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(54) **PACKAGE FOR POURABLE PRODUCT, BLANK AND METHOD FOR MANUFACTURING SAID PACKAGE**

(57) Package (10) for pourable product, comprising a front wall (12), an opposing rear wall (13), a first (14) and a second (15) lateral wall interposed between them on respective opposing sides, a lower wall (16) and an opposing upper wall (17) essentially in contact with respective upper edges of the front (12) and rear (13) walls and inclined both with respect to the latter and also with respect to the lower wall (16).

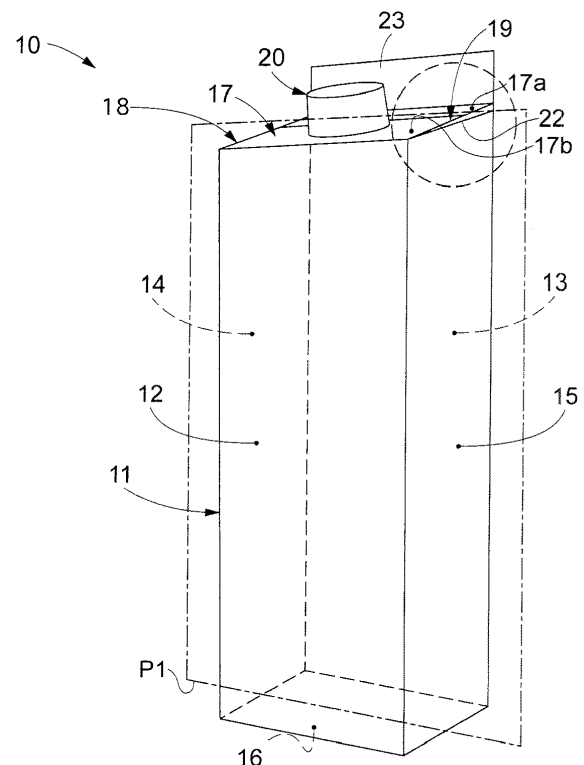


fig. 1

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a package for a pourable product, in particular a food product such as fruit juice, milk, wine, tomato sauce, water, but also flour, starch, breadcrumbs, sugar, salt and so on, or a pourable product for home care such as detergents, for personal care or cosmetic such as shampoo or soap, or other pourable products. The present invention also concerns the corresponding method for manufacturing the package.

BACKGROUND OF THE INVENTION

[0002] Packages for pourable products, for example liquid, granular or powdered, are known, which typically have a parallelepiped, truncated pyramid or similar shape, surmounted by an upper portion to which generally re-closable opening means can be applied.

[0003] These packages are generally manufactured starting from a flat sheet of multilayer material, for example a layer of cardboard coated on both sides with a sheet of heat-sealable plastic material, such as polyethylene. The sheet of multilayer material is suitably shaped and subjected to creasing in order to obtain folding lines useful for folding and forming the package. The result of these operations is known as a blank.

[0004] The manufacturing of the package also provides suitable welds, which can be obtained by overlapping certain flaps or portions of the blank, welding them together by heat or by ultrasound. These types of welds are effective and reliable for welding together up to four overlapping flaps, or five overlapping flaps in the event that one of the five flaps engages only a small portion of the weld, possibly already being involved in a previous weld, such as a longitudinal weld of the package.

[0005] The upper portion of the package can be variously conformed: flat upper portions are known, essentially consisting of a single wall coinciding with an upper transverse face of the parallelepiped or truncated pyramid or suchlike, which delimits the package at the top.

[0006] Gable top upper portions are also known, in which upper walls of the package combine to form a gable-shaped or pointed "roof".

[0007] Other shapes for the upper portion are also known, able to achieve functional and/or aesthetic improvements of the package. For example, US 6,182,887 discloses an asymmetrical upper portion, with an upper wall having a larger surface than the walls of symmetrical alternatives, which can therefore offer more space for the opening means, making it easier to pour the pourable product.

[0008] However, manufacturing particularly functional forms of upper portions may require welding together an excessive number of overlapping flaps of multilayer ma-

terial.

[0009] There is therefore the need to perfect a package for pourable product that can overcome at least one of the disadvantages of the state of the art. To do this, it is necessary to solve the technical problem of providing a functional package without having to weld together an excessive number of overlapping flaps of multilayer material.

[0010] In particular, one purpose of the present invention is to provide a package for pourable product and perfect a corresponding manufacturing method which does not require welding together an excessive number of overlapping flaps of multilayer material.

[0011] Another purpose of the present invention is to provide a package for pourable product that allows to easily pour the pourable product contained therein.

[0012] Another purpose of the present invention is to provide a package for pourable product which has a stable structure, without excessive internal tensions and therefore not subject to breakages or tears during forming.

[0013] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0014] The present invention is set forth and characterized in the independent claims. The dependent claims describe other characteristics of the present invention or variants to the main inventive idea.

[0015] In accordance with the above purposes and to resolve the technical problem disclosed above in a new and original way, also achieving considerable advantages compared to the state of the prior art, a package for pourable product according to the present invention comprises a front wall, an opposing rear wall and a first and a second lateral wall interposed between them.

[0016] The package also comprises a lower wall and an opposing upper wall essentially in contact on its opposing sides with respective upper edges of the front and rear walls. This upper wall is inclined with respect to all the other walls.

[0017] The package also comprises an upper fin protruding in correspondence with matching upper ends of the upper and rear walls.

[0018] The package is asymmetrical with respect to a plane which is perpendicular to the lower wall and passing through the midpoints of the edges shared by the latter and each of the lateral walls.

[0019] The upper wall is provided with a first and an opposing second lateral edge, respectively in correspondence with respective first and second upper edge of the first and second lateral wall.

[0020] In accordance with one aspect of the present invention, the package comprises connection means having consecutive folded and overlapping flaps which

are configured to connect the upper fin with the rear wall. These connection means are disposed under the upper wall, between the first and second upper edge and respective first and second minor edge portions of the lateral edges which end essentially where the upper ends of the upper and rear walls match.

[0021] Advantageously, the connection means having consecutive folded and overlapping flaps are able to provide welding surfaces required to create the upper wall and the upper fin.

[0022] The present invention also concerns a planar blank for forming a package for pourable product.

