(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 750 817 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.12.2020 Bulletin 2020/51

(51) Int Cl.:
B65B 7/28 *(2006.01)* ***B65D 51/18*** *(2006.01)*
B65D 77/20 *(2006.01)*

(21) Application number: **20178952.6**

(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

(30) Priority: **13.06.2019 IT 201900008853**

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(54) SUPPORT AND METHOD FOR SEALING A MULTILAYER MEMBRANE TO A MAIN BODY OF A CARTRIDGE ADAPTED TO CONTAIN A CHARGE OF LIQUID FRAGRANCE, AND CORRESPONDING CARTRIDGE

(57) A support (1) for sealing a multilayer membrane (4) to a main body (3) of a cartridge (2) adapted to contain a charge of liquid fragrance, such support (1) has a vertical axis (X-X), a bottom surface (11) and an opposite top surface (12) arranged transverse to such vertical axis (X-X) of the support (1), such support (1) comprises: at least one seat (13) defined on the top surface (12) of the support (1) and configured to contain at least partially the main body (3) of a cartridge (2); a recess (14) defined on the top surface (12) of the support (1), spaced apart from the seat (13) and configured to support a first portion (31) of the main body (3); a groove (15) defined on the top surface (12) of the support (1) and interposed between the seat (13) and the recess (14).

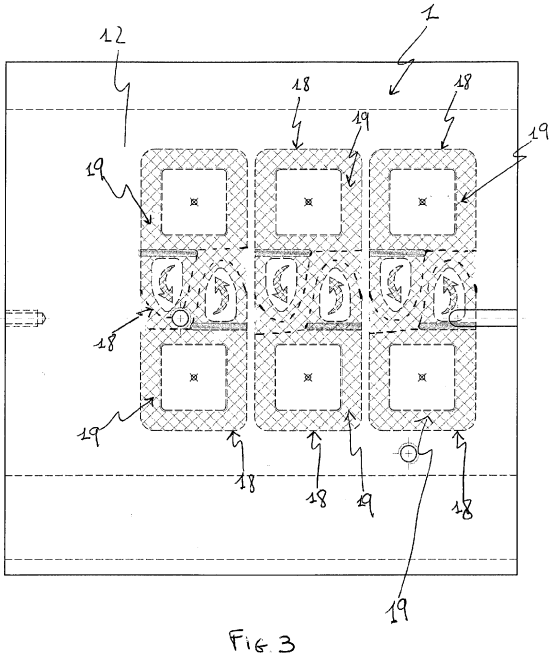

Fig. 3

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Description

Field of the invention

[0001] The present invention relates to a support and method for sealing a multilayer membrane to a main body of a cartridge adapted to contain a charge of liquid fragrance. This sealing support and corresponding sealing method are particularly used in manufacturing cartridges containing liquid fragrance, for air fresheners.

Background art

[0002] Cartridges containing liquid fragrance are known in the art. These cartridges comprise a main body which extends between a base and a top opposite thereto along a center axis. In detail, the main body comprises a pocket extending from the base to an opening at the top and configured to contain the charge of liquid fragrance.

[0003] The cartridge also comprises a multilayer membrane sealed to the main body. In detail, this multilayer membrane comprises a first layer of osmotic membrane and a second layer of aluminum.

[0004] More in detail, the top of the main body has a first portion, spaced apart from the opening of the pocket, and a sealing region that surrounds the opening of the pocket and is placed between the first portion and the opening. The multilayer membrane is sealed to the top of the main body at least at the sealing region of the top. Furthermore, the multilayer membrane extends at least partially on the first portion of the top. This first portion allows removal of the second layer of aluminum.

[0005] In order to use the cartridge, the second layer of aluminum is removed from the main body, by tearing it off from the first portion of the top. Following this removal, the first layer of osmotic membrane retains the liquid fragrance inside the pocket while allowing the passage of the aeriform substances produced by the liquid fragrance, i.e. allowing diffusion of the scent of the liquid fragrance.

[0006] One example of a prior art cartridge is disclosed in US5518790.

[0007] A support for sealing a multilayer membrane to a main body of a cartridge is also known. This support comprises a seat whose surface size and depth are complementary to the pocket of the main body. The support further comprises a recess defined on the top surface of the support, and whose surface extent is complementary to the first portion of the top of the main body.

[0008] The multilayer membrane is sealed to the main body, by first introducing the latter into the support so that the pocket fits in the seat, while the first portion is superimposed on the recess. Once the multilayer membrane has been laid on the top of the main body contained in the support, the multilayer membrane is heat-sealed to the main body, in particular to the top, by pressing a heating plate on the multilayer membrane.

[0009] One example of a prior art sealing support is disclosed in US5439100.

