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- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
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- (54) Title: FOLDED INDIVIDUAL ARTICLE IN A CIRCULAR PACKAGE

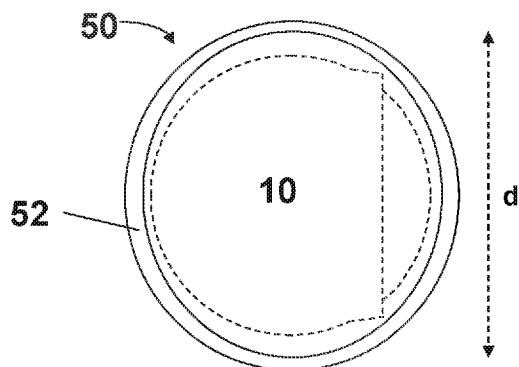


FIG. 5

- (57) Abstract: A packaged elongate sanitary protection product includes a folded sanitary product and a circular package. The sanitary product has first and second arcuate end portions comprising first and second ends, respectively, separated by a central portion, and a pair of longitudinal side edges connecting the first and second ends. The arcuate end portions have an effective radius and a maximum width, substantially equal to twice the effective radius. The central portion has a minimum width between about 75% and about 90% of the maximum width, and the sanitary product has a length between about 225% and about 285% of the maximum width. In addition, first and second fold lines are located a distance from each end equal to about 85% to about 105% of the maximum width of the arcuate end portions. The sanitary protection product is folded in a Z-configuration on first and second fold lines to form a substantially circular folded sanitary protection product, which is enveloped in the circular package.



Folded Individual Article in a Circular Package

FIELD OF THE INVENTION

The present invention relates to a foldable consumer article in a single use package with a generally circular appearance. More specifically, the present invention is directed to a consumer article with circular ends folded in “Z” configurations and individually wrapped in a thin, rounded sealable package.

BACKGROUND OF THE INVENTION

Personal consumer products such as wipes, wound bandages, and absorbent articles are commonly packaged in packages containing many individual articles. Often, the consumer wishes only to carry one or several of the articles in in a pocket, small bag, or purse. For user convenience, the articles may be packaged individually in single-use packages. Typically, the package is foil or plastic material, and sealed to prevent contamination of the product.

Generally, the package is square or rectangular in geometry. In some cases, the article is folded so as to take up less space in the bag or purse.

In the case of absorbent articles such as sanitary napkins and panty liners, women will carry one or several in their bag or purse. They remove them when needed. The square or rectangular packages, however, provide a conspicuous presentation for a single wrapped and folded sanitary article, and many women desire a less conspicuous wrapper, such as a more circular product.

Unfortunately, packaging a folded sanitary product having one or more protruding square edges does not present a nice, circular product for wrapping, and it creates wasted area within a circular package; this is especially true for a folded product employing a “C-fold” or G-fold” configuration. Therefore, what is needed is a substantially circular, folded sanitary product that can be neatly and economically enveloped in a circular pouch.

SUMMARY OF THE INVENTION

Surprisingly, we have found that a sanitary product can be designed to be folded to form a substantially circular, folded sanitary product that can be neatly enveloped in a tight-fitting circular pouch.

In one embodiment of our invention, a packaged elongate sanitary protection product includes a folded sanitary protection product and a circular package. The sanitary product has first and second arcuate end portions comprising first and second ends, respectively, separated by a central portion, and a pair of longitudinal side edges connecting the first and second ends. The arcuate end portions have an effective radius, and a maximum width, substantially equal to twice the effective radius. The central portion has a minimum width between about 75% and about 90% of the maximum width of the arcuate end portions, and the sanitary protection product has a length between about 225% and about 285% of the maximum width of the arcuate end portions. In addition, first and second fold lines are located a distance from each end equal to about 85% to about 105% of the maximum width of the arcuate end portions. The sanitary protection product is folded in a Z-configuration on the first and second fold lines to form a substantially circular folded sanitary protection product, which is enveloped in the circular package.

In another embodiment, the invention relates to a method of packaging an elongate sanitary protection product, such as described above. The method includes forming a first fold, substantially perpendicular to the length of the sanitary protection product, located a distance from the first end approximately equal to about 85% to about 105% of the maximum width of the arcuate end portions, forming a second fold, substantially perpendicular to the length of the sanitary protection product, located a distance from the second end approximately equal to about 85% to about 105% of the maximum width of the arcuate end portions, and enveloping the folded sanitary protection product with packaging material to form a substantially circular package. The first and second folds are in a Z-configuration to form a substantially circular Z-folded sanitary protection product.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of an embodiment of a foldable, round-ended consumer article of the present invention.

FIG. 2 is a side view of the consumer article embodiment of FIG. 1.

FIG. 3 is a side view of an example folding arrangement of the consumer article embodiment of FIG. 1 using two folding axes.

FIG. 4 is a top view of the folded consumer article of FIG. 3.

FIG. 5 is a top view of the folded consumer article of FIG. 4 wrapped in thin, cylindrical package.

FIG. 6 is a top view of a second embodiment of a foldable, round-ended consumer article of the present invention.

FIG. 7 is a top view of the folded consumer article of FIG. 6.

