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(54) **ABSORBENT ARTICLE PACKAGING WITH IMPROVED OPENING SYSTEM**

(57) A packaging (1) for disposable absorbent articles (2) in folded configuration arranged in two stacks (3a, 3b) being piled one over the other; the packaging comprising; a front panel (11); a rear panel (12); two lateral panels (13); an upper panel (14); a lower panel (15); said packaging is configured to be opened by a transverse weakness line (5) which is positioned between the two stacks, so that when opened, each stack is individually exposed, wherein the transverse weakness line

crosses the entire width " w_1 " of one of the front or rear panels and extends through the entire width " w_2 " of the two lateral panels of the packaging and further comprising at least one lateral longitudinal weakness line (6) intersecting the transverse weakness line on at most two, preferably only one, of the lateral panels forming a perpendicular angle between said transverse weakness line and said lateral longitudinal weakness line.

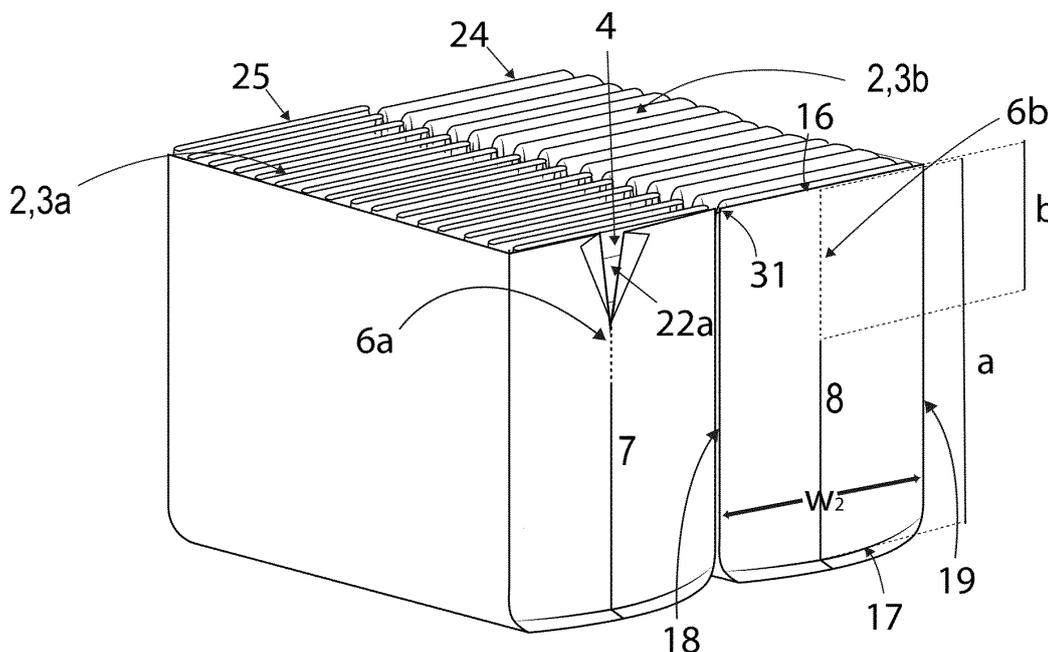


Fig. 4

Description**Technical Field**

5 **[0001]** The invention pertains to the technical field of packaging for disposable absorbent articles, particularly the present invention relates to a packaging comprising a plurality of compressed absorbent articles in one or more stacks with an opening system which makes the articles accessible to the caregiver in order to be taken out of the packaging one at a time.

Background

10 **[0002]** The disposable absorbent articles are articles used to absorb and contain body exudates, some examples of disposable absorbent articles are disposable diapers and disposable pants for babies and for incontinent adults, sanitary napkins, pads, pantliners, etc. Usually, these articles are packaged in a flexible packaging containing several articles placed one next to the other in compressed form in order to optimize the packaging and the shelf space, depending on
15 the number of articles inside the packaging, many times these are arranged in stacks one on top of the other; said packaging usually have an "easy-opening" system consisting in one or several weakening lines whereby the packaging can be opened to get the product out, but the easy opening system is useful for taking out the articles from the upper stack and it is difficult to access to the articles in the below stack. On the other hand, as the articles are compressed to
20 be packaged, when the packaging is opened through said weakness lines it is still difficult to take one diaper at a time, and is especially difficult to pull out the very first diaper from the packaging without pulling the contiguous diapers at the same time.

[0003] Without wishing to be bound by theory, caregivers need a packaging with an improved opening system, especially for those packaging comprising a plurality of absorbent articles disposed of in one or more stacks, wherein each
25 individual absorbent article is compressed against another absorbent article to fit within the packaging. The opening system needs to be easy to handle and should let the caregiver take one diaper at a time and to have an easy access to the articles of each stack.

[0004] The packaging of this invention solves this problem introducing in the packaging an easy opening system between each two stacks of disposable absorbent articles, so that when opened, two continuous stacks are accessible
30 to the caregiver in order to take out an article from the packaging; besides, the easy opening system of the invention, helps to release pressure within the packaging in order to pull out easily each disposable absorbent article individually, without pulling out the contiguous absorbent articles. In packages with only one stack of absorbent articles, the easy opening system will help to make the articles available and easy to grab

[0005] There are hundreds of patents referring different configurations of packages for disposable absorbent articles
35 and a lot of them referring to different "easy-opening" systems, but none of these patents divulges a packaging as the one proposed in the present invention. For example, the US5282687 issued Feb, 28, 1992 to Yee Paul, divulges a flexible packaging for disposable absorbent articles with a first line of frangibility coinciding with the bridging strap and with a complementary line of frangibility in the strap portion, coinciding with the first line of frangibility. The EP1819609 issued Dec, 9, 2004 to Clark James, describes a flexible package for disposable absorbent articles with an opening
40 device confined to the top surface and with at least one line of weakness, the opening device provides for easy opening of the flexible package and provides for easy access to articles within the interior compartment of the flexible package, in addition, the flexible package retains its shape even as the articles are removed from the flexible package. The EP2723653 issued June 22, 2011 to Everson Stacy, refers to a flexible packaging comprising a gusset adjacent to a top panel, a first weakness line on one side of a side panel longitudinal central axis, a second weakness line on the
45 opposite side of the same side panel longitudinal central axis and a third weakness line longitudinally between the first and second weakness lines, each line extending through the gusset of the packaging.