[0023] In accordance with another aspect of the present invention, the blank comprises a front panel and a first and second lateral panel, essentially in the shape of a rectangular trapezoid, which are adjacent to the front panel on opposite sides thereof.

[0024] The blank also comprises a rear panel, adjacent to the first lateral panel on a side thereof opposite the front panel and provided with a first, a second and a third rear welding portion and with a rear folding portion interposed between the second and third rear welding portion.

[0025] Moreover, the blank comprises an upper panel, adjacent to the front panel and provided with a first and a second front welding portion.

[0026] The blank also includes a first and a second upper triangular flap in the shape of a rectangular triangle, with the hypotenuse coinciding with an oblique side of the first or of the second lateral panel, respectively.

[0027] Moreover, the blank comprises a first and a second major upper lateral flap essentially in the shape of a rectangular triangle, each having a first cathetus coinciding with one side of the upper panel and the hypotenuse coinciding with a first cathetus of the first or second upper triangular flap, respectively.

[0028] The blank also includes a first and a second minor upper lateral flap essentially in the shape of a rectangular triangle, respectively opposite the first or second major upper lateral flap and with the hypotenuse coinciding with a second cathetus of the first or second upper triangular flap, respectively.

[0029] The blank also comprises a rear longitudinal flap, adjacent to the second lateral panel on a side thereof opposite the front panel.

[0030] Furthermore, the blank includes two first and two second lateral welding flaps, essentially rectangular in shape, respectively adjacent to the first major and minor upper lateral flaps and the second major and minor upper lateral flaps on sides opposite the first and second lateral panel.

[0031] The two first lateral welding flaps are adjacent to each other and axially symmetrical with respect to their common side. In addition, the two first lateral welding flaps are in contact, on sides opposite their common side, with the second rear and front welding portion, respectively. The two second lateral welding flaps are adjacent to each other and axially symmetrical with respect to their common side. In addition, the two second lateral welding

flaps are in contact, on sides opposite their common side, with the rear longitudinal flap and with the second front welding portion, respectively.

[0032] The present invention also concerns a method for manufacturing a package for pourable product.

[0033] In accordance with another aspect of the present invention, the method comprises forming, welding and sealing steps in which the package is formed by means of sequential folding and welding of panels of a blank as described above.

[0034] Moreover, the method comprises an upper welding step which provides to fold, in correspondence with a rear folding portion of the blank, a temporary upper fin, formed by first and second lateral welding flaps and first and second front and rear welding portions of the blank which are overlapping and welded, on a third rear welding portion of the blank.

[0035] Advantageously, this allows to distribute the tensions caused by creating the fold described above on the entire rear folding portion, rather than on a single line.

[0036] This folding operation is carried out in such a way as to essentially overlap, match and weld together the second rear welding portion with the third rear welding portion, thus forming an upper wall, an upper fin and connection means having consecutive folded and overlapping flaps disposed under the upper wall which connect the upper fin with a rear wall of the package.

[0037] In accordance with another aspect of the present invention, the method comprises, in the upper welding step, defining and forming the temporary upper fin by overlapping and essentially matching first lateral welding flaps of the blank and, in correspondence with an opposite side, second lateral welding flaps of the blank.

[0038] Simultaneously, the method provides to overlap and essentially match first front and rear welding portions of the blank, as well as second front and rear welding portions of the blank.

[0039] The second welding portions thus result overlapping with, and external to, the lateral welding flaps.

[0040] Moreover, the first lateral welding flaps are configured to come into contact, without overlapping with, with the second lateral welding flaps at least in correspondence with respective first and second peak vertices.

[0041] In this way, advantageously, it is not necessary to weld together an excessive number of overlapping layers of material.

DESCRIPTION OF THE DRAWINGS

[0042] These and other aspects, characteristics and advantages of the present invention will become apparent from the following description of some embodiments, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a first perspective view, schematic and not to

scale, of a package for pourable product according to the present invention;

- fig. 1a is an enlarged detail of fig. 1;
- figs. 2-4 are perspective views, schematic and not to scale, of alternative embodiments of the package for pourable product according to the present invention;
- fig. 5 is a top view of a blank according to the present invention;
- figs. 6-9 are schematic and not to scale representations of a step of a manufacturing sequence of the package of fig. 1; in particular, fig. 6 is a perspective view of the package of fig. 1 at the beginning of a sub-step of upper forming; fig. 7 is a perspective view of an upper and rear portion of the package of fig. 1 at the end of the sub-step of upper forming; fig. 8 is a front view of the package portion of fig. 7; fig. 9 is a lateral view of the package of fig. 1 at the end of its manufacturing sequence.

[0043] We must clarify that the phraseology and terminology used in the present description, as well as the figures in the attached drawings also in relation as to how described, have the sole function of better illustrating and explaining the present invention, their purpose being to provide a non-limiting example of the invention itself, since the scope of protection is defined by the claims.

[0044] To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings. It is understood that elements and characteristics of one embodiment can be conveniently combined or incorporated into other embodiments without further clarifications.

DESCRIPTION OF SOME EMBODIMENTS

[0045] With reference to fig. 1, a package 10 for a pourable product according to possible embodiments comprises a plurality of walls that delimit and define a containing body 11 able to contain a pourable product, for example a liquid food product such as fruit juice, milk, wine, tomato sauce, water or suchlike, or a granular or powdered food product such as flour, starch, bread-crumbs, sugar, salt or suchlike, or a pourable product for home care such as a detergents, for personal care or cosmetic such as shampoo or soap, or other pourable products.

[0046] In particular, the package 10 comprises a front wall 12, an opposing rear wall 13, a first lateral wall 14 and a second lateral wall 15. The lateral walls 14, 15 are interposed between the front 12 and rear 13 wall, on respective opposing sides of the package 10. The front wall 12, rear wall 13, first lateral wall 14 and second lateral wall 15 delimit the containing body 11 laterally.

[0047] The package 10 also comprises a lower wall 16, which delimits the containing body 11 at the bottom.

[0048] In some embodiments, the package 10 can

comprise a lower portion essentially in the shape of a parallelepiped, in which case the lower wall 16 is perpendicular, or essentially perpendicular, to the front 12, rear 13 and lateral 14, 15 walls.

