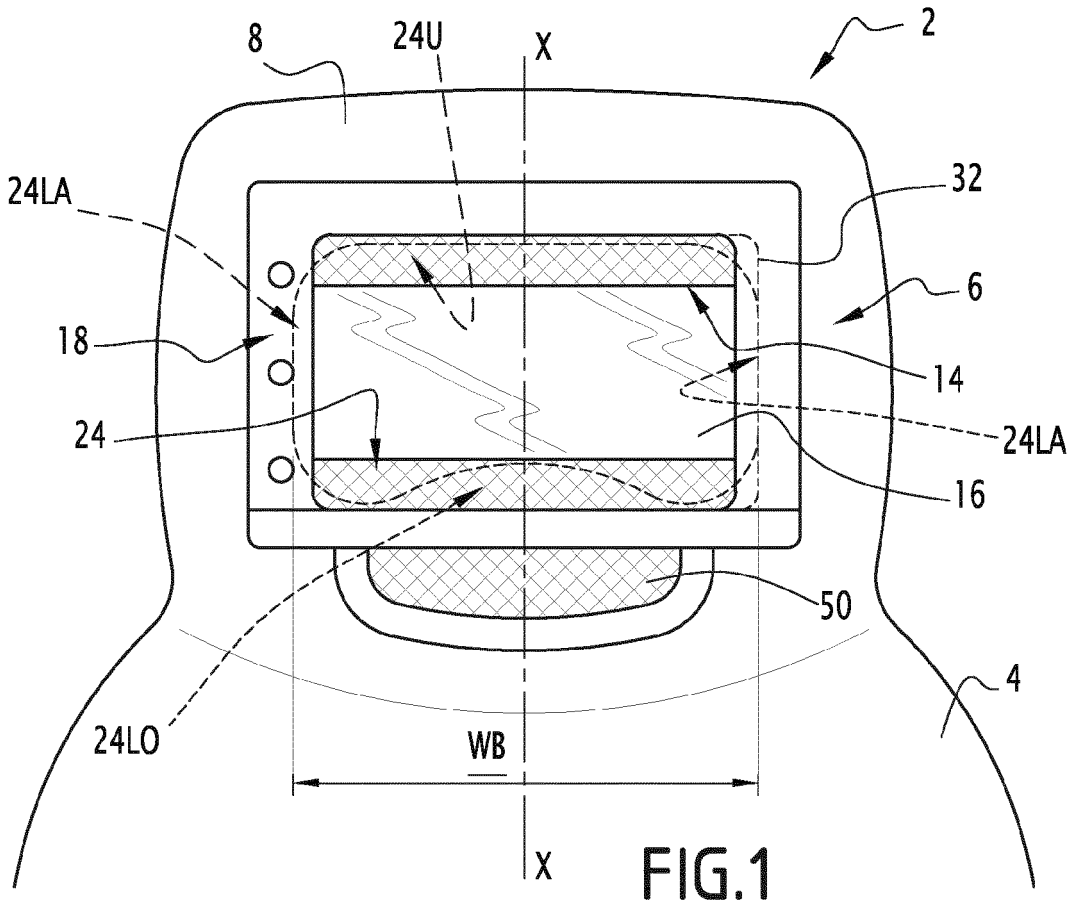

FIG.1

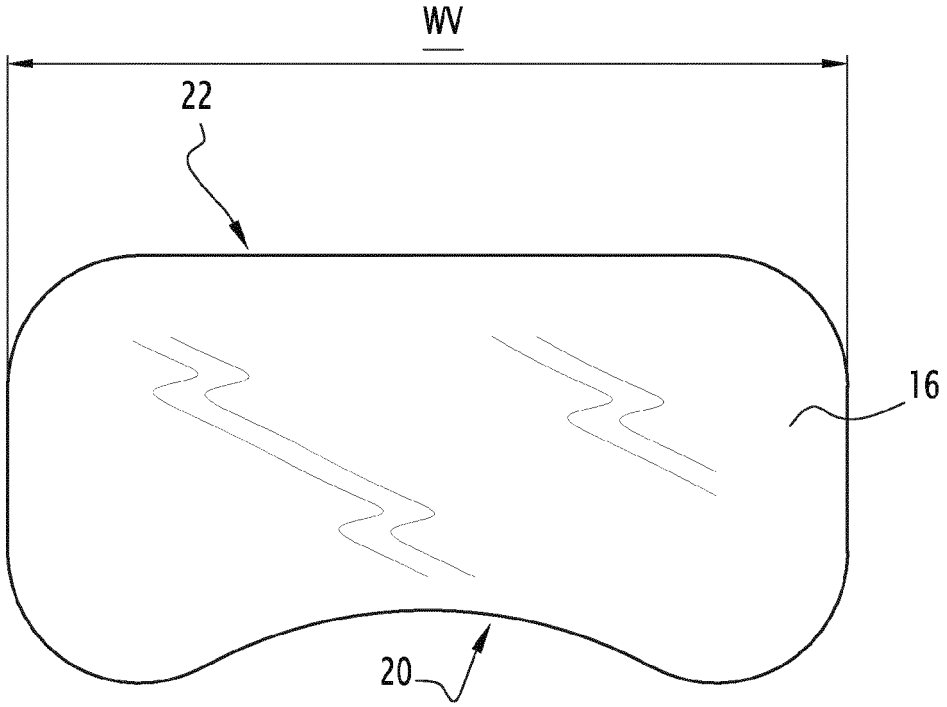

FIG.2