[0006] The opening systems divulged in these publications do not provide an efficient system to an easy access to the articles when they are arranged in two or more stacks inside the packaging and which release pressure within the packaging in order to pull out easily each disposable absorbent article.

50 **[0007]** The US5361905 issued Sep.,22,1993 to McQueeny divulges a flexible packaging for disposable absorbent articles arranged in plurality of stacks and with an opening means which extends across a primary opening wall and extends across each of a pair of oppositely located, complementary opening walls and positioned between immediately adjacent arrays of stacked articles, thereby providing for a separation of said package into at least a pair of sub packages. The flexible package of this invention does not solve the problem of releasing pressure within the packaging in order to
55 pull out easily each disposable absorbent article individually.

[0008] The packages described above, however, have not provided the desired combination of a package for disposable absorbent articles with an improved opening system to let the caregiver take one diaper at a time and to have an easy access to the articles of each stack, especially for those packaging comprising a plurality of absorbent articles disposed

in two or more stacks, wherein each individual absorbent article is compressed against another absorbent article to fit within the packaging,

Summary of the invention

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[0009] In one aspect of the present invention provides a packaging (1) for disposable absorbent articles (2) in folded configuration arranged in two stacks (3a,3b) being piled one over the other; the packaging (1) having a substantially rectangular prism shape comprising; a front panel (11); a rear panel (12); two lateral panels (13); an upper panel (14); and a lower panel (15); wherein, said packaging (1) is configured to be opened by a transverse weakness line (5) which is positioned between the two stacks (3a,3b), so that when opened, each stack (3a,3b) is individually exposed, to that the transverse weakness line (5) crosses the entire width " w_1 " of one of the front or rear panels and extends through the entire width " w_2 " of the two lateral panels (13); the packaging (1) comprises at least one lateral longitudinal weakness line (6) intersecting the transverse weakness line (5) on one of the lateral panels (13) forming a perpendicular angle between said transverse weakness line (5) and said lateral longitudinal weakness line (6); preferably wherein the lateral longitudinal weakness line (6) release pressure such that the first absorbent article (4) from the packaging (1) can be pulled out without tearing the a substantial portion of the packaging, said substantial portion preferably being at least 50%, preferably at least 40%, more preferably at least 30%, even more preferably at least 20%, most preferably at least 10%, of the total surface area of said packaging (the total surface area being determined by the sum of the areas of all said panels).

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[0010] In one more aspect of the invention, the absorbent articles (2) are arranged in three or more stacks (3) being piled one over the other within the packaging (1) said packaging (1) is configured to be opened by transverse weakness lines (5) positioned between each one of the stacks piled inside the packaging, the transverse weakness lines (5) crosses the entire width " w_1 " of one of the front or rear panels and extends through the entire width " w_2 " of the two lateral panels (13); the packaging (1) comprises at least two lateral longitudinal weakness lines (6) intersecting the transverse weakness lines (5) on one of the lateral panels (13) forming a perpendicular angle between said transverse weakness lines (5) and said lateral longitudinal weakness lines (6); wherein the lateral longitudinal weakness lines (6) release pressure to pull out the first absorbent article (4) from each of the stacks of absorbent articles.

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[0011] In another aspect of the present invention, the packaging (1) of the invention, contains one stack (3a) of disposable absorbent articles, the packaging (1) is configured to be opened by a transverse weakness line (5) being positioned between the upper edge (16) and the transverse centerline (x-x) of any of the front or rear panels (11,12), wherein the transverse weakness line (5) crosses the entire width " w_1 " of one of the front and rear panels (11,12) and extends through the entire width " w_2 " of the two lateral panels (13a, 13b), so that the packaging (1) comprises at least one lateral longitudinal weakness line (6) that extends from the transverse weakness line (5) on one of the lateral panels (13a, 13b) in a direction toward the lower edge (17) of said lateral panel (13a, 13b), forming a perpendicular angle between said transverse weakness line (5) and said lateral longitudinal weakness line (6); and preferably releases pressure such that the first absorbent article (4) from the packaging (1) can be pulled out without tearing the a substantial portion of the packaging, said substantial portion preferably being at least 50%, preferably at least 40%, more preferably at least 30%, even more preferably at least 20%, most preferably at least 10%, of the total surface area of said packaging (the total surface area being determined by the sum of the areas of all said panels). The transverse weakness line (5) is positioned preferably closer to the upper edge than to the the transverse centerline (x-x) of the panels in which said transverse weakness line (5) is present.

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Brief description of the drawings

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[0012]

Fig. 1a Shows a disposable absorbent article in an extended configuration with the topsheet facing toward the front

Fig. 1b - 1d Show a disposable absorbent article in a folded configuration

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Fig. 2 Shows a perspective view of a closed packaging for disposable absorbent articles according to the present invention

Fig. 3 Shows a lateral side view of the closed packaging for disposable absorbent articles of Fig. 1

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Fig. 4 Shows a perspective view of the opened packaging for disposable absorbent articles of Fig. 3

Fig. 5 Shows an alternative configuration of the packaging of the present invention

Detailed description of the invention

[0013] Unless otherwise defined, all terms used in disclosing the invention, including technical and scientific terms, have the meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. By means of further guidance, term definitions are included to appreciate better the teaching of the present invention.

[0014] As used herein, the following terms have the following meanings:

"A" , "an" , and "the" as used herein refers to both singular and plural referents unless the context clearly dictates otherwise. By way of example, "a compartment" refers to one or more than one compartment.

"About" as used herein referring to a measurable value such as a parameter, an amount, a temporal duration, and the like, is meant to encompass variations of +/-20% or less, preferably +/-10% or less, more preferably +/-5% or less, even more preferably +/-1% or less, and still more preferably +/-0.1% or less of and from the specified value, in so far such variations are appropriate to perform in the disclosed invention. However, it is to be understood that the value to which the modifier "about" refers is itself also specifically disclosed.

"Comprise" , "comprising" , "comprises, and "comprised of" as used herein are synonymous with "include" , "including" , "includes" or "contain" , "containing" , "contains" and are inclusive or open-ended terms that specifies the presence of what follows e.g. component and do not exclude or preclude the presence of additional, non-recited components, features, element, members, steps, known in the art or disclosed therein.