FIG. 8 is a top view of an exemplary foldable sanitary protection product of the present invention.

FIG. 9 is a top view of the folded sanitary protection product of FIG. 8.

FIG. 10 is a top view of an exemplary foldable sanitary protection product of the present invention.

FIG. 11 is a top view of the folded sanitary protection product of FIG. 10.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to foldable consumer articles in a package with a generally circular appearance. The following description is presented to enable one of ordinary skill in the art to make and use the invention. Various modifications to the embodiments and the generic principles and features described herein will be readily apparent to those skilled in the art. Thus, the present invention is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the features described herein.

The foldable consumer articles are first folded using two folding axes, also known as a “Z-fold”, and then packaged in a thin, generally circular package.

Referring to the drawings, FIGs. 1 and 2 are top and side views, respectively, of an embodiment of a foldable, round-ended consumer article **10** which may be used in the present invention. The article **10** has a first surface **12**, a second surface **14**, a first longitudinal side edge **16**, and a second longitudinal side edge **18**. Article **10** also has a central portion **22** and first and second arcuate end portions **24a** and **24b**, respectively. Article has a topsheet, a backsheet, and an absorbent structure therebetween

The materials of the topsheet, backsheet, and absorbent structure may be any conventional or exotic sanitary protection materials. Optional materials, such as transfer layers, may also be included in the absorbent sanitary articles of this invention.

Consumer article **10** has dimensions of length, "**L**", maximum width, "**W_{max}**", minimum width, "**W_{min}**", and thickness, "**t**" (measured as described below). Maximum width, "**W_{max}**" and minimum width, "**W_{min}**" results in consumer article **10** having a substantially hourglass shape. In some embodiments, thickness, "**t**" is less than about 2 mm.

End sections **24a** and **24b** are arcuate, where the term "arcuate" is defined as curved in shape. FIG. 1 shows first end section **24a** having an effective radius of "**r_a**", as measured from the center point of phantom line **26a** which is drawn between the points on first side edge **16** and second side edge **18** where article **10** transitions from central portion **22** to first end portion **24a** to any outside edge point of end portion **24a**. Second end portion **24b** is shown as a mirror image of first end portion **24a** and has an effective radius of "**r_b**", as measured from the center point of phantom line **26b** which is drawn between the points on first side edge **16** and second side edge **18** where article **10** transitions from central portion **22** to second end portion **24b** to any outside edge point of end portion **24b**. Side edges **16** and **18** are concave when followed from phantom line **26a** to from phantom line **26b**.

It is important to note that although end portions **24a** and **24b** project semi-circles when viewed from the top, they may also project as circular segments, semi-ellipses, or elliptical segments. If end portions **24a** and **24b** project as circular segments, effective radius **r** is measured from the center point of phantom line **26a** drawn between the points on first side edge **16** and a second side edge **18** where article **10** transitions from central portion **22** to first end portion **24a** to the outside edge point of end portion **24a** parallel to length direction **L**. If end portions **24a** and **24b** project as semi-ellipses or elliptical segments, the long axis of the ellipse may be either parallel to, or normal to length direction **L**. In these cases, effective radius **r** is measured from the center point of phantom line **26a** drawn between the points on first side edge **16** and second side edge **18** where article **10** transitions from central portion **22** to first end portion **24a** to the outside edge point of end portion **24a** parallel to length direction **L**. In all of the embodiments, end portion **24b** is a mirror image of end portion **24a**.

FIG. 1 shows length **L** of article **10** broken into three portions, the lengths of which are **2r**, **L-2r**, and **2r**. When summed together, the three lengths add up to the overall length **L** of consumer article **10**.

Consumer article **10** is a foldable, where “foldable” is defined as capable of being folded. An item is foldable if ratio of the length **L** to the thickness **t** is greater than that calculated using the well-known Gallivan paper folding formula:

$$\mathbf{L} \geq (\pi \mathbf{t} (2^n + 4) (2^n - 1)) / 6,$$

where **L** = length,

t = thickness, and

n = the number of folds.

Since the number of folds is 1, **n** = 1, and the ration of **L** to **t** is calculated to be:

$$\mathbf{L} \geq \pi \mathbf{t} / 6.$$

Foldable, round-ended consumer article **10** may be any number of different consumer articles with the rounded ends and the appropriate **L/t** ratio. These include, but are not limited to: baby or adult wipes, wound bandages and gauze, and absorbent articles such as diapers, sanitary napkins and panty liners.

Consumer article **10** is folded prior to being packaged in a thin, cylindrical package. The folding arrangement uses two folding axes that form fold lines **28**. The folding results in what is known as a “Z-fold”, since the folded article has the look of a forward or reversed English letter Z as viewed from the side.

FIG. 3 is a side view of an example folding arrangement of first embodiment consumer article **10** using two folding axes. The figure shows first surface **12**, second surface **14**, and second side edge **18** of article **10**. After folding, the thickness of consumer article **10** is represented by “**th**”. The value of **th** will depend on the pressure used to compress the “Z” configuration of article **10**. The minimum for **th** will be about three times the thickness (**t**) of consumer article **10**, or

$$\mathbf{th} \geq 3\mathbf{t}$$

FIG. 4 is a top view of folded consumer article **10**. In this view, end portions first surface **12** is visible. Diagonal “**d**” is calculated using the geometrical formula:

$$\mathbf{d} \geq (5\mathbf{W}^2 + \mathbf{L}^2 - 4\mathbf{LW})^{1/2},$$

where, **d** = diagonal,

W = width, and

L = length.

