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(54) **POUCH FOR TOBACCO PRODUCTS HAVING IMPROVED CLOSURE MEANS**

(57) A pouch (100) for tobacco products comprises: a pocket (110) for housing the tobacco products (130), the pocket (110) having an opening for accessing the tobacco products (130); and a flap (120) extending from the pocket (110) and movable relative to the pocket (110) between a first position in which the flap (120) is folded over the pocket (110) to cover the opening and a second position in which the opening is uncovered. The pouch (100) further comprises a resealable closure means for sealing the opening of the pocket (110), the closure means provided proximate the opening and comprising a first layer of a self-healing material (160) on a first inner surface of the pocket (110) and a second layer of the self-healing material (162) on a second inner surface of the pocket, opposite the first inner surface, wherein upon contact between the first layer (160) and the second layer (162) of the self-healing material, the self-healing material self-heals to form a seal between the first inner surface and the second inner surface of the pocket (110).

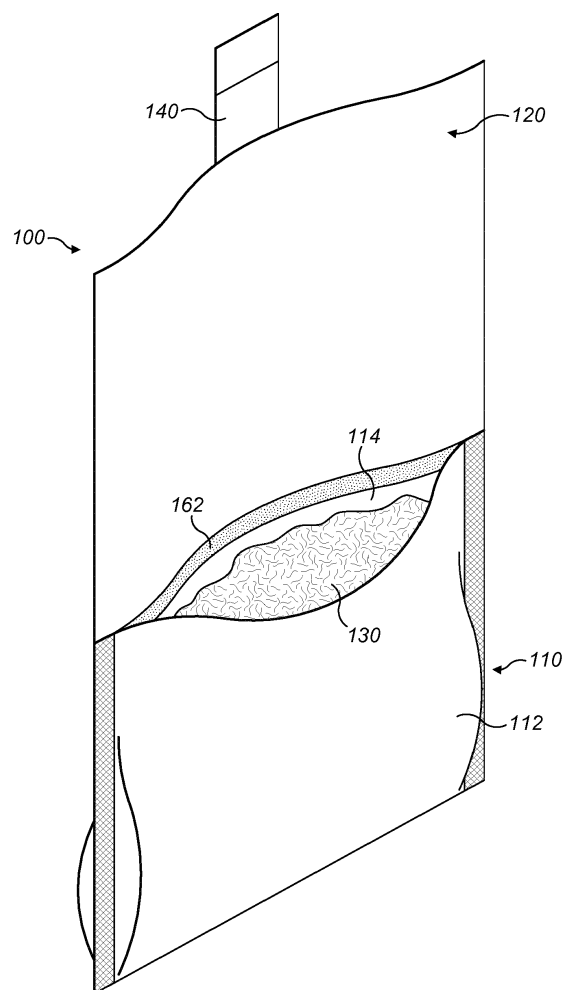


FIG. 1

Description

[0001] The present invention relates to a pouch for tobacco products comprising resealable closure means for improved closure of the pouch.

[0002] It is known to package tobacco products such as loose tobacco in pouches formed from sheets of flexible plastic material. Such pouches are typically formed by folding a rectangular sheet of plastic material over on itself and sealing along the edges to form a pocket. A portion of the rectangular sheet typically extends beyond the pocket to form a flap, which can be folded over the pocket in order to close the pouch. After being formed, the pouches are typically filled with the tobacco material and sealed.

[0003] It has been previously proposed to provide closure means within the pouch for closing the pouch between uses so that the freshness of the tobacco can be retained and in particular, so that moisture can be retained. However, such closure means can often deteriorate and become less effective after several repetitions of opening and closing of the pouch.

[0004] In addition, the closure means may be deteriorated as a result of contact with the tobacco contained within the pocket. For example, loose tobacco can become undesirably stuck to an adhesive or mechanical closure means. This can result in an undesirable appearance of the container and a less effectively functioning closing mechanism. This can also generate spaces that can allow air to pass into or out of the container when the closure means is in a closed position, which can result in an undesired change in the moisture level of the tobacco.

