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(54) **A SEALED PACKAGE CONTAINING A POURABLE FOOD PRODUCT AND A SHEET PACKAGING MATERIAL FOR PRODUCING A SEALED PACKAGE CONTAINING A POURABLE FOOD PRODUCT**

VERSIEGELTE VERPACKUNG MIT EINEM GIESSBAREN LEBENSMITTELPRODUKT UND FOLIENVERPACKUNGSMATERIAL ZUR HERSTELLUNG EINER VERSIEGELTEN VERPACKUNG MIT EINEM GIESSBAREN LEBENSMITTELPRODUKT

EMBALLAGE SCELLÉ CONTENANT UN PRODUIT ALIMENTAIRE VERSABLE ET MATÉRIAU D'EMBALLAGE EN FEUILLE POUR PRODUIRE UN EMBALLAGE SCELLÉ CONTENANT UN PRODUIT ALIMENTAIRE VERSABLE

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(56) References cited:
EP-A1- 2 392 517
EP-A1- 2 650 222
WO-A1-2017/001162
WO-A2-2017/025922

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Description

[0001] The present invention relates to a sealed package containing a pourable food product.

[0002] The present invention also relates to a sheet packaging material for producing a sealed package containing a pourable food product.

[0003] As commonly known, many pourable food products, such as fruit juice, UHT (ultra-high-temperature treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

[0004] A typical example is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by folding, sealing and cutting a web of laminated packaging material. In particular, the packaging material has a multilayer structure comprising a base layer, e.g. of paper, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene. In the case of aseptic packages for long-storage products, such as UHT milk, the packaging material also comprises a layer of oxygen-barrier material, e.g. an aluminium foil, which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material forming the inner face of the package eventually contacting the food product.

[0005] Packages of this sort are normally produced on fully automatic packaging machines, on which a continuous tube is formed from the web-fed packaging material; the web of packaging material is sterilized on the packaging machine, e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution, which, once sterilization is completed, is removed from the surfaces of the packaging material, e.g. evaporated by heating; the web so sterilized is then maintained in a closed, sterile environment, and is folded and sealed longitudinally to form a tube, which is fed vertically.

[0006] In order to complete the forming operations, the tube is filled with the sterilized or sterile-processed food product, and is sealed and subsequently cut along equally spaced cross sections; pillow packs are so obtained, which are then folded mechanically to form respective finished packages at a final folder.

[0007] To allow folding of the web packaging material both during forming and final folding, crease lines, i.e. weakening lines, are formed on the packaging material at the production plant by creasing tools. In practice, the crease lines define folding lines along which the pillow packs are folded to take the desired final configuration.

[0008] Alternatively, the packaging material may be cut into blanks, which are formed into packages on forming spindles, and the resulting packages are then filled with the food product and sealed. One example of this type of package is the so-called "gable-top" package known by the trade name Tetra Rex (registered trademark).

[0009] To open the above-described packages, these are normally provided with a removable portion, which is partly detached by an opening device from the rest of the packaging material to free a pour opening through which to pour out the product.

[0010] The removable portion is formed on the packaging material prior to folding and sealing the packaging material to form the finished package.

[0011] The removable portion normally comprises a so-called "prelaminated" hole, i.e. a circular hole formed through the base layer only of the packaging material and covered, when the material is laminated, with the layers of heat-seal plastic material and barrier material, which adhere to one another at the hole.

[0012] Each package of the above type, either cut from a tube of packaging material or formed on a forming spindle, is obtained from a basic unit of packaging material having given crease lines.

[0013] In other words, the above-mentioned basic unit represents the exact length of the packaging material used to produce one single package.

[0014] In the case of packages made from a tube of packaging material, the original web includes a plurality of basic units joined to each other; in the case of packages made on forming spindles, the basic unit is defined by the blank cut from the web prior to starting the forming and sealing operations.

[0015] The basic unit typically has a rectangular or square configuration with two boundary edges parallel to a longitudinal direction and two other boundary edges parallel to a transversal direction orthogonal to the longitudinal direction.

[0016] Once the basic unit is folded and sealed to form the respective finished package, the longitudinal direction becomes the direction along which the total height of the package itself is defined; the longitudinal direction also represents the main direction of extension of the web from which the basic unit is obtained.

[0017] The basic unit usually includes at least two transversal crease lines extending transversally to the longitudinal direction and dividing the basic unit itself into:

- a bottom region containing a bottom crease pattern and configured to form a bottom portion of the finished package;
- a top region containing a top crease pattern and configured to form a top portion of the finished package; and
- an intermediate region contained between the transversal crease lines, interposed between the bottom region and the top region and usually having a plurality of longitudinal crease lines designed to form lateral edges of a plurality of side walls of the finished package.

[0018] The transversal crease lines are also configured to define a bottom peripheral outline and a top peripheral outline of the finished package having endless configurations and respectively dividing the bottom portion and the top portion from the main portion.

[0019] The bottom portion of the finished package

normally includes a flat and horizontal bottom panel defining the resting surface of the package itself.

[0020] The top portion of the finished package may include a flat and horizontal top panel, parallel to the bottom panel; alternatively, slanted top panels are very conveniently used in combination with opening devices because they are wider than corresponding flat top panels of parallelepiped or prismatic packages and therefore allow the application of larger opening devices, e.g. provided with screw caps or the like.

[0021] As it is known, after their production, packages are transported to sale points by placing them on transport pallets, which have pre-determined sizes. A need is therefore particularly felt in the packaging field to optimize filling of the transport pallets with the finished packages while maintaining a pleasing appearance of such packages.

[0022] EP2650222 addresses the problem of providing a packaging container with a novel triangular cross section and a production method for said container. The packaging container obtained by: tube-form molding by vertical sealing of a web-shaped packaging material; filling inside the tube-shaped packaging material; horizontal sealing in the transverse direction of the tube-shaped packaging material; forming of a pillow-shaped container body; cutting off of individual pillow-shaped container bodies; and forming into a final shape by folding along creases to form a top wall, a side wall, and a bottom wall and attaching formed fins and flaps to said walls. The top wall and bottom wall have a triangular and a rectangular shape, respectively; the cross-section in the transverse direction of a packaging container main body, formed by four ridgelines that connect the triangulation points of the top wall and the four corner points of the bottom wall, is trapezoidal, and one corner point of the horizontal top wall protrudes towards the front side wall.

[0023] WO2017/001162 discloses a spout element for packaging, in particular composite packaging for liquid foodstuffs, said packaging having a polyhedral gable-shaped region and folded packaging casing flaps and the spout element having a main body, a polyhedral flange which is provided for connecting to a packaging casing and the connecting surfaces of which converge at surface meeting points; composite packaging for liquid foodstuffs, having a polyhedral gable-shaped region and folded packaging casing flaps, in which packaging the packaging casing is connected to the spout in a corresponding manner; and composite packaging for liquid foodstuffs having such a spout element. In order to keep the packaging undamaged and thus leak-tight during the connecting process between the spout element and packaging casing and during the folding of the packaging casing flaps, provision is made for receiving regions for the folding line of the packaging casing flaps to be formed in the region of the surface meeting points.

[0024] EP 2 392 517 A1 discloses a sealed package for pourable food products, comprising a quadrangular bottom panel which comprises a first front edge and a second rear edge opposite to each other; a quadrangular top panel which is opposite to bottom panel and comprises a third front edge and a fourth rear edge; a front panel which extends between first and third edges; and a rear panel which extends between second and fourth edges; the distance between first and third edges is smaller than the distance between second and fourth edges; top panel is angled with respect to a first plane defined by first and second edges; first and third edge define a second theoretical reference plane; front panel comprises a fifth and sixth edge which are opposite to one another and extend both between first and second edges; at least one of fifth and sixth front edge extends at least partially on the opposite side of a second theoretical plane with respect to rear panel; front panel comprises at least a first region which extends on the opposite side of a second theoretical plane with respect to rear panel.

[0025] It is therefore an object of the present invention to provide a sealed package containing a pourable food produce, which allows meeting the above-mentioned need in a straightforward and low-cost manner.

[0026] This object is achieved by a sealed package as claimed in claim 1.

[0027] This object is also achieved by a sheet packaging material for producing a sealed package containing a pourable food product, as claimed in claim 11.

[0028] Two preferred, non-limiting embodiments of the present invention will be described by way of example with reference to figures 1 to 8 and two examples not falling within the scope of the claims will be described by way of example with reference to figures 9 to 12, in which:

Figure 1 is a perspective view of a sealed package according to the present invention;

Figure 2 is a smaller-scale front view of the package of Figure 1;

Figure 3 is a smaller-scale side view of the package of Figure 1;

Figure 4 is a smaller-scale bottom view of the package of Figure 1;

Figure 5 is the projection, along a vertical direction, of a top panel of the package of Figure 3 on a horizontal plane containing a top front edge of the top panel itself;

Figure 6 is a front view of a basic unit of a sheet packaging material according to the present invention, from which the package of Figures 1 to 5 is obtained;

Figure 7 is a perspective view of a sealed package according to a different embodiment of the present invention;

Figure 8 is a front view of a basic unit of a sheet packaging material according to the present invention, from which the package of Figure 7 is obtained;

Figure 9 is a perspective view of a sealed package according to an example not falling within the scope of the claims;

Figure 10 is a front view of a basic unit of a sheet packaging material according to the example from which the package of Figure 9 is obtained;

Figure 11 is a perspective view of a sealed package according to an example not falling within the scope of the claims. and

Figure 12 is a front view of a basic unit of a sheet packaging material according to the example from which the package of Figure 11 is obtained.

[0029] Number 1 in Figures 1 to 5 indicates as a whole a sealed package according to the present invention, which contains a pourable food product and is obtained from a sheet packaging material 2 as shown in Figure 6.

[0030] Package 1 comprises a bottom portion 3, a top portion 4 and a main portion 5 interposed between bottom portion 3 and top portion 4 and including a plurality of side wall portions 6, each one delimited by two opposite lateral edge zones 7.

[0031] Main portion 5 is divided from bottom portion 3 by a bottom peripheral outline 8 having an endless configuration defined by a broken line. In a completely analogous manner, main portion 5 is divided from top portion 4 by a top peripheral outline 9, also having an endless configuration defined by a broken line.

[0032] Bottom portion 3 includes a flat and horizontal bottom panel 10 having a quadrilateral, i.e. rectangular or square (in the example shown rectangular), profile and defining the resting surface of the package itself.

[0033] Bottom panel 10 is delimited by bottom peripheral outline 8 in turn formed by four segments or contour edges, i.e. a bottom front edge 8a, a bottom rear edge 8b parallel to bottom front edge 8a and two bottom side edges 8c, orthogonal to bottom front edge 8a and bottom rear edge 8b.

[0034] Due to the rectangular profile of bottom panel 10, bottom front edge 8a and bottom rear edge 8b have the same length; the same applies to bottom side edges 8c, which also have the same length.

[0035] Package 1 extends vertically along a longitudinal direction A, which is orthogonal to bottom panel 10 and along which the total height of the package 1 itself is defined. Longitudinal direction A is also orthogonal to bottom front edge 8a, bottom rear edge 8b and bottom side edges 8c of bottom peripheral outline 8.

[0036] It is pointed out that, in the present description and in the claims, the term "total height" means either the height of the package when the latter has a constant height or the maximum height of the package when the latter has a variable height.

[0037] Bottom portion 3 further includes two bottom lateral flaps 11 having substantially triangular configurations and folded in a known manner onto bottom panel 10 (Figure 4).

[0038] Top portion 4 includes a flat and slanted top panel 14 having a quadrilateral, i.e. a square or a rectangular, profile and having a sloping configuration forwards with respect to longitudinal direction A.

[0039] In the example shown in Figures 1 to 3, top panel 14 is a rectangle approximating a square.

