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

(11) **EP 3 085 636 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
19.06.2019 Bulletin 2019/25

(51) Int Cl.:
B65D 51/20 *(2006.01)*

(21) Application number: **15164282.4**

(22) Date of filing: **20.04.2015**

(54) **SEALING FOIL WITH TEAR LINE**

DICHTUNGSBAHN MIT EINER AUFREISSLINIE

FEUILLE D'ÉTANCHÉITÉ AVEC LIGNE DE DÉCHIRURE

(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

(43) Date of publication of application:
26.10.2016 Bulletin 2016/43

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EP 3 085 636 B1

Description

[0001] The present invention relates to sealing foils for use in packaging and in particular to sealing foils having a weakened tear line along which the foil may be torn to open the package. The invention also relates to a method of forming such a sealing foil. Packages are available in many forms and sizes according to the product to be contained. In the food packaging industries, the presence of a sealing foil can be of great importance in maintaining a product in sterile or fresh condition prior to use. One form of seal that has been disclosed for such packaging is shown in WO2014062119 which describes a sealing foil according to the preamble of claim 1.

[0002] The seal comprises two layers welded together, wherein the first layer is an aluminium laminate that can be heat sealed or otherwise welded to the sides of a container e.g. using an induction welding process.

[0003] In order to open such seals, they may be provided with a tear line extending along a tearing path around the lid. The tear line may cut the first layer but may not penetrate a hermetic second layer located beneath the first layer and welded thereto. A pull tab may be provided for a user to grasp and commence tearing the first layer along the tearing path. In order to achieve adequate opening it is important that the tear line is without interruption or that any such interruptions are minimal as these may lead to uncontrolled ripping of the sealing foil in a direction other than along the tearing path. A seal is disclosed in WO2005075314 that has a pull tab, which leads into a tear line that is continuous through a lead-in section and a circumferential section. Although in theory this arrangement ensures a continuous tear, in practice, the manner in which the tear line is produced may lead to undesired discontinuities. Forming of the tear line generally takes place by punching or die-cutting with a series of punches, each having a blade for cutting a portion of the tear line. For production purposes, the circumferential section is cut using a punch that is different from that of the lead-in section. Alignment of one punch with the following punch determines the accuracy with which the different portions of the tear line align to each other. Furthermore, in order that sealing prior to opening is not compromised, the tear line should be confined within the region covered by the hermetic second layer. Since these layers are not always co-extensive, and are assembled together by welding after cutting of the tear line, careful positioning is required. Due to manufacturing tolerances, existing arrangements have lead to at least some sealing foils having discontinuous tear lines that can lead to uncontrolled ripping on opening of the seal.

[0004] It would be desirable to provide an alternative arrangement that allows accurate placement of the tear line and encourages correct opening of the seal without ripping. A scored foil is disclosed in GB998102, secured to the wall of a can by double seaming. According to the invention there is provided a sealing foil for closing a packaging container according to claim 1 comprising: a pre-cut first layer; a hermetic second layer, connected to the first layer and coextensive therewith over the full extent of the second layer; wherein the first layer is pre-cut with a plurality of tear lines defining a tearing path leading from a pull tab to a tear end including a lead-in tear line extending from the pull tab to a circumferential tear line defining an access opening such that a central portion of the sealing foil can be removed to provide an access opening to the container and a lead-in tear line is contiguous with a circumferential tear line such that uncontrolled ripping of the sealing foil is prevented, wherein the first layer extends beyond the second layer for connection to an inner wall of the container, and wherein the lead-in tear line extends from the pull tab outwards to the circumferential tear line and enters tangentially or crosses the circumferential tear line.

[0005] In the present context, contiguous to one another, is intended to require that the portions of the tear line either intersect or run parallel and adjacent to such an extent that a tear is obliged to follow from one portion of the tear line to a following portion, whereby uncontrolled ripping away from the tear path is avoided.