[0005] It would be desirable to provide a pouch having improved closure means for retaining the pouch in a sealed condition during normal handling. It would be further desirable to provide such a pouch wherein the closure means provides a strong closure and retains effectiveness after repeated closure and opening, without significant deterioration. It would be particularly desirable to provide such a pouch that can be manufactured without significant modification of existing pouch designs or packaging equipment and techniques.

[0006] According to the present invention there is provided a pouch for tobacco products, the pouch comprising: a pocket for housing the tobacco products, the pocket having an opening for accessing the tobacco products; and a flap extending from the pocket and movable relative to the pocket between a first position in which the flap is folded over the pocket to cover the opening and a second position in which the opening is uncovered. The pouch comprises a resealable closure means for sealing the opening of the pocket, the closure means provided proximate the opening and comprising a first layer of a self-healing material on a first inner surface of the pocket and a second layer of the self-healing material on a second inner surface of the pocket, opposite the first inner surface. Upon contact between the first layer and the second

layer of the self-healing material, the self-healing material self-heals to form a seal between the first inner surface and the second inner surface of the pouch.

[0007] According to the present invention there is further provided the use of a self-healing material to provide a resealable closure means in a pouch for tobacco products.

[0008] The two layers of self-healing material incorporated into the pouches according to the invention provide a novel and improved closure means for keeping the pocket closed between uses.

[0009] The term "self-healing material" is used herein to refer to a material that is capable of repairing damage to itself in order to "self-heal", without external intervention. The first and second layers must be formed from the same self-healing material so that the self-healing can occur. Prior to the first opening of the pouches of the present invention, the first and second layers of self-healing material will be substantially integral with each other but the layers will be torn apart as the pocket is opened. Upon reclosure of the pocket, the first and second layers are brought back into contact with each other and the self-healing material is able to repair itself and self-heal so that the two layers become integrated with each other and bond back together. In this way, the seal between the first and second inner surfaces of the pocket is reformed each time the first and second layers are brought back together.

[0010] Advantageously, the seal between the first and second layers of self-healing material provides a strong and secure closure for the pocket of the pouch. This ensures that the pocket remains securely closed between uses. Furthermore, the self-healing of the self-healing material upon closure of the pocket provides a highly effective seal that can minimise and preferably substantially prevent the ingress of air and moisture into the pocket of the pouch. The freshness of the tobacco products within the pocket can therefore be retained between uses. In some cases, such as for loose tobacco, it may also be desirable to reduce or prevent loss of moisture from the pocket.

[0011] The processes of tearing the self-healing material to open the pocket and sealing the self-healing material when the pocket is closed can be repeated potentially indefinitely and there should be little or no degradation of the material in view of its capability of self-healing any damage. The closure means can therefore retain effectiveness over the entire period during which the pouch is likely to be in use.

[0012] Advantageously, the surface of the first and second layers of the self-healing material can be non-sticky so that loose material from the tobacco products, for example, loose tobacco, does not stick to the layers of the self-healing material. This enables the appearance and the function of the layers of self-healing material to be retained during use.

[0013] Certain self-healing materials may be suitable to be applied by printing techniques. The first and second

layers of the self-healing material can therefore be conveniently and efficiently applied to the selected areas of the pouch during the manufacturing process, without needing to significantly modify the pouch. Advantageously, the layers of self-healing material may be applied to the sheet of material used to form the pouch before the pouch is assembled, or when the pouch is assembled by not yet filled. In this way, the assembly process is substantially unaffected by the presence of the self-healing material.

[0014] Several different types of self-healing material are available and such materials would be known to the skilled person. Preferably, the self-healing material used in the pouches of the present invention is a polymeric material and particularly preferably, a network formed of one or more supramolecular polymers. The term "supramolecular polymer" is used herein to refer to a polymer in which the polymer chains are held together by reversible, non-covalent bonds.

[0015] Upon opening of the pouch, the first and second layers of the self-healing material are torn apart from each other and this causes the non-covalent bonds between polymer chains in the polymeric network to be broken. However, with self-healing materials, the non-covalent bonds will re-form when the first and second layers are brought back into contact with each other upon closure of the pouch, thereby sealing up the gap between the layers.