[0049] According to possible alternative embodiments, not shown in the attached drawings, the lower portion of the package 10 can be essentially in the shape of a truncated pyramid, or a truncated cone, or suchlike.

[0050] In addition, the lower portion of the package 10 can comprise lateral edges, interposed between and connecting the front 12, rear 13 and lateral 14, 15 walls, or not comprise lateral edges, comprising a lateral surface without edges, such as a cylindrical or conical lateral surface or suchlike.

[0051] In general, the package 10 can have any geometric shape suitable to delimit and define the containing body 11.

[0052] In some embodiments, the lower wall 16 is essentially square or rectangular in shape, preferably square.

[0053] According to possible embodiments, the front 12 and rear 13 wall can be essentially rectangular in shape, and the front wall 12 is shorter than the rear wall 13, in the sense that a longitudinal dimension of the front wall 12 is smaller than a longitudinal dimension of the rear wall 13.

[0054] We must clarify that in this context by the term "longitudinal" we mean longitudinal with respect to the package 10, meaning essentially perpendicular to the lower wall 16.

[0055] In possible embodiments, the lateral walls 14, 15 can have the shape of rectangular trapezoids having the minor base coinciding with a respective side of the front wall 12, the major base coinciding with a respective side of the rear wall 13 and an oblique side at the top, opposite the lower wall 16.

[0056] According to possible embodiments, the package 10 also comprises an upper wall 17, on which opening means 20 can be installed in a known manner, which can for example comprise a threaded or pressure cap, or other opening means that are preferably, but not necessarily, re-closable. The upper wall 17 delimits the containing body 11 at the top.

[0057] According to possible embodiments, the upper wall 17 can have an essentially rectangular shape and be in contact on one side thereof with an upper margin, or edge, of the front wall 12.

[0058] In addition, the upper wall 17 can essentially be in contact, or match, on a side thereof opposite the front wall 12, with an upper margin, or edge, of the rear wall 13. Consequently, the upper wall 17 is oblique, in the sense that it is inclined both with respect to the lower wall 16 and also with respect to the front 12 and rear 13 walls.

[0059] It follows that the package 10 is asymmetrical, in the sense that it is not symmetrical with respect to a plane P1 perpendicular to the lower wall 16 and passing through the midpoints of the edges shared by the latter and each lateral wall 14, 15 (figs. 1-4, 8). This configura-

tion allows to create an upper wall 17 having a considerable surface, thus advantageously offering ample space for the placement of the opening means 20. This allows both to choose relatively large opening means 20 and also to be able to place them in an optimal position for pouring the pourable product.

[0060] In some embodiments, the package 10 also comprises, in correspondence with mating upper ends of the upper 17 and rear 13 walls, an upper fin 23, obtained by suitably welding together portions of panels conformed to define the upper 17 and rear 13 walls, as explained in more detail below.

[0061] The upper fin 23 protrudes from the package 10 at the top, and a lower border, or edge, thereof substantially matches the upper ends of the upper 17 and rear 13 wall, being essentially coplanar to a plane defined by the rear wall 13.

[0062] According to possible example and non-limiting embodiments, the upper fin 23 has an essentially rectangular shape, or rectangular with rounded corners.

[0063] In some embodiments, the upper wall 17 comprises a minor upper portion 17a, adjacent to the upper fin 23, and a major upper portion 17b, adjacent to the front wall 12.

[0064] The minor upper portion 17a preferably has an essentially rectangular shape and is interposed between the upper fin 23 and the major upper portion 17b, in particular having an upper margin in common with a lower margin of the upper fin 23 and an opposite lower margin in common with an upper margin of the major upper portion 17b.

[0065] The major upper portion 17b preferably has an essentially rectangular or square shape, and a surface area larger than the surface of the minor upper portion 17a. In addition, the major upper portion 17b is interposed between the minor upper portion 17a and the front wall 12, in particular having an upper margin in common with a lower margin of the minor upper portion 17a and an opposite lower margin in common with an upper margin, or edge, of the front wall 12.

[0066] Preferably, the possible opening means 20 are installed on the major upper portion 17b.

[0067] In addition, as better shown in fig. 9, a first margin, or first lateral edge 18 of the upper wall 17, is provided in correspondence with a first margin, or first upper edge 21 of the first lateral wall 14, and an opposing second margin, or second lateral edge 19 of the upper wall 17, is provided in correspondence with a second margin, or second upper edge 22 of the second lateral wall 15 (figs. 1, 1a).

[0068] We must clarify that in the drawings, and especially in figs. 1a, 7, 9, the thicknesses of some parts of the package 10 are shown with exaggerated dimensions for greater clarity.

[0069] The first lateral edge 18 and the corresponding first upper edge 21 on one side of the package 10, and the second lateral edge 19 and the corresponding second upper edge 22 on the opposite side, are preferably mat-

ing in shape and extend preferably between two common vertices, thus joining the front wall 12 and the rear wall 13.

[0070] The lateral edges 18, 19 comprise respective first 18a and second 19a minor edge portions, corresponding to the minor upper portion 17a, and respective first 18b and second 19b major edge portions, corresponding to the major upper portion 17b (figs. 1a, 9).

[0071] According to possible embodiments, between each major edge portion 18b, 19b and the corresponding upper edge 21, 22 there is an empty space, which at least partly distances each major edge portion 18b, 19b from the corresponding upper edge 21, 22 (figs. 1a, 9). According to possible alternative embodiments, each major edge portion 18b, 19b is in direct contact with the corresponding upper edge 21, 22.

[0072] The first minor edge portion 18a and the second minor edge portion 19a extend from an upper end, respectively, of the first major edge portion 18b or of the second major edge portion 19b to the upper fin 23, essentially terminating where the upper ends of the upper 17 and rear 13 wall match.

[0073] Furthermore, in some embodiments, the package 10 comprises connection means having consecutive folded and overlapping flaps configured to connect the upper fin 23 with the rear wall 13 and disposed below the upper wall 17.

[0074] In particular, the connection means having consecutive folded and overlapping flaps can comprise at least a first element Z1 having consecutive folded and overlapping flaps Z1a, Z1c and a second element Z2 having consecutive folded and overlapping flaps Z2a, Z2c.

