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(54) **Package formed from at least one flexible film**

(57) The package (10) formed from at least one flexible film delimiting an initially closed space comprises:
- two principal longitudinal walls (14A, 14B); and
- at least one intermediate wall (16A, 16B) disposed between the two principal walls (14A, 14B) in order to delimit the said initially closed space, the or each intermediate

wall (16A) being at least locally curved towards the interior of the initially closed space. It has a weakened line (30) produced at least partially in a curved region (19A) of the intermediate wall (16A) and continuing over at most three-quarters of the width of each principal wall (14A, 14B).

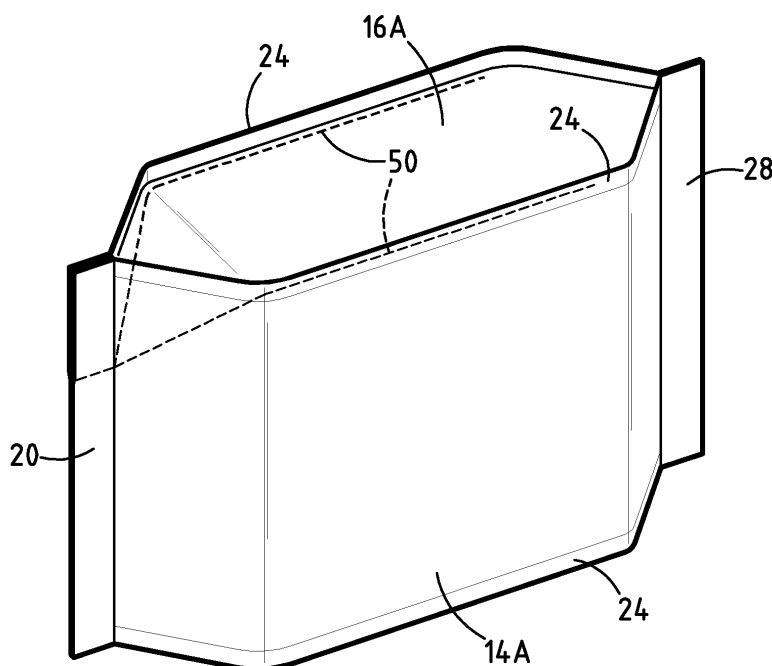


FIG.5

Description

[0001] The present invention relates to a package formed from at least one flexible film delimiting an initially closed space, comprising:

- two principal longitudinal walls; and
- at least one intermediate wall disposed between the two principal walls in order to delimit the said initially closed space, the or each intermediate wall being at least locally curved towards the interior of the initially closed space.

[0002] Numerous products in the form of powder, granules, liquid or more generally in flowable form necessitate packaging which has a pouring spout. This is so for example in the case of caster sugar.

[0003] This pouring spout constitutes a mouth which makes it possible to concentrate the flow of the product out of the package. Such pouring spouts are known on rigid packages made for example from a cardboard blank which is folded over to constitute a substantially parallelepipedal box. The pouring spout is put into a generally rectangular opening provided in a lateral wall of the box. It is formed for example by an insert having a U-shaped cross-section, this insert being displaceable between a retracted position in the interior of the box in which it covers the opening and a position in which it projects towards the exterior in which it permits guiding of the products coming out of the opening.

[0004] It is likewise known to form packages from a flexible plastics film in order to delimit a pocket. These packages are then equipped with a neck or any other type of guiding mouth in order to guide the product out of the package. This neck is attached to the pocket formed from the plastics film.

[0005] Irrespective of the construction chosen, the package has a relatively complex structure and therefore the cost price is high.

[0006] The object of the invention is to propose a package which permits easy pouring of flowable products at a reduced manufacturing cost.

[0007] To this end the invention relates to a package as defined in Claim 1.

[0008] Particular embodiments of the invention are the subjects of the dependent claims.

[0009] The invention will be better understood upon reading the following description which is given solely by way of example and with reference to the drawings, in which:

- Figure 1 shows a perspective view of a flexible package according to the invention before opening;
- Figure 2 shows a perspective view of the package of Figure 1 after opening;
- Figure 3 shows a perspective view of another embodiment of a package according to the invention before opening;

- Figure 4 shows a view identical to Figure 3 of the same package after opening;
- Figure 5 shows a perspective view of yet another embodiment of a package according to the invention immediately before opening;
- Figure 6 shows a view identical to that of Figure 5 of the same package during the final phase of opening;
- Figure 7 shows a perspective view of a last embodiment of a package according to the invention before opening;
- Figure 8 shows a view identical to that of Figure 7 of the same package during the opening phase; and
- Figure 9 shows a view identical to that of Figure 7 of a similar package having only one lateral zone during the opening phase.

[0010] The package 10 illustrated in Figure 1 is a flexible package intended to contain materials in the form of grains, powder, broken pieces or more generally in a flowable form. This package is capable of maintaining a vertical position when placed on a horizontal flat surface. For this purpose it has a flat base 12. The base is bordered by a peripheral shell 13 consisting of four lateral walls extending generally perpendicular to one another and perpendicular to the base 12. In particular the shell 13 of the package comprises two principal walls 14A, 14B and two intermediate walls 16A, 16B connecting the principal walls.