[0040] Top panel 14 is delimited by top peripheral outline 9 in turn formed by four segments or contour edges, i.e. a top front edge 9a parallel to bottom front edge 8a and bottom rear edge 8b, a top rear edge 9b, parallel to top front edge 9a and arranged higher than the top front edge 9a itself, and two top side edges 9c, orthogonal to top front edge 9a and top rear edge 9b and inclined with respect to longitudinal direction A.

[0041] As a consequence, top peripheral outline 9 extends transversally with respect to longitudinal direction A.

[0042] Due to the rectangular profile of top panel 14, top front edge 9a and top rear edge 9b have the same length; the same applies to top side edges 9c, which also have the same length.

[0043] Top portion 4 further includes two top lateral flaps 15 having substantially triangular configurations and folded in a known manner onto two opposite side wall portions 6 of main portion 5.

[0044] As visible in Figures 1 to 3 and 5, top portion 4 is also provided with an opening device 16 of plastic material placed over and around a removable portion 17 (Figure 6) of the packaging material 2. Opening device 16 is applied onto top panel 14 by conventional fastening systems, such as adhesives, or by micro-flame, electric-current-induction, ultrasound, laser, injection moulding or other heat-sealing techniques.

[0045] In the example shown in Figures 1 to 5, main portion 5 of package 1 includes four side wall portions 6 with different profiles and sizes; advantageously, lateral edge zones 7 delimiting side wall portions 6 have rounded configurations.

[0046] In particular, a first side wall portion 6, designed to define a front face of package 1, has a substantially rectangular configuration delimited, at bottom and top, by straight bottom front edge 8a and top front edge 9a, and at opposite sides, by respective rounded and convex lateral edge zones 7.

[0047] A second side wall portion 6, designed to define a rear face of package 1, also has a substantially rectangular configuration and is delimited, at bottom and top, by straight bottom rear edge 8b and top rear edge 9b, and at opposite sides, by respective rounded and convex lateral edge zones 7; this second side wall portion 6 faces the side wall portion 6 designed to define the front face of the package 1 and has a height, parallel to longitudinal

direction A, greater than the height of this latter side wall portion 6.

[0048] Each of the other two side wall portions 6 has a profile substantially resembling a rectangular trapezium delimited:

- at the bottom, by one respective horizontal bottom side edge 8c;
- at the top, by one respective inclined top side edge 9c; and
- at opposite sides, by respective rounded and convex lateral edge zones 7.

[0049] The two side wall portions 6 having the trapezoidal profiles receive the respective top lateral flaps 15 on their outer surfaces.

[0050] According to an important aspect of the present invention, the area of bottom panel 10 is different from the area of a top quadrilateral Q (Figure 5) obtained by projecting, along longitudinal direction A, top panel 14 on a reference plane P (Figure 3) parallel to the bottom panel 10, crossing package 1 and containing top front edge 9a of top peripheral outline 9.

[0051] In particular, the area of bottom panel 10 is smaller than the area of top quadrilateral Q.

[0052] According to another possible variant not shown, the area of bottom panel 10 may be bigger than the area of top quadrilateral Q.

[0053] Analogously to top panel 14, top quadrilateral Q is a square or a rectangle, in the examples shown a rectangle approximating a square.

[0054] With particular reference to Figure 5, top quadrilateral Q includes a top front segment Q1, corresponding to bottom front edge 8a, a top rear segment Q2, corresponding to bottom rear edge 8b, and two top side segments Q3, respectively corresponding to bottom side edges 8c.

[0055] Preferably, top side segments Q3 have the same length, which is in turn different from the length of bottom side edges 8c. More specifically, in the example shown, the length of bottom side edges 8c is smaller than the length of top side segments Q3.

[0056] In a similar way, top front segment Q1 and top rear segment Q2 have the same length, which is in turn different from the length of bottom front edge 8a and bottom rear edge 8b.

[0057] More specifically, in the example shown, the length of bottom front edge 8a and bottom rear edge 8b is greater than the length of top front segment Q1 and top rear segment Q2.

[0058] The packaging material 2 from which package 1 is made is shown in Figure 6 and has a known multilayer structure (not shown) comprising a base layer, e.g. of paper, for stiffness, and a number of lamination layers covering both sides of the base layer.

[0059] Preferably, the lamination layers comprise one layer of oxygen-barrier material, e.g. an aluminum foil, and a number of layers of heat-seal plastic material covering both sides of the base layer and both sides of the layer of oxygen-barrier material. In other words, by proceeding from the side eventually forming the inside of package 1, packaging material 2 comprises one layer of heat-seal plastic material, one layer of oxygen-barrier material, another layer of heat-seal plastic material, the base layer, and one or more additional layers of heat-seal plastic material.

[0060] The letter M in Figure 6 indicates a basic unit of packaging material 2, by which to produce package 1, and which may be a precut blank, or a portion of a web of packaging material comprising a succession of basic units M.

[0061] In the first case, basic unit M is folded on a known forming spindle (not shown), is filled with the food product, and is sealed at the top to form the final package.

[0062] In the second case, described therein with reference to Figures 1 to 12, the web of packaging material 2, comprising a succession of basic units M, is:

- folded into a cylinder and sealed longitudinally to form a vertical tube;
- filled continuously with the food product; and
- sealed transversely and cut into basic units M, which are then folded to form respective packages 1.

[0063] After completion of these operations, package 1 has:

- a bottom transverse sealing band 18 (Figure 5) crossing bottom panel 10 along a centre line thereof and extending parallel to front bottom edge 8a and rear bottom edge 8b;
- a top transverse sealing band 19 (Figures 1 to 4) crossing top panel 14 parallel to, and between, front top edge 9a and rear top edge 9b; and
- a longitudinal sealing band 20 extending perpendicularly between the bottom transverse sealing band 18 and the top transverse sealing band 19 along respective portions of bottom panel 10 and top panel 14 and along the side wall portion 6 defining the rear face of package 1.

[0064] More specifically, after package 1 is completely sealed and formed, bottom panel 10 is crossed by bottom transverse sealing band 18 and by an end portion 20a of longitudinal sealing band 20 extending perpendicularly from the bottom transverse sealing band 18.

[0065] In a completely analogous way, after package 1 is completely sealed and formed, top panel 14 is crossed by top transverse sealing band 19 and by an end portion 20b of longitudinal sealing band 20 extending perpendicularly from the top transverse sealing band 19 and opposite to end portion 20a; in greater detail, top transverse sealing band 19 divides top panel 14 into two zones 14a, 14b and end portion 20b of longitudinal sealing band 20 extends on one (14b) of such zones 14a, 14b from an intermediate portion of the top transverse sealing band

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[0066] During the forming operations to obtain package 1, top transverse sealing band 19 is folded on zone 14b and end portion 20b of longitudinal sealing band 20; in this way, zone 14a has a bigger area than zone 14b and is therefore more suitable for receiving removable portion 17 and opening device 16.

[0067] In the example shown in Figure 6, removable portion 17 has a circular profile and is designed to be at least partly detached in use from the rest of the packaging material by opening device 16 to free a pour opening through which to pour out the product.

[0068] Removable portion 17 is formed on packaging material 2 prior to folding and sealing the packaging material 2 itself to form the finished package.

[0069] In the present case, removable portion 17 comprises a so-called "prelaminated" hole, i.e. a circular hole formed through the base layer only of packaging material 2 and covered, when the packaging material 2 itself is laminated, with the layers of heat-seal plastic material and oxygen-barrier material, which adhere to one another at the hole.

[0070] With particular reference to Figure 6, basic unit M of packaging material 2 has a rectangular configuration and is delimited by:

- two side boundary edges 22 parallel to a longitudinal direction coinciding with longitudinal direction A in an upright condition of basic unit M;
- a bottom boundary edge 23 parallel to a transversal direction B orthogonal to longitudinal direction A; and
- a top boundary edge 24 parallel to transversal direction B and to bottom boundary edge 23.

[0071] Basic unit M of packaging material 2 comprises a number of crease lines defining respective fold lines, along which the packaging material 2 itself is folded to form the finished package 1.

[0072] More specifically, basic unit M comprises two transversal crease lines 25, 26 extending transversally with respect to longitudinal direction A and dividing the basic unit M itself into:

- a bottom region 27 containing a bottom crease pattern 28 and configured to form bottom portion 3 of package 1;
- a top region 29 containing a top crease pattern 30 and configured to form top portion 4 of package 1; and
- an intermediate region 31 contained between transversal crease lines 25, 26, interposed between bottom region 27 and top region 29 and designed to form side wall portions 6 of package 1.

[0073] Transversal crease line 25 extends parallel to bottom boundary edge 23 and top boundary edge 24 and is arranged closer to bottom boundary edge 23 than transversal crease line 26. Transversal crease line 25 is configured to define bottom peripheral outline 8 of package 1.

[0074] In particular, transversal crease line 25 includes:

- a bottom central portion 25a configured to define bottom front edge 8a of package 1;
- two bottom end portions 25b arranged on opposite sides of bottom central portion 25a, located adjacent to respective side boundary edges 22 and configured to define bottom rear edge 8b of package 1; and
- two bottom side portions 25c, extending adjacent to opposite sides of bottom central portion 25a, connecting the central portion 25a itself to the respective end portions 25b and designed to define respective bottom side edges 8c of package 1.

[0075] Transversal crease line 26 is arranged closer to top boundary edge 24 than transversal crease line 25 and is configured to define top peripheral outline 9 of package 1. In particular, transversal crease line 26 has a broken-line shape with:

- a top central portion 26a parallel to transversal direction B and configured to define top front edge 9a of package 1;
- two top end portions 26b parallel to transversal direction B, arranged closer to top boundary edge 24 than top central portion 26a and configured to define top rear edge 9b of package 1; and
- two inclined top side portions 26c, having slanted configurations with respect to longitudinal direction A and transversal direction B and each one connecting top central portion 26a to respective top end portions 26b.

[0076] As visible in Figure 6, top side portions 26c converge towards top central portion 26a.

[0077] Basic unit M includes two further transversal crease lines 32, 33 extending parallel to direction B and placed near bottom boundary edge 23 and top boundary edge 24, respectively; transversal crease lines 32, 33 delimit with bottom boundary edge 23 and top boundary edge 24 respective bottom transversal sealing area 34 and top transversal sealing area 35 configured to define bottom transversal sealing band 18 and top transversal sealing band 19 of package 1.

[0078] Bottom crease pattern 28 is designed to produce bottom panel 10 and bottom lateral flaps 11 of package 1. In particular, bottom crease pattern 28 includes, in a known manner, four longitudinal crease lines 36a, 36b parallel to longitudinal direction A and extending between transversal crease lines 25 and 32.

[0079] Longitudinal crease lines 36b are the most internal ones, whilst longitudinal crease lines 36a are located near opposite side boundary edges 22; the area between longitudinal crease lines 36b as well as the areas delimited by longitudinal crease lines 36a with

the respective side boundary edges 22 are configured to define bottom panel 10 of package 1.

[0080] In each of the areas delimited between longitudinal crease lines 36a and 36b, bottom crease pattern 28 further includes two additional crease lines 37, 38 inclined with respect to both longitudinal direction A and transversal direction B.

[0081] In particular, the additional crease lines 37, 38 of each pair have one end in common located on transversal crease line 32 and opposite ends located at the intersection points between transversal crease line 25 and longitudinal crease lines 36a and 36b, respectively. In this way, each pair of additional crease lines 37, 38 delimits a triangle 39 with the segment of transversal crease line 25 comprised between the additional crease lines 37, 38 themselves.

[0082] Each area between longitudinal crease lines 36a and 36b is configured to define one respective bottom lateral flap 11 of package 1.

[0083] Top crease pattern 30 is designed to produce top panel 14 and top lateral flaps 15 of package 1. In particular, top crease pattern 30 includes four longitudinal crease lines 40a, 40b parallel to longitudinal direction A and extending between transversal crease lines 26 and 33.

[0084] Longitudinal crease lines 40b are the most internal ones, whilst longitudinal crease lines 40a are located near opposite side boundary edges 22; the area between longitudinal crease lines 40b as well as the areas delimited by longitudinal crease lines 40a with the respective side boundary edges 22 are configured to define top panel 14 of package 1. Removable portion 17 is formed in the area of top region 29 comprised between longitudinal crease lines 40b.