Problem of the prior art

[0010] One drawback of the use of prior art cartridges is that the removal of the second layer of aluminum of the membrane may also cause simultaneous removal of the first layer of osmotic membrane. Thus, in order to use the cartridge, the user applies a pulling force to the aluminum layer at the first portion of the top of the main body. Due to the adhesion between the aluminum layer and the osmotic membrane, this pulling force is transferred to the osmotic membrane. If the transferred pulling force is greater than the adhesion of the membrane to the main body, the osmotic membrane will tend to be peeled off with the layer of aluminum.

[0011] As a result, the liquid fragrance will no longer be retained inside the pocket, and will be free to leak out of it, thereby affecting the integrity of the cartridge.

Summary of the invention

[0012] In this context, the technical purpose of the present invention is to provide a support and a method for sealing a multilayer membrane to a main body of a cartridge adapted to contain a charge of liquid fragrance that can overcome the drawbacks of the prior art.

[0013] In particular, an object of the present invention is to provide a sealing support and a corresponding sealing method that can effectively seal the multilayer membrane to the main body, while allowing the osmotic membrane to be stably attached to the main body even after removal of the layer of aluminum.

[0014] The aforementioned technical purpose and objects are substantially fulfilled by a sealing support and a corresponding sealing method that comprise the technical features as disclosed in one or more of the accompanying claims.

Advantages of the Invention

[0015] In particular, a sealing support of the present invention has a vertical axis, a bottom surface and an opposite top surface arranged transverse to the vertical axis of the support.

[0016] The support comprises at least one seat defined on the top surface of the support and configured to at least partially contain a main body of a cartridge.

[0017] In addition, the support comprises a recess defined on the top surface of the support, spaced from the seat and configured to support a first portion of the main body.

[0018] Moreover, the support comprises a groove formed on the top surface of the support and interposed between the seat and the recess.

[0019] Preferably, in order to seal a multilayer membrane to a main body of a cartridge, the main body of the

cartridge is introduced into the support. A charge of fragrance is introduced inside the pocket of the main body and then a multilayer membrane is heat-sealed to the top of the main body. In particular, the support allows the multilayer membrane not to be sealed to the portion of the main body superimposed on the groove. Advantageously, this non-sealed portion of the membrane ensures proper removal of the layer of aluminum, while avoiding removal of the osmotic membrane. In particular, this non-sealed portion of the membrane prevents the pulling force exerted by a user to remove the aluminum layer from being transferred to the osmotic membrane.

BIEF DESCRIPTION OF THE DRAWINGS

[0020] Further features and advantages of the present invention will result more clearly from the illustrative, non-limiting description of a preferred, non-exclusive embodiment of a support and a method for sealing a multilayer membrane to a main body of a cartridge adapted to contain a charge of liquid fragrance as shown in the annexed drawings, in which:

- Figure 1 is a side view of a cartridge of the present invention;
- Figure 2 is a top view of a detail of the cartridge of Figure 1;
- Figure 3 is a top view of a support for sealing a multilayer membrane of the present invention;
- Figure 3a is an enlarged top view of a detail of the support of Figure 3;
- Figure 4 is a side and partially sectional view of the support of Figure 3.

DETAILED DESCRIPTION

[0021] Particularly referring to the accompanying figures, reference numeral 2 designates a cartridge adapted to contain a charge of liquid fragrance.

[0022] This cartridge 2 comprises a main body 3 comprising a base 32 and an opposite top 33 arranged along a center axis K-K. Preferably, the base 32 and the top 33 are arranged parallel to each other and transverse to the center axis K-K. In other words, the base 32 and the top 33 extend at least along a transverse direction Z-Z perpendicular to the center axis K-K.

[0023] The main body 3 comprises a pocket 34 having an opening 341 located at the top 33 of the main body 3 and configured to contain a charge of liquid fragrance. This pocket 34 extends from the base 32 to the top 33 along the center axis K-K.

[0024] More in detail, the main body 3 has a first sealing region 35 surrounding the opening 341 of the pocket 34. Preferably, this first sealing region 35 is concentric with the opening 341 of the pocket 34. The first sealing region 35 has a first side 351 and an opposite second side 352 arranged along the transverse direction Z-Z. The opening 341 is interposed between the first side 351 and the second side 352 of the first sealing region 35.

[0025] The main body 3 also has a first portion 31 located at the top 33 and spaced apart from the opening 341 of the pocket 34. Preferably, the first portion 31 is formed with a tab shape.

[0026] More in detail, the main body 3 has a second sealing region 36 at the first portion 31. Preferably, the second sealing region 36 at least partially surrounds the first portion 31. The second sealing region 36 has a first side 361 and a second side 362 arranged along the transverse direction Z-Z. Preferably, the first portion 31 is interposed between the first side 361 and the second side 362 of the second sealing region 36.

[0027] In addition, the main body 3 has a connecting region 37 extending between the first sealing region 35 and the second sealing region 36. In particular, the connecting region 37 has a first edge 371 and a second edge 372 arranged along the transverse direction Z-Z. In particular, the first edge 371 of the connecting region 37 is placed at the first side 351 of the first sealing region 35 and at the first side 361 of the second sealing region 36. In other words, the first edge 371 of the connecting region 37 connects the first side 351 of the first sealing region 35 to the first side 361 of the second sealing region 36. On the other hand, the second edge 372 of the connecting region 37 is arranged at the second side 362 of the second sealing region 36 and is spaced apart from the second side 351 of the first sealing region 35 along the transverse direction Z-Z.

