

(19)



(11)

EP 1 861 322 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
16.07.2008 Bulletin 2008/29

(51) Int Cl.:
B65D 77/22 *(2006.01)* **B65D 51/16** *(2006.01)*

(21) Application number: **06709881.4**

(86) International application number:
PCT/GB2006/000649

(22) Date of filing: **24.02.2006**

(87) International publication number:
WO 2006/092562 (08.09.2006 Gazette 2006/36)

(54) **SELF-VENTING COVER FOR HEATABLE FOOD PACKAGE**

SELBSTENTLÜFTUNGSDECKEL FÜR EINE AUFWÄRMBARE LEBENSMITTELPACKUNG

COUVERCLE AUTO-VENTILÉ POUR EMBALLAGE DE NOURRITURE CHAUFFABLE

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

(30) Priority: **03.03.2005 GB 0504418**

(43) Date of publication of application:
05.12.2007 Bulletin 2007/49

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Description

[0001] This invention relates to a self-venting cover for a heatable food package, and in the preferred embodiment provides cover particularly suitable for a food package intended for microwave heating.

[0002] Food products, particularly pre-cooked food products, are commonly sold in packages which are intended for re-heating either in a conventional oven or in a microwave oven. Such packages commonly comprise a relatively rigid tray which contains the food product in question and a film cover which is secured to the tray around the top edge thereof.

[0003] Heating the package results in the generation of steam within the package and if no steps are taken to vent the steam, pressure generated in the pack is liable to "explode". This is highly undesirable. The traditional solution to this problem was to instruct users of the pack to pierce the film cover prior to heating of the pack. This procedure is effective provided that the customer does as instructed and pierces the film. However, if the user fails to pierce the film the problem of pack explosion remains.

[0004] With a view to alleviating the problem outlined above packages have been proposed which include vent systems which automatically vent the package in the event of elevated temperature and/or elevated pressure within the pack. Such systems are shown, for example, in EP-A-0174188 and US-A-5989608. Whilst the prior art proposals appear to offer solutions to the problem outlined above, they are in themselves deficient in various respects. In particular, the automatic venting systems of the prior art may under certain circumstances not be effective to provide the required venting with the result that excessive pressure builds up within the pack, and also suffer from the disadvantage that the venting aperture will be resealed in the event that pressure within the pack falls below the pressure on the exterior of the pack. This can result in implosion of the pack.

[0005] In addition to the problems with prior art arrangements as described above, it is now perceived that the presence of some excess pressure within a pack is desirable during the heating process. Accordingly, whilst venting of a package to prevent explosion is desirable, that venting should ideally be carried out in a controlled manner, at least during the early phases of heating, so as to derive benefit from a super-ambient steam pressure generated within the package.

[0006] With a view to obviating the disadvantages outlined above and providing a controlled and reliable venting arrangement there is provided, in accordance with the present invention, a self-venting cover for a heatable food package comprising: a sheet of film having at least one opening formed therein to permit the passage of steam therethrough; and a label secured to the film for controlling the flow of steam through the opening, the label comprising a sheet of material having a first region secured to the film in an area remote from the opening

and having a second elongated region covering the opening, wherein the elongated region is only partially secured to the film and a vent passage is defined between the unsecured portion of the elongated region and the film itself, the vent passage extending from the opening towards the periphery of the label to permit controlled venting of steam from the opening, whereby the elongated region of the label is relatively narrow and the first region is relatively wide and is located spaced from the opening.

[0007] Preferably, the label includes a strip which is non-adhesive and which, in one embodiment, extends the full length of the label, in particular all the way to the opposing edges of the label to provide two vent passages and which, in total, extends the full length of the cover to provide two vent passages from the aperture. Such an arrangement is particularly easy to mass-produce because the non-adhesive strip and adjacent adhesive areas can be produced in the machine direction of the machine which is fabricating the cover.

[0008] In an alternative embodiment, however, the non-adhesive portion of the label is surrounded by adhesive, at least one side of which is relatively narrow compared with the adhesive bounding at least one other side of the non-adhesive portion. IN this embodiment, then, the passage does not extend all the way to the edge of the label and instead the relatively narrow region of adhesive bordering the non-adhesive portion will lift as pressure within the passage increases to a pre-defined level so as to allow venting to atmosphere.