[0085] In each of the areas delimited between longitudinal crease lines 40a and 40b, top crease pattern 30 further includes two additional crease lines 41, 42 inclined with respect to both longitudinal direction A and transversal direction B.

[0086] In particular, the additional crease lines 41, 42 of each pair have one end in common located on transversal crease line 33 and opposite ends located at, or adjacent to, the opposite ends of the respective inclined top side portion 26c of transversal crease line 26.

[0087] In this way, each pair of additional crease lines 41, 42 delimits a triangle 43 with the respective top side portion 26c of transversal creased line 26.

[0088] Each area between longitudinal crease lines 40a and 40b is configured to define one respective top lateral flap 15 of package 1.

[0089] According to an important aspect of the present invention, the length of top central portion 26a of transversal crease line 26 is different from the length of bottom central portion 25a of transversal crease line 25; in addition, the length of each of bottom side portions 25c of transversal crease line 25 is also different from the length of the projection R, parallel to longitudinal direction A, of each of top side portions 26c of transversal crease line 26 on a reference line S parallel to transversal crease line 25 and containing top central portion 26a.

[0090] In particular, the length of top central portion 26a is smaller than the length of bottom central portion 25a; in a different manner, the length of each projection R is greater than the length of the corresponding bottom side portion 25c.

[0091] As visible in Figure 6, the length of bottom central portion 25a corresponds to the length of the segment of transversal crease line 32 comprised between longitudinal crease lines 36b; in a completely analogous manner, the length of top central portion 26a corresponds to the length of the segment of transversal crease line 33 comprised between longitudinal crease lines 40b.

[0092] The same applies to bottom side portions 25c, whose lengths correspond to the lengths of the respective segments of transversal crease line 32 comprised between each pair of longitudinal crease lines 36a and 36b. Analogously, the lengths of projections R correspond to the lengths of the respective segments of transversal crease line 33 comprised between each pair of longitudinal crease lines 40a and 40b.

[0093] It is important to note that the length of top front segment Q1 and top rear segment Q2 of top quadrilateral Q corresponds to the length of top central portion 26a; in an analogous manner, the length of top side segments Q3 of top quadrilateral Q corresponds to the length of projections R.

[0094] In the embodiment shown in Figure 6, intermediate region 31 includes a central transversal band 44 having a uniform structure, i.e. lacking any creasing or weakening, and crossing the areas of the intermediate region 31 itself designed to form the respective lateral edge zones 7 of side wall portions 6 of package 1.

[0095] Preferably, intermediate region 31 of basic unit M further comprises a plurality of V-shaped crease lines 45 having respective vertices 46 located on or adjacent to the transversal crease lines 25, 26 and at given points thereof designed to define the opposite ends of respective lateral edge zones 7 delimiting the side wall portions 6 of package 1; each V-shaped crease line 45 extends from and in proximity of the respective transversal crease line 25, 26 up to central transversal band 44 and comprises two legs 47 diverging from the respective vertex 46.

[0096] In particular, each V-shaped crease line 45 extends from the respective transversal crease line 25, 26 towards the other transversal crease line 26, 25 and has a size, parallel to longitudinal direction A, greater than zero and smaller than one fourth, preferably smaller than one tenth, of the total height of intermediate region 31 measured parallel to the longitudinal direction A itself.

[0097] It is pointed out that, in the present description and in the claims, the term "total height of intermediate region 31" corresponds to the total height of the package.

[0098] In practice, each V-shaped crease line 45 extending from transversal crease line 25 and the corre-

sponding V-shaped crease line 45 extending from transversal crease line 26 are spaced apart parallel to longitudinal direction A.

[0099] Preferably, each V-shaped crease line 45 has a size, parallel to longitudinal direction A, smaller than the maximum height of bottom region 27 or top region 29 measured parallel to the longitudinal direction A itself.

[0100] More preferably, each leg of the V-shaped crease lines 45 has a length smaller than the maximum length of the heights of triangles 39, 43 with reference to their bases on respective transversal crease lines 25, 26.

[0101] In the example shown, each V-shaped crease line 45 has a size, parallel to longitudinal direction A, substantially equal to one fourteenth of the total height of intermediate region 31 measured parallel to the longitudinal direction A itself.

[0102] As visible in Figures 1 to 4, V-shaped crease lines 45 are the only crease lines present in intermediate region 31 at the areas designed to define lateral edge zones 7 between side wall portions 6 of package 1.

[0103] Due to the absence of continuous longitudinal crease lines between transversal crease lines 25, 26, the resulting package 1 presents a round configuration along lateral edge zones 7. V-shaped crease lines 45 perform the function of easing folding of the packaging material 2 at the corners between lateral edge zones 7 of side wall portions 6 and bottom peripheral outline 8 and top peripheral outline 9 without affecting the round configuration of lateral edge zones 7.

[0104] In the example shown, legs 47 of each V-shaped crease line 45 are rectilinear or straight; as a possible alternative not shown, legs 47 of each V-shaped crease line 45 may also be curved, preferably with their concavities facing one another.

[0105] Preferably, legs 47 of each V-shaped crease line 45 delimit an angle comprised between 45° and 90°.

[0106] Number 1' in Figure 7 indicates as a whole a different embodiment of a sealed package according to the present invention and obtained by a basic unit M' (Figure 8) of sheet packaging material 2. Package 1' being similar to package 1, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts; the same applies for basic units M' and M.

[0107] In particular, package 1' differs from package 1 only in that lateral edge zones 7 between side wall portions 6 are defined by respective longitudinal crease lines 50 extending between transversal crease lines 25 and 26. Longitudinal crease lines 50 are slightly slanted with respect to longitudinal direction A due to the different lengths between bottom central portion 25a and top central portions 26a of transversal crease lines 25, 26 as well as between bottom side portions 25c of transversal crease line 25 and respective projections R on reference line S.

[0108] In this case, there is no need for V-shaped crease lines, which are therefore absent.

[0109] Number 1" in Figure 9 indicates an example of a sealed package, not falling within the scope of the claims, obtained by a basic unit M" (Figure 10) of sheet packaging material 2. Package 1" being similar to package 1, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts; the same applies for basic units M" and M.

[0110] In particular, package 1" differs from package 1 only by having a top panel 14" that extends horizontally and parallel to bottom panel 10.

[0111] In greater details, top panel 14" is delimited by a top peripheral outline 9" (formed by edges 9a", 9b", 9c") parallel to bottom peripheral outline 8 and deriving by a transversal crease line 26'' also parallel to transversal crease line 25 and to transversal direction B.

[0112] In this case, top panel 14'' extends entirely on reference plane P and therefore the projection of top panel 14" on this latter plane, i.e. top quadrilateral Q, coincides with the top panel 14" itself.

[0113] The same applies to the projections R of top side portions 26c" of transversal crease line 26'' on reference line S, which coincide with the top side portions 26c" themselves; in fact, in this case, reference line S coincides with top transversal crease line 26".

[0114] Number 1‴ in Figure 11 indicates an example of a sealed package, not falling within the scope of the claims, obtained by a basic unit M‴ (Figure 12) of sheet packaging material 2. Package 1‴ being similar to package 1", the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts; the same applies for basic units M‴ and M".

[0115] In particular, package 1‴ differs from package 1" only in that lateral edge zones 7 between side wall portions 6 are defined by respective longitudinal crease lines 50 extending between transversal crease lines 25 and 26. Even in this case, longitudinal crease lines 50 are slightly slanted with respect to longitudinal direction A due to the different lengths between bottom central portion 25a and top central portion 26a'' of transversal crease lines 25, 26" as well as between bottom side portions 25c and top side portion 26c" of the same transversal crease lines 25, 26".

[0116] Thanks to the presence of longitudinal crease lines 50, there is no need for V-shaped crease lines, which are therefore absent.

[0117] The advantages of packages 1, 1' and basic units M, M' of packaging material 2 according to the present invention will be clear from the above description.

[0118] In particular, all the solutions of packages 1, 1' described present bottom portions 3 slightly different from the top portions 4. In this way, it is possible to optimize filling of the transport pallets with the finished packages 1, 1', which present high flexibility in their dimensions without imparting relevant changes in their appearance. For instance, a slimmer bottom portion 3 than the top portion 4 permits to compensate the bulging

effect produced by gravity on the pourable product contained in the package when placed in the upright position, which product tends to accumulate in the bottom portion of the package 1, 1' itself.

[0119] Clearly, changes may be made to packages 1, 1' and basic units M, M' of packaging material 2 as described and illustrated herein without, however, departing from the scope of protection defined in the accompanying claims.

Claims

1. A sealed package (1, 1') containing a pourable food product and comprising a bottom portion (3), a top portion (4) and a main portion (5) interposed between said bottom portion (3) and said top portion (4) and including a plurality of side wall portions (6);

wherein said main portion (5) is divided from said bottom portion (3) and said top portion (4) respectively by a bottom peripheral outline (8) and a top peripheral outline (9), each having an endless configuration and extending transversally with respect to a longitudinal direction (A), along which the total height of the package (1, 1') is defined;
wherein each of said bottom peripheral outline (8) and said top peripheral outline (9) has a broken-line shape and is formed by a plurality of contour edges (8a, 8b, 8c; 9a, 9b, 9c) joined to each other;
wherein said bottom portion (3) comprises a quadrilateral bottom panel (10) delimited by said bottom peripheral outline (8) and extending orthogonal to said longitudinal direction (A); and wherein said top portion (4) comprises a quadrilateral top panel (14) delimited by said top peripheral outline (9) and extending transversally to said longitudinal direction (A);
wherein said top panel (14) is slanted with respect to said bottom panel (10), said reference plane (P) and said longitudinal direction (A);
characterized in that the area of the bottom panel (10) is different from the area of a top quadrilateral (Q) obtained by projecting, along said longitudinal direction (A), said top panel (14) on a reference plane (P) parallel to said bottom panel (10), crossing the package (1, 1') and containing at least one (9a) of the contour edges (9a, 9b, 9c) of said top peripheral outline (9).

2. The package as claimed in claim 1, wherein said reference plane (P) contains at least a top front edge (9a) of the contour edges (9a, 9b, 9c) of said top peripheral outline (9).

3. The package as claimed in claim 1 or 2, wherein the area of said bottom panel (10) is smaller than the area of said top quadrilateral (Q).

4. The package as claimed in any one of the foregoing claims, wherein said contour edges of said bottom peripheral outline (8) include a bottom front edge (8a), a bottom rear edge (8b) and two bottom side edges (8c) and wherein said top quadrilateral (Q) includes a top front segment (Q1), corresponding to said bottom front edge (8a), a top rear segment (Q2), corresponding to said bottom rear edge (8b), and two top side segments (Q3), respectively corresponding to said bottom side edges (8c).

5. The package as claimed in claim 4, wherein said bottom side edges (8c) have the same length and said top side segments (Q3) have the same length; and wherein the length of said bottom side edges (8c) is different from the length of said top side segments (Q3).

6. The package as claimed in claim 5, wherein said length of said bottom side edges (8c) is smaller than said length of said top side segments (Q3).

7. The package as claimed in any one of claims 4 to 6, wherein said bottom front edge (8a) and said bottom rear edge (8b) have the same length and said top front segment (Q1) and said top rear segment (Q2) have the same length; and wherein the length of said bottom front edge (8a) and said bottom rear edge (8b) is different from the length of said top front segment (Q1) and said top rear segment (Q2).

8. The package as claimed in claim 7, wherein said length of said bottom front edge (8a) and said bottom rear edge (8b) is greater than said length of said top front segment (Q1) and said top rear segment (Q2).

9. The package as claimed in any one of the foregoing claims, wherein each of said side wall portions (6) is delimited by two rounded lateral edge zones (7) convex outward.

10. The package as claimed in any one of claims 1 to 8, wherein each of said side wall portions (6) is delimited by two straight lateral edge zones (7).