[0016] Supramolecular polymeric materials can be easily processed due to the large decrease in viscosity that typically occurs with relatively small increases in temperature of the material. In particular, the reduced viscosity of the supramolecular polymeric material upon heating enables the material to be effectively applied to the pouch using printing techniques.

[0017] Preferred supramolecular polymeric materials for use in the present invention form networks based on hydrogen bonds. Hydrogen bonds advantageously provide high strength bonds between polymer chains, which ensures that a strong and effective seal can be formed between the first and second layers of the self-healing materials. In such embodiments, the polymer chains within the supramolecular polymeric material are adapted to incorporate one or more hydrogen bonding units, wherein the hydrogen bonding units provide the self-healing properties of the material, as described above. The hydrogen bonding units may be incorporated as end groups in the polymeric chain. Alternatively or in addition, the hydrogen bonding units may be incorporated as side groups from the polymeric chain. Alternatively or in addition, the hydrogen bonding units may be incorporated within the backbone of the polymeric chain.

[0018] Preferably, the hydrogen bonding units incorporated within the polymeric chains of the supramolecular polymeric material are multiple hydrogen bonding units, which means that they are capable of forming more than one hydrogen bond. For example, certain supramolecular polymeric materials comprise quadruple hydro-

gen bonding units, which are capable of forming four hydrogen bonds. Such polymeric materials are described, for example, in EP-A-2310376. The use of multiple hydrogen bonding units provides a strong bond between the polymer chains, which in turn provides a strong seal between the layers of self-healing material.

[0019] The backbone of the polymeric chain may be selected based on the desired properties of the self-healing material. Suitable polymeric backbones include but are not limited to polyethylene glycol and polyurethane.

[0020] Examples of suitable self-healing polymeric materials for use in the present invention are SupraB™ available from SupraPolix BV and Reverlink™ available from Arkema.

[0021] Preferably, the self-healing material is printed onto the first and second inner surfaces of the pocket to provide the first and second layers. The self-healing material may be printed using any suitable printing process, including but not limited to flexographic printing, gravure printing, offset printing or digital printing. Preferably, the self-healing material is printed using a flexographic printing process or a gravure printing process, most preferably a flexographic printing process.

[0022] Preferably, the first and second layers of self-healing material are substantially transparent. This means that the self-healing material can be incorporated onto the surfaces of the pouch without adversely affecting the appearance of the pouch.

[0023] If desired, the areas to which the self-healing material is applied may be printed with a suitable ink prior to the application of the self-healing material. Such printing can modify the surface appearance in these areas. For example, selective printing may be helpful where it is desired for the consumer to be able to identify the position of the areas of the self-healing material.

[0024] When the pocket of the pouches according to the invention is closed, the first inner surface of the pocket is disposed adjacent to the second inner surface of the pocket so that the surfaces overlap with each other over a first overlapping area. Additional surfaces proximate the opening of the pocket may also be disposed adjacent to each other when the pocket is closed, particularly when the pocket becomes more empty. The total overlapping area between the surfaces of the pocket will typically be larger than the first overlapping area although in some cases, it may be possible for the total overlapping area and the first overlapping area to be the same.

[0025] Preferably, each of the first and second layers of self-healing material covers a surface area of at least 2 centimetre squared on the respective inner surface of the pocket, more preferably at least 3 centimetres squared, even more preferably at least 4 centimetres squared. By providing a surface area above these values, it is possible to ensure good alignment of the first and second layers of self-healing material so that the seal between the layers can be optimised across the full width of the opening.

[0026] Preferably, each of the first and second layers

of self-healing material covers a surface area of less than 12 centimetres squared on the respective inner surface of the pocket, more preferably of less than 10 centimetres squared. Preferably, the first layer and the second layer of the self-healing material cover substantially the same surface area as each other so that the area of overlap of the layers and therefore the sealing effect between the layers may be maximised.

[0027] Preferably, each of the first and second layers of self-healing material has thickness of less than about 300 micrometres, more preferably a thickness of less than about 150 micrometres, even more preferably a thickness of less than about 100 micrometres. Preferably, each of the first and second layers of self-healing material has a thickness of at least about 20 micrometres, more preferably at least about 60 micrometres.