In the embodiment shown in FIGs. 3 and 4, the length **L** of consumer article **10** is equal to five times the radius “**r**” of end portions **24a** and **24b**. As a result, the top view of folded consumer article **10** project as nearly circular. In some embodiments, **L** is greater than six times **r** (or 3 times W_{max}), while in other embodiments, **L** is less than six times **r** (or 3 times W_{max}).

The narrowed central portion **22** allows the Z-folded product to acquire a nearly circular format. Preferably, the central portion **22** has a minimum width (W_{min}) that is between about 75% and about 90% of the maximum width (W_{max}). More preferably, the W_{min} is between about 80% and about 85% of W_{max} . The relationship between the article length **L** and maximum width W_{max} also affects the ability of the Z-folded product to acquire the desired nearly circular format. Preferably, the article length **L** is between about 225% and about 285% of the maximum width (W_{max}). More preferably, **L** is between about 235% and 250% of W_{max} . In addition, the location of the fold lines **28a**, **28b** affects the ability of the Z-folded product to acquire the desired nearly circular format. Preferably, the fold lines **28a**, **28b** are located a distance from each end **24a**, **24b**, respectively, equal to about 85% to about 105% of the W_{max} , more preferably, between about 90% to about 95% of the W_{max} .

FIG. 5 is a top view of the folded consumer article **10** of FIG. 4 wrapped in thin, circular package, where “thin” is defined as a folded consumer article **10** thickness **th** to diagonal **d** ratio (th/d) of less than 0.5, or 0.25, or 0.1 or 0.05. FIG. 5 shows the inner diameter of circular package **50** equal to diagonal **d**. Circular package **50** is also shown to have circular flange seal **52** to prevent contamination to folded consumer article **10**.

It is important to note that circular package **50** could also be in the form of an elliptical or oval cylindrical package, where the top view of the package projects an ellipse or an oval. Package **50** must also have an internal volume sized to receive folded consumer article **10**.

Circular package **50** could be made of sealable materials such as thin aluminum foil or plastic film. In the case of aluminum foil, the package can be sealed via crimp sealing. Plastic film material can be sealed via heat sealing. In some embodiments, the packing material is two sheets of packing material. In other embodiments, the packing material is a folded sheet of packing material.

In a preferred embodiment, shown in FIG. 6, the first fold line **28a'** is disposed perpendicular to the longitudinal axis and is located at a distance from the first end **24a'**

approximately equal to the maximum width W_{\max} of the first end **24a'**. The second fold line **28b'** is also disposed perpendicular to the longitudinal axis and is located at a distance from the second end **24b'** approximately equal to the maximum width W_{\max} of the second end **24b'**. Thus, when the product is folded in the Z-fold configuration, as shown in FIG. 7, the arcuate ends **24a'**, **24b'** of the sanitary protection article **10'** define a substantially circular Z-folded sanitary protection product. In this embodiment, the absorbent core **30** has narrowed ends **32a** and **32b** and does not extend over the total area of the absorbent article **10'**. The circular form of the ends **24a'**, **24b'** and the location of the fold lines **28a'**, **28b'** provide a substantially circular folded product with minor protruding square edges **34**.

Thickness measurement:

Thickness of the product can be determined with a thickness gauge applying uniform pressure. A preferred thickness gauge is Ames LG 1820-1-04 or equivalent with a 0.1 psi pressure applied by a 57 g dead weight and a foot surface area of 1.129" of diameter contact; precision is ± 0.02 mm or 0.001". The product thickness is measured in the first and second ends and in the center portion. The thickness of the finished product (less any release paper) is measured as follows:

1. Place the release paper (if any) under the foot of the thickness gauge.
2. Re-zero the gauge to remove the thickness of the release paper from the measurements. The gauge should read 0.00 mm (0.000").
3. Reposition the release paper so that it is positioned properly on the adhesive strip and that there are no folds in it, if necessary.
4. Raise the foot of the gauge and place the napkin underneath at the desired position (first and second ends and in the center portion) so that the foot of the gauge hangs above the product.
- 5 Lower the foot delicately, making sure it does not drop suddenly on the product surface.
- 6 Allow the gauge to stabilize (approximately 3 seconds), and record the product thickness to the nearest 0.02 mm (0.001").
- 7 Repeat steps 4 to 6 for each product area to be measured.

EXAMPLES

Example 1:

An example of a pantiliner **110** according to the invention is shown in Figs. 8 and 9. As shown in the top plan view, the arcuate ends **124a, 124b** have a maximum width **125** of 58 mm and a radius **127** of 25 mm, and the central portion **122** has a minimum width **123** of 43.5 mm. Thus, the central portion **122** has a minimum width of about 75% of the maximum width of the arcuate ends **124a,124b**. When the product is z-folded along fold lines **134** as shown in Fig. 9, with the first arcuate end **124a** on top, the product can be circumscribed by a circle **135** having a diameter of 64 mm.