11. A sheet packaging material (M, M') for producing a sealed package (1, 1') containing a pourable food product, said packaging material (M, M') having a rectangular or square configuration with two boundary edges (22) parallel to a longitudinal direction (A) and two other boundary edges (23, 24) parallel to a transversal direction (B) orthogonal to said longitudinal direction (A); said packaging material (M, M') comprising at least a bottom transversal crease line

(25) and a top transversal crease line (26) extending transversally to said longitudinal direction (A) and dividing the packaging material (M, M') into:

- a bottom region (27) containing a bottom crease pattern (28) and configured to form a bottom portion (3) of said package (1, 1');
- a top region (29) containing a top crease pattern (30) and configured to form a top portion (4) of said package (1, 1'); and
- an intermediate region (31) contained between said bottom transversal crease line (25) and said top transversal crease line (26), interposed between said bottom region (27) and said top region (29) and designed to form a main portion (5) of said package (1, 1') having a plurality of side wall portions (6);

wherein said bottom transversal crease line (25) and said top transversal crease line (26) are configured to define a bottom peripheral outline (8) and a top peripheral outline (9) of said package (1, 1') respectively dividing said bottom portion (3) and said top portion (4) from said main portion (5);
wherein said bottom transversal crease line (25) extends parallel to said transversal direction (B) and includes a bottom central portion (25a), designed to define a bottom front edge (8a) of said package (1, 1'), and two bottom side portions (25c), extending on opposite sides of said bottom central portion (25a) and designed to define respective bottom side edges (8c) of said package (1, 1');
wherein said top transversal crease line (26) includes a top central portion (26a), designed to define a top front edge (9a) of said package (1, 1'), and two top side portions (26c), extending on opposite sides of said top central portion (26a) and designed to define respective top side edges (9c) of said package (1, 1');
wherein said bottom crease pattern (28) is configured to define a quadrilateral bottom panel (10) of said package (1, 1') and said top crease pattern (30) is configured to define a quadrilateral top panel (14) of said package (1, 1');
wherein said top side portions (26c) of said top transversal crease line (26) are inclined with respect to both said longitudinal direction (A) and said transversal direction (B) and converge towards said top central portion (26a)
characterized in that the length of said top central portion (26a) of said top transversal crease line (26) is different from the length of said bottom central portion (25a) of said bottom transversal crease line (25).

12. The packaging material as claimed in claim 11, wherein the length of each of said bottom side portions (25c) of said bottom transversal crease line (25) is different from the length of the projection (R), parallel to said longitudinal direction (A), of each of said top side portions (26c) of said top transversal crease line (26) on a reference line (S) parallel to said bottom transversal crease line (25) and containing at least said top central portion (26a).

13. The packaging material as claimed in claim 12, wherein said length of each of said bottom side portions (25c) is smaller than said length of the corresponding said projection (R).

14. The packaging material as claimed in any one of claims 11 to 13, wherein said length of said bottom central portion (25a) of said bottom transversal crease line (25) is greater than said length of said top central portion (26a) of said top transversal crease line (26).

15. The packaging material as claimed in any one of claims 11 to 14, further comprising a plurality of longitudinal crease lines (50) extending between said bottom transversal crease line (25) and said top transversal crease line (26) and configured to define respective lateral edge zones (7) of the side wall portions (6) of said package (1').

16. The packaging material as claimed in claim 15, wherein said longitudinal crease lines (50) are slightly slanted with respect to said longitudinal direction (A).

Patentansprüche

1. Versiegelte Packung (1, 1'), die ein gießfähiges Nahrungsmittelprodukt enthält und einen unteren Abschnitt (3), einen oberen Abschnitt (4) und einen zwischen dem unteren Abschnitt (3) und dem oberen Abschnitt (4) liegenden Hauptabschnitt (5) umfasst und eine Vielzahl von Seitenwandabschnitten (6) aufweist; wobei der Hauptabschnitt (5) jeweils durch eine untere Umfangskontur (8) und eine obere Umfangskontur (9), die jeweils eine Endloskonfiguration haben und sich bezüglich einer Längsrichtung (A), entlang derer die Gesamthöhe der Packung (1, 1') definiert ist, quer erstrecken, von dem unteren Abschnitt (3) und dem oberen Abschnitt (4) abgeteilt ist;

wobei die untere Umfangskontur (8) und die obere Umfangskontur (9) jeweils strichlinienförmig sind und durch eine Vielzahl von miteinan-

der verbundenen Konturkanten (8a, 8b, 8c; 9a, 9b, 9c) ausgebildet sind; wobei der untere Abschnitt (3) ein vierseitiges unteres Feld (10) umfasst, das von der unteren Umfangskontur (8) begrenzt wird und sich orthogonal zu der Längsrichtung (A) erstreckt; und
wobei der obere Abschnitt (4) ein vierseitiges oberes Feld (14) umfasst, das von der oberen Umfangskontur (9) begrenzt wird und sich quer zu der Längsrichtung (A) erstreckt;
wobei das obere Feld (14) bezüglich des unteren Felds (10), der Bezugsebene (P) und der Längsrichtung (A) geneigt ist;
dadurch gekennzeichnet, dass
die Fläche des unteren Felds (10) von der Fläche eines oberen Vierecks (Q) verschieden ist, das durch Projizieren des oberen Felds (14) entlang der Längsrichtung (A) auf eine Bezugsebene (P) erhalten wird, die parallel zu dem unteren Feld (10) verläuft, die Packung (1, 1') kreuzt und mindestens eine (9a) der Konturkanten (9a, 9b, 9c) der oberen Umfangskontur (9) enthält.

2. Packung nach Anspruch 1, wobei die Bezugsebene (P) mindestens eine obere Vorderkante (9a) der Konturkanten (9a, 9b, 9c) der oberen Umfangskontur (9) enthält.

3. Packung nach Anspruch 1 oder 2, wobei die Fläche des unteren Felds (10) kleiner als die Fläche des oberen Vierecks (Q) ist.

4. Packung nach einem der vorhergehenden Ansprüche, wobei die Konturkanten der unteren Umfangskontur (8) eine untere Vorderkante (8a), eine untere Hinterkante (8b) und zwei untere Seitenkanten (8c) aufweisen und wobei das obere Viereck (Q) ein oberes Vordersegment (Q1), das der unteren Vorderkante (8a) entspricht, ein oberes Hintersegment (Q2), das der unteren Hinterkante (8b) entspricht, und zwei obere Seitensegmente (Q3) aufweist, die jeweils den unteren Seitenkanten (8c) entsprechen.

5. Packung nach Anspruch 4, wobei die unteren Seitenkanten (8c) die gleiche Länge aufweisen und die oberen Seitensegmente (Q3) die gleiche Länge aufweisen; und wobei die Länge der unteren Seitenkanten (8c) von der Länge der oberen Seitensegmente (Q3) verschieden ist.

6. Packung nach Anspruch 5, wobei die Länge der unteren Seitenkanten (8c) kleiner als die Länge der oberen Seitensegmente (Q3) ist.

7. Packung nach einem der Ansprüche 4 bis 6, wobei die untere Vorderkante (8a) und die untere Hinterkante (8b) die gleiche Länge aufweisen und das obere Vordersegment (Q1) und das obere Hintersegment (Q2) die gleiche Länge aufweisen; und wobei die Länge der unteren Vorderkante (8a) und der unteren Hinterkante (8b) von der Länge des oberen Vordersegments (Q1) und des oberen Hintersegments (Q2) verschieden ist.

8. Packung nach Anspruch 7, wobei die Länge der unteren Vorderkante (8a) und der unteren Hinterkante (8b) größer ist als die Länge des oberen Vordersegments (Q1) und des oberen Hintersegments (Q2).

9. Packung nach einem der vorhergehenden Ansprüche, wobei jeder der Seitenwandabschnitte (6) durch zwei abgerundete seitliche Kantenbereiche (7) begrenzt ist, die nach außen konvex sind.

10. Packung nach einem der Ansprüche 1 bis 8, wobei jeder der Seitenwandabschnitte (6) durch zwei gerade seitliche Kantenbereiche (7) begrenzt ist.

11. Folienverpackungsmaterial (M, M') zur Herstellung einer versiegelten Packung (1, 1'), die ein gießfähiges Nahrungsmittelprodukt enthält, wobei das Verpackungsmaterial (M, M') eine rechteckige oder quadratische Konfiguration mit zwei Randkanten (22) parallel zu einer Längsrichtung (A) und zwei anderen Randkanten (23, 24) parallel zu einer Querrichtung (B) orthogonal zu der Längsrichtung (A) hat; wobei das Verpackungsmaterial (M, M') mindestens eine untere Querknicklinie (25) und eine obere Querknicklinie (26) umfasst, die sich quer zu der Längsrichtung (A) erstrecken und das Verpackungsmaterial (M, M') in Folgendes unterteilen:

- einen unteren Bereich (27), der ein unteres Knicklinienmuster (28) enthält und zum Bilden eines unteren Abschnitts (3) der Packung (1, 1') ausgestaltet ist;
- einen oberen Bereich (29), der ein oberes Knicklinienmuster (30) enthält und zum Bilden eines oberen Abschnitts (4) der Packung (1, 1') ausgestaltet ist; und
- einen Zwischenbereich (31), der zwischen der unteren Querknicklinie (25) und der oberen Querknicklinie (26) enthalten ist, zwischen dem unteren Bereich (27) und dem oberen Bereich (29) liegt und dazu ausgelegt ist, einen Hauptabschnitt (5) der Packung (1, 1') zu bilden, der eine Vielzahl von Seitenwandabschnitten (6) hat;

wobei die untere Querknicklinie (25) und die obere Querknicklinie (26) dazu ausgestaltet sind, eine untere Umfangskontur (8) und eine obere Umfangskontur (9) der Packung (1, 1') zu definieren, die den unteren Ab-

schnitt (3) und den oberen Abschnitt (4) jeweils von dem Hauptabschnitt (5) abteilen;
wobei sich die untere Querknicklinie (25) parallel zu der Querrichtung (B) erstreckt und einen unteren mittleren Abschnitt (25a), der dazu ausgelegt ist, eine untere Vorderkante (8a) der Packung (1, 1') zu definieren, und zwei untere Seitenabschnitte (25c) aufweist, die sich an gegenüberliegenden Seiten des unteren mittleren Abschnitts (25a) erstrecken und dazu ausgelegt sind, jeweilige untere Seitenkanten (8c) der Packung (1, 1') zu definieren;
wobei die obere Querknicklinie (26) einen oberen mittleren Abschnitt (26a), der dazu ausgelegt ist, eine obere Vorderkante (9a) der Packung (1, 1') zu definieren, und zwei obere Seitenabschnitte (26c) aufweist, die sich an gegenüberliegenden Seiten des oberen mittleren Abschnitts (26a) erstrecken und dazu ausgelegt sind, jeweilige obere Seitenkanten (9c) der Packung (1, 1') zu definieren;
wobei das untere Knicklinienmuster (28) dazu ausgestaltet ist, ein vierseitiges unteres Feld (10) der Packung (1, 1') zu definieren, und das obere Knicklinienmuster (30) dazu ausgestaltet ist, ein vierseitiges oberes Feld (14) der Packung (1, 1') zu definieren;
wobei die oberen Seitenabschnitte (26c) der oberen Querknicklinie (26) bezüglich sowohl der Längsrichtung (A) als auch der Querrichtung (B) schräg sind und zu dem oberen mittleren Abschnitt (26a) hin konvergieren, **dadurch gekennzeichnet, dass**
die Länge des oberen mittleren Abschnitts (26a) der oberen Querknicklinie (26) von der Länge des unteren mittleren Abschnitts (25a) der unteren Querknicklinie (25) verschieden ist.