[0006] In one embodiment, the sealing foil is not square shaped. In particular, the sealing foil may be of a rectangular shape with the longer sides of the foil preferably being outwardly bowed. The shorter sides are preferably without a radius between the corners of the foil. Furthermore, the sealing foil has corners that are rounded off. The bowed sides and rounded corners facilitate controlled tearing of the foil. Furthermore, the lead-in tear line should join the circumferential tear line on one of the longer sides, preferably as far from the corner as possible. In one embodiment, the lead-in tear line should join the circumferential tear line at a about the mid-point of the longer side or earlier.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The features and advantages of the invention will be appreciated upon reference to the following drawings of a number of exemplary embodiments, in which:

Figure 1 shows a prior art sealing foil;

Figure 2 shows a detail of the prior art sealing foil of Figure 1;

Figure 3 shows the detail of Figure 2, during opening of the sealing foil;

Figure 4 shows a detail of part of a sealing foil according to a first embodiment of the invention;

Figure 5 shows a detail of part of a sealing foil according to a second embodiment of the invention; and

Figure 6 shows a detail of part of a sealing foil ac-

cording to a third embodiment of the invention.

[0008] Figure 1 shows an existing sealing foil 1 as may be used in various types of food packaging such as drinks powders, infant formulas and the like. The foil 1 comprises a first layer 2 and a second layer 3, which are joined together by welding at various points on their surface. The first layer 2 is formed of a heat-sealable aluminium laminate and extends to an outer circumference 4 that can be joined by heat sealing (such as induction sealing) to an inside wall of a container (not shown). The second layer 3 is slightly smaller than the first layer 2 and is formed of a heat sealable aluminium laminate, with the first and second layers 2, 3 being joined together face to face with the heat sealable surfaces engaged. It will be understood that other appropriate materials may be used for these layers e.g. polymer materials.

[0009] A tear path 5 is formed in the upper first layer leading from a pull tab 6 to a tear end 7. The tear path 5 comprises a series of tear lines 5A, 5B, 5C, pre-cut through the material of the first layer 2. These include a first diagonal, lead-in tear line 5A, a second circumferential tear line 5B and an inner tear line 5C. The pull tab 6 and the diagonal tear line 5A are angled to the circumferential tear line 5B by around 20 degrees. On pulling on the pull tab 6, the sealing foil 1 tears along the tear path 5 whereby the pre-cut first layer 2 causes the underlying second layer 3, which is welded to it, to be torn in a controlled manner. A central portion 8 of the sealing foil 1 is thus removed and an opening formed corresponding to the circumferential tear line 5B.

[0010] Figure 2 shows an enlarged portion of Figure 1 illustrating the intersection of the diagonal tear line 5A with the circumferential tear line 5B. As can be seen, these are formed as separate cuts and they are not contiguous with each other at the point of intersection. This is because the tear line 5B is formed in a separate cutting action to that of the diagonal tear line 5A using a different punch or blade. The accuracy by which the production machine can be set up will determine the size of the gap G. In an existing arrangement, the blade that forms the diagonal tear line 5A is set to avoid the possibility of passing the circumferential tear line 5B. This is to avoid any chance that the diagonal line 5A could extend beyond the outer extent of the second layer 3, once the layers 2, 3 are assembled together.

[0011] Figure 3 shows the detail of Figure 2 during opening of such a conventional foil 1. As a user pulls in the direction P on the pull tab 6, the second layer 3 is caused to tear along the diagonal tear line 5A towards the intersection with the circumferential tear line 5B. Due to the presence of the gap G, the tear does not proceed correctly and instead both the first layer 2 and the second layer 3 rip in the direction R. Such uncontrolled ripping of the sealing foil 1 is undesirable.