[0028] Therefore, the connecting region 37 is interposed between the opening 341 of the pocket 34 and the first portion 31. The first portion 31 projects out of the connecting region 37 away from the opening 341 of the pocket 34. Preferably, the connecting region 37 is spaced apart from the first portion 31 of the main body 3.

[0029] The cartridge comprises a multilayer membrane 4 that is heat-sealed to the main body 3. Preferably, this multilayer membrane 4 comprises a first layer of osmotic membrane 41 and a second layer of aluminum 42. The first layer of osmotic membrane 41 directly contacts the top 33 of the main body 3, whereas the second layer of aluminum 42 is superimposed on the first layer of osmotic membrane 41. In particular, the first layer of osmotic membrane 41 allows the liquid fragrance to be retained inside the pocket 34, while allowing release of the aeriform substances produced by the liquid fragrance. On the other hand, the second layer of aluminum 42 can preserve the scent of the liquid fragrance contained in the pocket 34, by not allowing the release of the aeriform substances produced by the liquid fragrance. As further explained hereinafter, in order to use the cartridge 2 the second layer of aluminum 42 must be removed.

[0030] The multilayer membrane 4 is heat-sealed to the top 33 of the main body 3. In particular, the multilayer membrane 4 is heat-sealed to the main body 3 at the first 35 and the second 36 sealing regions of the main body 3. In addition, the multilayer membrane 4 is not heat-sealed to the connecting region 37 of the main body 3.

Furthermore, the multilayer membrane 4 is at least partially superimposed on the first portion 31. In other words, the multilayer membrane 4 is heat-sealed to the first 35 and the second 36 sealing regions only. Yet in other words, the multilayer membrane 4 is not heat-sealed to the main body 3 at the opening 341 of the pocket 34, at the first portion 31 and at the connecting region 37.

[0031] In order to use the cartridge 2, the user must remove the second aluminum layer 42 by tearing it off from the first portion 31. In other words, the user applies a pulling force to the second layer of aluminum 42 from the first portion 31. Due to the presence of a portion of the multilayer membrane 4 interposed between the first sealing region 35 and the second sealing region 36 and not heat-sealed to the main body 3, the pulling force is not transferred to the first layer of osmotic membrane 41 superimposed on the opening 341 of the pocket 34. This first layer of osmotic membrane 41 remains stably fixed to the top 33 of the main body 3. That is, this portion of the membrane that is not heat-sealed to the main body 3 avoids excessive adhesion to occur between the first layer of osmotic membrane 41 and the second layer of aluminum 42. Advantageously, following removal of the second layer of aluminum 42, the liquid fragrance is retained inside the pocket 34 by the first layer of osmotic membrane 41, which at the same time allows release of the scent of the fragrance.

[0032] The present invention also relates to a support 1 for sealing the multilayer membrane 4 to the main body 3 of the cartridge 2. The support 1 has a vertical axis X-X, a bottom surface 11 and an opposite top surface 12 arranged transverse to the vertical axis X-X of the support 1. The term vertical axis X-X is intended as the axis that is substantially vertically oriented when the support 1 is in use.

[0033] In particular, the support 1 comprises at least one seat 13 defined on the top surface 12 of the support 1 and configured to at least partially contain the main body 3 of the cartridge 2. Preferably, the seat 13 is configured to contain the pocket 34 of the main body 3. In other words, the seat 13 has an opening 131 at the top surface 12 of the support 1. The pocket 34 of the main body 3 is adapted to be introduced into the seat 13 through the corresponding opening 131. Still preferably, the seat 13 is complementary in size and shape to the pocket 34 of the main body 3. In other words, the seat 13 matches the pocket 34 of the main body 3.

[0034] More the detail, the support has a first sealing surface 16 that surrounds the seat 13. This first sealing surface 16 is defined on the top surface 12 of the support 1. Preferably, this first sealing surface 16 is concentric with the opening 131 of the seat 13. Still preferably, the shape and size of the first sealing surface 16 match the shape and size of the first sealing region 35 of the main body 3.

[0035] The support 1 also comprises a recess 14 formed on the top surface 12 of the support 1 and spaced apart from the seat 13. This recess 14 is configured to support a first portion 31 of the main body 3. Preferably, the shape and size of the recess 14 at the top surface 12 of the support 1 match the shape and size of the first portion 31 of the main body 3.

[0036] More in detail, the support 1 has a second sealing surface 17 located at the recess 14. This second sealing surface 17 is defined on the top surface 12 of the support 1. Preferably, the second sealing surface 17 at least partially surrounds the recess 14. Still preferably, the shape and size of the second sealing surface 17 match the shape and size of the second sealing region 36.