Example 2.

An example of a pantiliner **210** according to the invention is shown in Figs. 10 and 11. As shown in the top plan view, the arcuate ends **224a, 224b** have a maximum width **225** of 58 mm and a radius **227** of 27 mm, and the central portion **222** has a minimum width **223** of 52.2 mm. Thus, the central portion **222** has a minimum width of about 90% of the maximum width of the arcuate ends **224a,224b**. When the product is z-folded along fold lines **234** as shown in Fig. 11, with the first arcuate end **224a** on top, the product can be circumscribed by a circle **235** having a diameter of 64 mm.

The specification and embodiments above are presented to aid in the complete and non-limiting understanding of the invention disclosed herein. Since many variations and embodiments of the invention can be made without departing from its spirit and scope, the invention resides in the claims hereinafter appended.

What is claimed is:

1. A packaged elongate sanitary protection product comprising:
 - a) the sanitary protection product having:
 - i) first and second arcuate end portions comprising first and second ends, respectively, separated by a central portion, the arcuate end portions having an effective radius;
 - ii) a pair of longitudinal side edges connecting the first and second ends;
 - iii) first and second arcuate ends having maximum width substantially equal to twice the effective radius;
 - iv) the central portion having a minimum width between about 75% and about 90% of the maximum width;
 - v) the sanitary protection product having a length between about 225% and about 285% of the maximum width; and
 - vi) first and second fold lines located a distance from each end equal to about 85% to about 105% of the maximum width;wherein the sanitary protection product is folded in a Z-configuration on the first and second fold lines to form a substantially circular folded sanitary protection product; and
 - b) a circular package arranged and configured to envelope the substantially circular Z-folded sanitary protection product.
2. The packaged elongate sanitary protection product having a substantially hourglass shape.
3. The packaged elongate sanitary protection product of claim 2, wherein the pair of longitudinal side edges in the central portion are substantially concave.
4. The packaged elongate sanitary protection product of claim 3, wherein the pair of longitudinal side edges have a substantially curvilinear transition from the substantially arcuate ends to the substantially concave central portion.

5. The packaged elongate sanitary protection product of claim 1, wherein the sanitary protection product has a length between about 235% and about 250% of the maximum width.

6. The packaged elongate sanitary protection product of claim 1, wherein the first and second fold lines are located a distance from each end equal to about 90% to about 95% of the maximum width.

7. The packaged elongate sanitary protection product of claim 1, wherein the circular package comprises a substantially circular flange seal.

8. The packaged elongate sanitary protection product of claim 7 wherein the packaging material comprises two sheets of packaging material.

9. The packaged elongate sanitary protection product of claim 7 wherein the packaging material comprises a folded sheet of packaging material.

10. The packaged elongate sanitary protection product of claim 1 wherein the sanitary protection product has a thickness of less than about 2 mm.

11. A method of packaging an elongate sanitary protection product comprising first and second arcuate end portions comprising first and second ends, respectively, separated by a central portion, the arcuate end portions having an effective radius and a maximum width substantially equal to twice the effective radius, a pair of longitudinal side edges connecting the first and second ends, wherein the central portion has a minimum width between about 75% and about 90% of the maximum width, the sanitary protection product has a length between about 200% and about 300% of the maximum width, the method comprising the steps of:

a) forming a first fold, substantially perpendicular to the length of the sanitary protection product, located a distance from the first end approximately equal to the maximum width;

b) forming a second fold, substantially perpendicular to the length of the sanitary protection product, located a distance from the second end approximately equal to the maximum width;

whereby the first and second folds are in a Z-configuration to form a substantially circular Z-folded sanitary protection product; and

c) enveloping the substantially circular Z-folded sanitary protection product with packaging material;

d) forming a substantially circular flange seal in the packaging material to envelope the Z-folded sanitary protection product.