[0075] The first element Z1 (fig. 9) and the second element Z2 (fig. 1a) can be provided, respectively, between the first minor edge portion 18a and the first upper edge 21, or between the second minor edge portion 19a and the second upper edge 22.

[0076] Each element Z1, Z2 is folded on itself, meaning that it comprises, respectively, a first Z1b or second Z2b fold between respective first Z1a, Z1c or second Z2a, Z2c flaps, with a first Z1a or second Z2a overlying flap overlapping a first Z1c or second Z2c underlying flap. In particular, each overlying flap Z1a, Z2a extends, below the minor portion 17a, from the base of the upper fin 23 to the corresponding fold Z1b, Z2b. Each underlying flap Z1c, Z2c extends, below the respective overlying flap Z1a, Z2a, between the corresponding fold Z1b, Z2b and a vertex shared by the rear wall 13 and the corresponding lateral wall 14, 15.

[0077] The elements Z1, Z2 therefore connect the upper fin 23 with the rear wall 13 and are able to provide welding surfaces necessary to create the upper wall 17 and the upper fin 23, as explained in more detail below.

[0078] In other words, each element Z1, Z2 is conformed as a broken line, comprising a pair of consecutive segments, that is, the respective flaps Z1a, Z1c or Z2a, Z2c, which form an angle that protrudes with respect to a plane defined by the rear wall 13, below the minor upper

portion 17a, in correspondence with the first or second fold Z1b, Z2b. On the side opposing the corresponding fold Z1b, Z2b, the first or second overlying flap Z1a, Z2a forms a respective angle that is re-entrant toward the plane defined by the rear wall 13 when it connects with the upper fin 23, while the first or second underlying flap Z1c, Z2c forms a respective re-entrant angle when it connects with the rear wall 13.

[0079] The package 10 can be made starting from a respective single planar blank 100, that is, from a flat sheet of relatively rigid and preferably impermeable material, suitably pre-cut and creased to form folding lines thereon (fig. 5), along which the blank 100 is folded to form the package 10.

[0080] In preferred embodiments, the blank 100 is made with a layer of cardboard coated on both sides with a heat-sealable plastic material, for example polyethylene.

[0081] According to possible embodiments, the material constituting the blank 100 can also comprise at least one coupled aluminum layer.

[0082] The plastic material makes the package 10, obtained from the blank 100, waterproof and therefore suitable to contain a pourable liquid product. Furthermore, the coating of heat-sealable plastic material makes it possible to weld together several overlapping portions or flaps of the blank 100, preferably between two and four or five, by means of heat or ultrasonic welding. The welds are able to keep the package 10 in the correct conformation and seal it.

[0083] The blank 100 is divided by the folding lines into a plurality of panels configured to define, in the formed package 10, the walls of the package 10 itself, as described above.

[0084] In particular, the blank 100 comprises a front panel 112, essentially rectangular, configured to define, in the formed package 10, the front wall 12.

[0085] The blank 100 also provides a first 114 and a second 115 lateral panel, essentially in the shape of a rectangular trapezoid, adjacent to the front panel 112 on opposite sides thereof and configured to define, in the formed package 10, the respective first and second lateral wall 14 and 15. In particular, the lateral panels 114 and 115 have the respective minor bases coinciding with the two opposite major sides of the front panel 112.

[0086] The blank 100 also comprises a rear panel 113, essentially rectangular, adjacent to the first lateral panel 114 on a side thereof opposite the front panel 112, in particular having a major side in common with the major base of the first lateral panel 114.

[0087] The rear panel 113 is configured to define, in the formed package 10, the rear wall 13.

[0088] The front 112, rear 113 and lateral 114, 115 panels preferably have respective transverse dimensions of equal length, in the sense that the minor bases of the front 112 and rear 113 panels, and the sides of the lateral panels 114, 115 opposite their oblique sides all essentially have the same length. In this way, lower sides

of the front 112, rear 113 and lateral 114, 115 panels can define, in the formed package 10, respective edges of the square lower wall 16.

[0089] It should be noted that in this context by the term "transverse" we mean transverse to the blank 100, that is, essentially parallel to the minor sides of the front panel 112; instead, by the term "longitudinal" we mean essentially perpendicular to the transverse direction.

[0090] The blank 100 also provides, in a known manner, a plurality of lower flaps 116a-e configured to define, when folded and suitably overlapping, or partly overlapping, with each other, the lower wall 16.

[0091] In some embodiments, lower triangular flaps 116a are provided adjacent to the first and second lateral panel 114, 115, on sides thereof opposite their oblique sides. Furthermore, a first 116b and a second 116c lower lateral flap can be provided on opposite parts of each lower triangular flap 116a.

[0092] A substantially rectangular lower front flap 116d can be provided adjacent to the front panel 112 and interposed between the two second lower lateral flaps 116c. Furthermore, an essentially rectangular lower rear flap 116e can be provided adjacent to the rear panel 113 and to the first lower lateral flap 116b closest to the latter.

[0093] The blank 100 further comprises, in correspondence with an end thereof opposite the rear panel 113, an essentially rectangular rear longitudinal flap 101, adjacent to the second lateral panel 115 and to the first lower lateral flap 116b closest to the latter.

[0094] The rear panel 113 is configured to be partly overlapping the entire rear longitudinal flap 101, to be able to perform a longitudinal weld, as described in detail below.

[0095] The blank 100 also comprises an upper panel 117, essentially rectangular or square in shape, configured to define, in the formed package 10, the upper wall 17.

[0096] The upper panel 117 is adjacent to the front panel 112 in correspondence with a side thereof opposite the lower front flap 116d.

[0097] According to possible embodiments, an opening portion 120 suitable for the installation of the opening means 20 can be provided in the upper panel 117.

[0098] For example, the opening portion 120 can be a hole mating in shape with the opening means 20, or a pierceable, or removable, portion, for example made of aluminate material. Moreover, the perimeter of the opening portion 120 could be pre-cut, that is, weakened by folds, holes or partial cuts to facilitate a subsequent actual cut.

[0099] The blank 100 also provides a plurality of first 118a-c and second 119a-c upper flaps on opposite sides of the upper panel 117.

[0100] Preferably, the first and second upper flaps 118a-c, 119a-c essentially have the shape of rectangular triangles.