[0012] Figure 4 shows a first embodiment of a sealing foil 10 according to the invention, shown in detail view corresponding to Figure 2. Other parts of the sealing foil 10 may be identical to the prior art foil of Figure 1 and are provided with like references preceded by 10. According to Figure 4, the diagonal tear line 15A has a curved end 15D that crosses the circumferential tear line 15B and turns in a tangential direction to it. In this context tangential is intended to include both collinear and parallel i.e. it is sufficient that the curved end has at least a portion that lies parallel to the circumferential tear line 15B and may even terminate in a direction returning towards the circumferential tear line 15B. In this manner, during operation the tear will progress along the diagonal tear line 15A and will either directly join the circumferential tear line 15B or cross over via the curved end 15D and then return to join it subsequently. Uncontrolled ripping is thus eliminated, even if the diagonal tear line 15A and circumferential tear line 15B are cut by different punches in different steps and careful alignment of the respective punches is no longer essential.

[0013] Figure 5 shows a second embodiment of a sealing foil 20 according to the invention in a detailed view similar to Figure 4. Like references in this embodiment are used, preceded by 20. According to this embodiment, the diagonal tear line 25A has an extended curved end 25D that is tangential to the circumferential tear line 25B over an extended length. Again, in this context tangential is intended to include parallel, since these lines 25B, 25D will only coincide if the set-up of the respective punches is accurate. Nevertheless, irrespective of their accuracy, during opening of the sealing foil 20 of Figure 5, the tear progressing along curved end 25D is tearing parallel to the circumferential tear line 25B and will be more likely to continue in this direction since the force as applied in following curved end 25D is in the same direction as the circumferential tear line 25B.

[0014] Figure 6 shows a third embodiment of a sealing foil 30 according to the invention in a detailed view similar to Figure 4. Like references in this embodiment are used, preceded by 30. According to this embodiment, the diagonal tear line 35A extends into the circumferential tear line 35B and continues uninterrupted to the tear end 37. These sections of the tear line 35A, 35B can be cut with a single blade or punch in a single process.

[0015] Although reference is given here and throughout the description to the tear line being uninterrupted, the skilled person will be aware that minor interruption of the cut formed through the first layer may be present. These maintain the integrity of the first layer and prevent the tear line from opening during production and/or prior to use in areas where the first layer and the second layer may not be welded or otherwise connected together. Many modifications in addition to those described above may be made to the structures and techniques described herein without departing from the scope of the invention. In particular, although the pull tab has been shown at a diagonal to the circumferential tear line, it may do so at any angle between perpendicular and 5 degrees and the lead-in tear line may be straight or curved. Accordingly, although specific embodiments have been described,

these are examples only and are not limiting upon the scope of the invention, which is defined by the appended claims.

Claims

1. A sealing foil (1) for closing a packaging container comprising:

   a pre-cut first layer (2);
   a hermetic second layer (3), connected to the first layer and coextensive therewith over the full extent of the second layer;
   wherein the first layer extends beyond the second layer for connection to an inner wall of the container;
   characterized in that the first layer is pre-cut with a plurality of tear lines defining a tearing path (5) leading from a pull tab (6) to a tear end (7) including a lead-in tear line extending from the pull tab to a circumferential tear line defining an access opening such that a central portion (8) of the sealing foil can be removed to provide an access opening to the container;
   wherein the lead-in tear line (5A) is contiguous with the circumferential tear line (5B) such that uncontrolled ripping of the sealing foil is prevented, and the lead-in tear line extends from the pull tab outwards to the circumferential tear line and enters tangentially or crosses the circumferential tear line.

2. The sealing foil according to claim 1, wherein the lead-in tear line (5A) extends at an angle of between 90 degrees and 5 degrees to the circumferential tear line (5B) preferably at an angle of between 30 degrees and 10 degrees.

3. The sealing foil according to any preceding claim, wherein the lead-in tear line (5A) curves tangentially to the circumferential tear line (5B).

4. The sealing foil according to any preceding claim, wherein the first layer (2) is a laminate comprising aluminium.

5. The sealing foil according to any preceding claim, wherein the second layer (3) comprises an oxygen barrier material.

6. A method of manufacture of a sealing foil according to any preceding claim, comprising:

   providing a quantity of material for forming the first layer (2);
   pre-cutting the first layer with a series of cuts to define the tearing path (5);
   providing a quantity of material for forming the second layer (3); and joining the first and second layers together.