12. Verpackungsmaterial nach Anspruch 11, wobei die Länge jedes der unteren Seitenabschnitte (25c) der unteren Querknicklinie (25) von der Länge der parallel zu der Längsrichtung (A) verlaufenden Projizierung (R) jedes der oberen Seitenabschnitte (26c) der oberen Querknicklinie (26) auf eine Bezugslinie (S) verschieden ist, die parallel zu der unteren Querknicklinie (25) verläuft und mindestens den oberen mittleren Abschnitt (26a) enthält.

13. Verpackungsmaterial nach Anspruch 12, wobei die Länge jedes der unteren Seitenabschnitte (25c) kleiner als die Länge der entsprechenden Projizierung (R) ist.

14. Verpackungsmaterial nach einem der Ansprüche 11 bis 13, wobei die Länge des unteren mittleren Abschnitts (25a) der unteren Querknicklinie (25) größer als die Länge des oberen mittleren Abschnitts (26a) der oberen Querknicklinie (26) ist.

15. Verpackungsmaterial nach einem der Ansprüche 11 bis 14, ferner umfassend eine Vielzahl von Längsknicklinien (50), die sich zwischen der unteren Querknicklinie (25) und der oberen Querknicklinie (26) erstrecken und dazu ausgestaltet sind, jeweilige seitliche Kantenbereiche (7) der Seitenwandabschnitte (6) der Packung (1') zu definieren.

16. Verpackungsmaterial nach Anspruch 15, wobei die Längsknicklinien (50) bezüglich der Längsrichtung (A) leicht geneigt sind.

Revendications

1. Emballage scellé (1, 1') contenant un produit alimentaire versable et comprenant une partie inférieure (3), une partie supérieure (4) et une partie principale (5) interposée entre ladite partie inférieure (3) et ladite partie supérieure (4) et comprenant une pluralité de parties paroi latérale (6) ;

ladite partie principale (5) étant séparée de ladite partie inférieure (3) et de ladite partie supérieure (4) respectivement par un contour périphérique inférieur (8) et un contour périphérique supérieur (9), chacun ayant une configuration sans fin et s'étendant transversalement par rapport à une direction longitudinale (A), le long de laquelle la hauteur totale de l'emballage (1, 1') est définie ;
chacun dudit contour périphérique inférieur (8) et dudit contour périphérique supérieur (9) ayant une forme de ligne brisée et étant formé par une pluralité de bords de contour (8a, 8b, 8c ; 9a, 9b, 9c) reliés entre eux ; ladite partie inférieure (3) comprenant un panneau inférieur quadrilatéral (10) délimité par ledit contour périphérique inférieur (8) et s'étendant orthogonalement à ladite direction longitudinale (A) ; et
ladite partie supérieure (4) comprenant un panneau supérieur quadrilatéral (14) délimité par ledit contour périphérique supérieur (9) et s'étendant transversalement à ladite direction longitudinale (A) ;
ledit panneau supérieur (14) étant incliné par rapport audit panneau inférieur (10), audit plan de référence (P) et à ladite direction longitudinale (A) ;
caractérisé en ce que
la surface du panneau inférieur (10) est différente de la surface d'un quadrilatère supérieur

(Q) obtenu en projetant, selon ladite direction longitudinale (A), ledit panneau supérieur (14) sur un plan de référence (P) parallèle audit panneau inférieur (10), traversant l'emballage (1, 1') et contenant au moins un (9a) des bords de contour (9a, 9b, 9c) dudit contour périphérique supérieur (9).

2. Emballage selon la revendication 1, ledit plan de référence (P) contenant au moins un bord avant supérieur (9a) des bords de contour (9a, 9b, 9c) dudit contour périphérique supérieur (9).

3. Emballage selon la revendication 1 ou 2, la surface dudit panneau inférieur (10) étant inférieure à la surface dudit quadrilatère supérieur (Q).

4. Emballage selon l'une quelconque des revendications précédentes, lesdits bords de contour dudit contour périphérique inférieur (8) comprenant un bord avant inférieur (8a), un bord arrière inférieur (8b) et deux bords latéraux inférieurs (8c) et ledit quadrilatère supérieur (Q) comprenant un segment avant supérieur (Q1), correspondant audit bord avant inférieur (8a), un segment arrière supérieur (Q2), correspondant audit bord arrière inférieur (8b), et deux segments latéraux supérieurs (Q3), correspondant respectivement auxdits bords latéraux inférieurs (8c).

5. Emballage selon la revendication 4, lesdits bords latéraux inférieurs (8c) ayant la même longueur et lesdits segments latéraux supérieurs (Q3) ayant la même longueur ; et la longueur desdits bords latéraux inférieurs (8c) étant différente de la longueur desdits segments latéraux supérieurs (Q3).

6. Emballage selon la revendication 5, ladite longueur desdits bords latéraux inférieurs (8c) étant inférieure à ladite longueur desdits segments latéraux supérieurs (Q3).

7. Emballage selon l'une quelconque des revendications 4 à 6, ledit bord avant inférieur (8a) et ledit bord arrière inférieur (8b) ayant la même longueur et ledit segment avant supérieur (Q1) et ledit segment arrière supérieur (Q2) ayant la même longueur ; et la longueur dudit bord avant inférieur (8a) et dudit bord arrière inférieur (8b) étant différente de la longueur dudit segment avant supérieur (Q1) et dudit segment arrière supérieur (Q2).

8. Emballage selon la revendication 7, ladite longueur dudit bord avant inférieur (8a) et dudit bord arrière inférieur (8b) étant supérieure à ladite longueur dudit segment avant supérieur (Q1) et dudit segment arrière supérieur (Q2).

9. Emballage selon l'une quelconque des revendications précédentes, chacune desdites parties paroi latérale (6) étant délimitée par deux zones de bord latérales arrondies (7) convexes vers l'extérieur.

10. Emballage selon l'une quelconque des revendications 1 à 8, chacune desdites parties paroi latérale (6) étant délimitée par deux zones de bord latérales droites (7).

11. Matériau d'emballage en feuille (M, M') pour la production d'un emballage scellé (1, 1') contenant un produit alimentaire versable, ledit matériau d'emballage (M, M') ayant une configuration rectangulaire ou carrée avec deux bords de délimitation (22) parallèles à une direction longitudinale (A) et deux autres bords de délimitation (23, 24) parallèles à une direction transversale (B) orthogonale à ladite direction longitudinale (A) ; ledit matériau d'emballage (M, M') comprenant au moins une ligne de pliage transversale inférieure (25) et une ligne de pliage transversale supérieure (26) s'étendant transversalement à ladite direction longitudinale (A) et divisant le matériau d'emballage (M, M') en :

- une région inférieure (27) contenant un motif de pliage inférieur (28) et conçue pour former une partie inférieure (3) dudit emballage (1, 1') ;
- une région supérieure (29) contenant un motif de pliage supérieur (30) et conçue pour former une partie supérieure (4) dudit emballage (1, 1') ; et
- une région intermédiaire (31) contenue entre ladite ligne de pliage transversale inférieure (25) et ladite ligne de pliage transversale supérieure (26), interposée entre ladite région inférieure (27) et ladite région supérieure (29) et conçue pour former une partie principale (5) dudit emballage (1, 1') ayant une pluralité de parties paroi latérale (6) ;

ladite ligne de pliage transversale inférieure (25) et ladite ligne de pliage transversale supérieure (26) étant conçues pour définir un contour périphérique inférieur (8) et un contour périphérique supérieur (9) dudit emballage (1, 1') divisant respectivement ladite partie inférieure (3) et ladite partie supérieure (4) de ladite partie principale (5) ; ladite ligne de pliage transversale inférieure (25) s'étendant parallèlement à ladite direction transversale (B) et comprenant une partie centrale inférieure (25a), conçue pour définir un bord avant inférieur (8a) dudit emballage (1, 1'), et deux parties latérales inférieures (25c), s'étendant sur des côtés opposés de ladite partie centrale inférieure (25a) et conçues pour définir des

bords latéraux inférieurs (8c) respectifs dudit emballage (1, 1') ;
ladite ligne de pliage transversale supérieure (26) comprenant une partie centrale supérieure (26a), conçue pour définir un bord avant supérieur (9a) dudit emballage (1, 1'), et deux parties latérales supérieures (26c), s'étendant sur des côtés opposés de ladite partie centrale supérieure (26a) et conçues pour définir des bords latéraux supérieurs (9c) respectifs dudit emballage (1, 1') ;
ledit motif de pliage inférieur (28) étant conçu pour définir un panneau inférieur quadrilatéral (10) dudit emballage (1, 1') et ledit motif de pliage supérieur (30) étant conçu pour définir un panneau supérieur quadrilatéral (14) dudit emballage (1, 1') ;
lesdites parties latérales supérieures (26c) de ladite ligne de pliage transversale supérieure (26) étant inclinées par rapport à ladite direction longitudinale (A) et à ladite direction transversale (B) et convergeant vers ladite partie centrale supérieure (26a) **caractérisé en ce que**
la longueur de ladite partie centrale supérieure (26a) de ladite ligne de pliage transversale supérieure (26) est différente de la longueur de ladite partie centrale inférieure (25a) de ladite ligne de pliage transversale inférieure (25).

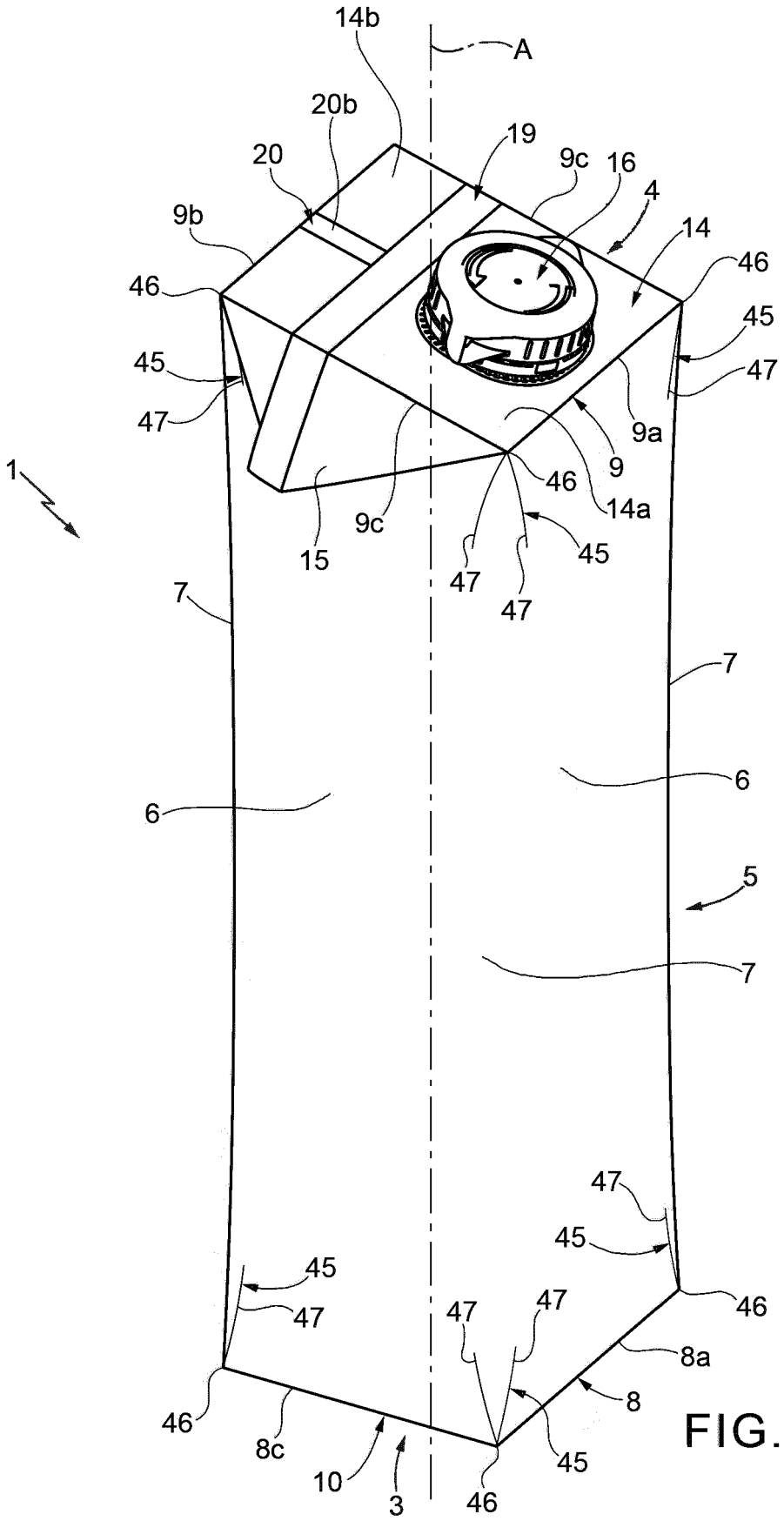
12. Matériau d'emballage selon la revendication 11, la longueur de chacune desdites parties latérales inférieures (25c) de ladite ligne de pliage transversale inférieure (25) étant différente de la longueur de la saillie (R), parallèle à ladite direction longitudinale (A), de chacune desdites parties latérales supérieures (26c) de ladite ligne de pliage transversale supérieure (26) sur une ligne de référence (S) parallèle à ladite ligne de pliage transversale inférieure (25) et contenant au moins ladite partie centrale supérieure (26a).