"Absorbent article" , as used herein, refers to devices that absorb and contain liquid, and more specifically, refers to devices that are placed against or in proximity to the body of the wearer to absorb and contain the various exudates discharged from the body. Absorbent articles include but are not limited to baby diapers, adult incontinence briefs, training pants, sanitary napkins and the like. Absorbent articles preferably comprise a longitudinal axis and a transversal axis perpendicular to said longitudinal axis. The longitudinal axis is hereby conventionally chosen in the front-to-back direction of the article when referring to the article being worn.

"Packaging" , as used herein, refers to a rigid, semi-rigid or flexible container for one or more individual articles such as disposable absorbent articles, preferably but not limited to baby diapers, adult incontinence briefs, training pants, sanitary napkins, pantliners, wet wipes and/or tampons. The "packaging" may comprise prism shape such as rectangular prism, cubic, cylinder, pyramidal and the like, wherein the rectangular prism is the most common shape comprising a front panel, a rear panel, two lateral panels, an upper panel and a lower panel.

"Weakness line" or "frangible line" , as used herein, refers to a line defined by partial or total continuous perforations through a material. The line defined by the perforations may be straight, undulated, curved, zig-zag shape or any other suitable shape. The perforations may be dots, lines, crosses, ellipses or any other suitable shape useful to trim the material and to separate a continuous layer in two or more portions.

[0015] The recitation of numerical ranges by endpoints includes all numbers and fractions subsumed within that range, as well as the recited endpoints.

[0016] The present invention is preferably directed to a packaging for disposable absorbent articles. Without wishing to be bound by theory, caregivers need a packaging with an improved opening system, especially for those packaging comprising a plurality of absorbent articles disposed in two or more stacks, wherein each individual absorbent article is compressed against other absorbent article to fit within the packaging. The opening system needs to be easy to handle and should let the caregiver take one diaper at a time. In the market, there are many packaging for disposable absorbent articles that comprise a weakness lines to be opened, nonetheless, when the packaging are opened through said weakness lines it is still difficult to take one diaper at a time, and is especially difficult to pull out the very first diaper from the packaging without pulling the contiguous diapers at the same time. This is mainly due to the compression force within the packaging. The packaging for disposable absorbent articles of the present invention provides an improved opening system, which consists on weakness lines that are not only easy to handle but also help to release pressure within the packaging in order to pull out easily each disposable absorbent article individually, without pulling out the contiguous absorbent articles.

[0017] The description of the invention will be focused mainly on baby diapers, nevertheless the packaging with improved opening system described herein may be used as well for adult pants, training pants, sanitary napkins and any other disposable absorbent article.

[0018] The disposable absorbent articles (2) comprised within the packaging may have an extended configuration such as exemplified in Fig. 1a, with a topsheet (21b), a backsheet (21a) and an absorbent core (29) between said

topsheet and said backsheet (21a, 21b), and other additional components well known in the art, such as a fastening member (31) disposed on the backsheet (21b) In order to be stored within the packaging (1) of the present invention, the disposable absorbent articles (2) may be bi-folded or tri-folded. In a configuration of the present invention, the disposable absorbent articles (2) are bi-folded preferably through a central transverse fold line (28a) that crosses the entire width of the disposable absorbent article (2) and through at least two lateral longitudinal fold lines (28b, 28c) that are placed preferably outward from the absorbent core structure (29). The baby diapers may be preferably folded first through said two lateral longitudinal fold lines (28b, 28b) and then folded through said central transverse fold line (28a). In the disposable absorbent article (1) folded configuration, the backsheet (21a) is facing toward the exterior and the topsheet (21b) toward the interior as can be seen in Fig. 1b to 1d; the bi-folded diaper forms an inversed "U" shape with a front face (22a) and an opposite back face (22b), two lateral faces (23), two lateral edges (26 and 27), an apex (24) that matches with the central transverse fold line (28a) and an opposite edge (25) where the front and back edges (30a,30b) of the diaper coincide.

[0019] The folded disposable absorbent article (2) has a length "a" which is equal to the length of the stacks (3) of disposable absorbent articles disposed within the packaging (1). The stacks (3) are formed by at least two disposable absorbent articles (2) accommodated contiguously with the front face (22a) facing against the back face (22b) of the adjacent disposable absorbent article. Once the stack (3) is stored within the packaging (1), the lateral faces (23) face toward a surface of the packaging (1).

[0020] Fig. 2 shows the packaging (1) of the present invention, full with disposable absorbent articles (2), said packaging (1) comprises a substantially rectangular prism shape with a front panel (11), a rear panel (12), two lateral panels (13a, 13b), an upper panel (14) and a lower panel (15). The absorbent articles (2) are stored within the packaging (1) in folded configuration such as Figs. 1b to 1d and grouped in two stacks (3a, 3b). Each stack (3) comprises a plurality of disposable absorbent articles (2) and the two stacks (3) are arranged contiguously piled one over the other. The front face (22a) of each absorbent article (2) in the packaging is oriented toward one of the two lateral panels (13a, 13b), and either of the lateral faces (23) of the absorbent articles (2) are oriented toward the front panel (11) and the opposing lateral face (23) is oriented toward the rear panel (12). The front and rear panels (11,12) comprise a width "w₁" which is determined by the width of the stacks (3) when stored within the packaging (1). As seen in Fig. 2 a transverse weakness line (5) crosses the entire width "w₁" of the front panel (11) or of the rear panel (12) Said transverse weakness line (5) extends from said front or rear panel (11,12) toward the two lateral panels (13a, 13b) through its entire width "w₂", said width "w₂" is determined by the width of the front and back faces (22a,22b) of the disposable absorbent articles (2) .

[0021] The packaging (1) for disposable absorbent articles (2) of the invention may as well comprise one or more seals (9) on at least one of its surfaces for forming the packaging (1). The packaging (1) is closed entirely through the seals (9) in order to keep inside the disposable absorbent articles (2) and to maintain the absorbent articles in a substantially hermetic storage..

[0022] The packaging (1) also comprises at least one lateral longitudinal weakness line (6) that extends on one or the two lateral panels (13a, 13b), said lateral longitudinal weakness line (6) intersects the transverse weakness line (5) forming a perpendicular angle between said lateral longitudinal weakness line (6) and said transverse weakness line (5).

[0023] Fig. 3, which illustrates a lateral side view of the packaging of the present invention, shows clearly the perpendicular angle formed between said lateral longitudinal weakness line (6) and said transverse weakness line (5). Said transverse weakness line (5) is placed between the two stacks (3a, 3b) so that when the packaging (1) is opened, each stack (3a, 3b) is individually exposed as seen in Fig. 4.