[0009] The relatively wide first region provides a large area for adhesive bonding or welding of the cover to the film. By this means, complete detachment of the cover from the film is avoided. The relatively narrow elongated region allows the portion of the label which overlies the aperture to become detached from the film during heating, thereby providing a free and unrestrictive passage through the opening in the later stages of package heating.

[0010] Preferably, at least the portion of the label which overlies the opening is of a material which tends to shrink when heated. Such shrinkage assists in detaching the label from the film in the region of the opening and ensures that the label will not re-close the opening in the event that pressure within the package temporarily falls to a sub-ambient level.

[0011] In one embodiment, the opening is in the form of a slit cut in the material of the film. The slit may be a simple linear slit running in the machine direction of the machine used for forming the cover. Such an arrangement is particularly easy to implement in practice.

[0012] In an alternative embodiment, however, the opening is in the form of a hole punched in the material of the film. More particularly, the two concentric, circumferentially spaced circular arcs are cut in the film so as to form two semi-circular flaps which are connected to the film by a pair of common, radial tabs which separate the arcuate cuts. It will, of course, be understood that other hole shapes may be used, such as square, but

appropriate shaping of the slits which form the two flaps.

[0013] The invention may be embodied as a cover which is secured by appropriate means to a relatively rigid tray. In the preferred embodiment, the cover is securable to a tray by way of a peelable bond facilitating easy removal of the cover in order to serve the product contained within the tray. In the alternative, the cover may be used in association with other film material to form a package in another form such as a flexible bag or pouch.

[0014] In practice, the material of the label can be relatively thin material, for example 50 microns thick PVC. Such an arrangement is particularly desirable because the covers can be pre-formed in a packaging factory environment and reeled for delivery to a food packaging factory for ultimate use. This is a considerable advantage over relatively complex arrangements using multi-layer materials which are not susceptible to reel delivery.

[0015] The above and further features and advantages of the invention will become clear from the following description of embodiments thereof, reference being made to the accompanying drawings, in which

Figure 1 is a top plan view of a food package provided with a cover in accordance with a first embodiment of the present invention; and

Figure 2 is a top plan view of a label in accordance with a second embodiment of the invention.

[0016] Referring first to Figure 1, the package 1 illustrated comprises a cover 2 which is bonded to the upper edge of a tray containing a food product. The cover 2 comprises a sheet of film material 3 and a label 4 secured to the film material by adhesive. The film 3 is formed with a slit 5 running in the machine direction A of the machine which was used to form the cover. The slit 5 may be a through slit or maybe a line of weakness which, when pressure begins to build within the package, will open to provide an opening. The position of the slit 5 is such that it is covered by an elongate portion 6 of the label 4.

[0017] The label 4 includes, in addition to the elongate portion 6, a generally circular portion 7. The label 4 is secured to the film 3 by two areas of adhesive 8, 9. The areas of adhesive are separated by a central strip 10 which is not adhesively secured to the film. As illustrated, the strip 10 runs the entire length of the label 4 in the machine direction A.

[0018] In this embodiment of the invention, the strips 8, 9 and 10 are formed by laying down two spaced apart strips of adhesive on the material of the label 4 before the label is secured to the film. It is to be noted, however, that other arrangements are possible such as other pattern coatings, or in particular if desired the entire surface of the label 4 facing the film may be coated with adhesive, and a central strip of that adhesive may be treated in some way to prevent adhesion to the underlying film 3. Alternatively, it may be possible to secure the label 4 to the film by means other than adhesive, for example a

welding process.

[0019] In the illustrated preferred embodiments of the invention the film 3 is a polyester/polypropylene laminate comprising a layer of approximately 12 microns of polyester laminated to a layer of 50-70 microns of cast polypropylene. The label is formed from a shrink grade PVC film, for example 50 microns thick and is secured to the film by a suitable food grade adhesive, for example an acrylic based adhesive.

[0020] The effect of the arrangement described above is that vent passages 11, 12 are defined between the material of the film 3 and the material of the label 4, the vent passages connecting the opening formed by the slit 5 to the exterior of the package.

[0021] When a package formed as described above is heated, for example in a microwave oven, steam will be liberated from the food product contained in the package and this will elevate the pressure within the package. Initially, there will be little leakage of steam from the package. However, as the pressure and temperature of the package increases the slit 5 will eventually open to define an opening which connects the interior of the package to the passages 11, 12. Steam may thereafter vent in a controlled manner through the passages 11, 12 to prevent explosion of the pack but to maintain a super-ambient steam pressure within the package.