[0028] At least one of the first and second inner surfaces of the pocket onto which the self-healing material is applied may optionally be embossed in order to raise at least a part of the surface relative to the surrounding surface of the pouch. This may advantageously enhance contact between the layers of self-healing material, in order to provide an optimised seal. It may also aid the consumer in identifying the location of the closure means.

[0029] Preferably, the first and second layers of self-healing material are provided such that the force required to separate the first and second surfaces of the pouch from each other is less than about 15 Newtons. This can ensure that the pouch is still relatively easy to open when a consumer wishes to access the tobacco products.

[0030] Preferably, the force required to separate the first and second surfaces of the pouch is at least about 4 Newtons, more preferably at least about 6 Newtons, more preferably at least about 10 Newtons. This can reduce the likelihood of the pouch being accidentally opened during normal handling of the pouch, for example, when the pouch is in a consumer's pocket.

[0031] The pouches according to the invention may have any suitable structure. However, in some particularly preferred embodiments, the pouch comprises a pocket front wall and a pocket back wall forming a pocket having an opening at the top end. The pocket front wall and the pocket back wall may be formed of separate sheets of material. In this case, the pocket front wall and the pocket back wall are preferably permanently sealed together along the side edges and the bottom edge of the pocket, for example by means of an adhesive or by ultrasonic welding. Alternatively, the pocket front wall and the pocket back wall may be integrally formed from a single sheet of material. In this case, either the bottom edge or a side edge will correspond to a fold line in the sheet material, with the remaining bottom and side edge or edges being permanently sealed.

[0032] In such embodiments, the first layer of the self-healing material is preferably provided adjacent the top edge of the pocket front wall and the second layer of the self-healing material is preferably provided adjacent the top edge of the pocket back wall. Preferably, a first strip

of the self-healing material is provided adjacent the top edge of the pocket front wall and a second strip of the self-healing material is provided adjacent the top edge of the pocket back wall. The first layer and the second layer of the self-healing material may extend all of the way to the top edge of the respective pocket wall, or there may be a spacing between each layer of the self-healing material and the top edge of the respective wall. Where there is a spacing, the spacing is preferably no more than 20 mm such that the resealable closure means are still conveniently provided proximate the opening.

[0033] The opening in the pocket may extend across substantially the full width of the pocket. In this case, the pocket front wall and the pocket back wall will not be permanently sealed along the top edge. Alternatively, the opening in the pocket may extend only part way across the width of the pocket. For example, the top edges of the pocket front wall and the pocket back wall may be permanently sealed together along one or more portions of the top edge to reduce the size of the opening of the pocket.

[0034] Preferably, the pocket is hermetically sealed by the resealable closure means. This means that the seal created between the first and second layers of the self-healing material is substantially airtight. This ensures that the freshness of the tobacco products within the pocket can be retained between uses. It also ensures that the moisture content of the tobacco products can advantageously be retained at a substantially consistent level.

[0035] As used herein the terms "side", "top", "bottom", "front", "back", "inner", "outer" and other terms used to describe relative positions of the pouches according to the invention refer to the pouch in an upright position with the opening at the top. When describing pouches according to the present invention, these terms are used irrespective of the orientation of the pouch being described.

[0036] The flap of pouches according to the invention extends from the pocket and is preferably integral to the pocket. Where the pocket is formed of a pocket front wall and a pocket back wall, the flap preferably extends from the pocket back wall and can be folded over the pocket front wall. The flap is preferably integrally formed with the pocket back wall.

[0037] The flap may be formed of a single panel of the sheet material forming the pouch. Alternatively, the flap may be formed of two or more panels that are folded relative to each other to provide the flap with more structure. For example, the flap may comprise an arrangement of panels that are folded and adhered to each other to form a second pocket for the pouch.

[0038] The height of the flap may be substantially the same as the height of the pocket front wall, so that the flap covers substantially the entire pocket front wall. Alternatively, the height of the flap may be smaller than the height of the pocket front wall so that in the closed position of the flap, the flap extends only partially down the pocket front wall.