13. Matériau d'emballage selon la revendication 12, ladite longueur de chacune desdites parties latérales inférieures (25c) étant inférieure à ladite longueur de ladite saillie (R) correspondante.

14. Matériau d'emballage selon l'une quelconque des revendications 11 à 13, ladite longueur de ladite partie centrale inférieure (25a) de ladite ligne de pliage transversale inférieure (25) étant supérieure à ladite longueur de ladite partie centrale supérieure (26a) de ladite ligne de pliage transversale supérieure (26).

15. Matériau d'emballage selon l'une quelconque des revendications 11 à 14, comprenant en outre une pluralité de lignes de pliage longitudinales (50) s'étendant entre ladite ligne de pliage transversale inférieure (25) et ladite ligne de pliage transversale supérieure (26) et conçues pour définir des zones de bord latérales (7) respectives des parties paroi latérale (6) dudit emballage (1').

16. Matériau d'emballage selon la revendication 15, lesdites lignes de pliage longitudinales (50) étant légèrement inclinées par rapport à ladite direction longitudinale (A).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19
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9b
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46
46
45
45
47
47
9a
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14a
9c
15
45
47
47
7
7
6
6
5
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47
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45
47
47
47
46
8a
8
46
8c
45
10
3
46

FIG. 1

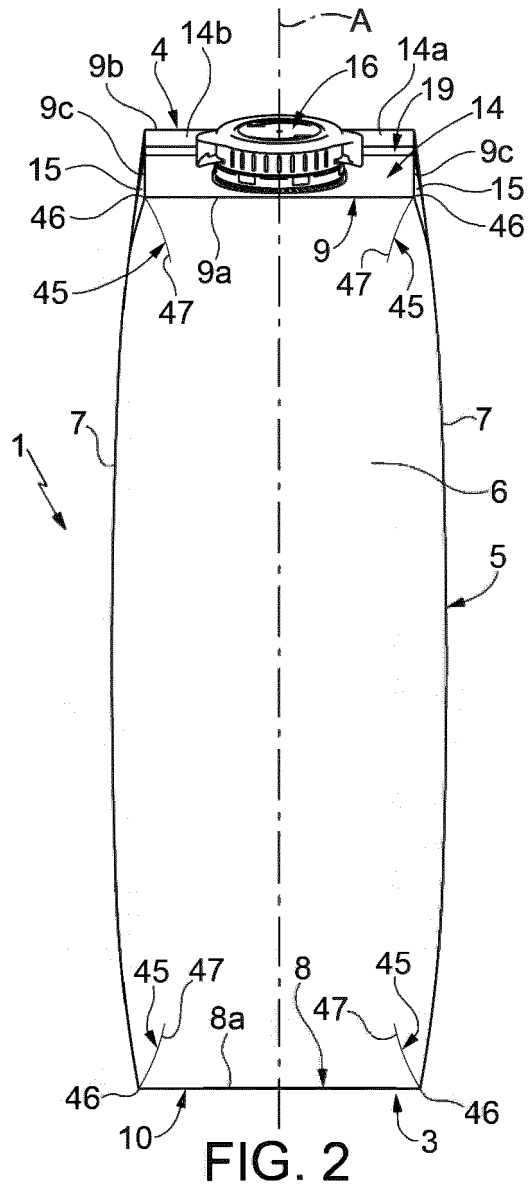


FIG. 2

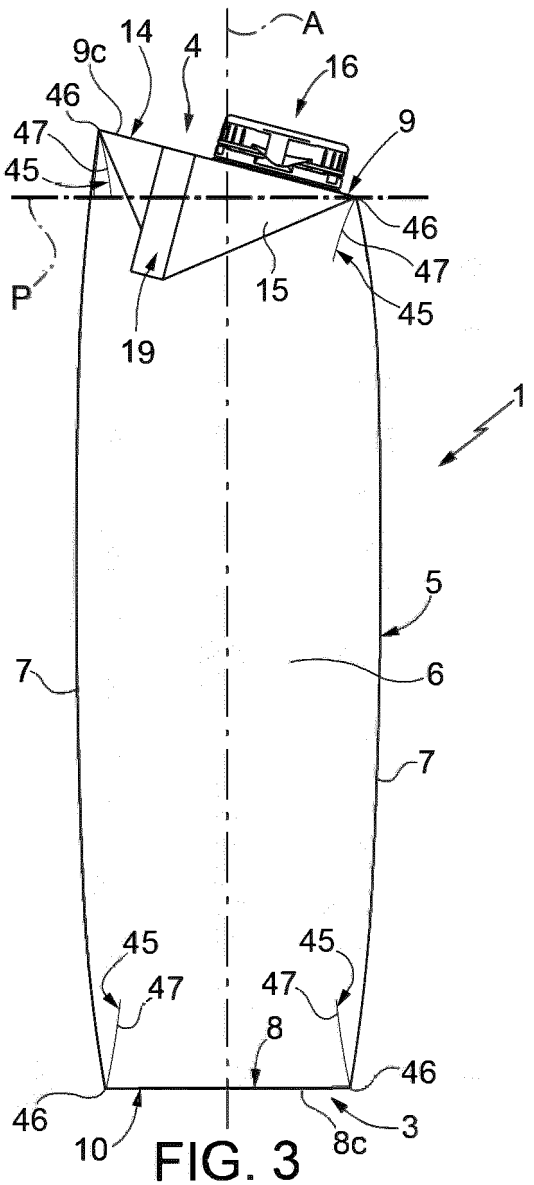
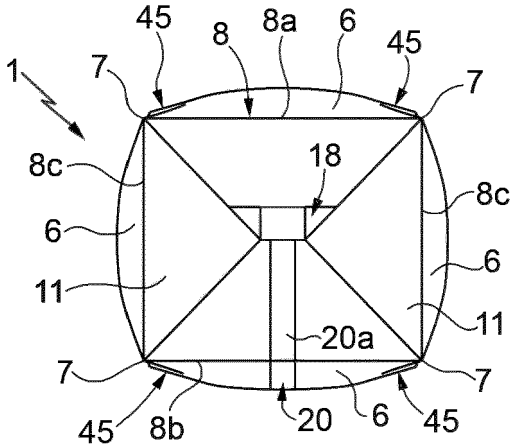


FIG. 3



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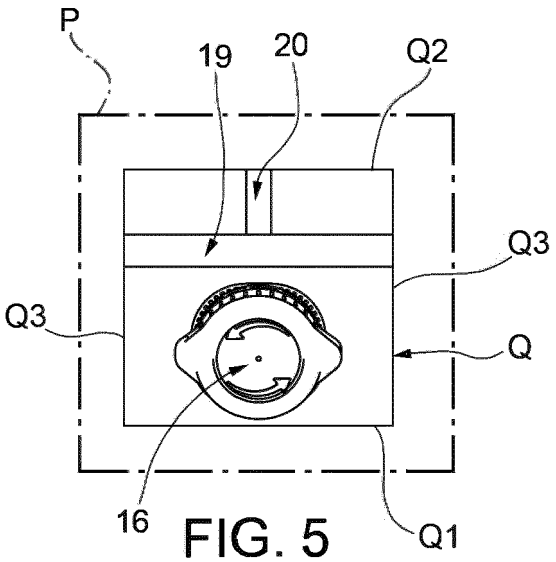
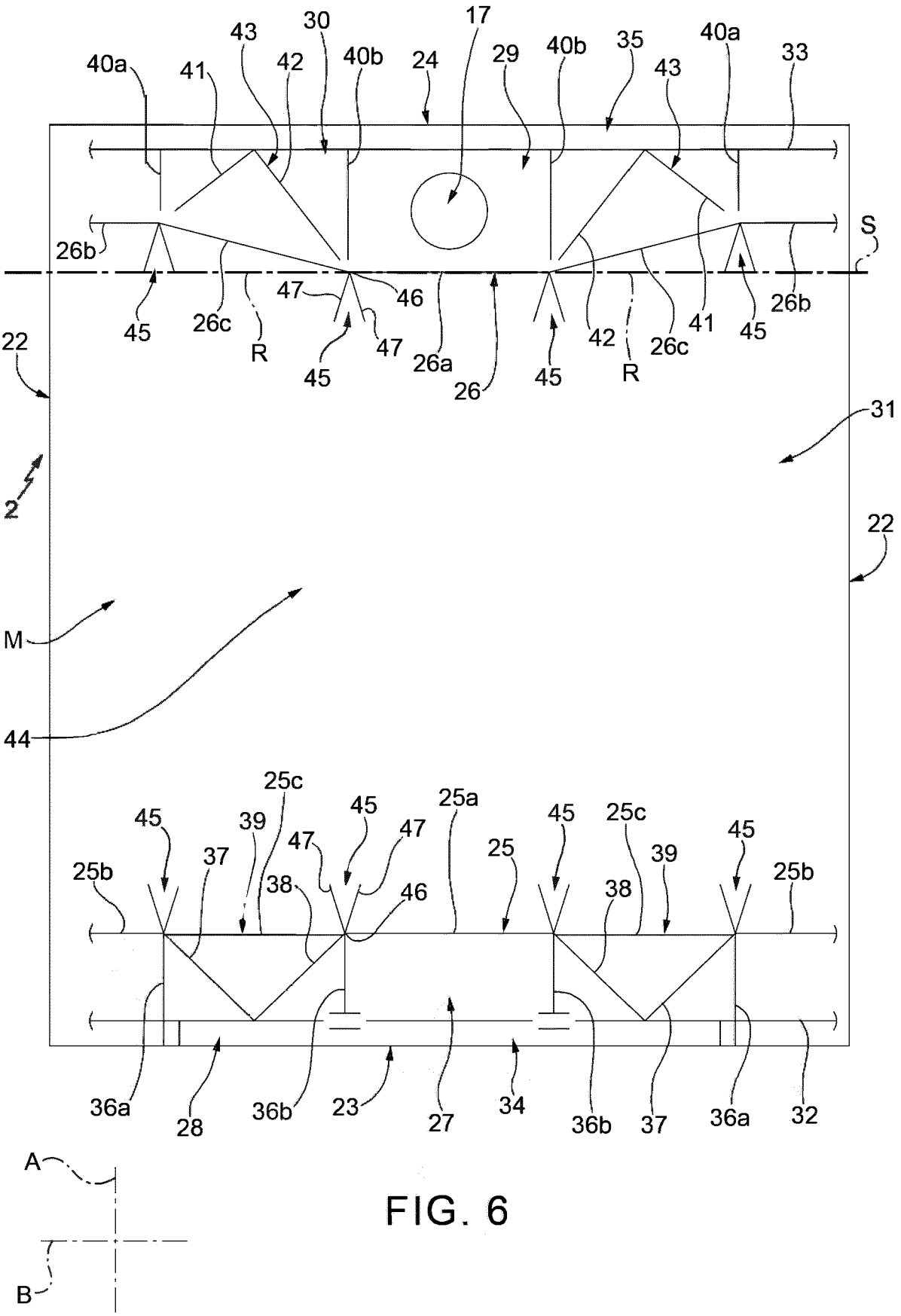