[0101] In particular, a first 118a and a second 119a upper triangular flap can be provided adjacent to the first

or second lateral panel 114, 115, respectively, with the respective hypotenuse coinciding with the oblique side of the corresponding lateral panel 114, 115.

[0102] Furthermore, a first 118b and a second 119b major upper lateral flap can be interposed between the upper panel 117 and, respectively, the first or the second upper triangular flap 118a, 119a, in particular having a respective first cathetus coinciding with a corresponding side of the upper panel 117 and the respective hypotenuse coinciding with a first cathetus of the corresponding upper triangular flap 118a, 119a.

[0103] A first 118c and a second 119c minor upper lateral flap can also be provided opposite, respectively, the first or second major upper lateral flap 118b, 119b, with the respective hypotenuse coinciding with a second cathetus of the corresponding upper triangular flap 118a, 119a.

[0104] The first upper flaps 118a-c therefore have a first common vertex VC1 in common, opposite the hypotenuse of the first upper triangular flap 118a; furthermore, the second upper flaps 119a-c have a second common vertex VC2 in common, opposite the hypotenuse of the second upper triangular flap 119a.

[0105] The first and second upper lateral flaps 118b-c, 119b-c are conformed to be folded, respectively, onto the first or second upper triangular flap 118a, 119a to allow the formation of the upper wall 17 and of the upper fin 23, as explained in detail below.

[0106] The upper panel 117 comprises, in correspondence with an end thereof opposite the front panel 112, a first 102 and a second 104 front welding portion, essentially rectangular, which are able to define, respectively, a front part of the upper fin 23 and the major upper portion 17b.

[0107] In addition, the rear panel 113 comprises, in correspondence with an end thereof opposite the lower rear flap 116e, a first 103, a second 105 and a third 106 rear welding portion, essentially rectangular, which are able to define, respectively, a rear part of the upper flap 23 and the consecutive folded and overlapping flaps Z1a, Z1c, Z2a, Z2c of the first and second element Z1, Z2 having consecutive folded and overlapping flaps, as explained in detail below.

[0108] According to possible embodiments, the first front 102 and rear 103 welding portions can have the shape of a rectangle with two rounded upper corners.

[0109] Preferably, the first front welding portion 102 and the first rear welding portion 103 have the same shape and the same sizes.

[0110] Furthermore, preferably, the second front welding portion 104 and the second rear welding portion 105 have the same shape and the same sizes.

[0111] The rear panel 113 can also comprise a rear folding portion 107, essentially rectangular in shape, interposed between the second rear welding portion 105 and the third rear welding portion 106. The rear folding portion 107 is conformed to facilitate the formation of the elements Z1, Z2 having consecutive folded and

overlapping flaps, as explained in detail below.

[0112] According to possible embodiments, the rear folding portion 107 is defined and delimited by two folding lines, or creases, very close to each other and respectively coinciding with a lower margin of the second rear welding portion 105 and with an upper margin of the third rear welding portion 106.

[0113] According to possible embodiments, the rear folding portion 107 is defined and essentially consists of a single crease wider than the other folding lines or creases of the blank 100, the single crease being interposed between the second rear welding portion 105 and the third rear welding portion 106.

[0114] Preferably, the first common vertex VC1 is equidistant from the sides of the second rear welding portion 105 and of the second front welding portion 104 which are closest thereto, the distance of the first common vertex VC1 from such sides being essentially equal to half the length of a transverse size of the second rear welding portion 105, or equivalently to half the length of a transverse size of the second front welding portion 104.

[0115] Preferably, the second common vertex VC2 is equidistant from the sides of the rear longitudinal flap 101 and of the second front welding portion 104 which are closest thereto, the distance of the second common vertex VC2 from such sides being essentially equal to half the length of a transverse size of the second rear welding portion 105, or equivalently to half the length of a transverse size of the second front welding portion 104.

[0116] As described using fig. 5, the blank 100 also comprises two first 121 and two second 122 lateral welding flaps, respectively adjacent to the first major and minor upper lateral flaps 118b, 118c and to the second major and minor upper lateral flaps 119b, 119c on sides opposite the first and second lateral panel 114, 115.

[0117] According to possible embodiments, the first and second lateral welding flaps 121, 122 are essentially rectangular in shape.

[0118] In particular, one of the two first lateral welding flaps 121 can have a lower side coinciding with a first cathetus of the first minor upper lateral flap 118c, and the other first lateral welding flap 121 can have a lower side coinciding with a second cathetus of the first major upper lateral flap 118b.

[0119] Preferably, the two first lateral welding flaps 121 are adjacent to each other, in particular they have a common side in correspondence with the first common vertex VC1. In particular, the common side of the two first lateral welding flaps 121 extends between the first common vertex VC1 and a first peak vertex VP1.

[0120] In addition, the two first lateral welding flaps 121 can be in contact, on sides opposite their common side, with the second rear welding portion 105 and with the second front welding portion 104, respectively.

[0121] Preferably, the common side of the two first lateral welding flaps 121 and the respective sides opposite said common side have a length shorter than the

length of the corresponding side of the second rear 105 or front 104 welding portions with which they are in contact.

[0122] According to possible embodiments, the two first lateral welding flaps 121 do not have a perfectly rectangular shape, but a tapered shape, which narrows as they move away from their common side.

[0123] Preferably, the two first lateral welding flaps 121 are axially symmetrical with respect to each other with respect to their common side.

[0124] In addition, one of the two second lateral welding flaps 122 can have a lower side coinciding with a first cathetus of the second minor upper lateral flap 119c, and the other second lateral welding flap 122 can have a lower side coinciding with a second cathetus of the second major upper lateral flap 119b.

[0125] Preferably, the two second lateral welding flaps 122 are adjacent to each other, in particular they have a common side in correspondence with the second common vertex VC2. In particular, the common side of the two second lateral welding flaps 122 extends between the second common vertex VC2 and a second peak vertex VP2.

[0126] In addition, the two second lateral welding flaps 122 can be in contact, on sides opposite their common side, with the rear longitudinal flap 101 and with the second front welding portion 104, respectively.

[0127] Preferably, the common side of the two second lateral welding flaps 122 and the respective sides opposite said common side have a length shorter than the length of the corresponding side of the second front welding portion 104 with which one of the two second lateral welding flaps 122 is in contact.