[0039] Alternatively and preferably, the height of the

flap may be bigger than the height of the pocket front wall. In such cases, the extended flap may be wrapped around the pocket and releasably attached to the packet back wall (for instance by the retaining means described below). Alternatively, the extended flap may be releasably folded up on itself and the folded flap attached to the pocket front wall. The provision of an extended flap advantageously provides the consumer with an increased surface on which to manipulate the tobacco material when the flap is in the second position, for example, to manipulate cut filler to produce a cigarette.

[0040] Preferably, the pouch comprises means for retaining the flap in the first position, folded over the pocket. This ensure that the flap remains in place over the opening in the pocket between uses. The means for retaining the flap in the first position may take any suitable form. For example, the inner surface of the flap may comprise a resealable adhesive for sealing the flap to the outer front surface of the pocket. Alternatively, the flap may be provided with an adhesive label at the free end of the flap, wherein one end of the adhesive label is permanently affixed to the flap and the other end of the adhesive label is provided with a resealable adhesive to secure the adhesive label to the outer front surface of the pocket.

[0041] In order to access the tobacco products within the pouch, the consumer must first move the flap from the first position into the second position so that the opening is uncovered and then must pull the first and second inner surfaces of the pocket apart from each other in order to break the seal between the first and second layers of the self-healing material such that the pocket can be opened. To re-close the pouch, the consumer must bring the first and second layers of the self-healing material back into contact with each other so that the self-healing material can self-heal itself to form a bond between the first and second inner surfaces of the pocket. The flap can then be returned to the first position over the sealed opening.

[0042] Pouches according to the present invention find application for tobacco products, such as loose tobacco, pouches of tobacco, cigarette papers or cigarette filters. Preferably, the pocket of pouches according to the invention contains one or more tobacco products.

[0043] Preferably, pouches according to the invention are formed from one or more folded laminar sheets. Particularly, pouches according to the invention are formed from a single folded laminar sheet. The one or more folded laminar sheets are preferably formed of a sheet of a plastic material such as a polyolefin. In certain embodiments, the one or more laminar sheets may be formed of a laminate of two or more layers of the same or different materials, which may include layers of plastic, paper, metal or combinations thereof.

[0044] The exterior surfaces of pouches according to the invention may be printed, embossed, debossed or otherwise embellished with manufacturer or brand logos, trade marks, slogans and other consumer information and indicia.

[0045] The invention will be further described, by way of example, with reference to the accompanying drawings in which:

5 Figure 1 is a perspective view of a pouch according to the present invention; and

Figure 2 is a cross-sectional view of the pouch of Figure 1.

10 Figure 1 shows a pouch 100 according to the present invention, for housing loose tobacco.

The pouch 100 is formed of a single sheet of a flexible plastic material that has been folded to define a pocket 110 and a flap 120.

15 **[0046]** The pocket 110 comprises a pocket front wall 112 and a pocket back wall 114 which are permanently sealed together along the side edges of the pocket 110. The pocket 110 contains a portion of loose tobacco material 130 which is accessible through an opening defined in at the upper end of the pocket 110. The opening extends across the full width of the pocket 110 so that the pocket front wall 112 and the pocket back wall 114 are unsealed along the respective top edges.

20 **[0047]** The flap 120 comprises a single panel extending from the pocket back wall 114, which is movable relative to the pocket 110 between the open position shown in Figure 1, in which the opening at the upper end of the pocket is exposed, and a closed position (not shown). In the closed position, the lid flap 120 overlies the pocket front wall 112 and covers the opening. An adhesive label 140 is provided at the free end of the flap 120. One end of the adhesive label 140 is permanently affixed to the outer surface of the flap 120 adjacent the free edge. The opposite end of the adhesive label 140 is provided with a resealable adhesive on the inner surface for affixing the adhesive label 140 to the outer surface of the pocket front wall 112 between uses.

25 **[0048]** As shown in Figure 2, a first strip 160 of a self-healing material is provided on the inner surface of the pocket front wall 112, adjacent the top edge. A second strip 162 of the same self-healing material is provided on the inner surface of the pocket back wall 114, adjacent the top edge. The first strip 160 and the second strip 162 of the self-healing material both extend across the full width of the pocket 110.