[0011] At their upper end the principal walls 14A, 14B converge towards one another by inclined faces 18A, 18B which meet along an upper transverse weld 20 extending in the central vertical plane of the package.

[0012] The two intermediate walls 16A, 16B are generally curved towards the interior, at least in the upper region denoted 19A, 19B disposed in the vicinity of the upper weld 20 between the two inclined faces 18A, 18B. Thus each intermediate wall 16A, 16B forms a gusset in its upper part. When the film is formed in order to define a space which is initially closed but not filled, the inclined upper regions 19A and 19B are not distinguishable from the rest of the intermediate walls 16A, 16B. They appear during the filling of the container and the increase in pressure therein due to the action of the contents. This pushes the intermediate walls 16A and 16B identified as gussets which unfold according to the degree of freedom available to them under the effect of the pressure induced by the contents. During this phase the shape of the container retains the ends close to the weld 20, which has the effect of locally reducing the free space and of forming the regions 19A and 19B. At its upper end each intermediate wall is folded back on itself in order to form a fold 22, the upper end which is folded back of the intermediate wall 16A, 16B being gripped between the two principal walls 14A, 14B and generally maintained joined thereto by the weld 20.

[0013] Stiffening welds 24 are provided along the four vertical edges of the shell, that is to say in the connecting regions between the principal walls 14A, 14B and the

intermediate walls 16A, 16B. These edges extend from the base 12 to the upper weld 20.

[0014] In practice the package is formed from a single film which is initially wound on a reel. The film is first of all wound on itself, then the two opposing longitudinal ends are welded in order to create a longitudinal weld 26 extending in the central part of the principal wall 14A.

[0015] The four longitudinal stiffening welds 24 are then effected by sealing of the film on itself, the inner facing surfaces of the film being welded to one another.

[0016] The weld 26 can be brought up to and merged with one of the welds 24.

[0017] The upper parts of the intermediate walls 16A, 16B are then folded back to create the curved regions 19A, 19B in the form of a gusset. The upper weld 20 is then produced by clamping the upper end of the intermediate walls which have been folded back. A transverse weld 28 is produced at the other end of the package in order to form the base. The upper weld 20 and the lower weld 28 can be produced simultaneously for successive packages produced from one and the same film from one and the same reel.

[0018] The flat base 12 is obtained by adapted folding of the film as is known *per se*.

[0019] Furthermore, at least one intermediate wall, for example the wall 16A, has, ideally in the region 19A curved towards the interior, a weakened line 30.

[0020] In the described embodiment, this weakened line is open and extends only on the intermediate wall 16A or symmetrically with respect to the intermediate wall 16B. It generally describes the shape of a tongue of which the curvature is oriented towards the base of the package, the ends of the weakened line being situated in the vicinity of the welds 24 produced along the edges of the intermediate wall 16A.

[0021] This weakened line 30 is formed by treatment of the film constituting the package. The treatment is advantageously applied before the shaping of the package whilst the film is in the course of manufacture and before or during the operation of winding it on a reel.

[0022] According to a first embodiment, the weakened line 30 is produced by application of high-energy radiation, such as a laser, along the course of the line which is to be weakened. This high-energy treatment is effected on one or several layers of the film 14 when this latter comprises more than one layer.

[0023] According to another embodiment, the weakened line is formed by a mechanical weakening of the film which extends along the course of the weakened line. This mechanical treatment acts on one or several of the layers of the film when the film comprises more than one layer.

[0024] According to a first example of mechanical treatment, microporous weakening is carried out in order to form the weakened line. Such microporous treatment is carried out for example by passing the film between two rollers, one of the rollers having a surface which has been rendered abrasive in the zone which is to be applied

to the line to be weakened. Such treatment is described for example in the document FR-2 717 449.

[0025] According to a second example, the mechanical weakening is obtained by cutting the thickness of one or several layers of the film when the film comprises more than one layer. These cuts are formed by applying a die with cutting elements along the weakened line. During the treatment, the film is pressed between the die and a support, as is known *per se*. Thus the part which is cut or partially cut is formed of perforations.

[0026] According to yet another example, the weakened line 30 is formed by a microperforated region which does not extend completely through the film but reduces the resistance to rupture of the film in the treated zone. These microperforations can penetrate only through one of the layers of the film when the film comprises several layers.

[0027] Furthermore, a combination of the weakening treatments described above can be carried out on one and the same film, either on one and the same layer of the film or on different layers of the film if the film comprises more than one layer.

[0028] For opening of such a package, the operator applies a pressure or traction to the tongue delimited by the weakened line 30 in such a way that the intermediate wall 16A breaks along the course of the weakened line. The intermediate wall 16A which is initially curved towards the interior is held by the user who pulls this wall in the broken region in order to curve it towards the exterior of the package, as illustrated in Figure 2.

[0029] The reversal of the curvature of the intermediate wall 16A permits the creation of a pouring spout from which it is possible for the user to dispense the products contained in the package by simply tilting the package.