[0128] According to possible embodiments, the two second lateral welding flaps 122 do not have a perfectly rectangular shape, but a tapered shape, which narrows as they move away from their common side.

[0129] Preferably, the two second lateral welding flaps 122 are axially symmetrical with respect to each other with respect to their common side.

[0130] Preferably, the first and second lateral welding flaps 121, 122 have the same shape and sizes, and each have the length of a transverse size thereof equal to half the length of a transverse size of the second front and rear welding portions 104, 105.

[0131] The first lateral welding flaps 121 are conformed to be folded along their common side so as to overlap with and essentially match each other and portions of the second front and rear welding portions 104, 105, as explained in detail below.

[0132] Similarly, the second lateral welding flaps 122 are also conformed to be folded along their common side so as to overlap with and essentially match each other and portions of the second front and rear welding portions 104, 105, as explained in detail below.

[0133] The embodiments of the method for manufacturing the package 10 comprise the following steps. Initially, a preparation step provides to make available a flat sheet of relatively rigid and preferably impermeable ma-

terial.

[0134] According to some embodiments, the flat sheet made available is a multilayer material formed by a layer of cardboard coated on both sides with a heat-sealable plastic material.

[0135] In possible embodiments, the multilayer material further comprises at least one aluminum coupled layer.

[0136] A subsequent shaping and creasing step provides to shape and crease the flat sheet to obtain the blank 100 described above using fig. 5.

[0137] Subsequently, a longitudinal welding step provides to overlap the rear longitudinal flap 101 with a border portion of the blank 100 adjacent to the free major side of the rear panel 113 and to the free minor side of the lower rear flap 116e, and then weld the rear longitudinal flap 101 to the margin portion, for example by heat or ultrasound, thus obtaining a tubular blank in which the rear panel 113 and the second lateral panel 115 have a common side.

[0138] Subsequently, a step of forming the lower wall 16 provides to fold, overlap and weld the lower flaps 116a-e in a known manner in order to form the lower wall 16.

[0139] For example, the step of forming the lower wall 16 can provide to fold the first lower lateral flaps 116b and the lower rear flap 116e onto the lower triangular flap 116a, and then the second lower lateral flaps 116c and the lower front flap 116d onto the lower rear flap 116e, in order to define respective overlapping portions configured to be welded together.

[0140] The step of forming the lower wall 16 can take place, for example, by folding and forming the panels of the tubular blank around a forming mandrel.

[0141] During the step of forming the lower wall 16, while the lower wall 16 is being created, the front 12, rear 13 and lateral 14, 15 walls are also defined or partly defined (figs. 6-7). Consequently, a containing body 11 open at the top is formed (fig. 6).

[0142] According to possible embodiments, after the step of forming the lower wall 16, there can be provided a step of filling the containing body 11 with a pourable product, or a step of installing the opening means 20 in correspondence with the opening portion 120, or both such steps in the desired order.

[0143] According to possible alternative embodiments, the filling step and/or the step of installing the opening means 20 can instead take place after a step of upper sealing of the package 10.

[0144] The step of upper sealing of the package 10 comprises an upper forming sub-step, which provides to fold the first and second upper triangular flap 118a, 119a toward the inside of the containing body 11, simultaneously folding the first major 118b and minor 118c upper lateral flaps and the second major 119b and minor 119c upper lateral flaps onto the respective first and second upper triangular flaps 118a, 119a (fig. 6).

[0145] The upper forming sub-step thus provides to overlap and essentially match the first lateral welding

flaps 121 in correspondence with one side of the package 10, and to overlap and essentially match the second lateral welding flaps 122 in correspondence with an opposite side of the package 10 (figs. 6-8).

[0146] At the same time, the upper forming sub-step provides to overlap and essentially match the first front welding portion 102 with the first rear welding portion 103, and the second front welding portion 104 with the second rear welding portion 105 (fig. 7). The major upper portion 17b is thus defined, corresponding to an upper panel portion 117 overlapping the first and second major upper lateral flap 118b, 119b and not overlapping the first and second rear welding portion 103, 105.

[0147] In this way, a provisional upper fin 23' (fig. 7) is also defined and formed, formed by the overlapping of the first and second front welding portion 102, 104 with the respective first and second rear welding portion 103, 105.

[0148] In addition, a provisional minor upper portion 17a' (fig. 7) is defined and formed, essentially formed by the third rear welding portion 106 and the rear folding portion 107 overlapping with the first and second minor upper lateral flap 118c, 119c.

[0149] We must clarify that the second front 104 and rear 105 welding portions are overlapping with and external to the first and second lateral welding flaps 121, 122.

[0150] Advantageously, the first lateral welding flaps 121 are configured to not overlap with the second lateral welding flaps 122. Furthermore, advantageously, the first lateral welding flaps 121 are configured to come into contact with the second lateral welding flaps 122 at least in correspondence with the first peak vertex VP1 and the second peak vertex VP2 (fig. 8).

[0151] The upper welding step therefore provides, in a first welding sub-step, to weld together, by heat or ultrasound for example, the overlapping portions in correspondence with the upper provisional fin 23'.

[0152] Since the first lateral welding flaps 121 are configured not to overlap with the second lateral welding flaps 122, advantageously, it is not necessary to weld together an excessive number of overlapping layers of material.

[0153] In addition, the contact between the first lateral welding flaps 121 and the second lateral welding flaps 122 at least in correspondence with the respective peak vertices VP1, VP2 ensures a complete seal along the entire upper end of the package 10. The complete and reliable seal of the package 10, even in the absence of overlap between first and second lateral welding flaps 121, 122, is further guaranteed by the welding in correspondence with the first front welding portion 102, overlapping the first rear welding portion 103.

[0154] The upper sealing step then comprises a second sealing sub-step, which provides to heat the provisional minor upper portion 17a' and/or the provisional upper fin 23' at least in correspondence with the second rear welding portion 105 and subsequently to fold, in correspondence with the rear folding portion 107, the

provisional upper fin 23' onto the provisional minor upper portion 17a', in such a way as to essentially overlap, match and weld together the second rear welding portion 105 and the third rear welding portion 106, or, equivalently, the provisional minor upper portion 17a'.