30 **[0049]** The first strip 160 and the second strip 162 of the self-healing material are substantially the same size and shape as each other and are positioned opposite each other such that when the pocket front wall 112 and the pocket back wall 114 are brought together, the first strip 160 and the second strip 162 overlap with each other over substantially their full area.

35 **[0050]** The first strip 160 and the second strip 162 of the self-healing material provide a resealable closure means to hermetically seal the pocket 110 between uses.

40 **[0051]** To close the pouch 100, the consumer brings the pocket front wall 112 and the pocket back wall 114 together such that the first strip 160 and the second strip

162 of the self-healing material are brought into contact with each other to seal the pocket 110. The flap 120 is then folded over the opening and affixed to the outer surface of the pocket front wall 112. In this position, with the first strip 160 and the second strip 162 in contact with each other, the self-healing material begins to repair itself, or self-heal, so that the layers become bonded to each other. The pocket 110 is thereby sealed along the top edge.

[0052] In order to reopen the pouch, the flap 120 must first be opened into the position shown in Figure 1 and then the pocket front wall 112 and the pocket back wall 114 must be pulled apart from each other. This causes the layers of the self-healing material to be torn apart from each other. However, each time the pocket 110 is closed, the self-healing of the material can take place again to re-form the seal.

Claims

1. A pouch for tobacco products, the pouch comprising:
 - a pocket for housing the tobacco products, the pocket having an opening for accessing the tobacco products; and
 - a flap extending from the pocket and movable relative to the pocket between a first position in which the flap is folded over the pocket to cover the opening and a second position in which the opening is uncovered;
 - wherein the pouch comprises a resealable closure means for sealing the opening of the pocket, the closure means provided proximate the opening and comprising a first layer of a self-healing material on a first inner surface of the pocket and a second layer of the self-healing material on a second inner surface of the pocket, opposite the first inner surface, wherein upon contact between the first layer and the second layer of the self-healing material, the self-healing material self-heals to form a seal between the first inner surface and the second inner surface of the pocket.
2. A pouch according to claim 1, wherein the self-healing material comprises a network of one or more self-healing supramolecular polymers.
3. A pouch according to claim 2, wherein the self-healing material comprises a network of one or more supramolecular polymers based on hydrogen bonds.
4. A pouch according to claim 3, wherein the polymer chains of the one or more supramolecular polymers comprise one or more multiple hydrogen bonding units.
5. A pouch according to any preceding claim, wherein the force required to separate the first surface and the second surface of the pocket in order to open the resealable closure means is at least about 4 Newtons.
6. A pouch according to any preceding claim, wherein the first layer and the second layer of the self-healing material extend across the full width of the opening of the pocket.
7. A pouch according to any preceding claim, wherein the pocket is hermetically sealed by the resealable closure means.
8. A pouch according to any preceding claim, wherein the pocket is defined by a front pocket wall and a back pocket wall, wherein the resealable closure means comprises a first strip of the self-healing material adjacent the top edge of the front pocket wall and a second strip of the self-healing material adjacent the top edge of the back pocket wall, opposite the first strip of the self-healing material.
9. A pouch according to any preceding claims, further comprising means for retaining the flap in the first position over the pocket.
10. A pouch according to any preceding claim, formed of a single folded laminar sheet.
11. A pouch according to any preceding claim containing one or more tobacco products within the pocket.
12. Use of a self-healing material to provide a resealable closure means in a pouch for tobacco products.