[0024] In an embodiment of the present invention, not shown in figures, the stacks (3a, 3b) may be arranged so that the apices (24) of the absorbent articles in the first stack (3a) are adjacent to the apices (24) of the absorbent articles in the second stack (3b), in this way, once the packaging (1) is opened through said transverse weakness line (5), both stacks (3a, 3b) expose the apices (24) of the absorbent articles (2) through the formed opening. In an additional embodiment of the present invention, not shown in figures, the stacks (3a, 3b) may be arranged so that the opposite edges (25) of the absorbent articles in the first stack (3a) are adjacent to the opposite edges (25) of the absorbent articles in the second stack (3b), in this way, once the packaging (1) is opened through said transverse weakness line (5), both stacks (3a, 3b) expose the opposite edges (25) of the absorbent articles (2) through the formed opening.

[0025] In a preferred embodiment of the present invention the stacks (3a, 3b) may be arranged within the packaging (1) so that the apices (24) of the absorbent articles (2) in the first stack (3a) are adjacent to the opposite edges (25) of the absorbent articles (2) in the second stack (3b), in this way, once the packaging (1) is opened through said transverse weakness line (5), the first stack (3a) may expose the apices (24) of the absorbent articles (2) and the second adjacent stack (3b) may expose the opposite edges (25) of the absorbent articles (2), as seen in Fig. 4. In this embodiment of the present invention, the process for packaging the disposable absorbent articles (2) is simple and low-cost because all the disposable absorbent articles (2) are folded and stacked in a single direction without the need of rotating one of the two stacks (3a, 3b) in 180° so that the apices (24) or the opposite edges (25) of each stack (3a, 3b) meet.

[0026] Fig. 4 shows the packaging (1) for disposable absorbent articles (2) of the present invention opened through the transverse weakness line (5), which, once the packaging is open, partially separates said packaging (1) into a first

portion (7) and a second portion (8), each portion joined together only by either the front or rear panel (11,12) where the transverse weakness line (5) does not extend. Once partially separated, each portion (7, 8) is defined by an upper edge (16), a lower edge (17), a first lateral edge (18) and a second lateral edge (19). The packaging (1) is configured to be opened and then folded through a junction portion (31) which is the portion of the front or the rear panel (11,12) where the transverse weakness line (5) does not extend. The junction portion (31) keeps the first portion (7) of the packaging joined to the second portion (8) of the packaging in said opened configuration.

[0027] The lateral longitudinal weakness line (6) intersects said transverse weakness line (5) on either of the lateral panels (13a, 13b), in alternative configuration of the present invention two lateral longitudinal weakness lines (6a, 6b) intersect the transverse weakness line (5) in each of the lateral panels (13a, 13b). The lateral longitudinal weakness line (6) is longitudinally divided by the transverse weakness line (5), so that a first half (20a) of the lateral longitudinal weakness line (6) is placed on the first portion (7) of the packaging and the second half (20b) of the lateral longitudinal weakness line (6) is placed on the second portion (8) of the packaging when it is opened. The length "b" of both halves (20a, 20b) of the lateral longitudinal weakness line (6) extends from 1/6 to 1/3, preferably from 1/5 to 1/4 of the length "a" of the absorbent article (1) in folded configuration. The lateral longitudinal weakness lines (6, 6a, 6b) may be positioned on a lateral longitudinal centerline (10) placed in the lateral panels (13a, 13b) or in a region preferably closer to the lateral longitudinal centerline (10) than to either of the first or second lateral edges (18,19) of the first and second portions (7, 8) of the opened packaging (1).

[0028] After opening the packaging of the present invention by either half (20a,20b) of the lateral longitudinal weakness line (6), the pressure of the packaging (1) against the stacked absorbent articles (2) is reduced, therefore the caregiver can easily pull out the first absorbent article (4) from the packaging (1) without pulling out the contiguous disposable absorbent articles (2).

[0029] The strength required for taking out the first disposable diaper (4) from the packaging (1) is determined by factors such as the compression force of the packaging (1) against the stack (3) of disposable absorbent articles (2), the density and thickness of the diaper, the amount of disposable diapers in each stack, the friction between the materials of the disposable absorbent articles (backsheet, elastic waist, rear and front panels, fastening elements, etc.) and between said materials against the inner surface of the packaging (1), among other factors. In the present invention, opening the lateral longitudinal weakness lines (6a, 6b) will influence directly the strength required for taking out a first absorbent article (4) from the packaging (1), when at least one lateral longitudinal weakness line (6a,6b) is opened in one of the two lateral panels (13a, 13b) of the packaging (1) the compression force of the packaging is reduced and the strength for taking out said absorbent article (4) will be 2000 g/in at most.

[0030] Another important factor will be the available surface to grab a significant portion of the disposable absorbent article (1) with one hand without releasing said disposable absorbent article (1); the opening through lateral longitudinal weakness line (6) of the present invention allows the caregiver to grab firmly with one hand a significant portion of the disposable absorbent article, said portion can be mainly the apex (24) along with a portion of the front face (22a) and the back face (22b) of a disposable absorbent article, front The available portion of the first disposable absorbent article (4) will be directly determined by the length "b" of one half of lateral longitudinal weakness line (20a, 20b), if the length "b" is 1/3 of the length "a" of the disposable absorbent article in said folded configuration, then the hand of the caregiver will be allowed to grab a length of about 1/3 of the disposable absorbent article and said apex (24) or opposing edge (25).

[0031] In one more aspect of the invention, the absorbent articles (2) are arranged in three or more stacks (3) being piled one over the other within the packaging (1) said packaging (1) is configured to be opened by transverse weakness lines (5) positioned between each one of the stacks piled inside the packaging, the transverse weakness lines (5) crosses the entire width "w₁" of one of the front or rear panels and extends through the entire width "w₂" of the two lateral panels (13); the packaging (1) comprises at least two lateral longitudinal weakness lines (6) intersecting the transverse weakness lines (5) on one of the lateral panels (13) forming a perpendicular angle between said transverse weakness lines (5) and said lateral longitudinal weakness lines (6); wherein the lateral longitudinal weakness lines (6) release pressure to pull out the first absorbent article (4) from each of the stacks of absorbent articles.