[0155] The upper wall 17 is thus defined and formed, in particular forming the minor upper portion 17a starting from the second front welding portion 104 (figs. 7-9). The upper fin 23 is also defined and formed, in particular starting from the first front and rear welding portions 102, 103.

[0156] In the second forming sub-step, the connection means Z1, Z2 having consecutive folded and overlapping flaps are also formed, thus connecting the upper fin 23 with the rear wall 13.

[0157] In particular, the overlap between the third rear welding portion 106, the first minor upper lateral flap 118c, the second rear welding portion 105 and the first lateral welding flaps 121 forms the first element Z1 having consecutive folded and overlapping flaps (fig. 9).

[0158] Similarly, the overlap between the third rear welding portion 106, the second minor upper lateral flap 119c, the second rear welding portion 105 and the second lateral welding flaps 122 forms the second element Z2 having consecutive folded and overlapping flaps.

[0159] In fact, each overlying flap Z1a, Z2a extends below a corresponding part of the minor upper portion 17a and is formed, respectively, by the first or second lateral welding flaps 121, 122 and by a respective part of the second rear welding portion 105. Each overlying flap Z1a, Z2a therefore extends from the base of the upper flap 23 to the respective first Z1b or second Z2b fold in correspondence with the rear folding portion 107.

[0160] Each underlying flap Z1c, Z2c is formed, respectively, by the first or second minor upper lateral flap 118c, 119c and by a respective part of the third rear welding portion 106 overlapping it. Each underlying flap Z1c, Z2c therefore extends from the respective first Z1b or second Z2b fold in correspondence with the rear folding portion 107 to the upper end of the rear wall 13, so that the elements Z1, Z2 connect the upper flap 23 with the rear wall 13.

[0161] We must clarify that the elements Z1, Z2 provide, by means of their upper surfaces essentially corresponding to the first and second lateral welding flaps 121, 122 and to an internal surface of the second rear welding portion 105, a welding surface for joining the second rear welding portion 105 and the second front welding portion 104.

[0162] In addition, the elements Z1, Z2 provide, by means of their internal surfaces essentially corresponding to external surfaces of the second rear welding portion 105 and of the third rear welding portion 106, a welding surface for joining the second rear welding portion 105 and the provisional minor upper portion 17a'.

[0163] Advantageously, the second sealing sub-step gives additional stability and reliability to the upper seal of the package 10; moreover, it improves the aesthetics of

the package 10.

[0164] It should be noted that the formation of the elements Z1, Z2 provides to fold the provisional upper fin 23' in correspondence with a particularly thick portion thereof, since it is formed by the overlapping of four layers of material, that is, the second front and rear welding portions 104, 105 and the two first lateral welding flaps 121 or the two second lateral welding flaps 122.

[0165] As a result, this folding operation can cause stresses in the material of the tubular blank, which can generate shapes of the package 10 that are not functional and/or unsightly, or even tears or breaks in the material.

[0166] In the embodiments in which the rear folding portion 107 is defined and delimited by two folding lines or creases, the rear folding portion 107 advantageously allows to obtain the folding of the provisional upper fin 23' by folding the tubular blank along two lines instead of a single line, that is, the two sides of the rear folding portion 107 that delimit it transversely from the second and third rear welding portion 105, 106.

[0167] In embodiments in which the rear folding portion 107 essentially consists of a single particularly wide crease, the rear folding portion 107 advantageously allows to obtain the folding of the provisional upper fin 23' by folding the tubular blank essentially in correspondence with a folding area, instead of a single folding line, that is, in correspondence with the entire rear folding portion 107.

[0168] In both cases described above, the stresses caused by the folding of the provisional upper fin 23' are therefore distributed over the entire rear folding portion 107 instead of over a single line.

[0169] The Applicant has found that the rear folding portion 107 facilitates performing the second sealing sub-step, reducing the magnitude of the stresses generated in the material of the package 10 and thus reducing the risk of breaks and tears.

[0170] In some embodiments, the upper sealing step can possibly be followed by further steps of manufacturing the package 10. For example, if not yet performed, a step of installing the opening means 20 in correspondence with the opening portion 120 can be provided.

[0171] It is clear that modifications and/or additions of parts or steps may be made to the package 10, to the blank 100 and to the method as described heretofore, without departing from the field and scope of the present invention, as defined by the claims. For example, the package 10 could comprise one or more curved margins or edges 25, as described by way of a non-limiting example using fig. 2.

[0172] For example, the package 10 could comprise one or more minor edge walls 24, as described by way of non-limiting example using figs. 3-4. A minor edge wall 24 can be interposed between two adjacent walls among those described above, for example, but not limited to, between the front wall 12 and one of either the first or the second lateral wall 14, 15.

[0173] The minor edge wall 24 can be configured as a

sort of beveled edge, in the sense that it is positioned as a replacement for a "sharp" edge, meaning of no more than 90°, between two adjacent walls, and the two connection edges between the minor edge wall 24 and each of the two adjacent walls are less pronounced or obtuse, meaning they form angles greater than 90°.

[0174] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art will be able to achieve other equivalent forms of package for pourable product and corresponding manufacturing method having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

[0175] In the following claims, the sole purpose of the references in brackets is to facilitate their reading and they must not be considered as restrictive factors with regard to the field of protection defined by the claims.

20 Claims

1. Package (10) for pourable product, comprising a front wall (12), an opposing rear wall (13), a first (14) and a second (15) lateral wall interposed between them, a lower wall (16) and an opposing upper wall (17) essentially in contact on its opposing sides with respective upper edges of said front (12) and rear (13) walls and inclined with respect to all the other walls, an upper fin (23) protruding in correspondence with matching upper ends of said upper (17) and rear (13) walls, the package (10) being asymmetrical with respect to a plane (P1) which is perpendicular to said lower wall (16) and passing through the midpoints of the edges shared by the latter and each of said lateral walls (14, 15), said upper wall (17) being provided with a first (18) and an opposing second (19) lateral edge respectively in correspondence with respective first (21) and second (22) upper edge of said first and second lateral wall (14, 15), **characterized in that** it comprises connection means (Z1, Z2) having consecutive folded and overlapping flaps which are configured to connect said upper fin (23) with said rear wall (13) and disposed under said upper wall (17), between said first (21) and second (22) upper edge and respective first (18a) and second (19a) minor edge portions of said lateral edges (18, 19) which end essentially where said upper ends of said upper (17) and rear (13) walls match.