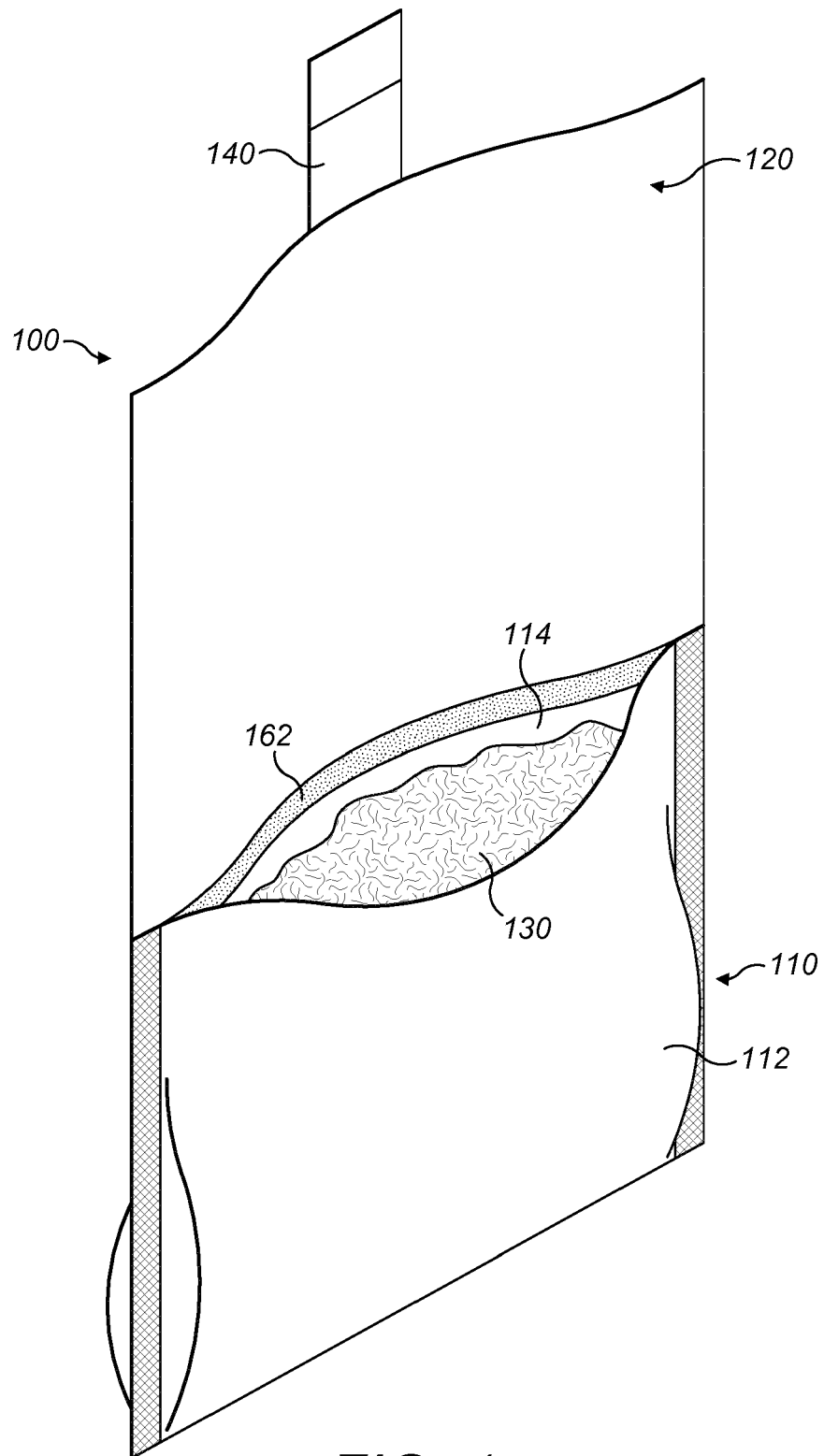


FIG. 1

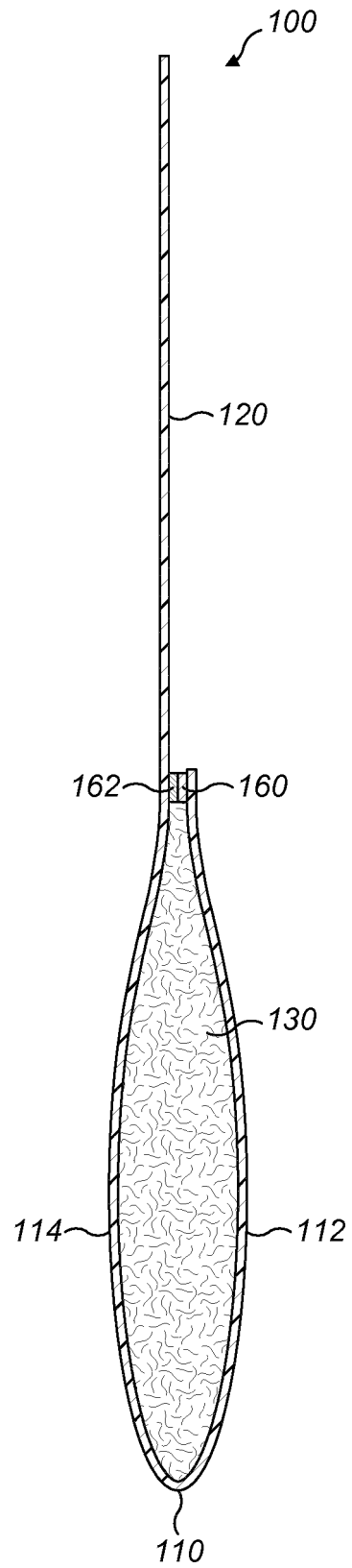


FIG. 2



EUROPEAN SEARCH REPORT

Application Number
EP 17 18 6616

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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	US 1 992 152 A (YEATES PERCY M) 19 February 1935 (1935-02-19) * page 2, column 1, line 37 - page 2, column 2, line 10 * * page 3, column 2, lines 30-45 * * figures 3,4,6 *	1-12	INV. A24F23/02 B65D33/24
Y	WO 2017/021448 A1 (REPSOL SA [ES]) 9 February 2017 (2017-02-09) * page 2, line 29 - page 7, line 7 * * page 35, lines 5-9 *	1-12	
A,D	EP 2 310 376 A1 (SUPRAPOLIX BV [NL]) 20 April 2011 (2011-04-20) * paragraphs [0001], [0012], [0069], [0070] *	1	
A	US 2016/068626 A1 (DISSON JEAN-PIERRE [FR] ET AL) 10 March 2016 (2016-03-10) * paragraphs [0024], [0095], [0117] - [0119] *	1	TECHNICAL FIELDS SEARCHED (IPC)
A	WO 2008/063057 A2 (SUPRAPOLIX BV [NL]; HOORNE-VAN GEMERT GABY MARIA L [NL]; JANSSEN HENRI) 29 May 2008 (2008-05-29) * page 19, lines 20-27 *	1	A24F B65D C08G
A	DE 10 2004 056043 A1 (FOCKE & CO [DE]) 24 May 2006 (2006-05-24) * abstract; figure 1 *	1-12	