[0022] Preferably, the material of the label will tend to shrink under the influence of heat. Accordingly, as heating of the package continues the elongate region 6 of the label will tend to detach itself from the underlying film and shrink back towards the round portion 7. The round portion 7 will be less liable to detach from the film 3 because of the larger area of contact of adhesive between the round portion 7 and the film 3. The shrinking of the label material means that after a certain period of heating the label will not be able to re-adhere to the film material in the region of the slot and accordingly implosion of the package will be prevented.

[0023] The relatively large area of adhesive provided in the rounded portion 7 will ensure that the label does not become completely detached from the film 3.

[0024] Referring now to Figure 2, there is shown a modified label 14 which is of similar size and shape to the label of Figure 1 and is used in conjunction with a packaging cover as described above in connection with Figure 1. In contrast, however, the label of the first embodiment, label 14 is secured to the film by a single area of adhesive 18 which in particular extends around the entire periphery of an adhesive free region 15 which is formed on the elongated portion 16 of the label 14 and which, when applied to the cover material, overlies a venting aperture in the film so as to form a venting passage. In contrast with the venting slit 5 of the embodiment of Figure 1, in Figure 2, the venting aperture is formed by a pair of arcuate slits, the ends of which are separated so as to form a pair of substantially semi circular flaps 20a, 20b which remain attached to the film, and through which steam from within the packaging can vent it will,

of course, be understood that a linear slit may be used with the embodiment of Figure 2, as may arcuate slits with the embodiment of Figure 1.

[0025] The relatively narrow width of the adhesive 18a which bounds the adhesive free region 15 on three sides is of lower strength than that of the adhesive 18b provided on the generally circular portion 17 of the label 14, due to the difference in the contact area of the two adhesive regions 18a, 18b. Rather than a slit 5 as in the embodiment of Figure 1, a pair of substantially semi-circular and hence, as steam from the packaging vents through the slit 5 into the venting passage formed by the adhesive free region 15, the pressure in that region 15 will increase until it is sufficient to overcome the bonding strength of the adhesive 18a, and the elongated portion 16 of the label 14 lifts, allowing venting of the steam to atmosphere.

[0026] As shown in Figure 2, the edge of the label 14 also has an adhesive free region 21 which extends around the entire periphery so as to form a margin around the label which is not bonded to the underlying cover. Such a margin may also be provided on the label 4 according to Figure 1. Preferably, the margin is 1.5mm wide and the region of adhesive 18a surrounding the adhesive free region 15 is 2 mm wide.

[0027] In all other respects, the manner of operation of the label 14 of Figure 2, including the preferable materials and material properties such as shrinking.