[0037] In addition, the support comprises a groove 15 formed on the top surface 12 of the support 1 and interposed between the seat 13 and the recess 14. In particular, the groove 15 extends between the first sealing surface 16 and the second sealing surface 17. Preferably, the shape and size of the groove 15 at the top surface 12 of the support 1 match the shape and size of the connecting region 37 of the main body 3.

[0038] More in detail, the groove 15 extends in a main longitudinal direction Y-Y. This main longitudinal direction Y-Y is perpendicular to the vertical axis X-X of the support 1. The groove 15 also has a first end 151 and a second end 152 arranged along the main longitudinal direction Y-Y. Preferably, the first end 151 and the second end 152 are opposite to each other and arranged transverse to the main longitudinal direction Y-Y.

[0039] In particular, the recess 14 is interposed between the first end 151 and the second end 152 of the groove 15 along the main longitudinal direction Y-Y. In other words, the recess 14 is externally interposed between the first end 151 and the second end 152 of the groove 15. Yet in other words, the recess 14 is interposed between the first end 151 and the second end 152 of the groove 15 and is spaced apart from the groove 15.

[0040] Preferably, the groove 15 has a depth that ranges from 5% to 10% of the extent of the groove 15 along the main longitudinal direction Y-Y of the groove 15.

[0041] The support 1 also has at least one sealing perimeter 18 surrounding the first 16 and second 17 sealing surfaces and the recess 14. More in detail, this sealing perimeter 18 surrounds the first 16 and second 17 sealing surfaces, the recess 14 and the groove 15. The sealing perimeter 18 is defined on the top surface of the support 1.

[0042] In particular, the ends 151, 152 of the groove 15 are arranged along the sealing perimeter 18. More in detail, the ends 151, 152 are arranged along opposite sides 181 of the sealing perimeter 18.

[0043] According to a preferred embodiment, the support 1 comprises a plurality of sealing units 19 distributed on the top surface 12 of the support 1. Each sealing unit 19 comprises a seat 13, a recess 14 and a groove 15. In detail, each sealing unit 19 is defined by a respective sealing perimeter 18. Therefore, it will be appreciated that a plurality of cartridges 2 may be simultaneously produced with the plurality of sealing units 19.

[0044] The present invention finally relates to a method

of manufacturing the cartridge 2. In particular, this method relates to sealing the multilayer membrane 4 to the main body 3 of the cartridge 2.

[0045] In detail, the method comprises the step of providing the support 2 for sealing the multilayer membrane 4 to the main body 3 of the cartridge 2.

[0046] Then, the main body 3 of the cartridge 2 is placed into the support 1, with the pocket 34 received in the seat 13, the first portion 31 contacting the recess 14 and the connecting region 37 superimposed on the groove 15. In the preferred embodiment, a single element (not shown) comprising six main bodies 3 connected together is introduced into the support 1.

[0047] More in detail, for each main body 3, the first sealing region 35 and the second sealing region 36 of the main body 3 are laid on the first sealing surface 16 and the second sealing surface 17 of the support 1 respectively. In yet further detail, the first edge 371 and the second edge 372 of the connecting region 37 of the main body 3 are laid on the first end 151 and the second end 152 of the groove 15 respectively.

[0048] Then, the pocket 34 of each main body 3 is filled with a charge of liquid fragrance, namely to the edge of the opening 341 of the pocket 34.

[0049] Subsequently, the multilayer membrane 4 is placed on the top 33 of the main body 3 accommodated in the support 1. In detail, the multilayer membrane 4 is laid on the top 33 of the main body 3 to cover the opening 341 of the pocket 34, the first sealing region 35 and the second sealing region 36, the connecting region 37 and the first portion 31 of the main body 3. In the preferred embodiment, a single multilayer membrane 4 is laid on the top 33 of each main body 3 inserted in the support 1.

[0050] Then, a heating plate (not shown) is applied to the multilayer membrane 4, to heat-seal the multilayer membrane 4 to the top 33 of each main body 3. In particular, heat-sealing is carried out at the first 35 and the second 36 sealing regions of the top 33 of the main body 3. It shall be noted that the multilayer membrane 4 is not heat-sealed to the main body 3 at the connecting region 37 of the main body 3. In the preferred embodiment, the multilayer membrane 4 is heat-sealed to the top 33 of each main body 3 inserted in the support 1 simultaneously.

[0051] Therefore, it should be noted that as the pocket 34 of the main body 3 is introduced into the seat 13 of the support 1, as the first portion 31 of the main body 3 is superimposed on the recess 14 of the support 1 and the as the second connecting region 37 of the main body 3 is superimposed on the groove 15 of the support 1, the multilayer membrane 4 is heat-sealed to the first 35 and the second 36 sealing regions of the main body only.

[0052] Finally, the multilayer membrane 4 heat-sealed to the main body 3 is cut at the sealing perimeter 18. In the preferred embodiment, cutting can also separate the main bodies 3.