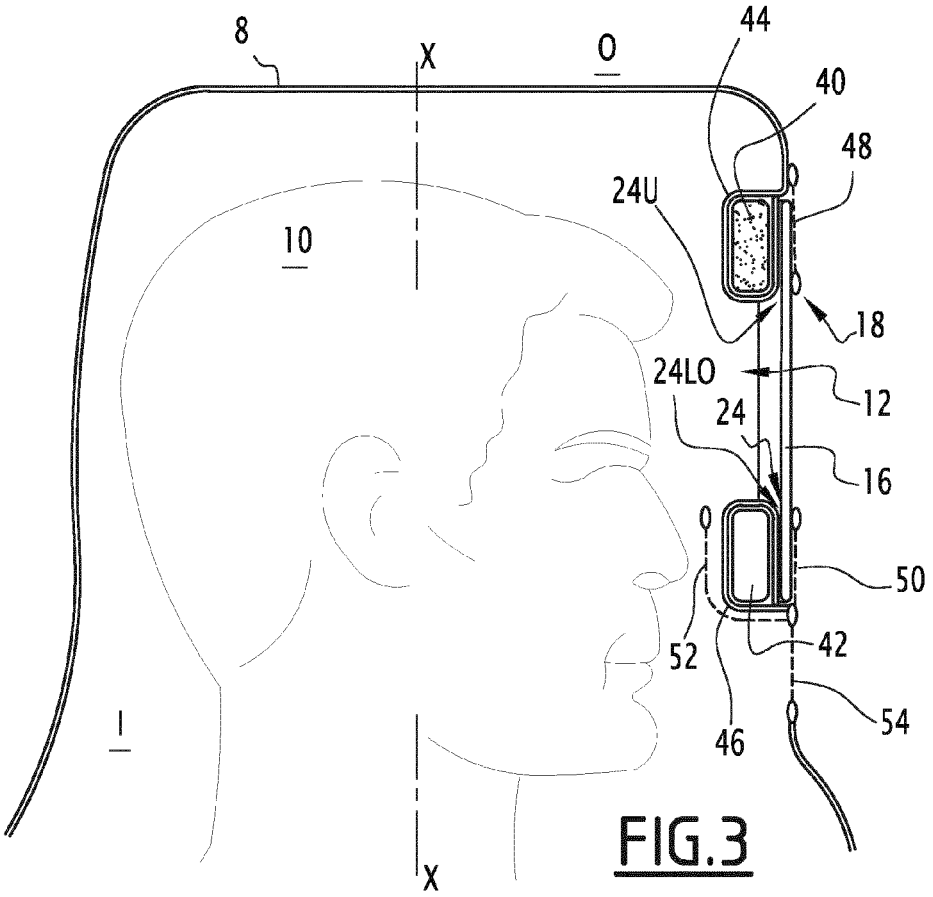
8
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FIG.3