A	EP 2 532 513 A2 (FOCKE & CO [DE]) 12 December 2012 (2012-12-12) * figure 1 *	1-12	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 January 2018	Examiner Leijten, René
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

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

EP 17 18 6616

5

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
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 1992152 A	19-02-1935	NONE	
WO 2017021448 A1	09-02-2017	AR 105598 A1 WO 2017021448 A1	18-10-2017 09-02-2017
EP 2310376 A1	20-04-2011	EP 2310376 A1 US 2011229724 A1 WO 2010002262 A1	20-04-2011 22-09-2011 07-01-2010
US 2016068626 A1	10-03-2016	CN 105143374 A EP 2989170 A1 FR 3004988 A1 US 2016068626 A1 WO 2014174174 A1	09-12-2015 02-03-2016 31-10-2014 10-03-2016 30-10-2014
WO 2008063057 A2	29-05-2008	AT 527305 T EP 2087027 A2 US 2010076147 A1 US 2014142256 A1 WO 2008063057 A2	15-10-2011 12-08-2009 25-03-2010 22-05-2014 29-05-2008
DE 102004056043 A1	24-05-2006	AT 476370 T DE 102004056043 A1 DK 1812303 T3 EP 1812303 A1 US 2009152139 A1 WO 2006061062 A1	15-08-2010 24-05-2006 22-11-2010 01-08-2007 18-06-2009 15-06-2006
EP 2532513 A2	12-12-2012	DE 102011105014 A1 EP 2532513 A2 PL 2532513 T3	13-12-2012 12-12-2012 31-01-2017

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2310376 A [0018]