Claims

1. A support for sealing (1) a multilayer membrane (4) to a main body (3) of a cartridge (2) adapted to contain a charge of liquid fragrance, said support (1) having a vertical axis (X-X), a bottom surface (11) and an opposite top surface (12), arranged transverse to said vertical axis (X-X) of the support (1), said support (1) comprising:

   - at least one seat (13) defined on the top surface (12) of the support (1) and configured to at least partially contain said main body (3) of a cartridge (2);
   - a recess (14) defined on the top surface (12) of the support (1) and spaced apart from the seat (13), said recess (14) being configured to support a first portion (31) of the main body (3);

   characterized in that it comprises:

   - a groove (15) defined on the top surface (12) of the support (1) and interposed between the seat (13) and the recess (14).

2. A support (1) as claimed in claim 1, wherein the groove (15) extends in a main longitudinal direction (Y-Y) and has first (151) and second (152) ends, the first (151) and the second (152) ends being arranged along said main longitudinal direction (Y-Y).

3. A support (1) as claimed in claim 2, wherein the recess (14) is interposed between the first (151) and second (152) ends of the groove (15) along said main longitudinal direction (Y-Y).

4. A support (1) as claimed in claim 2 or 3 having a first sealing surface (16) surrounding the seat (13), a second sealing surface (17) placed at the recess (14), at least one sealing perimeter (18) surrounding said sealing surfaces (16, 17) and said recess (14); said groove (15) extending between the first (16) and second (17) sealing surfaces.

5. A support (1) as claimed in claim 4, wherein the ends (151, 152) of said groove (15) are arranged along said sealing perimeter (18).

6. A support (1) as claimed in any of claims 2 to 5, wherein the groove (15) has a depth ranging from 5% to 10% the extent of the groove (15) in the main longitudinal direction (Y-Y).

7. A support (1) as claimed in claim 4 or 5, wherein the support (1) comprises a plurality of sealing units (19) distributed on the top surface (12) of the support (1), each sealing unit (19) being defined by a respective sealing perimeter (18).

8. A method of manufacturing a cartridge (2) adapted to contain a charge of liquid fragrance, said method comprising the steps of:

- providing a main body (3), which comprises a base (32) and an opposite top (33) arranged transverse to a center axis (K-K), said main body (3) comprising a pocket (34) with an opening (341) placed at the top (33) of the main body (3), said main body (3) having a first portion (31) placed at said top (33) and spaced apart from the opening (341) of the pocket (34), a first sealing region (35) surrounding the opening (341) of the pocket (34), a second sealing region (36) located at the first portion (31) and a connecting region (37) extending between the first (35) and the second (36) sealing regions;
- filling the pocket (34) with a charge of liquid fragrance;
- heat-sealing a multilayer membrane (4) to the main body (3) at the first (35) and the second (36) sealing regions of the top (33) of the main body (3);

characterized by:

- not heat-sealing the multilayer membrane (4) to the main body (3) at the connecting region (37) of the main body (3)

9. A method as claimed in claim 8, wherein the step of heat-sealing the multilayer membrane (4) to the main body (3) comprises the sub-steps of:

- providing a sealing support (1) as claimed in any of claims 1 to 7;
- placing the main body (3) in the support (1), with the pocket (34) received in the seat (13), the first portion (31) contacting the recess (14) and the connecting region (37) superimposed the groove (15);
- positioning the multilayer membrane (4) on the top (33) of the main body (3) accommodated in the support (1);
- applying a heating plate on the multilayer membrane (4) to heat-seal the multilayer membrane (4) to the top (33) of the main body (3).

10. A cartridge (2) adapted to contain a charge of liquid fragrance, said cartridge (2) comprising:

- a main body (3), which comprises a base (32) and an opposite top (33) arranged along a center axis (K-K), said main body (3) comprising a pocket (34) with an opening (341) placed at the top (33) of the main body (3) and configured to contain a charge of liquid fragrance, said main body (3) having a first portion (31) placed at said top (33) and spaced apart from the opening (341) of the pocket (34), a first sealing region (35) surrounding the opening (341) of the pocket (34), a second sealing region (36) located at the first portion (31) and a connecting region (37) extending between the first (35) and the second (36) sealing regions;
- a multilayer membrane (4) that is heat-sealed to the main body (3) at the first (35) and the second (36) sealing regions of the main body (3);

characterized in that:

- the multilayer membrane (4) is not heat-sealed to the connecting region (37) of the main body (3).

11. A cartridge (2) according to claim 10, wherein the connecting region (37) is spaced apart from the first portion (31) of the main body (3).