[0032] In an alternative configuration of the present invention, shown in Fig. 5, the packaging (1), full with disposable absorbent articles (2), comprises a substantially rectangular prism shape with a front panel (11), a rear panel (12), two lateral panels (13a, 13b), an upper panel (14) and a lower panel (15). The absorbent articles (2) are stored within the packaging (1) in folded configuration such as Figs. 1b to 1d and grouped in one stack (3a). The stack (3a) comprises a plurality of disposable absorbent articles (2). The front face (22a) of each absorbent article (2) in the packaging is oriented toward one of the two lateral panels (13a, 13b), and either of the lateral faces (23) of the absorbent articles (2) are oriented toward the front panel (11) and the opposing lateral face (23) is oriented toward the rear panel (12). The front and rear panels (11,12) comprise a width "w₁" which is determined by the width of the stack (3a) when stored within the packaging (1). The transverse weakness line (5) crosses the entire width "w₁" of the front panel (11) or of the rear panel (12). Said transverse weakness line (5) extends from said front or rear panel (11,12) toward the two lateral panels (13a, 13b) through its entire width "w₂", said width "w₂" is determined by the width of the front and back faces (22a,22b) of the disposable absorbent articles (2).

[0033] The packaging (1) also comprises at least one lateral longitudinal weakness line (6) that extends on one or the two lateral panels (13a, 13b), said lateral longitudinal weakness line (6) intersects the transverse weakness line (5) forming a perpendicular angle between said lateral longitudinal weakness line (6) and said transverse weakness line (5). The transverse weakness line (5) is placed in any point between the upper edge (17) and the transverse centerline (x-x), preferably closer to the upper edge (17) of the panels in which said transverse weakness line (5) is present. The packaging (1) comprises at least one lateral longitudinal weakness line (6a, 6b) that extends from the transverse weakness line (5) on one of the lateral panels (13a, 13b) in a direction toward the lower edge (17) of said lateral panel (13a, 13b), forming a perpendicular angle between said transverse weakness line (5) and said lateral longitudinal weakness line (13a, 13b); and releases pressure to pull out the first absorbent article from the packaging.

[0034] The lateral longitudinal weakness line (6) intersects said transverse weakness line (5) on either of the lateral panels (13a, 13b), in alternative configuration of the present invention two lateral longitudinal weakness lines (6a, 6b) intersect the transverse weakness line (5) in each of the lateral panels (13a, 13b). The length "c" of said lateral longitudinal weakness lines (6, 6a, 6b) extends from 1/6 to 1/3, preferably from 1/5 to 1/4 of the length "a" of the absorbent article (1) in folded configuration.

[0035] The material of the packaging (1) may be any suitable monolayer or multilayer film made of a thermoplastic polyolefin, preferably polypropylene or polyethylene, or a copolymer thereof, it may be as well a polyester such as polylactic acid (PLA) or polyethylene terephthalate (PET), polyhydroxyalkanoates (PHA), nylon or a copolymer thereof. Said material may be flexible or semi-flexible so that the packaging (1) can be opened with easiness through the formed perforations of the weakness lines. The method to measure the strength required to take out the first disposable diaper from the packaging of the present invention requires the use of a dynamometer. The packaging used is a double stack packaging with two lateral longitudinal weakness lines (6), one at each lateral panel (13a, 13b).

Test method: Strength for taking out the first disposable absorbent article from its packaging

[0036] Materials:

- Instron, E.U.A., 3345 Single Column System Dynamometer
- Stainless Steel Plate 10.0 x 15.0 cm
- Double-sided adhesive tape

Samples

[0037]

A. Packaging comprising two stacks of baby diapers size 4, said packaging (1) comprising a transverse weakness line (5) between both stacks (83) extending through the front panel (11), both of the lateral panels (13a, 13b) and partially through the rear panel (12).

B. Packaging comprising two stacks of baby diapers size 4, said packaging (1) comprising a transverse weakness line (5) between both stacks (3a, 3b) extending through the front panel (11) and both of the lateral panels (13a, 13b), and two lateral longitudinal weakness lines (6) one on each lateral panel (13a, 13b). The length of each half of the lateral longitudinal weakness lines (6a, 6b) is equal to 2 in.

[0038] Conditions:

- Temperature: 25°C
- Relative Humidity: 50%

[0039] Procedure:

1. Calibrate the Instron Dynamometer and adjust the speed to 12 in/min
2. Open the packaging (1) of Sample A through the transverse weakness line (5)
3. Align the exposed portion of the first disposable absorbent article (4) with the upper clamp of the dynamometer.
4. Fix the opened packaging (1) on the stainless steel plate by adhering said upper and lower panels (14, 15) to the entire surface of said stainless steel plate by means of the double-sided adhesive tape.
5. Fix the upper clamp of the dynamometer to the exposed apex (24) of the first disposable absorbent article (4).
6. Turn on the dynamometer and measure the strength required for taking out the first disposable absorbent article (4) in gf/in.
7. Repeat steps 2 - 6 in the other nine Samples A.

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8. Open the packaging (1) of Sample B through the transverse weakness line (5)
9. Open the packaging (1) of Sample B through the two lateral longitudinal weakness lines (6) on each lateral panel (13a, 13b)
10. Align the exposed portion of the first disposable absorbent article (4) with the upper clamp of the dynamometer.
11. Fix the opened packaging (1) on the stainless steel plate by adhering said upper and lower panels (14,15) to the entire surface of said stainless steel plate by means of the double-sided adhesive tape.
12. Fix the upper clamp of the dynamometer to the exposed apex (24) of the first disposable absorbent article (4).
13. Turn on the dynamometer and measure the strength required for taking out the first disposable absorbent article (4) in gf/in.
14. Repeat steps 8 - 13 in the other nine Samples B.

Results:

[0040]

Table 1

No. of samples	Sample A (g/in)	Sample B (g/in)
1	1855	1835
2	1883	1578
3	2765	1521
4	2009	1317
5	1953	2234
6	2212	1994
7	1928	1648
8	2692	2173
9	1778	1833
10	1764	1569
Average	2093	1770

[0041] As can be seen in Table 1, in the packaging (1) for disposable absorbent articles of the present invention, disclosed as Sample B, the average strength required for taking out a first disposable absorbent article is 1770 g/in, while the average strength required for taking out a disposable absorbent article in Sample A is greater than 2000 g/in. These results show that the two lateral longitudinal weakness lines (6) included in Sample B reduce significantly the strength required to pull out said first disposable absorbent article (4). Both weakness lines help to improve the handling of the packaging during use, while the transverse weakness line (5) allows the access to both of the stacks (3a, 3b), the lateral longitudinal weakness lines (6) makes easier to pull out the first disposable absorbent article (4) on each stack (3a, 3b).