FIG. 5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45
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26a
26
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42
R
26c
41
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26b
22
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2
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M
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25c
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25b
37
38
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A
B

FIG. 6

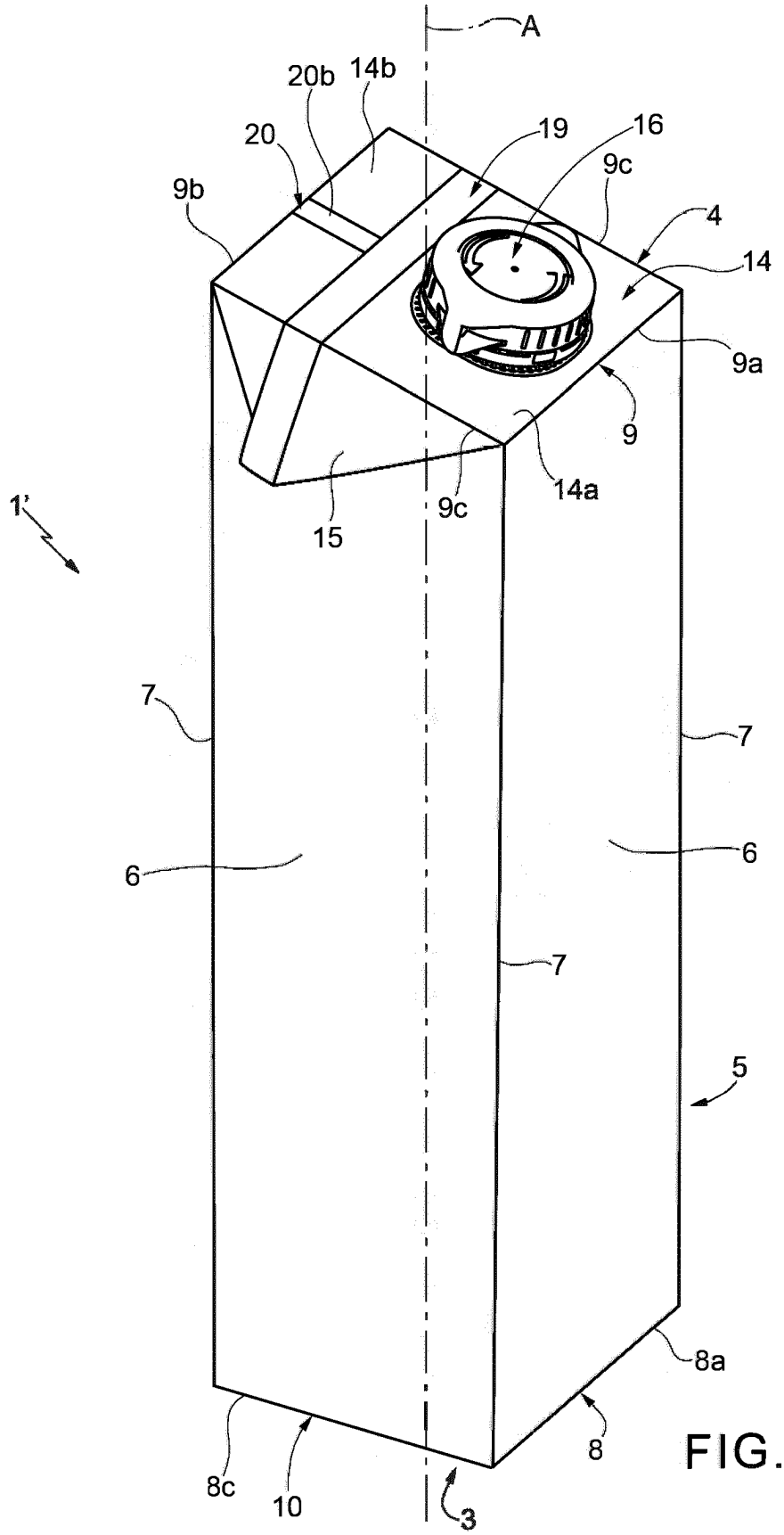
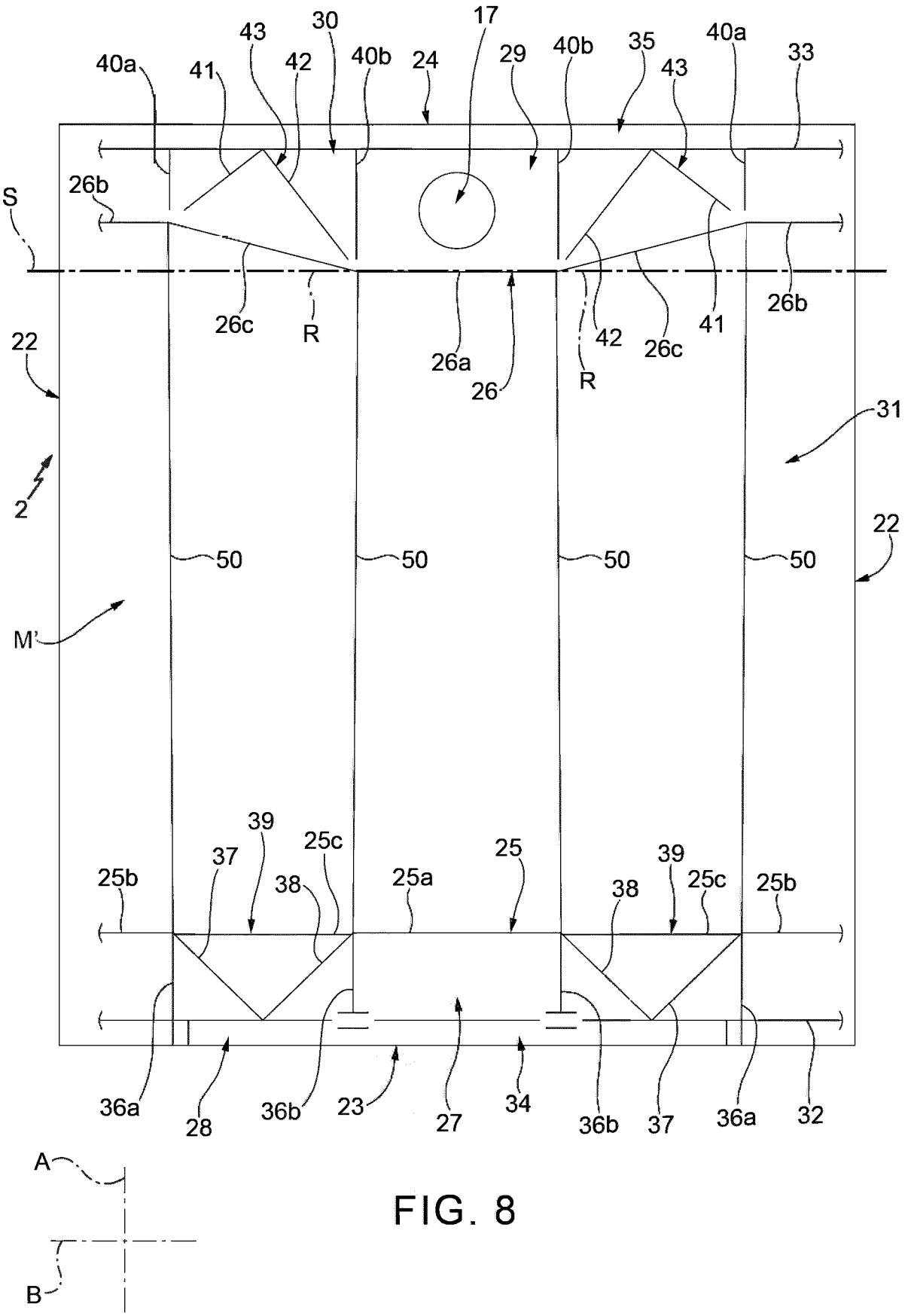


FIG. 7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26
R
42
26c
41
26b
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31
2
22
50
50
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50
M'
39
37
25c
25
39
25c
25b
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36b
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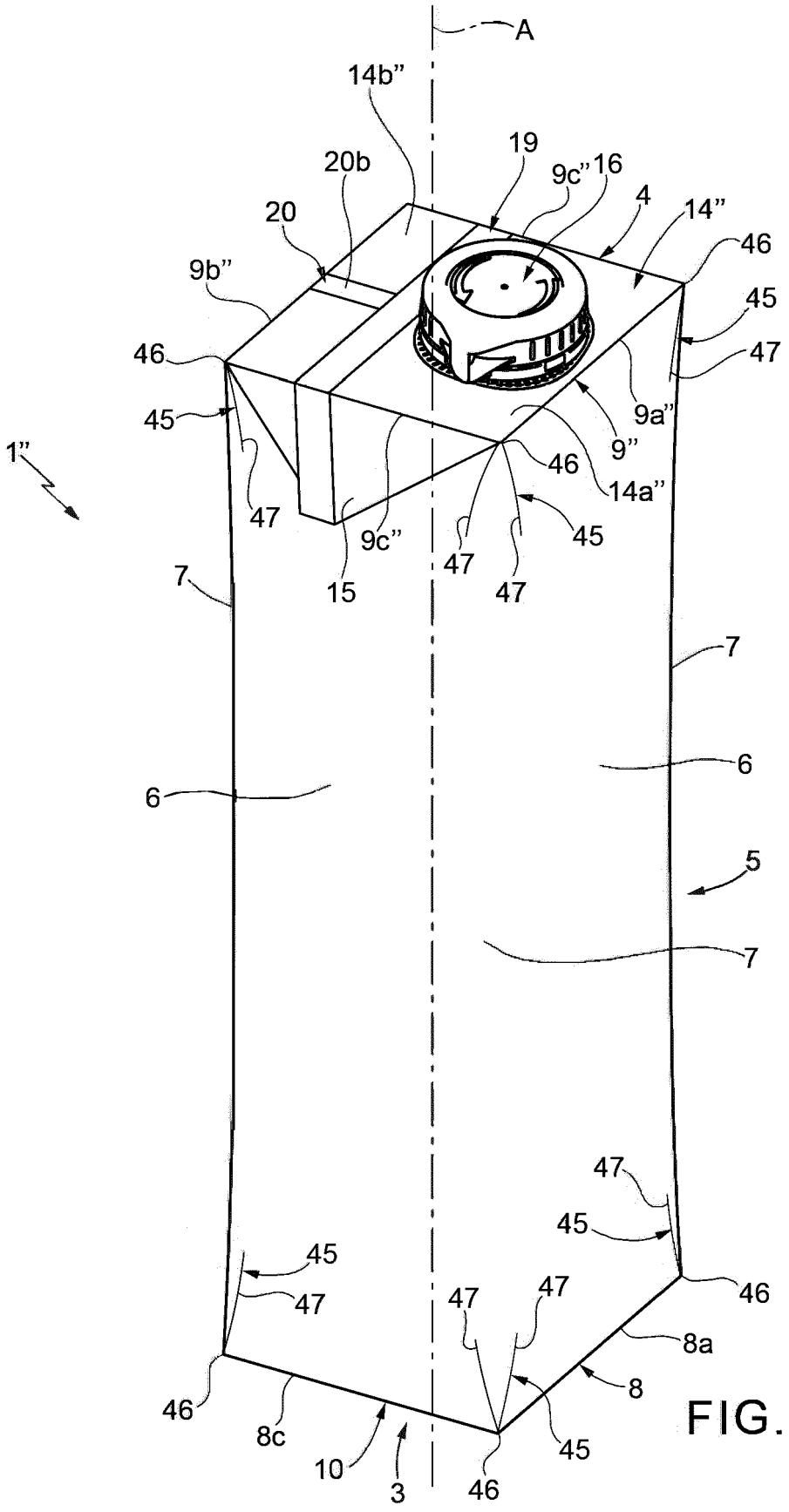
36a
32
A
B