[0030] Another embodiment of a package according to the invention is described in relation to Figures 3 and 4.

[0031] The parts of the different embodiments which are identical or corresponding are designated by the same reference numerals.

[0032] In the embodiment of Figures 3 and 4, the weakened line denoted 40 continues on the principal walls 14A, 14B, and in particular on the inclined faces 18A, 18B of these walls. These continuations denoted 42A, 42B extend at most over three-quarters and preferably at most a third of the width of the principal walls, this width being measured transversely with respect to the height of the intermediate wall, that is to say along the length of the weld 20. Moreover, these continuations 42A, 42B converge towards one another in order to meet in the weld 20. Thus the weakened line 40 forms a closed contour delimiting a corner 44 of the package.

[0033] When the intermediate wall 16A and at least one of the principal walls are formed from a film in one piece, the weakened line continues between the two walls on the weld 24. In this weld zone, the weakened line comprises two successive sections which are exactly superimposed due to the folding of the film on itself.

[0034] In this embodiment, and as previously, the in-

intermediate wall 16A can be broken along the weakened line 40. By gripping the upper corner 44 delimited by the weakened line 40 and its continuations 42, the user can separate the corner 44 of the package totally from the rest of the package, thus freeing the upper part of the package at right angles to the region curved towards the interior. By reversal of the curvature of the intermediate wall 16A, as illustrated in Figure 4, a mouth or pouring spout is formed.

[0035] Thus at the same time as the rupture, the removal along the precutting gives rise to the film constituting the gusset being entrained towards the exterior, leading to the formation of the spout as the movement continues. The rupture of the corner pulls the spout towards the exterior.

[0036] The weld 24 leads to perfect synchronisation of the pre-cut on either side of the walls 16A and 14A for example. This is due to a continuous course of the weakened line before shaping. This feature allows a good spread of the tear through the weld 24.

[0037] Thus it can be imagined that such a package is particularly convenient for delivering products of relatively substantial size, the circulation of which on the mouth is not impeded by the upper corner 44 of the package.

[0038] In the embodiment of Figures 5 and 6, the weakened line 50 extends over the part of the intermediate wall 16A which is curved towards the interior and continues over the main part of the height of this intermediate wall. Depending upon the chosen course, these continuations follow and are substantially parallel to the edge connecting the intermediate wall 16A to the principal walls 14A, 14B.

[0039] Thus the package is opened by rupture of the weakened line 50 at the curved region of the intermediate wall, for example by gripping between two digits the tongue defined by the weakened line and by tearing this latter away from the rest of the package. By continuing the traction, the rupture spreads along the two edges of the intermediate wall along the weakened line. When the weakened line 50 is totally ruptured, the main part of the intermediate wall 16A is detached from the rest of the package, this latter then forming a channel which makes it possible to gain access easily to all of the contents. Such a package is convenient in particular for the direct consumption in the package of cooked dishes or prepared salads.

[0040] Furthermore, the longitudinal welds 24 formed along the intermediate wall opposite the intermediate wall having the weakened line form a base which enables the package to stand with its transverse welds 20 and 28 disposed generally vertically. The welds 24 then form an upper retaining ring.

[0041] In the embodiment of Figures 7 and 8, one single weakened line 60 extends in the central part of the intermediate wall 16A between the transverse welds 20 and 28. This weakened line is straight and thus extends substantially parallel to the stiffening welds 24. It is located halfway between the latter and delimits in the in-

termediate wall two parts of substantially equal area.

[0042] As illustrated in Figure 8, in order to proceed to opening the user grips a stiffening weld 24 in each hand and produces a force perpendicular to the weakened line 60 along the course of the arrows F1, thus creating a slot in the lateral wall 16A extending in this way between the transverse welds 20 and 28.

[0043] As previously, after opening the welds 24 form an upper retaining ring of the package, which rests in the vertical position on the support formed by the two other stiffening welds 24. Likewise, as previously, the welds 20 and 28 serve to retain the whole unit vertical after opening.

[0044] In all the preceding embodiments, the longitudinal weld 26 can advantageously be formed by replacement of a stiffening weld 24, in such a way that one of the longitudinal welds is formed by the weld 26 connecting the two longitudinal edges of the package.

[0045] Furthermore, in all the embodiments described the package has two intermediate walls forming a gusset.

[0046] As a variant and as illustrated in Figure 9, the package has only one intermediate wall forming a gusset, the two principal walls 14A, 14B at the other side being connected to one another by one single longitudinal weld 72 or by continuity of the film according to an appropriate shaping method.

[0047] In this embodiment the intermediate wall 70 is curved concavely towards the interior. At its ends, it is welded on the inner surfaces of the principal walls 14A, 14B. However, contrary to the preceding embodiments, the intermediate wall 70 is not welded on itself in the continuation of the transverse welds 20 and 28, so that the ends of the intermediate wall are not clamped between the inner walls 14A and 14B but are merely applied to these walls.