Claims

1. A packaging (1) for disposable absorbent articles (2) in folded configuration arranged in two stacks (3a,3b) being piled one over the other; the packaging (1) having a substantially rectangular prism shape comprising;
a front panel (11);
a rear panel (12);
two lateral panels (13);
an upper panel (14);
and a lower panel (15);
said packaging (1) **characterized in that** it is configured to be opened by a transverse weakness line (5) which is positioned between the two stacks (3a,3b), so that when opened, each stack (3a,3b) is individually exposed, wherein the transverse weakness line (5) crosses the entire width "w₁" of one of the front or rear panels and extends through the entire width "w₂" of the two lateral panels (13) of the packaging (1) and further comprising at least one lateral

longitudinal weakness line (6) intersecting the transverse weakness line (5) on at most two, preferably only one, of the lateral panels (13) forming a perpendicular angle between said transverse weakness line (5) and said lateral longitudinal weakness line (6).

- 5 **2.** A packaging (1) for disposable absorbent articles (2) according to claim 1, **characterized in that** the packaging (1) comprises two lateral longitudinal weakness lines (6a, 6b), the first lateral longitudinal weakness line (6a) intersects the transverse weakness line (5) in one lateral panel (13a) and the second lateral longitudinal weakness line (6b) intersects the transverse weakness line (5) in the opposing lateral panel (13b).
- 10 **3.** A packaging (1) for disposable absorbent articles (2) according to claims 1 and 2, **characterized in that** the intersection between the at least one lateral longitudinal weakness line (6a, 6b) with the transverse weakness line (5) is substantially at the middle of the lateral longitudinal weakness line (6a, 6b), so that the lateral longitudinal weakness line (6) is divided by the transverse weakness line (5) in a first half (20a) and in a second half (20b), wherein, when the packaging (1) is opened by the transversal weakness line (5), the first half (20a) of the lateral longitudinal weakness line (6a, 6b) is on one stack (3a) of absorbent articles (2) and the second half (20b) of the lateral longitudinal weakness line (6) is on the other stack (3b) of absorbent articles (2).
- 15 **4.** A packaging (1) for disposable absorbent articles (2) according to claim 3, **characterized in that** each half (20a, 20b) of the lateral longitudinal weakness line (6) extends from 1/6 to 1/3, preferably from 1/5 to 1/4 of the length "a" of the absorbent article in folded configuration.
- 20 **5.** A packaging (1) for disposable absorbent articles (2) according to any of the preceding claims, **characterized in that** the packaging (3) is made of a flexible material preferably constituted by a thermoplastic polyolefin or polyester.
- 25 **6.** A packaging (1) for disposable absorbent articles (2) according to any of the preceding claims, **characterized in that** the strength required for pulling out from the packaging (1) a first individual absorbent article (4) in its folded configuration is at most 2000 g/in.
- 30 **7.** A packaging (1) for disposable absorbent articles (2) according to any of the preceding claims, **characterized in that** the transverse weakness line (5) crosses the entire width " w_1 " of one of the front and rear panels (11,12), extends through the entire width " w_2 " of the two lateral panels (13, 13a, 13b) and extends partially through the opposite front or rear panel (13, 13a, 13b) of said packaging (1).
- 35 **8.** A packaging (1) for disposable absorbent articles (2) according to any of the preceding claims, **characterized in that** the absorbent articles (2) are arranged in three or more stacks (3) being piled one over the other within the packaging (1).

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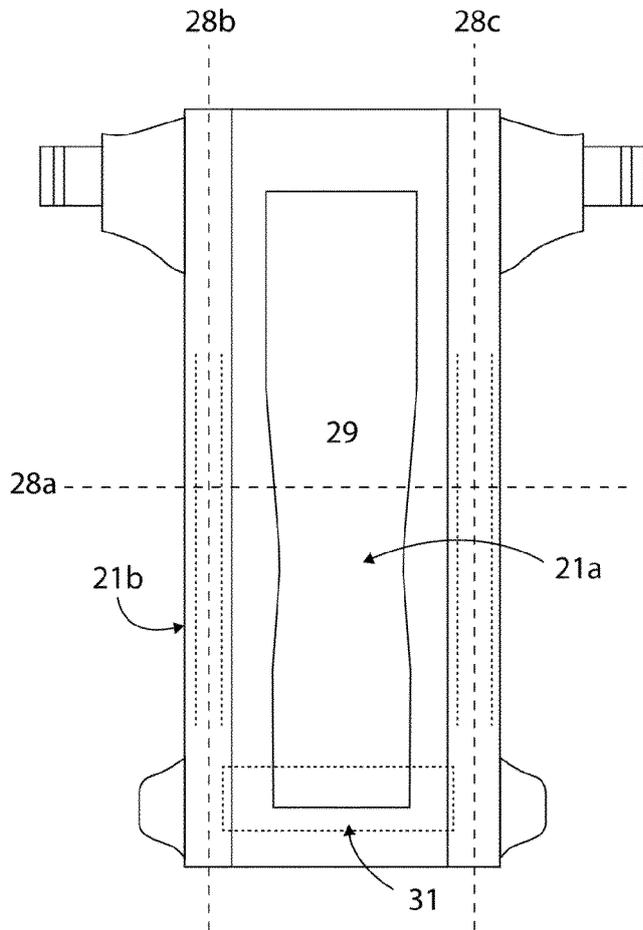