Claims

1. A self-venting cover (1) for a heatable food package comprising: a sheet of film (3) having at least one opening (5; 19a, 19b) formed therein to permit the passage of steam therethrough; and a label (4; 14) secured to the film (3) for controlling the flow of steam through the opening (5; 19a, 19b), the label (4; 14b) comprising a sheet of material having a first region (7; 17) secured to the film (3) in an area remote from the opening (5; 19a, 19b) and having a second elongated region (6; 16) covering the opening (5; 19a, 19b), wherein the elongated region (6; 16b) is only partially secured to the film (3) and a vent passage (11, 12; 15) is defined between the unsecured portion (10; 15) of the elongated region (6; 16) and the film (3) itself, the vent passage extending from the opening (5; 19a, 19b) towards the periphery of the label (4; 14) to permit controlled venting of steam from the opening (5; 19a, 19b), **characterised in that** the elongated region (6; 16) of the label (4; 14) is relatively narrow and the first region (7; 17) is relatively wide and is located spaced from the opening (5; 19a, 19b).
2. A self-venting cover according to claim 1 wherein the unsecured portion of the elongated region (6) includes a strip (10) which is non-adhesive and which extends the full length of the label (4) along both the first region (7) and the elongated region (6) to provide two vent passages (11, 12) from the opening (5) which, in total, extend the full length of the label (4).
3. A self-venting cover according to claim 1, wherein the unsecured portion (15) extends only partially along the elongated region (16) and the elongated region (16) is secured to the film (3) around substantially the entire periphery of the unsecured region (16).
4. A self-venting cover according to claim 3, wherein the secured portion (18a) of the elongated region (16) is smaller in area than the secured portion (18b) of the first region (17) of the label (14), such that secured portion (18a) of the elongated region (16) of the label (14) has a weaker bond strength than that of the first region (17) of the label (14).
5. A self-venting cover according to any of the preceding claims, wherein the unsecured portion (10; 15) of the elongated region (6; 16) extends in the machine direction of the machine on which the cover is fabricated.
6. A self-venting cover according to any of the preceding claims, wherein the label (4; 14), other than the unsecured portion (10; 15) of the elongated region (6; 16), is adhesively secured to the film.
7. A self-venting cover according to any of the preceding claims, wherein the relative narrowness of the elongated region (6, 16) allows the elongated region (6, 16) of the label (4, 14) which overlies the opening (5; 19a, 19b) to become detached from the film (3) during heating, thereby providing a free and unrestricted passage through the opening (5; 19a, 19b) in the later stages of package heating.
8. A self-venting cover according to any preceding claim wherein at least the elongated region (6; 16) of the label (4; 14) is of a material which tends to shrink when heated.
9. A self-venting cover according to any preceding claim wherein the opening (5; 19a, 19b) is in the form of a slit cut in the material of the film (3).
10. A self-venting cover according to claim 9 wherein the slit (5) is a simple linear slit (5) running in the machine direction of the machine used for forming the cover.
11. A self-venting cover according to claim 9, wherein the opening comprises a pair of arcuate slits (19a, 19b), the ends of which are spaced apart so as to form a pair of back to back, substantially semi-circular flaps (20a, 20b).

12. A self-venting cover according to any preceding claim wherein the material of the label is a relatively thin material whereby the covers can be pre-formed in a packaging factory environment and reeled for delivery to a food packaging factory for ultimate use.

Patentansprüche

1. Selbstentlüftungsdeckel (1) für eine aufwärmbare Lebensmittelpackung enthaltend:

ein Filmblatt (3) mit wenigstens einer darin ausgebildeten Öffnung (5;19a,19b), die den Durchgang von Dampf erlaubt; und ein Etikett (4; 14), das an dem Film (3) befestigt ist, um die Dampfströmung durch die Öffnung (5;19a,19b) zu beeinflussen, das aus einem Materialblatt besteht, das einen ersten, an dem Film (3) befestigten Bereich (7;17) in einem Flächenbereich fern von der Öffnung (5;19a,19b) und einen zweiten, länglichen Bereich (6;16) aufweist, der die Öffnung (5;19a,19b) bedeckt, wobei der längliche Bereich (6;16) nur teilweise an dem Film (3) befestigt ist und ein Entlüftungskanal (11,12;15) zwischen dem unbefestigten Abschnitt (10;15) des länglichen Bereichs (6;16) und dem Film (3) selbst definiert ist und sich von der Öffnung (5; 19a,19b) in Richtung auf den Rand des Etiketts (4;13) erstreckt, um eine kontrollierte Entlüftung von Dampf aus der Öffnung (5;19a,19b) zu ermöglichen, **dadurch gekennzeichnet, dass** der längliche Bereich (6;16) des Etiketts (4; 14) relativ schmal ist und der erste Bereich (7;17) relativ breit ist und zu der Öffnung (5;19a,19b) im Abstand gelegen ist.

2. Selbstentlüftungsdeckel nach Anspruch 1, bei dem der unbefestigte Abschnitt des länglichen Bereichs (6) einen Streifen (10) enthält, der nicht klebend ist und sich über die volle Länge des Etiketts (4) längs sowohl des ersten Bereichs (7) als auch des länglichen Bereichs (6) erstreckt, um zwei Entlüftungskanäle (11,12) von der Öffnung (5) zu bilden, die sich insgesamt über die volle Länge des Etiketts (4) erstrecken.
3. Selbstentlüftungsdeckel nach Anspruch 1, bei dem der unbefestigte Abschnitt (15) sich nur teilweise über den länglichen Bereich (16) erstreckt und der längliche Bereich (16) an dem Film (3) an im Wesentlichen dem gesamten Umfang des unbefestigten Bereichs (16) befestigt ist.
4. Selbstentlüftungsdeckel nach Anspruch 3, bei dem der befestigte Abschnitt (18a) des länglichen Bereichs (16) in der Fläche kleiner als der befestigte Abschnitt (18b) des ersten Bereichs (17) des Etiketts

(14) ist, so dass der befestigte Abschnitt (18) des länglichen Bereichs (16) des Etiketts (14) eine geringere Haftfestigkeit hat, als der erste Bereich (17) des Etiketts (14).