12. The method of Claim 11 wherein the sealed packaging material is substantially circular.

13. The method of claim 11 wherein the packaging material comprises two sheets of packaging material.

14. The method of claim 11 wherein the packaging material comprises a folded sheet of packaging material.

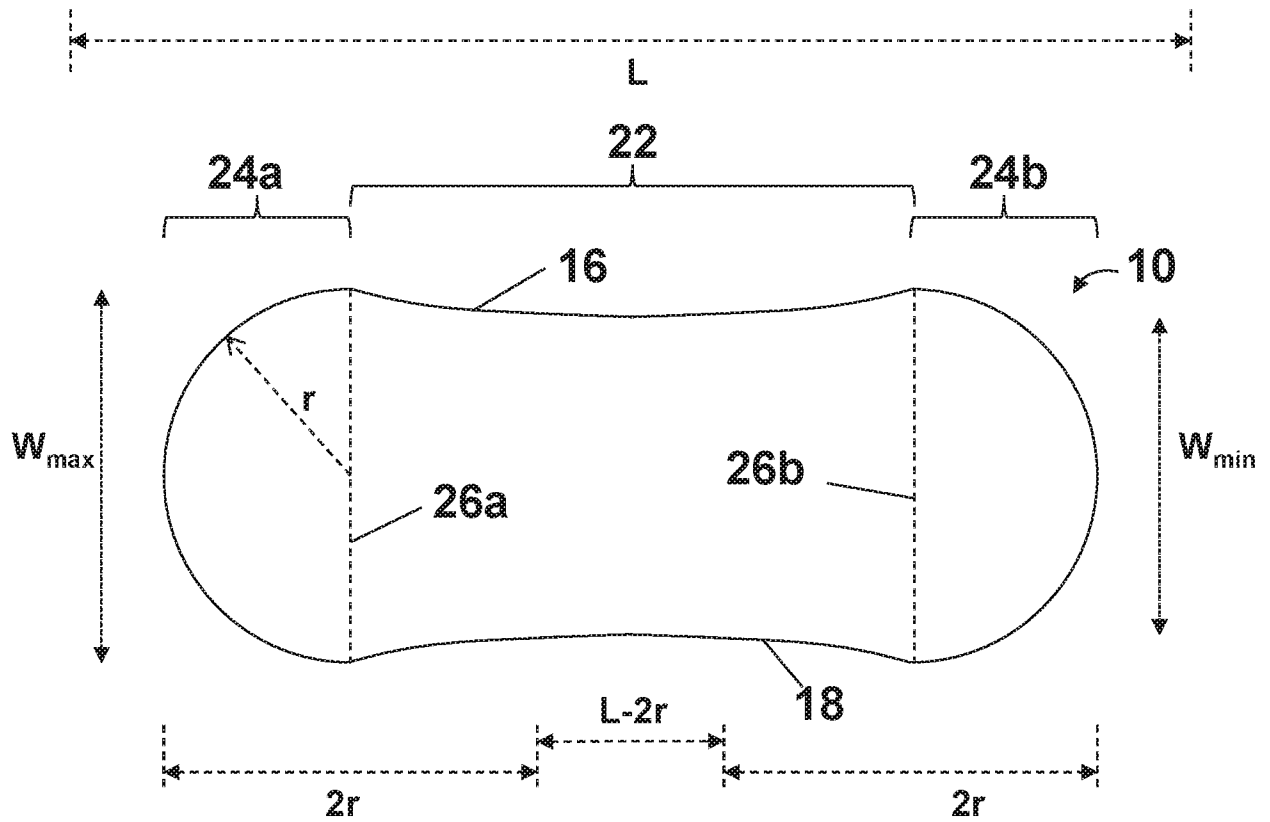


FIG. 1

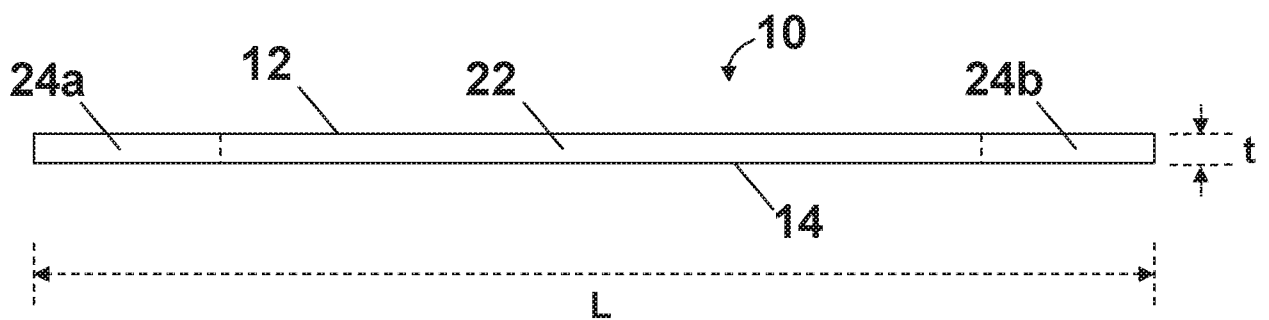


FIG. 2

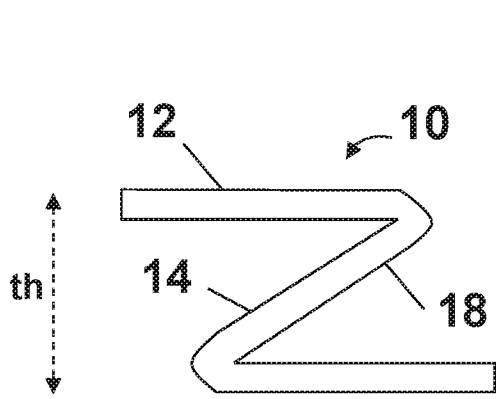


FIG. 3

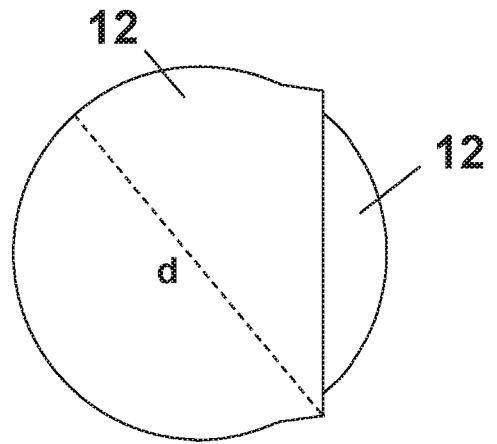


FIG. 4

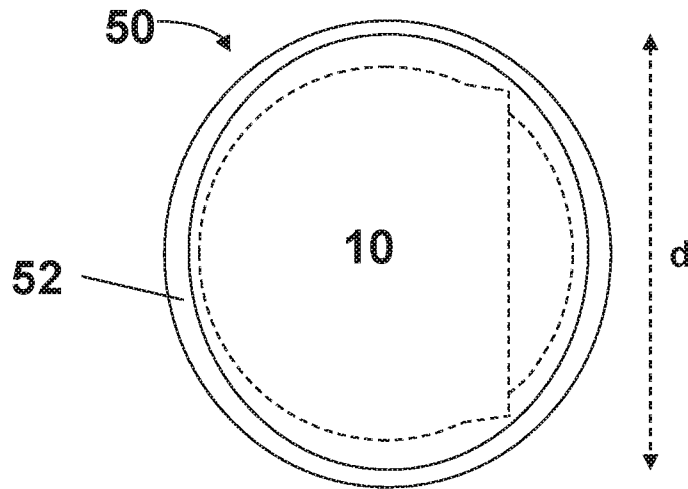
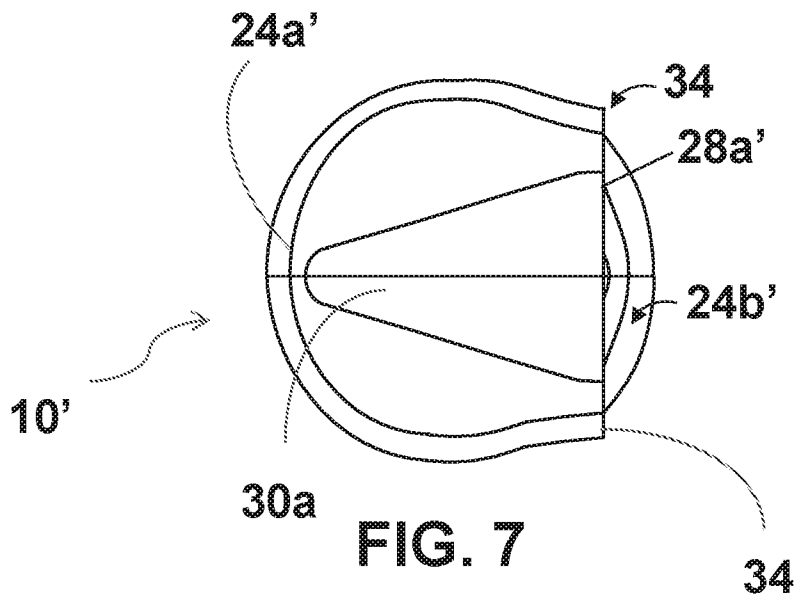
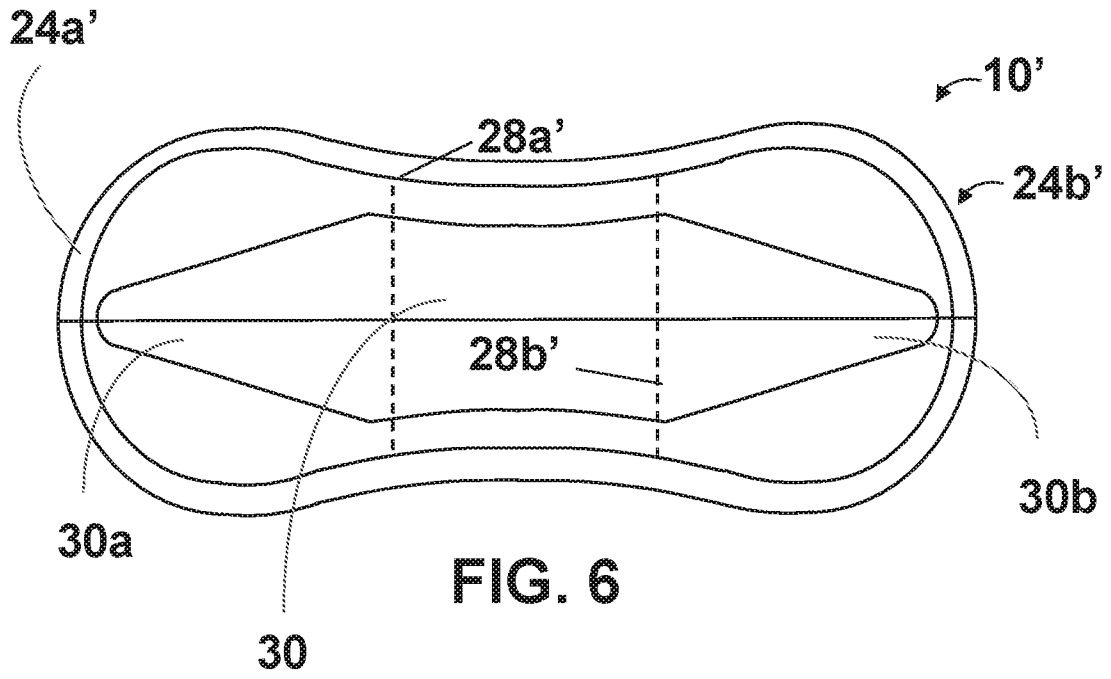