7. The method of claim 6, wherein the first layer is pre-cut using a punch having a first blade portion to form a diagonal cut and a second blade portion to form a circumferential cut and the first and second blade portions are contiguous and join at a sloping T-junction.

8. The method of claim 6, wherein the first layer is pre-cut using a punch having a blade having a diagonal portion and a circumferential portion.

9. The method of any of claims 6 to 8, wherein the first layer is joined to the second layer by induction welding.

Patentansprüche

1. Versiegelungsfolie (1) zum Verschließen eines Verpackungsbehälters, umfassend:

   eine vorgeschnittene erste Schicht (2);
   eine hermetische zweite Schicht (3), die mit der ersten Schicht verbunden ist und damit über die gesamte Ausdehnung der zweiten Schicht flächengleich ist;
   wobei die erste Schicht sich über die zweite Schicht hinaus zur Verbindung mit einer Innenwand des Behälters erstreckt;
   dadurch gekennzeichnet, dass die erste Schicht mit einer Vielzahl von Aufreisslinien, die einen von einer Ziehlasche (6) zu einem Aufreissende (7) führenden Aufreisspfad (5) definieren, einschließlich einer Einlaufaufreisslinie, die sich von der Ziehlasche zu einer eine Zugangsöffnung definierende umlaufenden Aufreisslinie erstreckt, sodass ein mittiger Abschnitt (8) der Versiegelungsfolie entfernt werden kann, um eine Zugangsöffnung in den Behälter zu ermöglichen, vorgeschnitten ist;
   wobei die Einlaufaufreisslinie (5A) mit der umlaufenden Aufreisslinie (5B) so beieinander liegt, dass ein unkontrolliertes Reißen der Versiegelungsfolie verhindert wird, und wobei die Einlaufaufreisslinie sich von der Ziehlasche zu der umlaufenden Aufreisslinie erstreckt und auf die umlaufende Aufreisslinie tangential zuläuft oder diese kreuzt.

2. Versiegelungsfolie gemäß Anspruch 1, wobei die Einlaufaufreisslinie (5A) sich in einem Winkel zwischen 90° und 5° zu der umlaufenden Aufreisslinie (5B), vorzugsweise in einem Winkel zwischen 30° und 10°, erstreckt.

3. Versiegelungsfolie gemäß einem der vorangegangenen Ansprüche, wobei die Einlaufaufreisslinie (5A) sich tangential zu der umlaufenden Aufreisslinie (5B) krümmt.

4. Versiegelungsfolie gemäß einem der vorangegangenen Ansprüche, wobei die erste Schicht (2) ein Laminat ist, das Aluminium umfasst.

5. Versiegelungsfolie gemäß einem der vorangegangenen Ansprüche, wobei die zweite Schicht (3) ein sauerstoffhemmendes Material umfasst.

6. Verfahren zum Herstellen einer Versiegelungsfolie gemäß einem der vorangegangenen Ansprüche, umfassend:

Bereitstellen einer Menge an Material zum Bilden der ersten Schicht (2);
Vorschneiden der ersten Schicht mit einer Reihe von Schnitten, um den Aufreisspfad (5) zu definieren;
Bereitstellen einer Menge an Material zum Bilden der zweiten Schicht (3); und
Verbinden der ersten und zweiten Schichten miteinander.

7. Verfahren gemäß Anspruch 6, wobei die erste Schicht unter Verwendung eines Stanzers, der einen ersten Klingenabschnitt zum Bilden eines schrägen Schnittes und einen zweiten Klingenabschnitt zum Bilden eines umlaufenden Schnittes aufweist, vorgeschnitten ist, wobei der erste und zweite Klingenabschnitt beieinander liegen und sich an einer schrägen T-Verbindung treffen.

8. Verfahren gemäß Anspruch 6, wobei die erste Schicht unter Verwendung eines Stanzers, der eine Klinge mit einem diagonalen Abschnitt und einem umlaufenden Abschnitt aufweist, vorgeschnitten ist.

9. Verfahren gemäß einem der Ansprüche 6 bis 8, wobei die erste Schicht mit der zweiten Schicht durch Induktionsschweißen verbunden ist.