[0048] In these circumstances two independent flaps 74A, 74B are formed at the ends of the principal walls 14A, 14B, these flaps both being articulated on the end of the body of the sachet along a folding line 76 extending from a point 78A where the transverse weld 20 and the weld of the two flaps meet to another point 78B where the weld 28 and the opposite end of the two flaps 74A, 74B meet.

[0049] A weakened line as described previously is formed in the vicinity of the folding line 76 from one end to the other of the intermediate wall 70 or over a portion of this zone. This weakened line is formed in the intermediate wall and only in the latter along all or part of the length of this wall.

[0050] The weakened line advantageously continues over the welded end regions.

[0051] As in the preceding embodiment, opening of the sachet is obtained by traction on the welds 24 in opposing directions, as illustrated by the arrows F2.

[0052] In the last two embodiments, the fact that there is only one weakened line along the intermediate wall avoids any difficulty of relative positioning between two weakened lines which might be provided on the principal

walls.

[0053] In certain packages each principal wall has a weakened line, making it possible to remove the upper end of the package completely by tearing it along the two weakened lines.

[0054] For this purpose the two weakened lines are disposed at the same level along the length of the package and meet along the welded longitudinal edges of the package.

[0055] In practice it has been found that it is a very delicate operation during manufacture to align the two weakened lines correctly, with the result that opening of the package can be very awkward as tearing of one of the principal walls takes place at random.

[0056] Furthermore, in order to facilitate opening of the package it is known to provide a notch on a lateral edge of the package in an extension of the two weakened lines. The positioning of this notch relative to these two weakened lines is likewise a very delicate operation, with the result that it is often found that the two weakened lines and the notch are not correctly positioned.

[0057] Thus the fact that there is only one weakened line on the intermediate wall makes it possible to eliminate this problem of alignment of the weakened lines.

(14A, 14B) and retained in the weld (20).

3. Package as claimed in Claim 1 or 2, **characterised in that** the package has after opening a wide access to the initially closed space obtained by the total or partial detachment of a cover formed by a detached part of the intermediate wall delimited by all or part of the weakened line (50).
4. Package as claimed in any one of the preceding claims, **characterised in that** the weakened line (30; 40; 50) defines a tongue shape on the curved region (19A).
5. Package as claimed in any one of the preceding claims, **characterised in that** the package has one single rupture line.
6. Package as claimed in any one of the preceding claims, **characterised in that** the weakened line is obtained by a mechanical treatment of the film and/or by application of high-energy radiation.

Claims

1. Package (10) formed from at least one flexible film delimiting an initially closed space comprising:
 - two principal longitudinal walls (14A, 14B); and
 - at least one intermediate wall (16A, 16B; 70) disposed between the two principal walls (14A, 14B) in order to delimit the said initially closed space, the or each intermediate wall (16A) being at least locally curved towards the interior of the initially closed space, **characterised in that** it has weakened line (30; 40; 50; 60; 76) produced at least partially in a curved region (19A) of the intermediate wall (16A) and continuing over at most three-quarters of the width of each principal wall (14A, 14B), the weakened line (30) extends solely on the intermediate wall (16A), the weakened line (50) continues from the curved region (19A) over the main part of the height of the intermediate wall (16A), by two continuations substantially parallel to the connecting edges between the intermediate wall (16A) and the principal walls (14A, 14B).
2. Package as claimed in Claim 1, **characterised in that** it comprises at least one transverse weld (20, 28) provided between the two principal walls (14A, 14B), the intermediate wall (16A) being folded back on itself in the vicinity of the transverse weld (20), the end of the intermediate wall (16A) thus folded back being clamped between the two principal walls