FIG. 8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9c"
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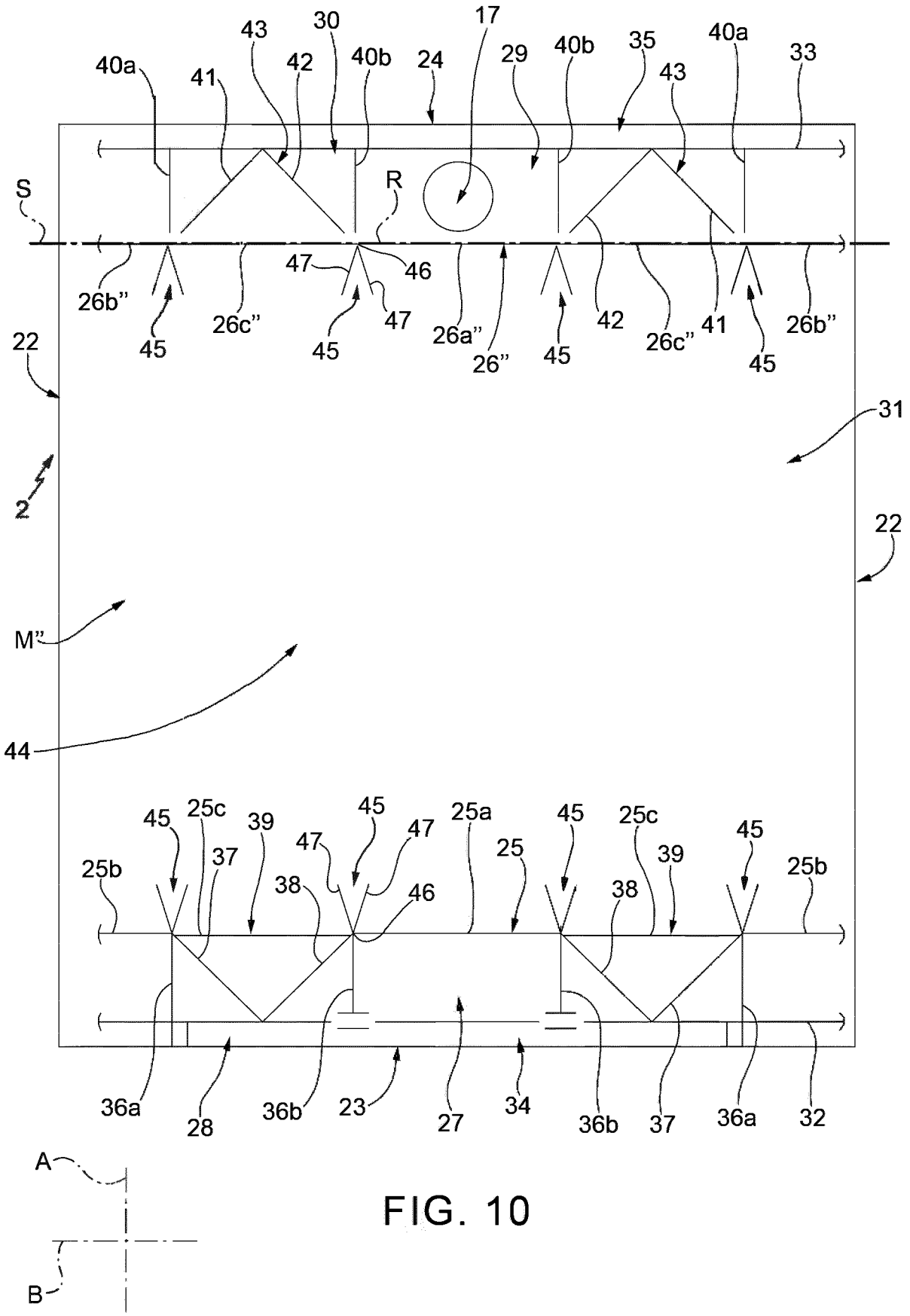
FIG. 9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26a"
26"
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26c"
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FIG. 10

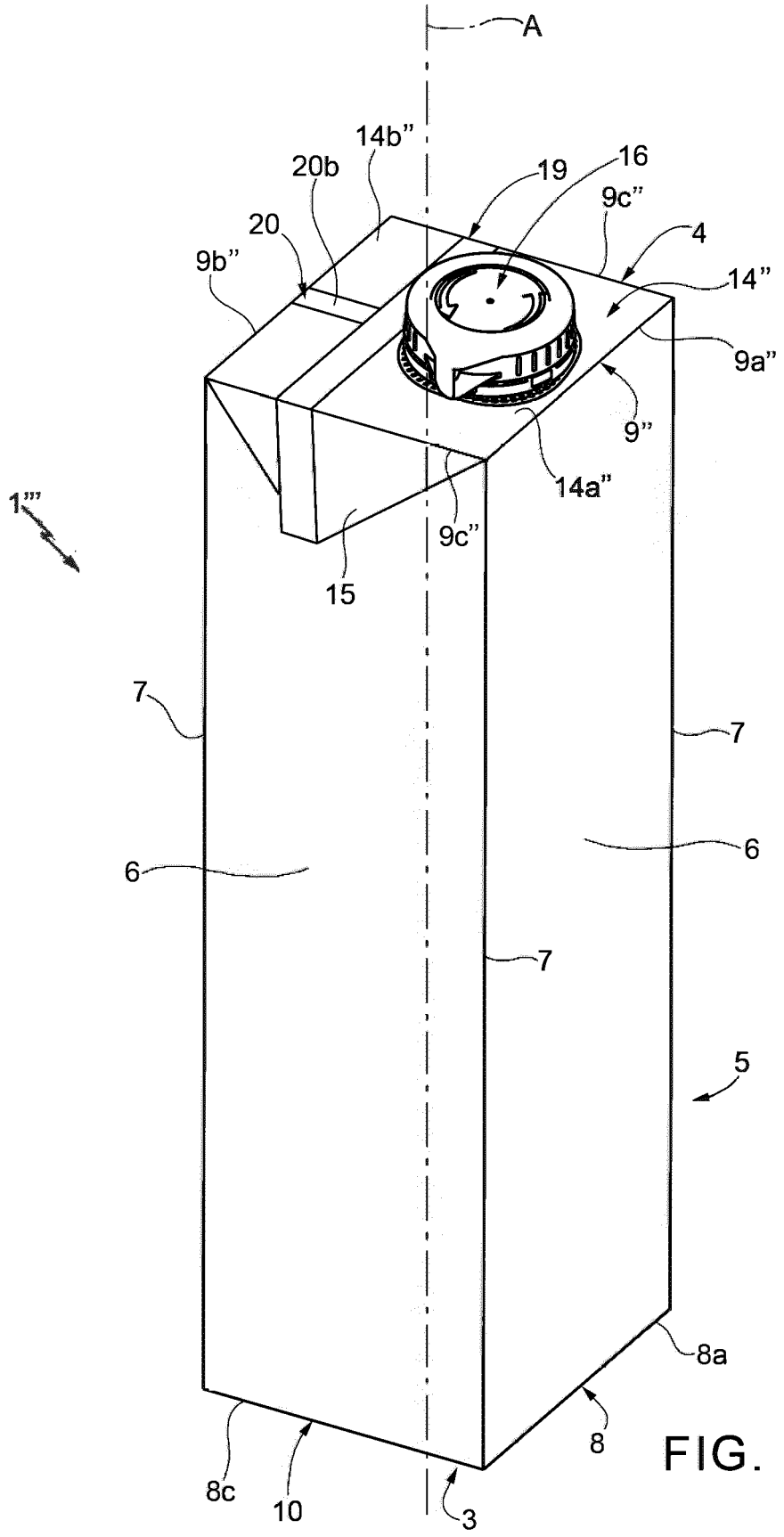
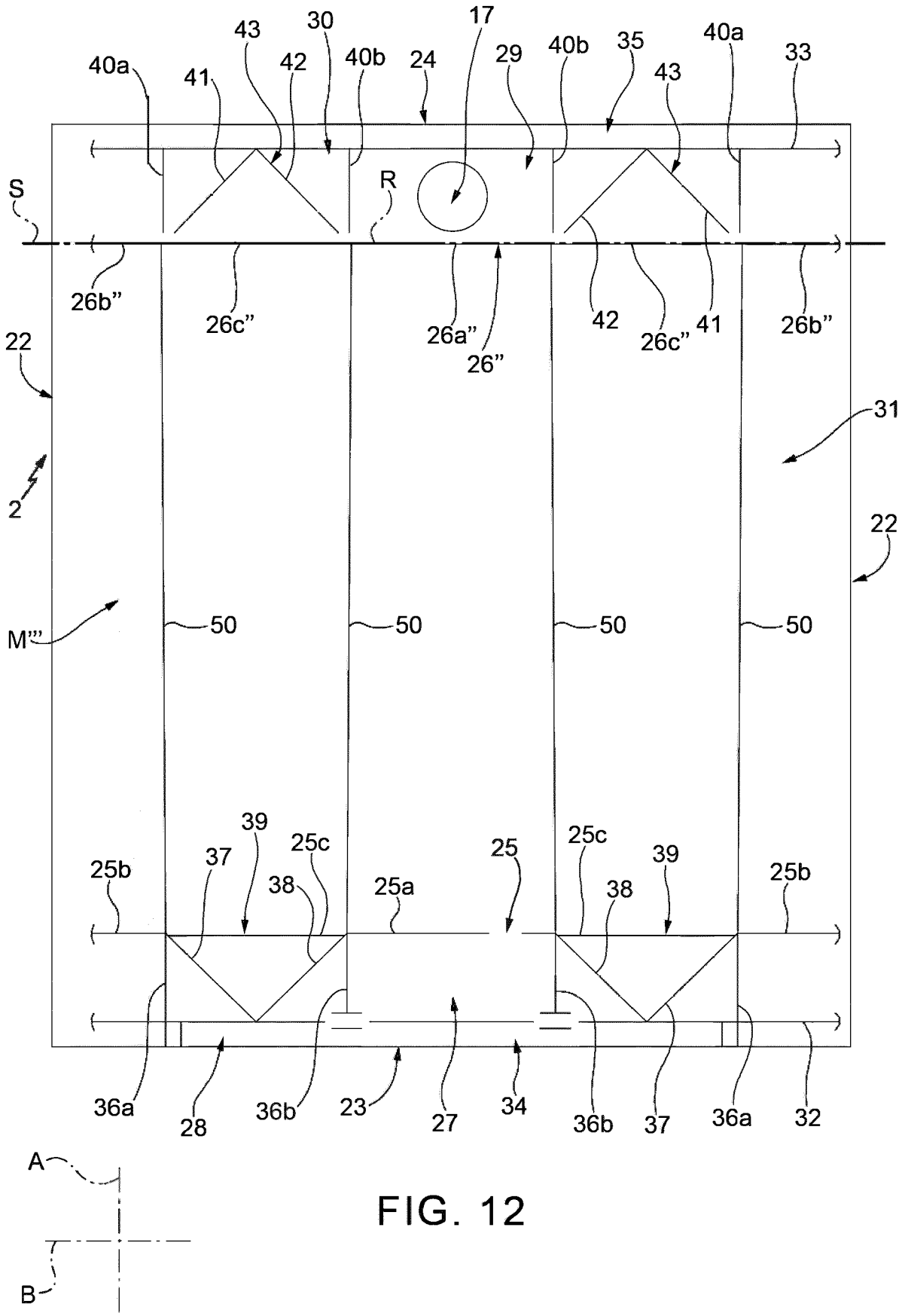


FIG. 11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25b
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36b
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36b
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36a
32
A
B

FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2650222 A **[0022]**
- WO 2017001162 A **[0023]**
- EP 2392517 A1 **[0024]**