Revendications

1. Feuille d'étanchéité (1) destinée à fermer un conteneur d'emballage comprenant :

une première couche prédécoupée (2) ;
une seconde couche hermétique (3), connectée à la première couche et coextensive avec celle-ci sur toute l'étendue de la seconde couche ;
dans laquelle la première couche s'étend au-delà de la seconde couche pour une connexion à une paroi interne du conteneur ;

caractérisé en ce que
la première couche est prédécoupée avec une pluralité de lignes de déchirure définissant un trajet de déchirure (5) menant d'une languette de traction (6) à une extrémité de déchirure (7) comprenant une ligne de déchirure d'entrée s'étendant depuis la languette de traction jusqu'à une ligne de déchirure circonférentielle définissant une ouverture d'accès de telle sorte qu'une partie centrale (8) de la feuille d'étanchéité peut être retirée pour fournir une ouverture d'accès au conteneur ;
dans lequel la ligne de déchirure d'entrée (5A) est contiguë à la ligne de déchirure circonférentielle (5B) de telle sorte qu'un arrachage incontrôlé de la feuille d'étanchéité est empêché, et la ligne de déchirure d'entrée s'étend de la languette de traction vers l'extérieur à la ligne de déchirure circonférentielle et pénètre de manière tangentielle ou croise la ligne de déchirure circonférentielle.

2. Feuille d'étanchéité selon la revendication 1, dans laquelle la ligne de déchirure d'entrée (5A) s'étend selon un angle compris entre 90 degrés et 5 degrés par rapport à la ligne de déchirure circonférentielle (5B), de préférence selon un angle compris entre 30 degrés et 10 degrés.

3. Feuille d'étanchéité selon l'une quelconque des revendications précédentes, dans laquelle la ligne de déchirure d'entrée (5A) est courbée de manière tangentielle par rapport à la ligne de déchirure circonférentielle (5B).

4. Feuille d'étanchéité selon l'une quelconque des revendications précédentes, dans laquelle la première couche (2) est un stratifié comprenant de l'aluminium.

5. Feuille d'étanchéité selon l'une quelconque des revendications précédentes, dans laquelle la seconde couche (3) comprend un matériau formant barrière à l'oxygène.

6. Méthode de fabrication d'une feuille d'étanchéité selon l'une quelconque des revendications précédentes, comprenant les étapes consistant à :

fournir une quantité de matériau pour former la première couche (2) ;
prédécouper la première couche avec une série d'entailles pour définir le trajet de déchirement (5) ;
fournir une quantité de matériau pour former la seconde couche (3) ; et
joindre les première et deuxième couches ensemble.

7. Méthode selon la revendication 6, dans laquelle la première couche est prédécoupée en utilisant un poinçon ayant une première partie de lame pour former une entaille diagonale et une seconde partie de lame pour former une entaille circonférentielle et les première et seconde parties de lame sont contiguës et se rejoignent à une jonction en T en pente.

8. Méthode selon la revendication 6, dans laquelle la première couche est prédécoupée en utilisant un poinçon ayant une lame ayant une partie en diagonale et une partie circonférentielle.

9. Méthode selon l'une quelconque des revendications 6 à 8, dans laquelle la première couche est jointe à la seconde couche par soudage par induction.