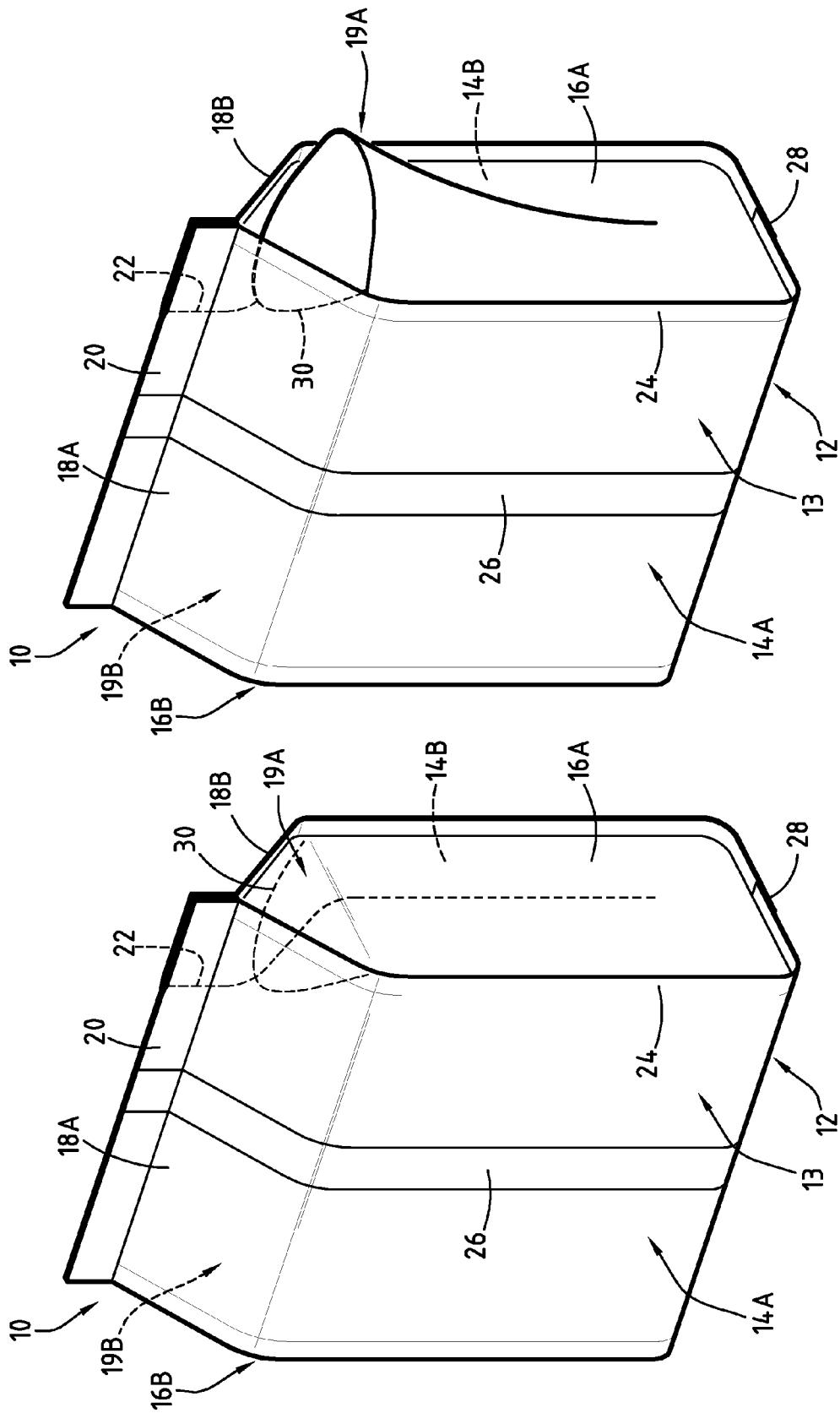


FIG. 2

FIG. 1

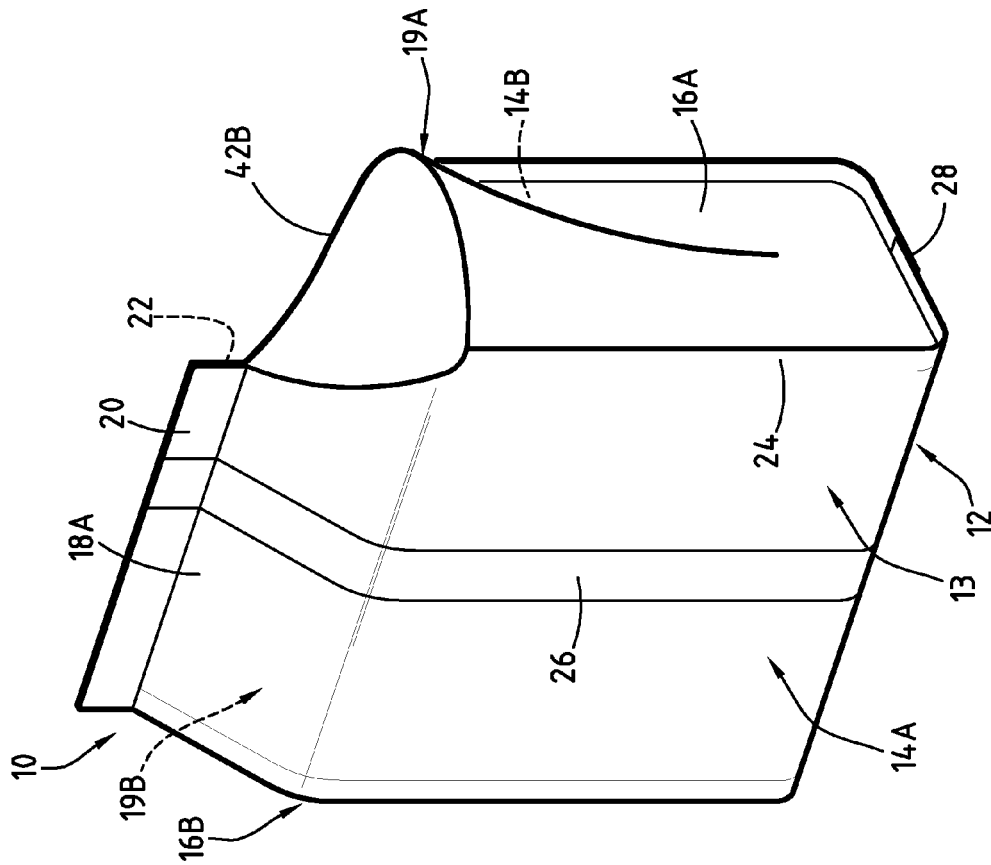


FIG. 4

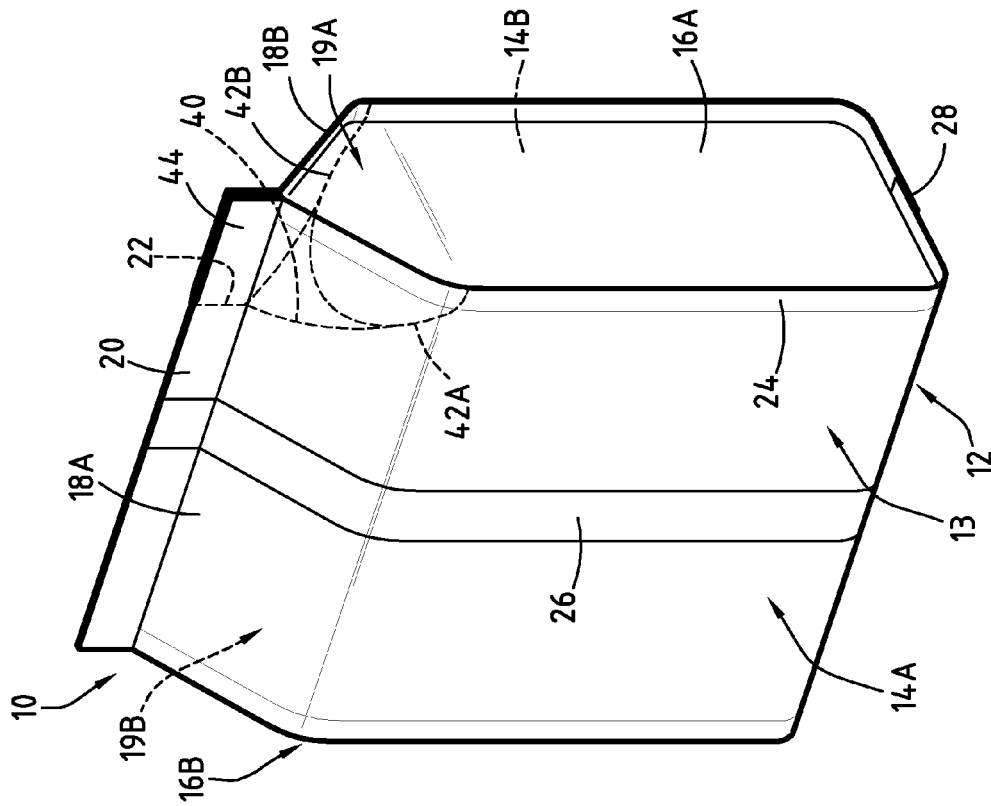