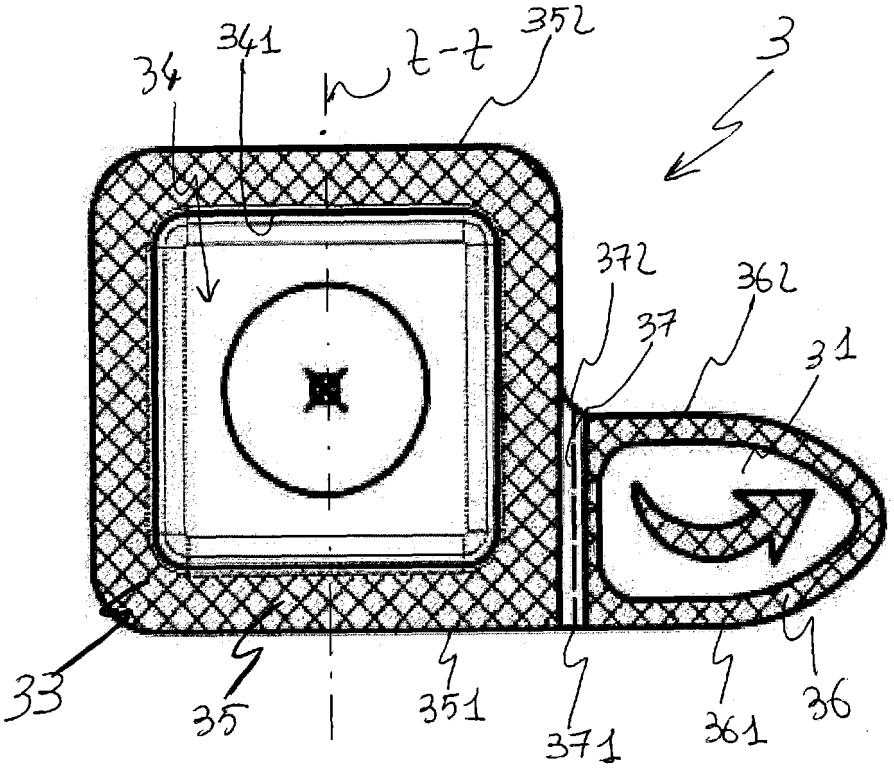
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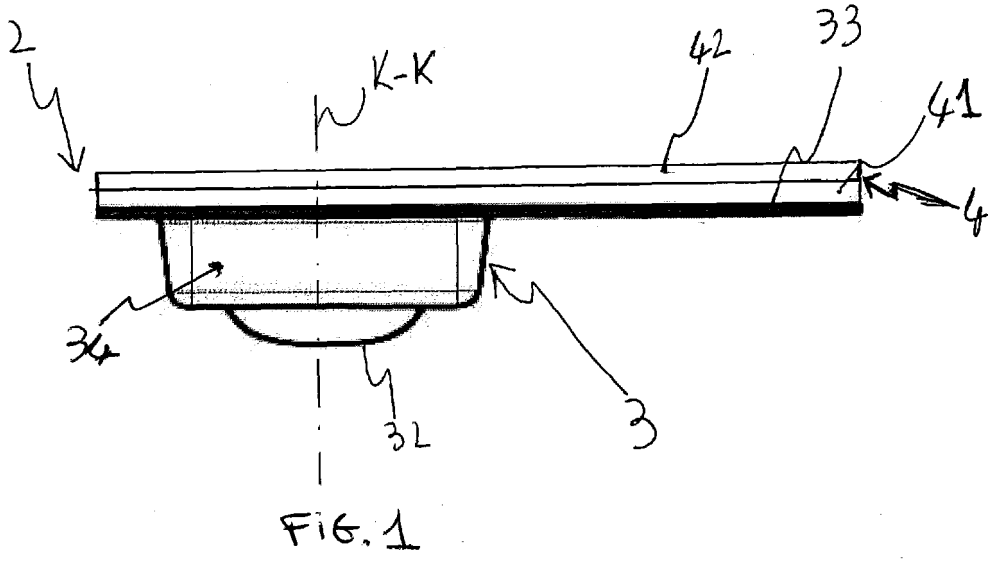
FIG. 2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K-K
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FIG. 1