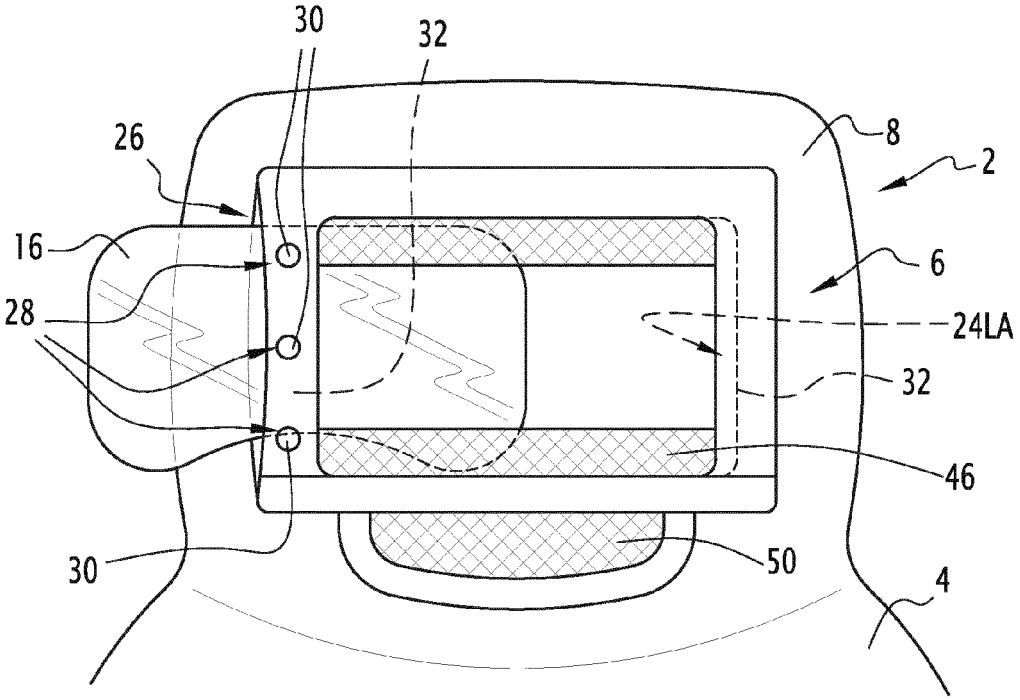
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FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 13 30 5354

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	JP 2003 049312 A (MIDORI ANZEN CO LTD) 21 February 2003 (2003-02-21) * abstract; claims 1-3; figures 1,2 *	1-11	INV. A41D13/11
X	US 2 529 106 A (SCHAUWEKER GEORGE H) 7 November 1950 (1950-11-07) * column 3, line 41 - column 4, line 15; figures 1,7 *	1-7,10	
X	US 4 901 716 A (STACKHOUSE WYMAN H [US] ET AL) 20 February 1990 (1990-02-20) * column 4, line 29 - column 5, line 20; claims 1,2; figures 1,3,6-9,11,12 *	1,2,4, 8-11	
A	GB 1 208 284 A (CHARNLEY JOHN) 14 October 1970 (1970-10-14) * page 2, line 49 - line 119; claims 1-16; figures 1-4 *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			A41D A62B A42B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 July 2013	Simpson, Estelle

CATEGORY OF CITED DOCUMENTS

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16-07-2013

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US 2529106 A	07-11-1950	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82