Fig. 1

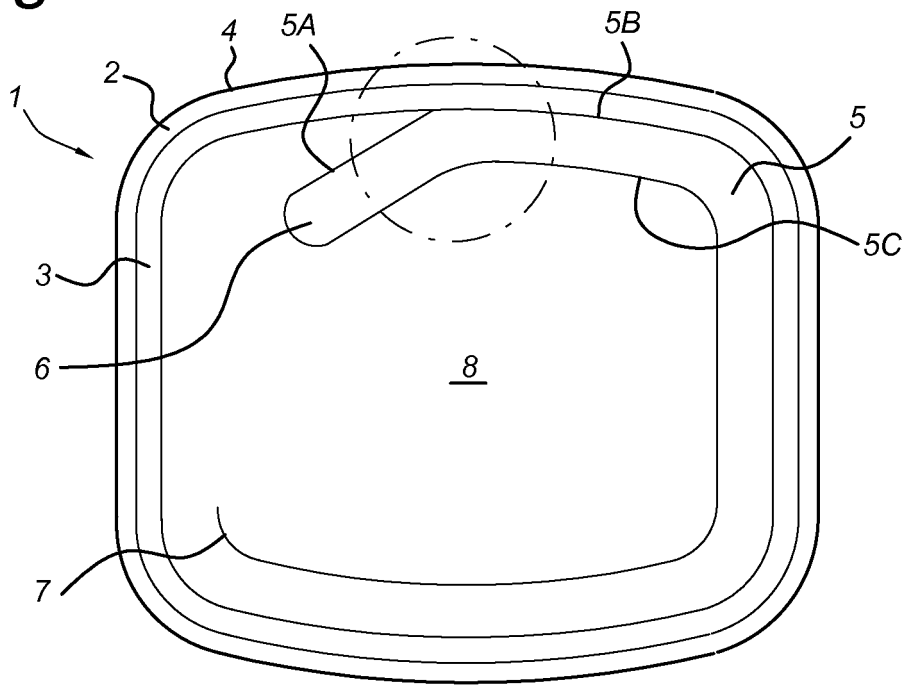


Fig. 2

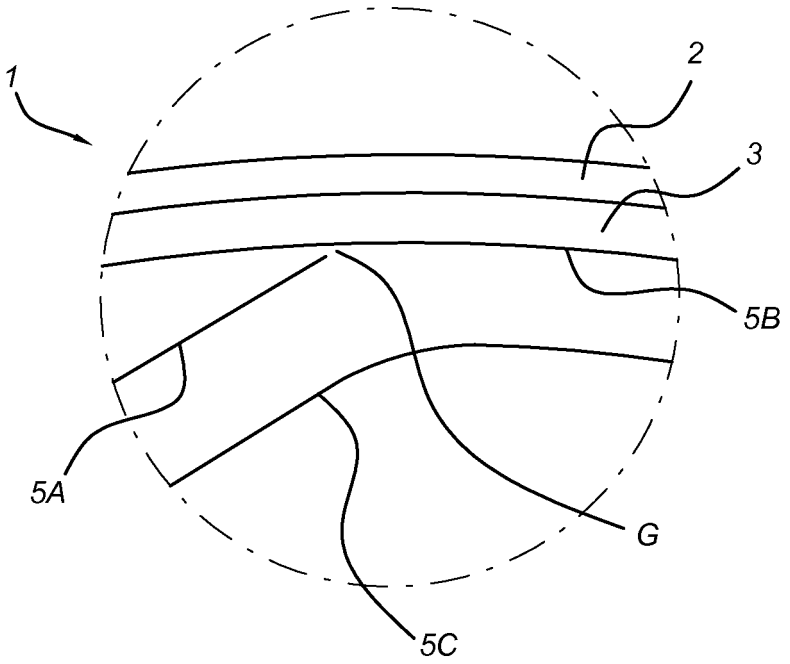


Fig. 3

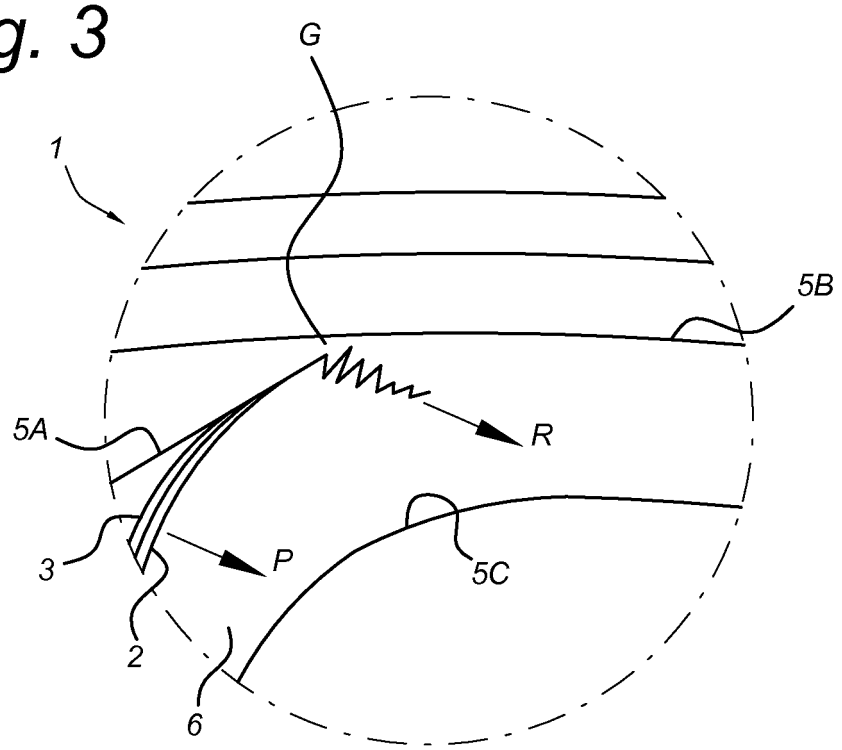