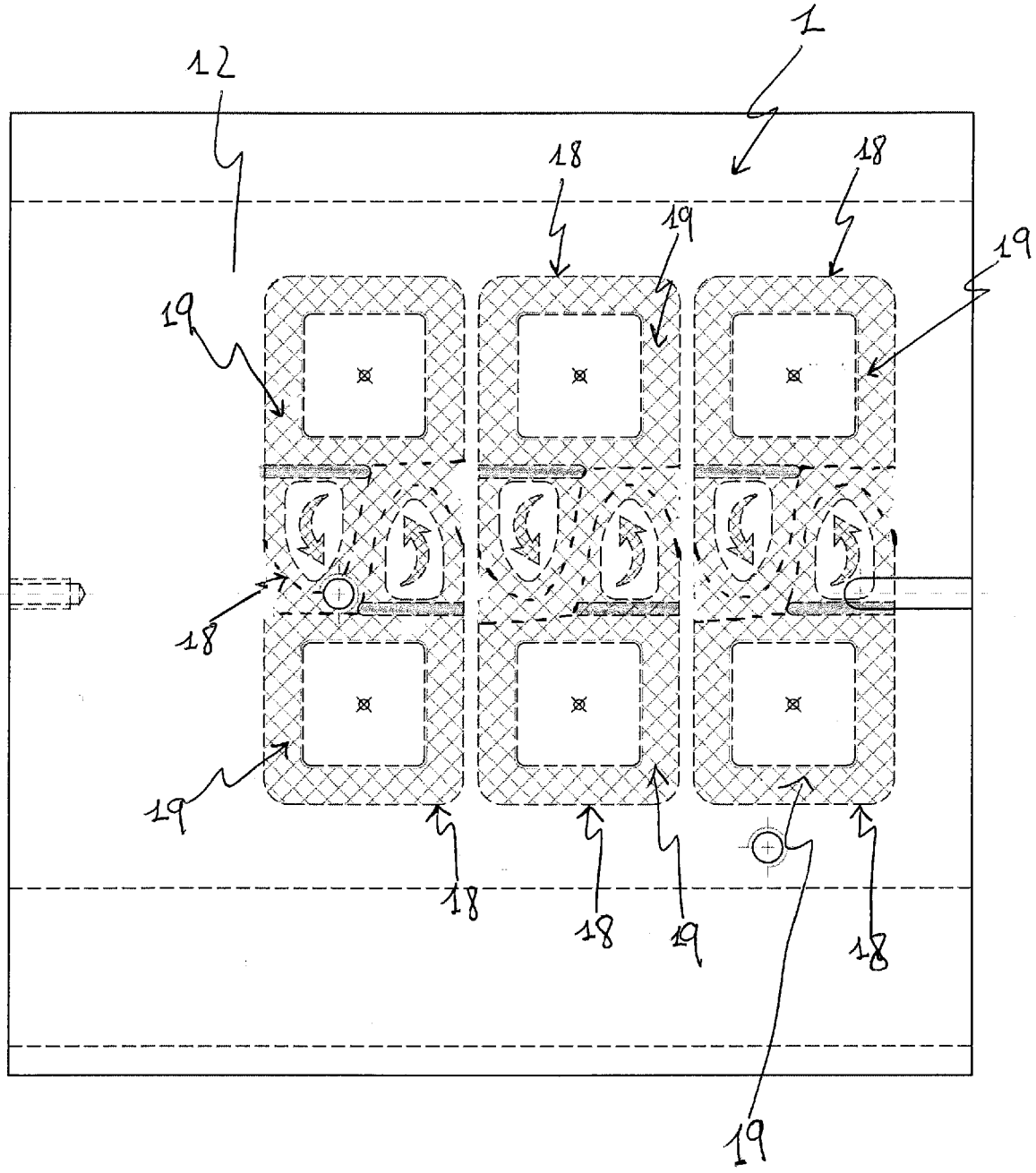

FIG. 3

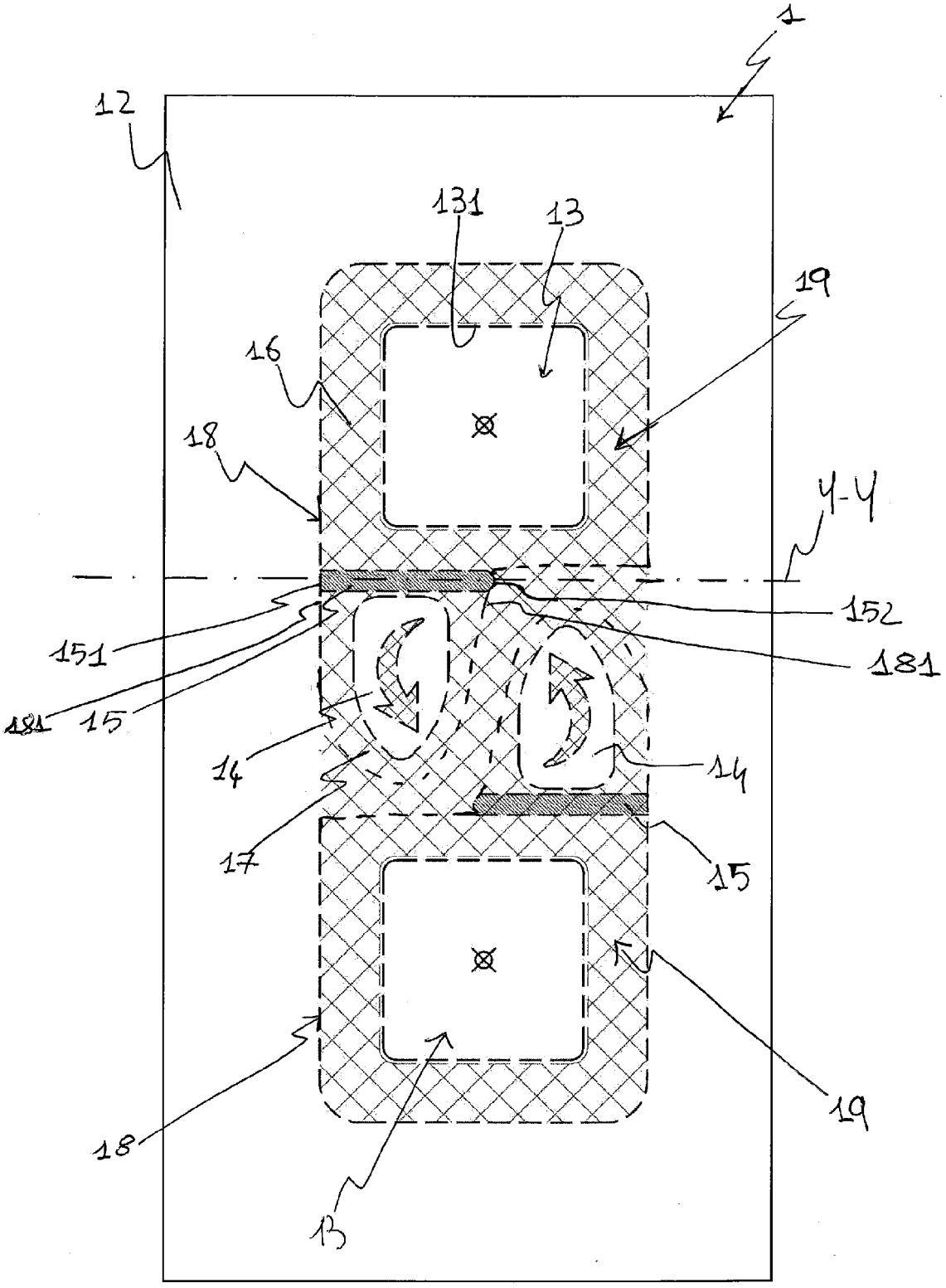

Fig. 3a

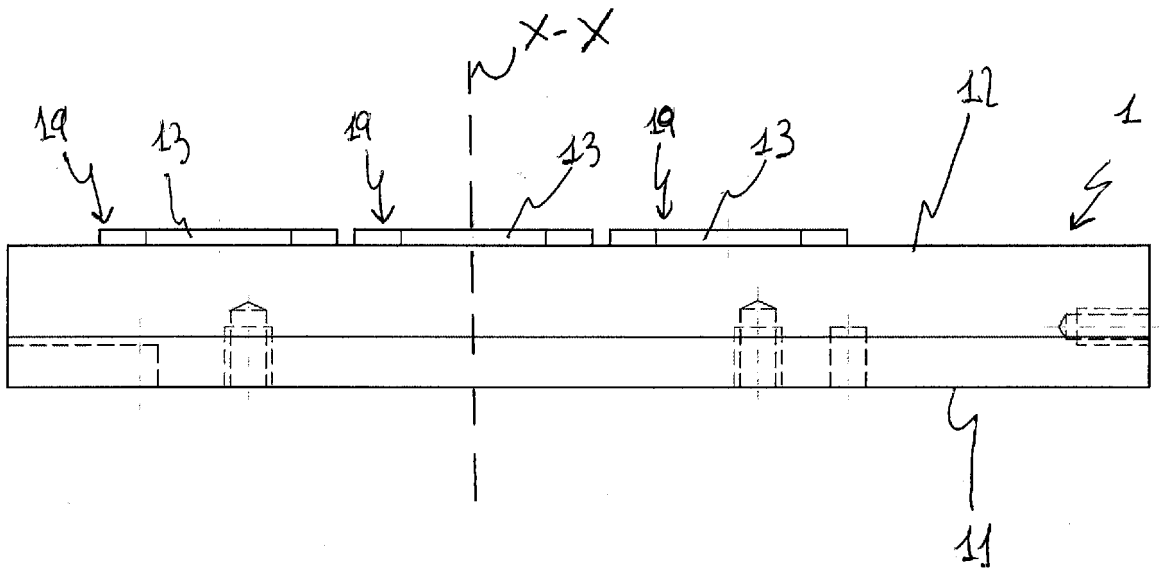

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 20 17 8952

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,D	US 5 439 100 A (GORDON ANDREW D [US] ET AL) 8 August 1995 (1995-08-08)	1-7	INV.
Y	* column 7, line 28 - line 46; figure 5 *	9	B65B7/28
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Y,D	US 5 518 790 A (HUBER HANS-PETER [DE] ET AL) 21 May 1996 (1996-05-21)	8-11	B65D77/20
	* column 6, line 42 - line 54; figures 1-3 *		

Y	US 3 921 805 A (COMPERE NEWTON L) 25 November 1975 (1975-11-25)	8-11	
	* figures 1-6 *		
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TECHNICAL FIELDS SEARCHED (IPC)

B65D
B65B
A61L
B29C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 October 2020	Dick, Birgit

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 17 8952

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