FIG. 5



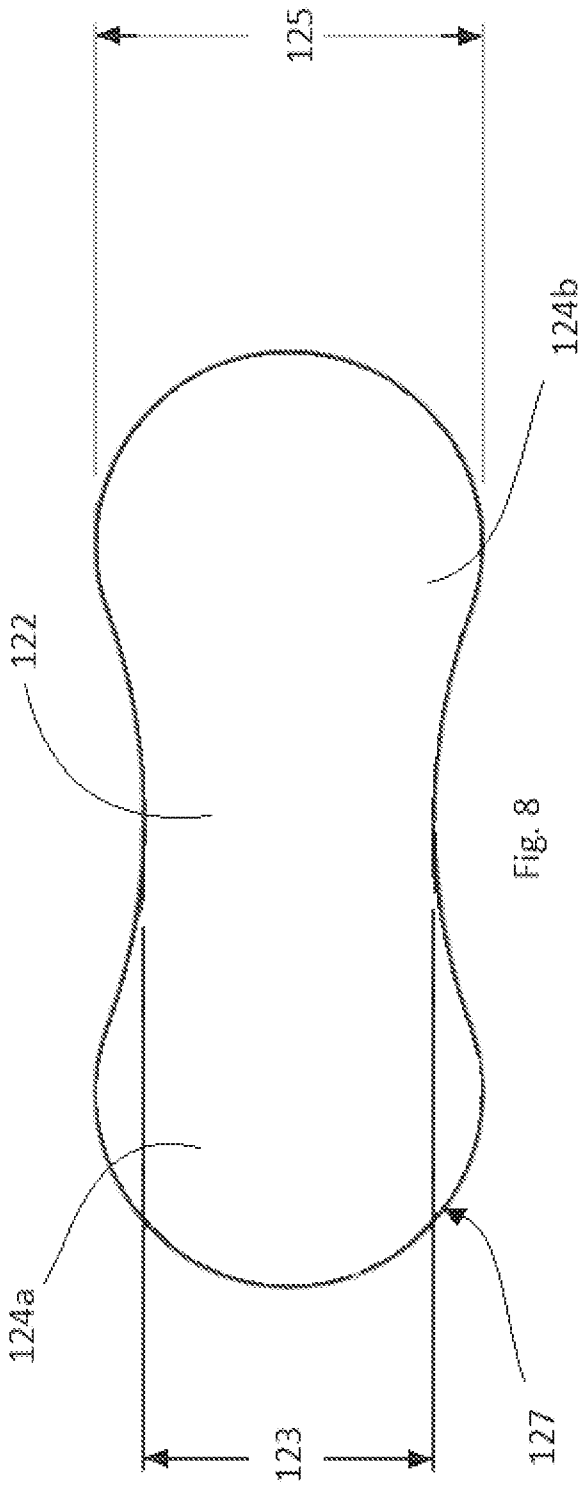


Fig. 8

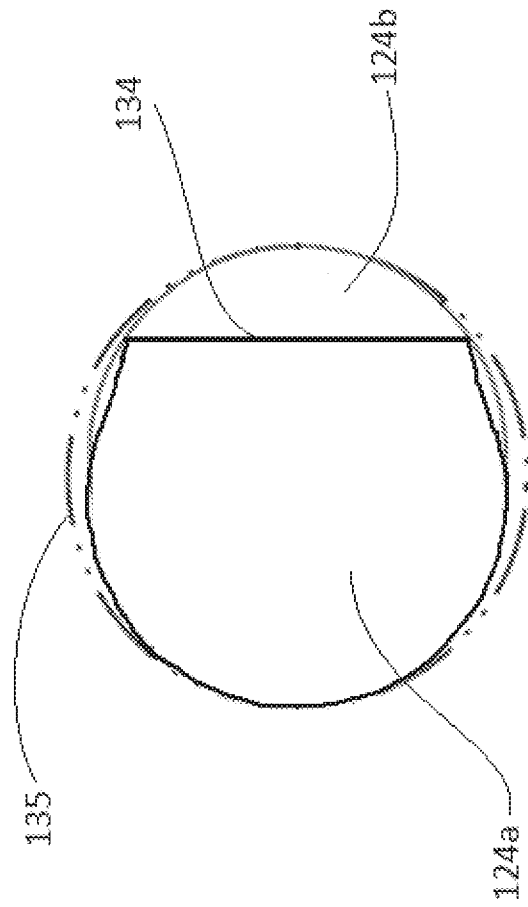


Fig. 9

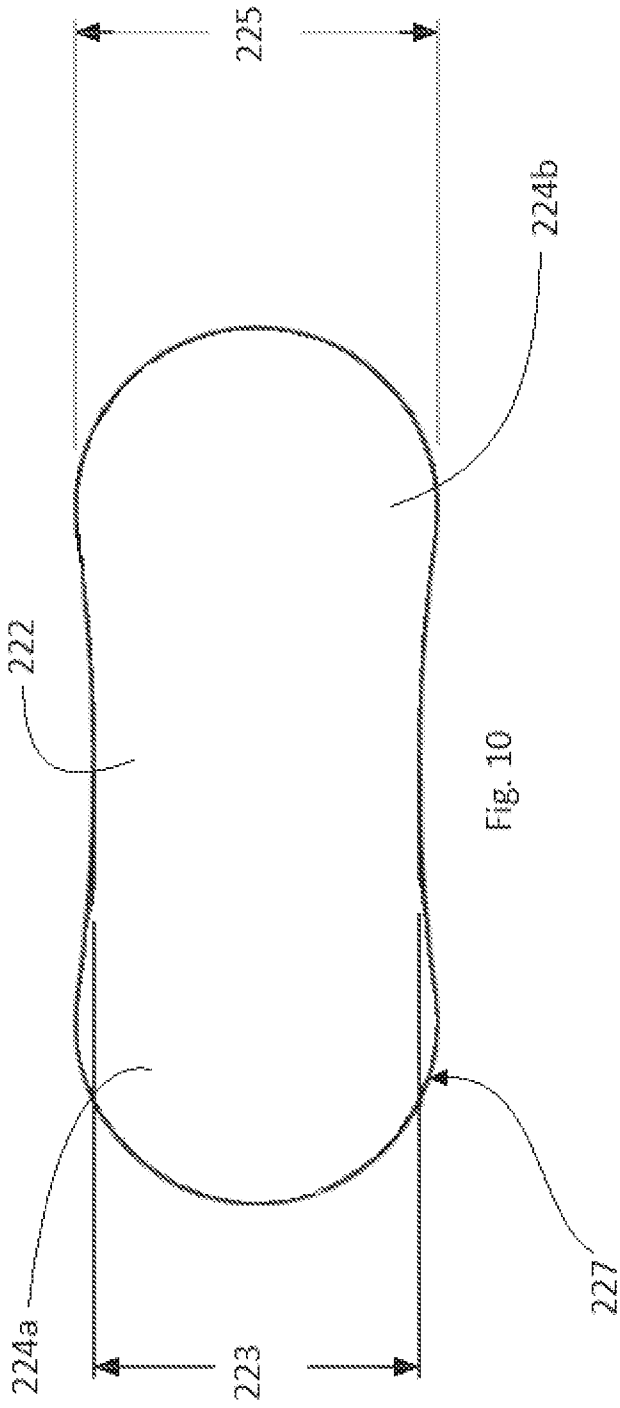


Fig. 10

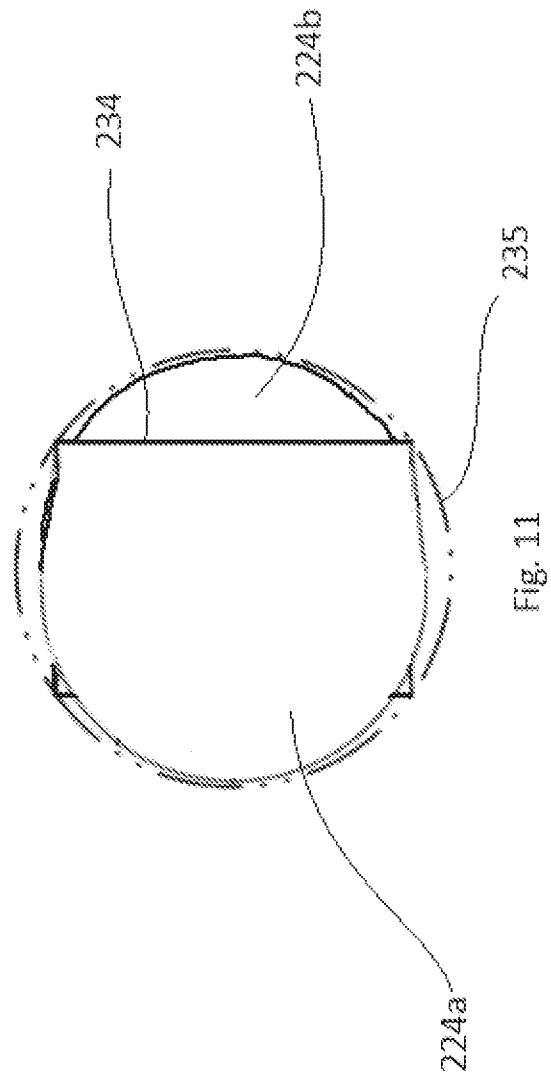


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2018/054817

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F13/472 A61F13/551 A61F13/47
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96/20668 A1 (MOELNLYCKE AB [SE]; HANSSON ROY [SE]; JOHANSSON KERSTIN [SE]) 11 July 1996 (1996-07-11) page 13, line 17 - page 14, line 20; figures 1-3	1-14
A	WO 97/15261 A1 (PROCTER & GAMBLE [US]) 1 May 1997 (1997-05-01) page 14, paragraph 3 - page 15, paragraph 1; figures 2, 4	1-14
A	WO 2015/060755 A1 (SCA HYGIENE PROD AB [SE]) 30 April 2015 (2015-04-30) page 15, line 32 - page 16, line 17; figures 7, 8	1-14
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 24 September 2018	Date of mailing of the international search report 04/10/2018
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Demay, Stéphane
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INTERNATIONAL SEARCH REPORT

International application No
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