Fig. 1a

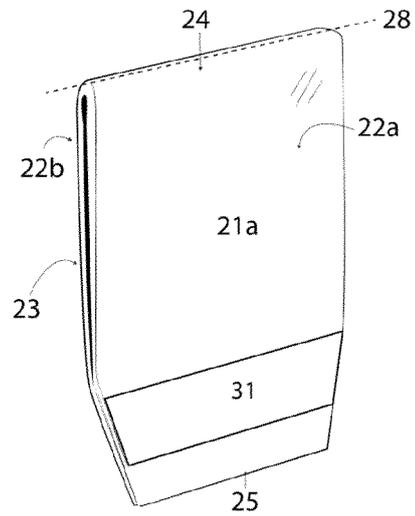


Fig. 1b

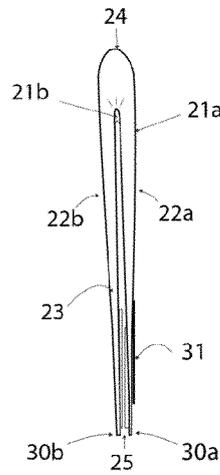


Fig. 1c

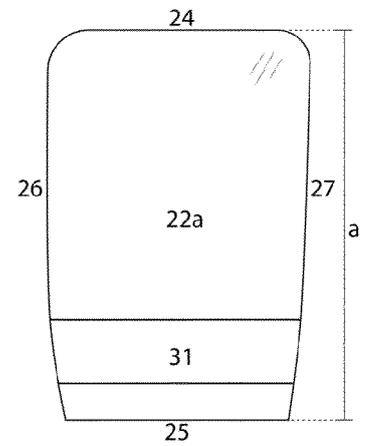


Fig. 1d

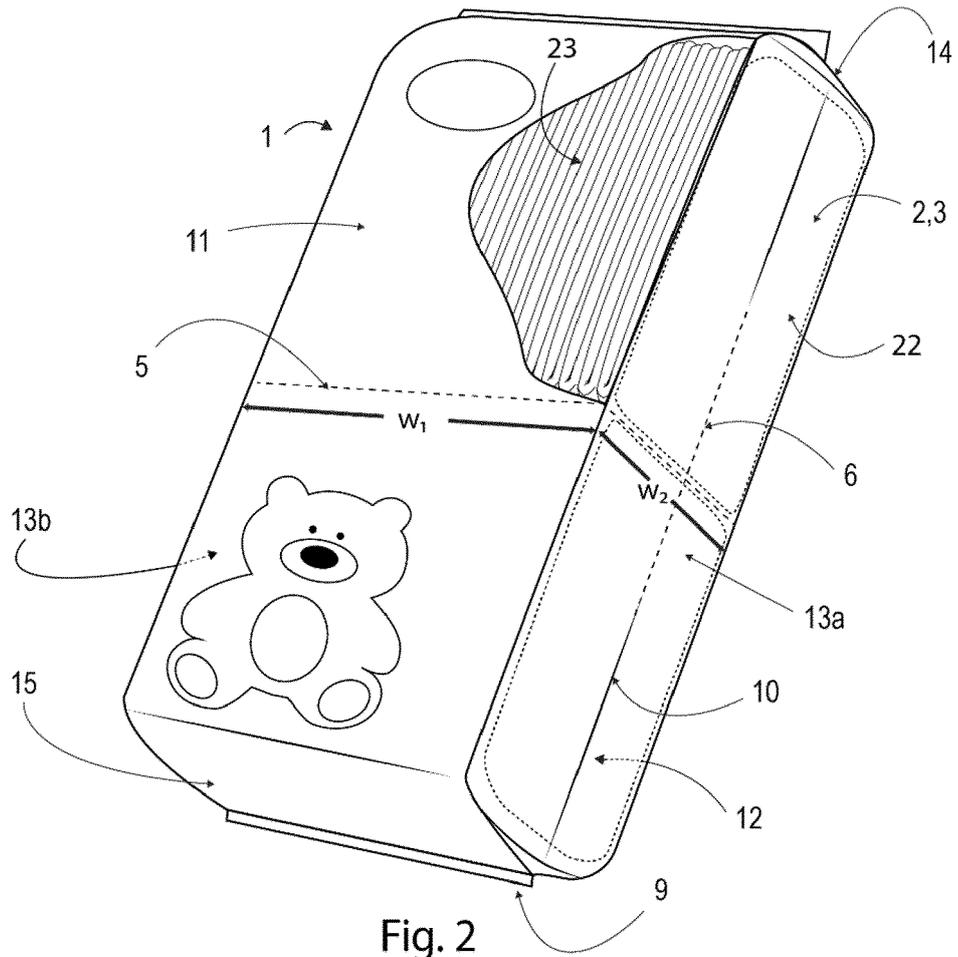


Fig. 2

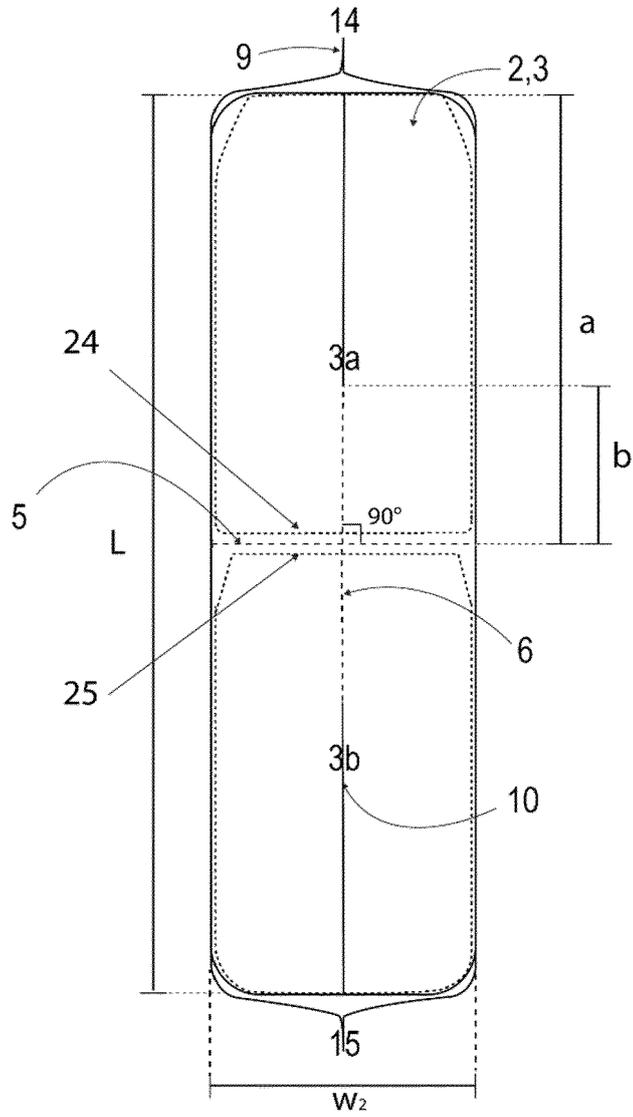


Fig. 3

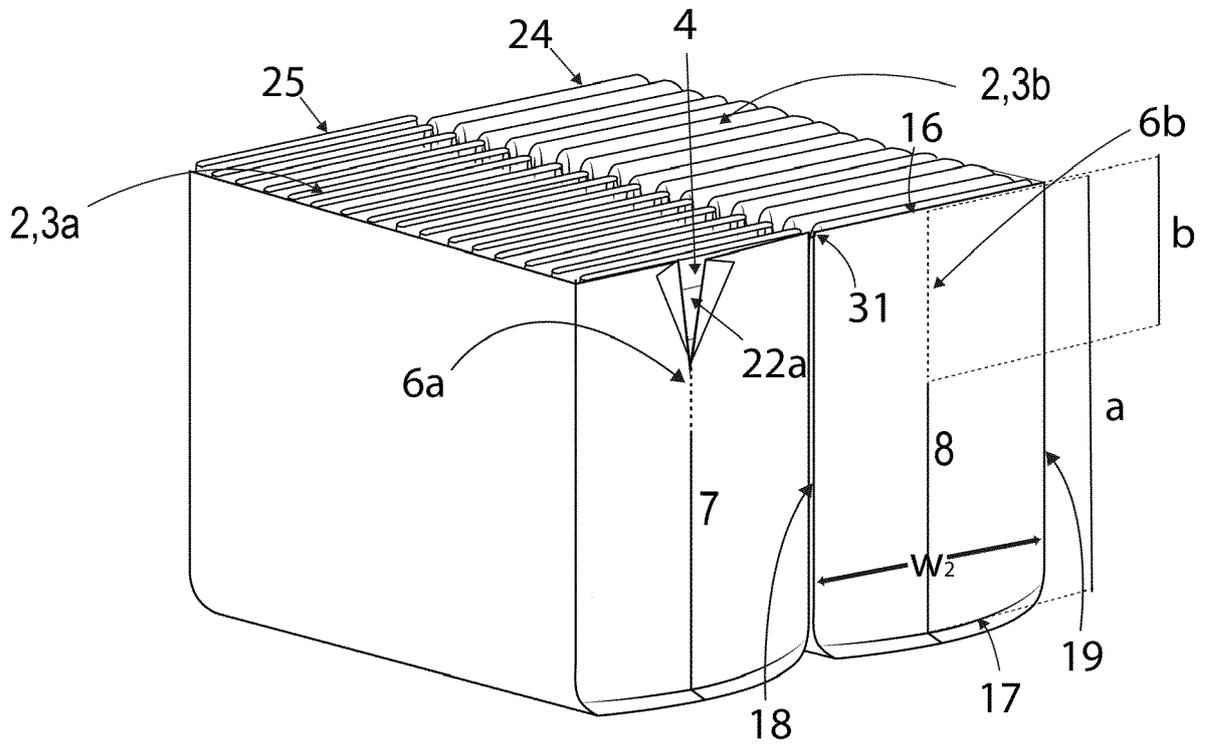


Fig. 4

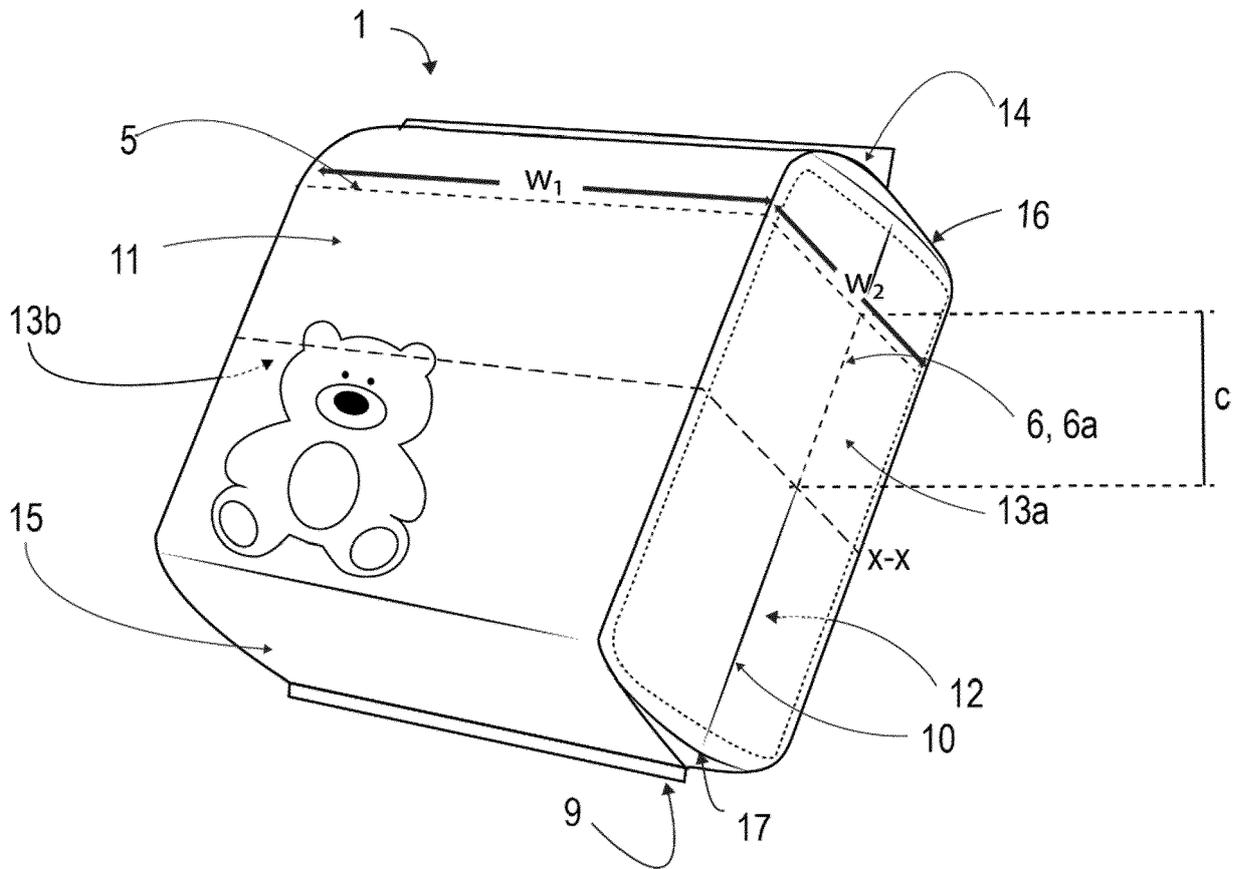


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
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Place of search Munich		Date of completion of the search 21 December 2018	Examiner Duc, Emmanuel
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The members are as contained in the European Patent Office EDP file on
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