FIG. 3

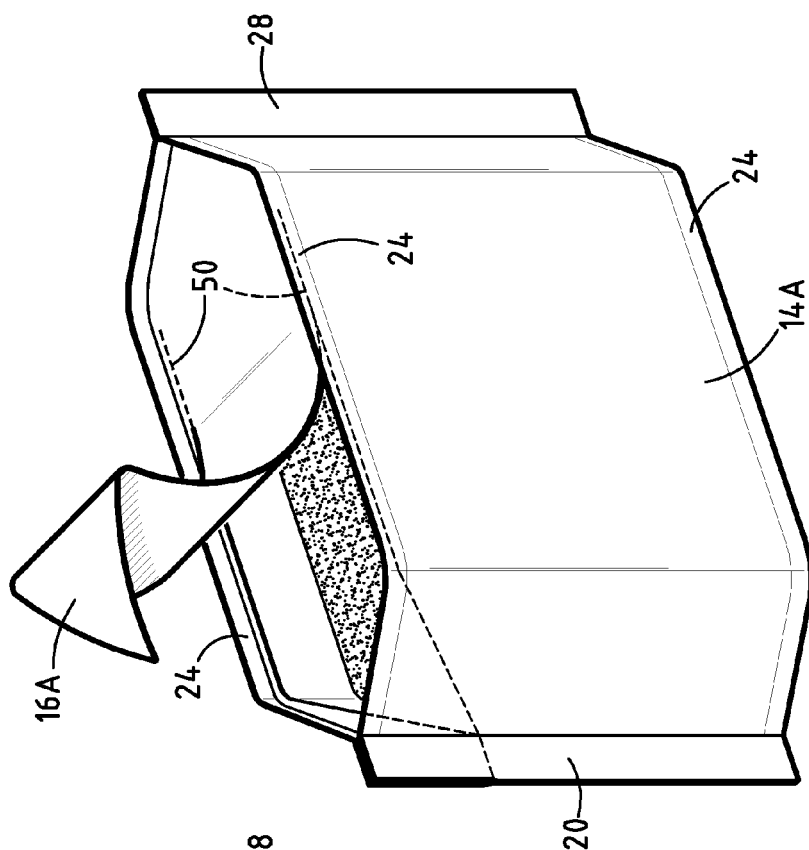


FIG. 5

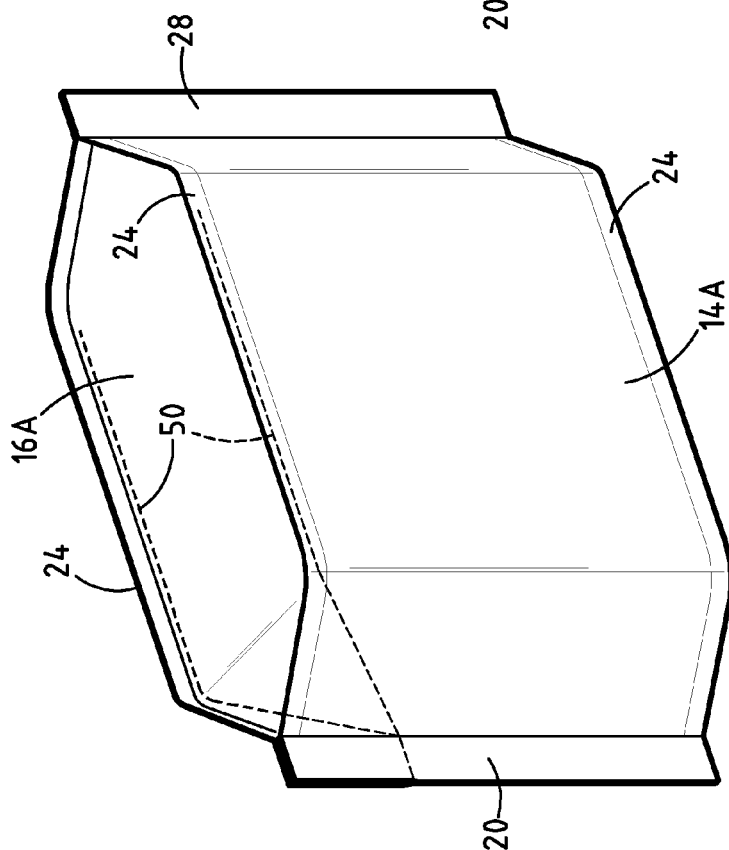


FIG. 6