Fig. 4

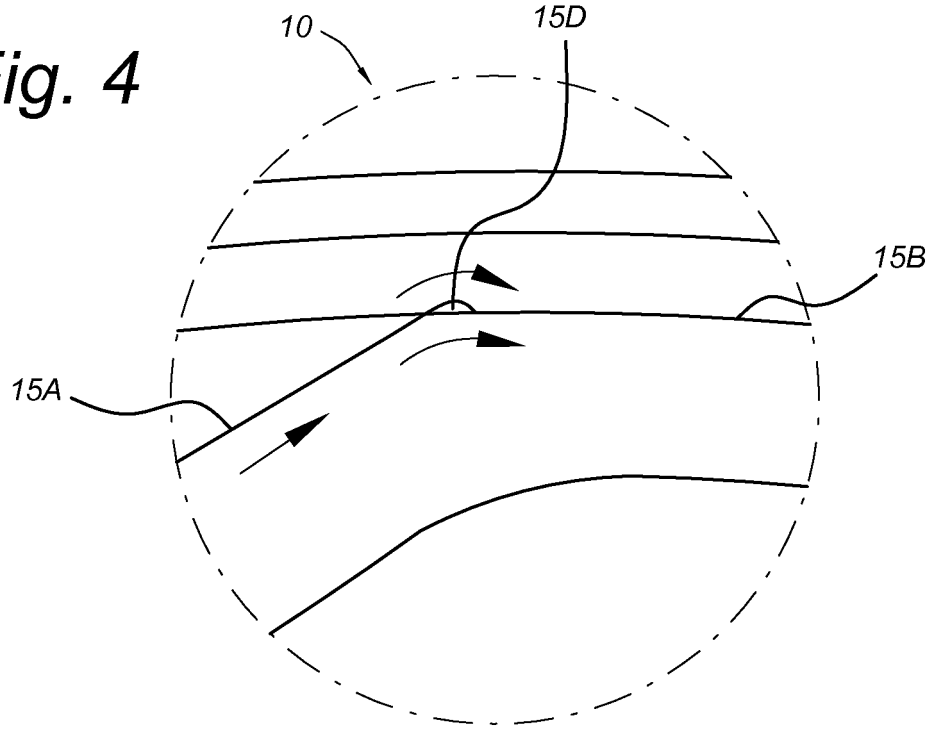


Fig. 5

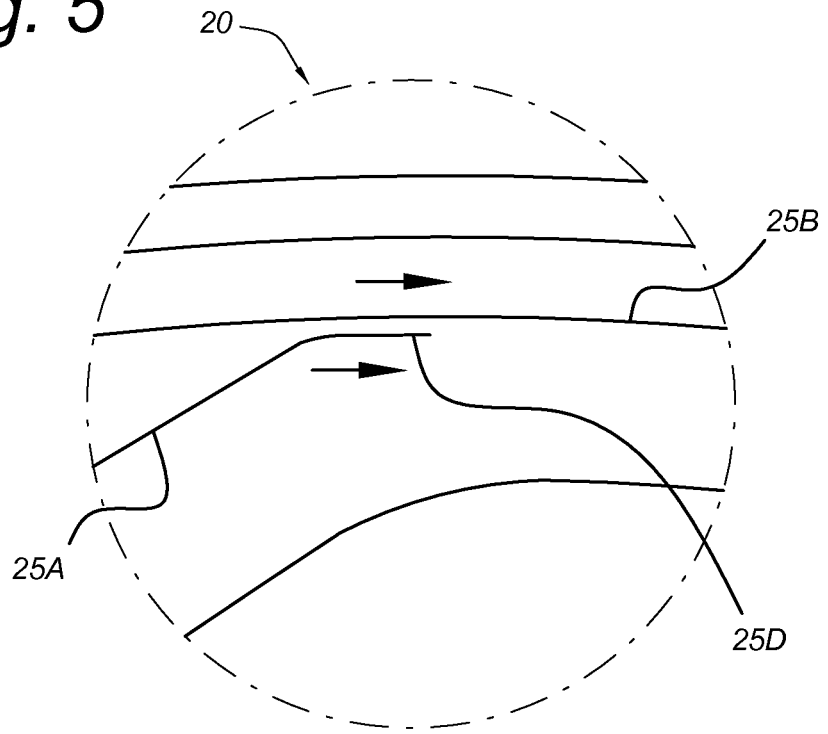
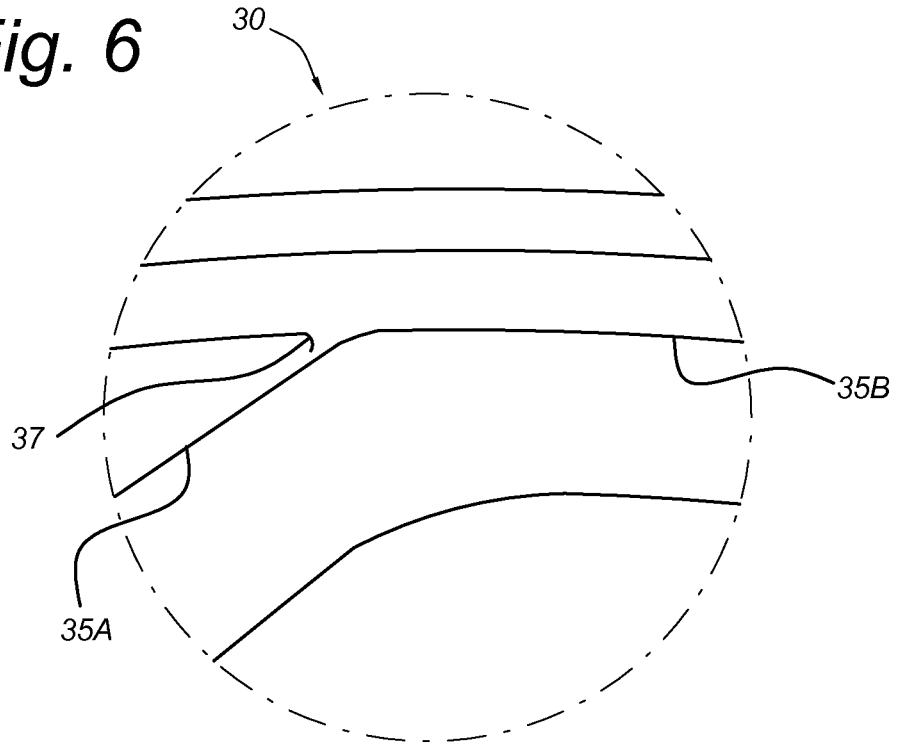


Fig. 6



REFERENCES CITED IN THE DESCRIPTION

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- WO 2005075314 A **[0003]**
- GB 998102 A **[0004]**