5. Selbstentlüftungsdeckel nach einem der vorhergehenden Ansprüche, bei dem der unbefestigte Abschnitt (10;15) des länglichen Bereichs (6;16) sich in der Arbeitsrichtung der Maschine erstreckt, mit der der Deckel hergestellt wird.
6. Selbstentlüftungsdeckel nach einem der vorhergehenden Ansprüche, bei dem das Etikett (4;14) mit Ausnahme des unbefestigten Abschnitts (10;15) des länglichen Bereichs (6;16) an dem Film klebend befestigt ist.
7. Selbstentlüftungsdeckel nach einem der vorhergehenden Ansprüche, bei dem die relative Schmalheit des länglichen Bereichs (6;16) es dem länglichen Bereich (6; 16) des Etiketts (4;14), der über der Öffnung (5;19a,19b) liegt, von dem Film (3) während der Aufwärmung gelöst zu werden, wodurch ein freier und uneingeschränkter Durchgang durch die Öffnung (5;19a,19b) in den späteren Stufen des Aufwärmens der Packung geschaffen wird.
8. Selbstentlüftungsdeckel nach einem der vorhergehenden Ansprüche, bei dem wenigstens der längliche Bereich (6;16) des Etiketts (4;14) aus einem Material besteht, das beim Aufwärmen zum Schrumpfen neigt.
9. Selbstentlüftungsdeckel nach einem der vorhergehenden Ansprüche, bei dem die Öffnung (5;19a,19b) die Form eines Schlitzes hat, der in das Material des Films (3) geschnitten ist.
10. Selbstentlüftungsdeckel nach Anspruch 9, bei dem der Schlitz (5) ein einfacher linearer Schlitz (5) ist, der in der Arbeitsrichtung der für die Herstellung des Deckels verwendeten Maschine läuft.
11. Selbstentlüftungsdeckel nach Anspruch 9, bei dem die Öffnung ein Paar bogenförmiger Schlitz (19a, 19b) aufweist, deren Enden einen Abstand voneinander haben, um ein Paar Rücken an Rücken liegender, im Wesentlichen halbkreisförmiger Laschen (20a,20b) zu bilden.
12. Selbstentlüftungsdeckel nach einem der vorhergehenden Ansprüche, bei dem das Material des Etiketts ein relativ dünnes Material ist, wodurch die Deckel in einer Verpackungsfabrik für die Auslieferung an einen Lebensmittelverpackungsbetrieb für die endgültige Verwendung vorgeformt und aufgewickelt werden können