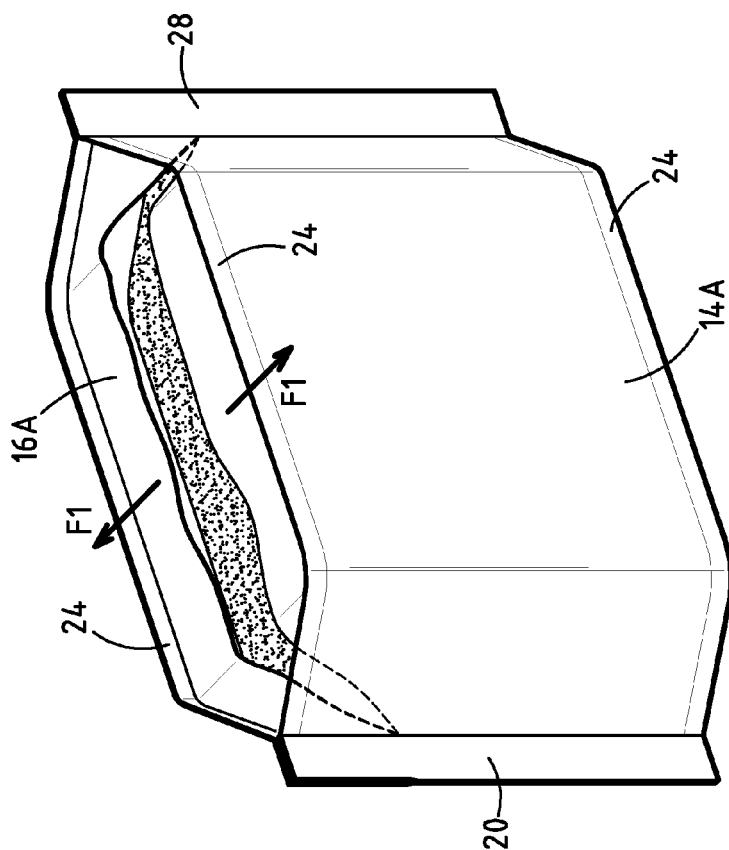


FIG. 8

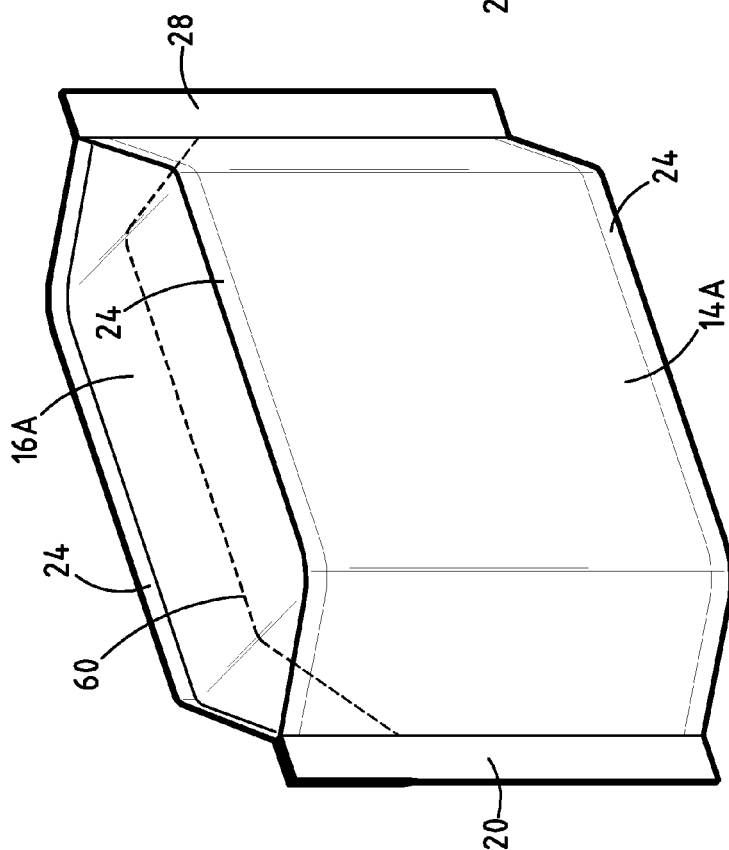
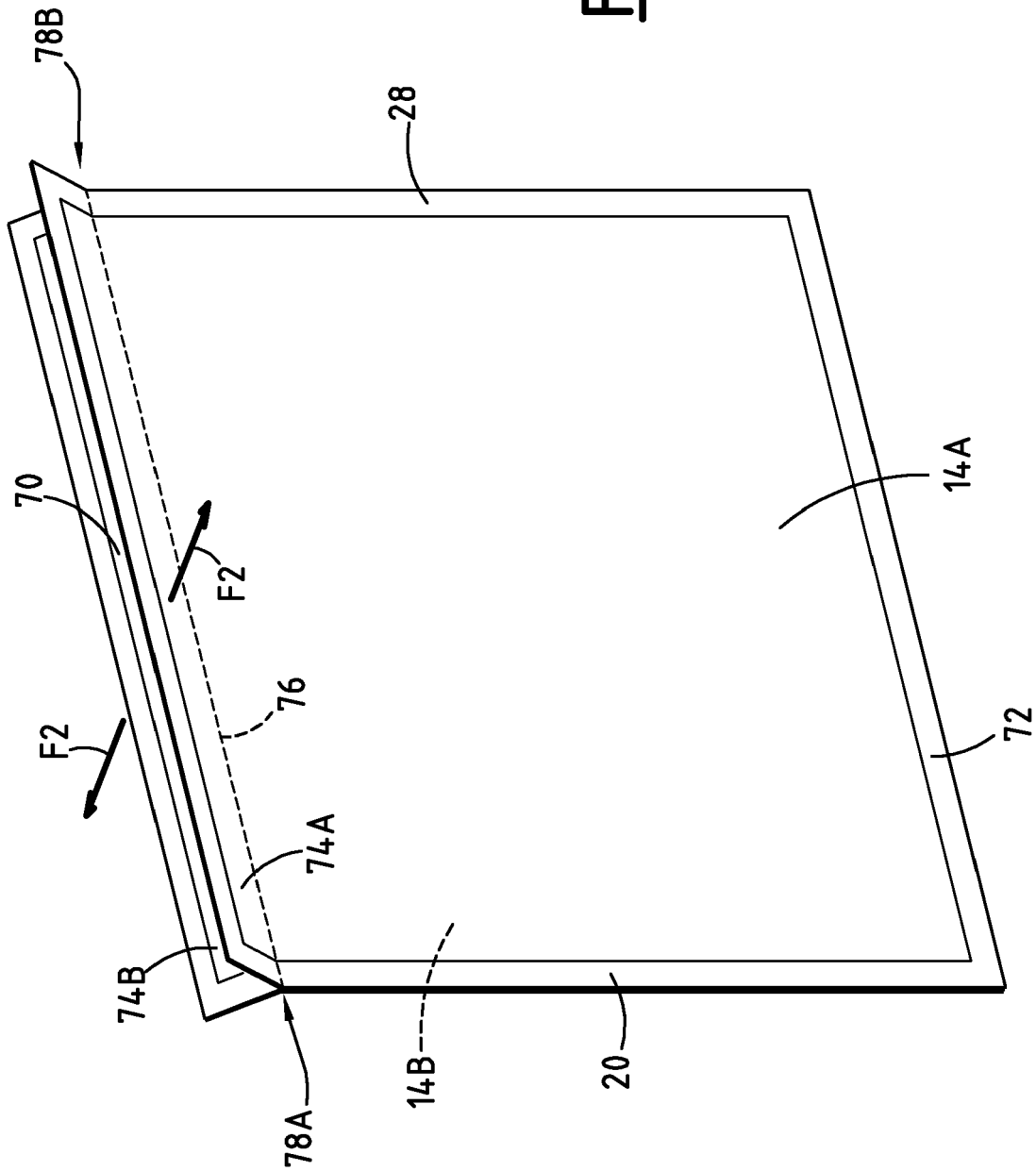


FIG. 7

FIG. 9





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Application Number
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