Revendications

1. Un couvercle auto-ventilé (1) pour emballage de nourriture chauffable comprenant : une feuille de film (3) ayant au moins une ouverture (5 ; 19a, 19b) formé intérieurement pour permettre le passage de vapeur ; et une étiquette (4 ; 14) fixée au film (3) afin de commander l'écoulement de vapeur à travers l'ouverture (5 ; 19a, 19b), l'étiquette (4 ; 14b) comprenant une feuille de matériau ayant une première région (7 ; 17) fixée au film (3) dans une zone située à distance de l'ouverture (5 ; 19a, 19b) et ayant une seconde région allongée (6, 16) recouvrant l'ouverture (5 ; 19a, 19b), la région allongée (6 ; 16b) étant seulement partiellement fixée au film (3) et un passage d'échappement (11, 12 ; 15) étant défini entre la partie non fixée (10 ; 15) de la région allongée (6 ; 16) et le film (3) lui-même, le passage d'échappement s'étendant depuis l'ouverture (5 ; 19a, 19b) en direction de la périphérie de l'étiquette (4 ; 14) pour permettre un échappement commandé de vapeur depuis l'ouverture (5 ; 19a, 19b), **caractérisé en ce que** la région allongée (6 ; 16) de l'étiquette (4 ; 14) est relativement étroite et la première région (7 ; 17) est relativement large et est située à l'écart de l'ouverture (5 ; 19a, 19b).
2. Un couvercle auto-ventilé selon la revendication 1, la partie non fixée de la région allongée (6) comprenant une bande (10) non-adhésive qui s'étend sur toute la longueur de l'étiquette (4), à la fois le long de la première région (7) et de la région allongée (6) afin de fournir deux passages d'échappement (11, 12) depuis l'ouverture (5) qui, au total, s'étend sur toute la longueur de l'étiquette (4).
3. Un couvercle auto-ventilé selon la revendication 1, la partie non fixée (15) s'étendant seulement partiellement le long de la région allongée (16) et la région allongée (16) étant fixée au film (3) sensiblement autour de la totalité de la périphérie de la région non fixée (16).
4. Un couvercle auto-ventilé selon la revendication 3, la partie fixée (18a) de la région allongée (16) étant d'une surface plus petite que la partie fixée (18b) de la première région (17) de l'étiquette (14), de telle sorte que la partie fixée (18a) de la région allongée (16) de l'étiquette (14) présente une résistance d'adhésion plus faible que celle de la première région (17) de l'étiquette (14).
5. Un couvercle auto-ventilé selon l'une quelconque des revendications précédentes, la partie non fixée (10 ; 15) de la région allongée (6 ; 16) s'étendant dans le sens machine de la machine dans laquelle le couvercle est fabriqué.
6. Un couvercle auto-ventilé selon l'une quelconque des revendications précédentes, l'étiquette (4 ; 14), mis à part la partie non fixée (10 ; 15) de la région allongée (6 ; 16), étant fixée de manière adhésive au film.
7. Un couvercle auto-ventilé selon l'une quelconque des revendications précédentes, l'étréitesse relative de la région allongée (6, 16) permettant à la région allongée (6, 16) de l'étiquette (4, 14) recouvrant l'ouverture (5 ; 19a, 19b) d'être détachée du film (3) lors du chauffage, fournissant ainsi un passage libre et sans obstacle à travers l'ouverture (5 ; 19a, 19b) aux étapes ultérieures du chauffage d'emballage.
8. Un couvercle auto-ventilé selon l'une quelconque des revendications précédentes, dans lequel au moins la région allongée (6 ; 16) de l'étiquette (4 ; 14) est constituée d'un matériau tendant à rétrécir lorsqu'il est chauffé.
9. Un couvercle auto-ventilé selon l'une quelconque des revendications précédentes, dans lequel l'ouverture (5 ; 19a, 19b) est de la forme d'une fente percée dans le matériau du film (3).
10. Un couvercle auto-ventilé selon la revendication 9, dans lequel la fente (5) est une fente linéaire simple (5) s'étendant dans le sens machine de la machine utilisée pour former le couvercle.
11. Un couvercle auto-ventilé selon la revendication 9, dans lequel l'ouverture comprend deux fentes arquées (19a, 19b), dont les extrémités sont espacées de façon à former deux rabats (20a, 20b) sensiblement semi-circulaires dos-à-dos.
12. Un couvercle auto-ventilé selon l'une quelconque des revendications précédentes, le matériau de l'étiquette étant un matériau relativement fin, les couvercles pouvant ainsi être préformés dans un environnement d'usine d'emballage puis enroulés en vue d'être fournis à une usine d'emballage de nourriture pour une utilisation finale.

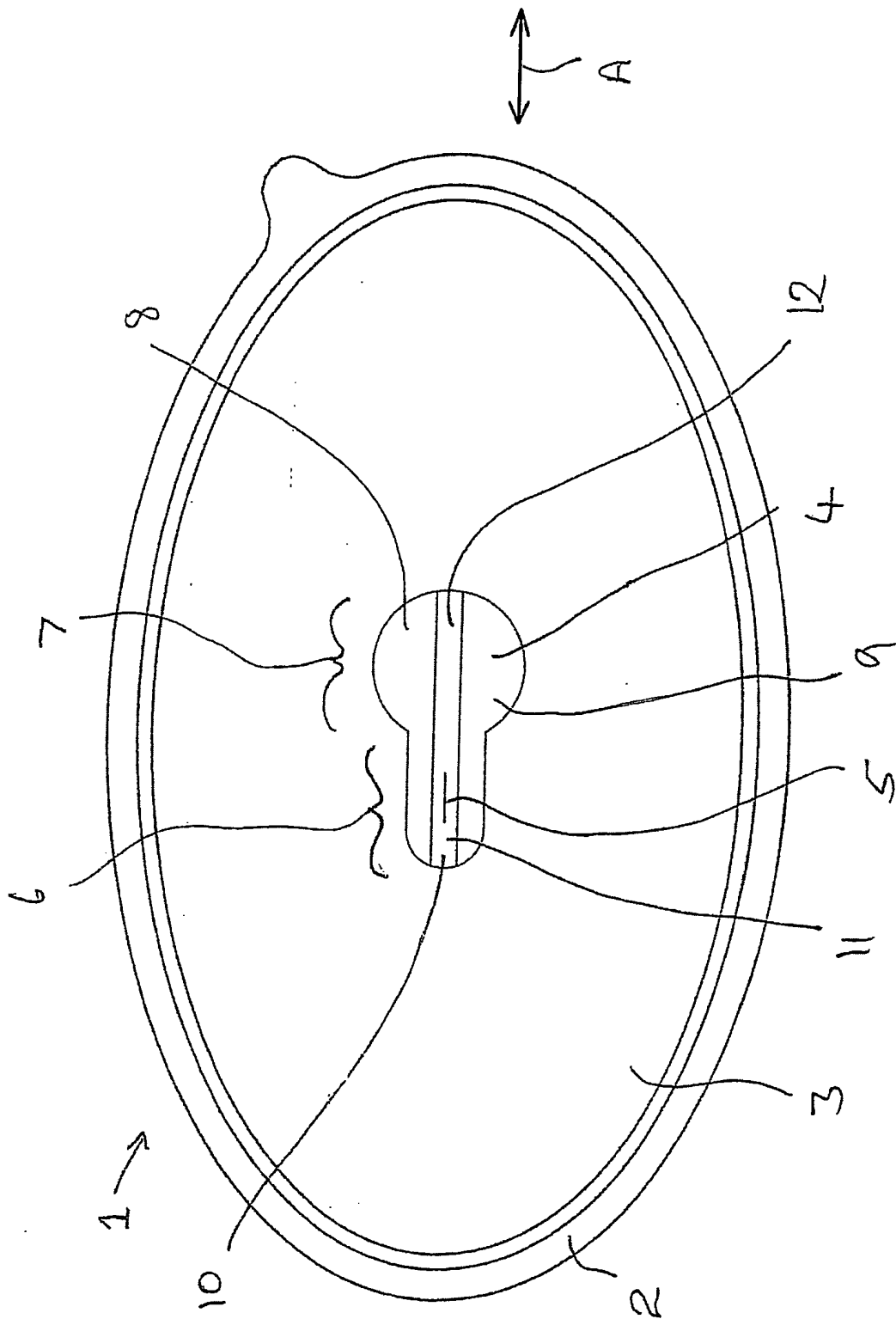


Figure 1

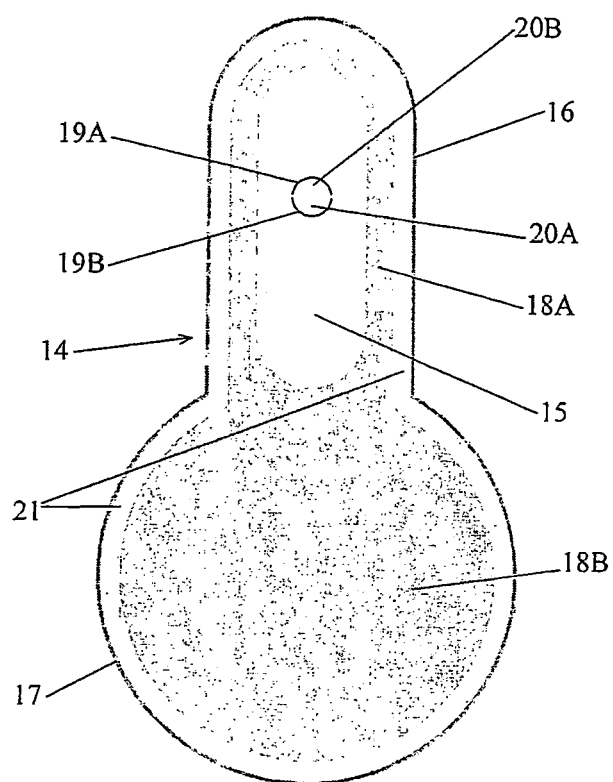


Figure 2

REFERENCES CITED IN THE DESCRIPTION

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