2. Package (10) as in claim 1, **characterized in that** said connection means (Z1, Z2) having consecutive folded and overlapping flaps comprise at least a first element (Z1) having consecutive folded and overlapping flaps (Z1a, Z1c) and a second element (Z2) having consecutive folded and overlapping flaps (Z2a, Z2c), each of said elements (Z1, Z2) comprising a respective first or second fold (Z1b, Z2b) be-

tween respective first (Z1a, Z1c) or second (Z2a, Z2c) overlapping flaps, a first or second overlying flap (Z1a, Z2a) extending, underneath a minor upper portion (17a) of said upper wall (17) adjacent to said upper fin (23), from the base of said upper fin (23) to said corresponding fold (Z1b, Z2b), and a first or second underlying flap (Z1c, Z2c) extending, underneath said corresponding overlying flap (Z1a, Z2a), between said corresponding fold (Z1b, Z2b) and a vertex which is common to said rear wall (13) and, respectively, to said first or second lateral wall (14, 15).

3. Package (10) as in claim 1 or 2, **characterized in that** it comprises one or more curved margins or edges (25).
4. Package (10) as in any claim hereinbefore, **characterized in that** it comprises at least one minor edge wall (24), interposed between two adjacent walls of said package (10) and forming, with each of them, angles greater than 90°.
5. Planar blank (100) for forming a package (10) for pourable product, **characterized in that** it comprises a front panel (112); a first and second (114, 115) lateral panel, essentially in the shape of a rectangular trapezoid, which are adjacent to said front panel (112) on opposite sides thereof; a rear panel (113), adjacent to said first lateral panel (114) on a side thereof opposite said front panel (112) and provided with a first, a second and a third (103, 105, 106) rear welding portion and with a rear folding portion (107) interposed between said second and third rear welding portion (105, 106); an upper panel (117), adjacent to said front panel (112) and provided with a first and a second (102, 104) front welding portion; a first and a second (118a, 119a) upper triangular flap in the shape of a rectangular triangle, with the hypotenuse coinciding with an oblique side of the first (114) or of the second (115) lateral panel, respectively; a first and a second (118b, 119b) major upper lateral flap essentially in the shape of a rectangular triangle, each having a first cathetus coinciding with one side of said upper panel (117) and the hypotenuse coinciding with a first cathetus of said first (118a) or second (119a) upper triangular flap, respectively; a first and a second (118c, 119c) minor upper lateral flap essentially in the shape of a rectangular triangle, respectively opposite said first or second (118b, 119b) major upper lateral flap and with the hypotenuse coinciding with a second cathetus of the first (118a) or second (119a) upper triangular flap, respectively; a rear longitudinal flap (101), adjacent to said second lateral panel (115) on a side thereof opposite said front panel (112); two first (121) and two second (122) lateral welding flaps, essentially rectangular in shape, respectively adjacent to said

first major and minor upper lateral flaps (118b, 118c) and said second major and minor upper lateral flaps (119b, 119c) on sides opposite said first and second lateral panel (114, 115); said two first lateral welding flaps (121) being adjacent to each other and axially symmetrical with respect to their common side and being in contact, on sides opposite their common side, with said second rear and front welding portion (105, 104), respectively; the two second lateral welding flaps (122) being adjacent to each other and axially symmetrical with respect to their common side and being in contact, on sides opposite their common side, with said rear longitudinal flap (101) and with said second front welding portion (104), respectively.

6. Blank (100) as in claim 5, **characterized in that** said first front and rear welding portions (102, 103) have the same shape and the same sizes and said second front and rear welding portions (104, 105) have the same shape and the same sizes.
7. Blank (100) as in claim 5 or 6, **characterized in that** said two first and second (121, 122) welding flaps have a tapered shape, which narrows as they move away from the respective common side.
8. Blank (100) as in any claim from 5 to 7, **characterized in that** said front (112), rear (113) and lateral (114, 115) panels have respective sizes transverse to said blank (100) of equal length.
9. Blank (100) as in claim 8, **characterized in that** said two first and two second (121, 122) lateral welding flaps have the respective side in common in correspondence with a respective first (VC1) or second (VC2) vertex which is common to said first (118a-c) or second (119a-c) upper flaps, said first and second common vertex (VC1, VC2) being equidistant from the sides closest to them of said second front welding portion (104) and, respectively, of said second rear welding portion (105) or of said rear longitudinal flap (101).
10. Method for manufacturing a package (10) for pourable product, **characterized in that** it comprises forming, welding and sealing steps in which said package (10) is formed by means of sequential folding and welding of panels of a blank (100) as in any claim from 5 to 9, **and in that** it comprises an upper welding step which provides to fold, in correspondence with a rear folding portion (107) of said blank (100), a temporary upper fin (23'), formed by first and second lateral welding flaps (121, 122) and first and second front (102, 104) and rear (103, 105) welding portions of said blank (100) which are overlapping and welded, on a third rear welding portion (106) of said blank (100), in such a way as to essen-

tially overlap, match and weld together said second rear welding portion (105) with said third rear welding portion (106), thus forming an upper wall (17), an upper fin (23) and connection means (Z1, Z2) having consecutive folded and overlapping flaps disposed under said upper wall (17) which connect said upper fin (23) with a rear wall (13) of the package (10).

11. Method as in claim 10, **characterized in that** said method also comprises, in said upper welding step, defining and forming said temporary upper fin (23') by overlapping and essentially matching first lateral welding flaps (121) of said blank (100) and, in correspondence with an opposite side, second lateral welding flaps (122) of said blank (100), by also overlapping and essentially matching first front and rear welding portions (102, 103) of said blank (100), as well as second front and rear welding portions (104, 105) of said blank (100), said second welding portions (104, 105) thus resulting overlapping with, and external to, said lateral welding flaps (121, 122), said first lateral welding flaps (121) being configured to come into contact, without overlapping with, with said second lateral welding flaps (122) at least in correspondence with respective first (VP1) and second (VP2) peak vertices.

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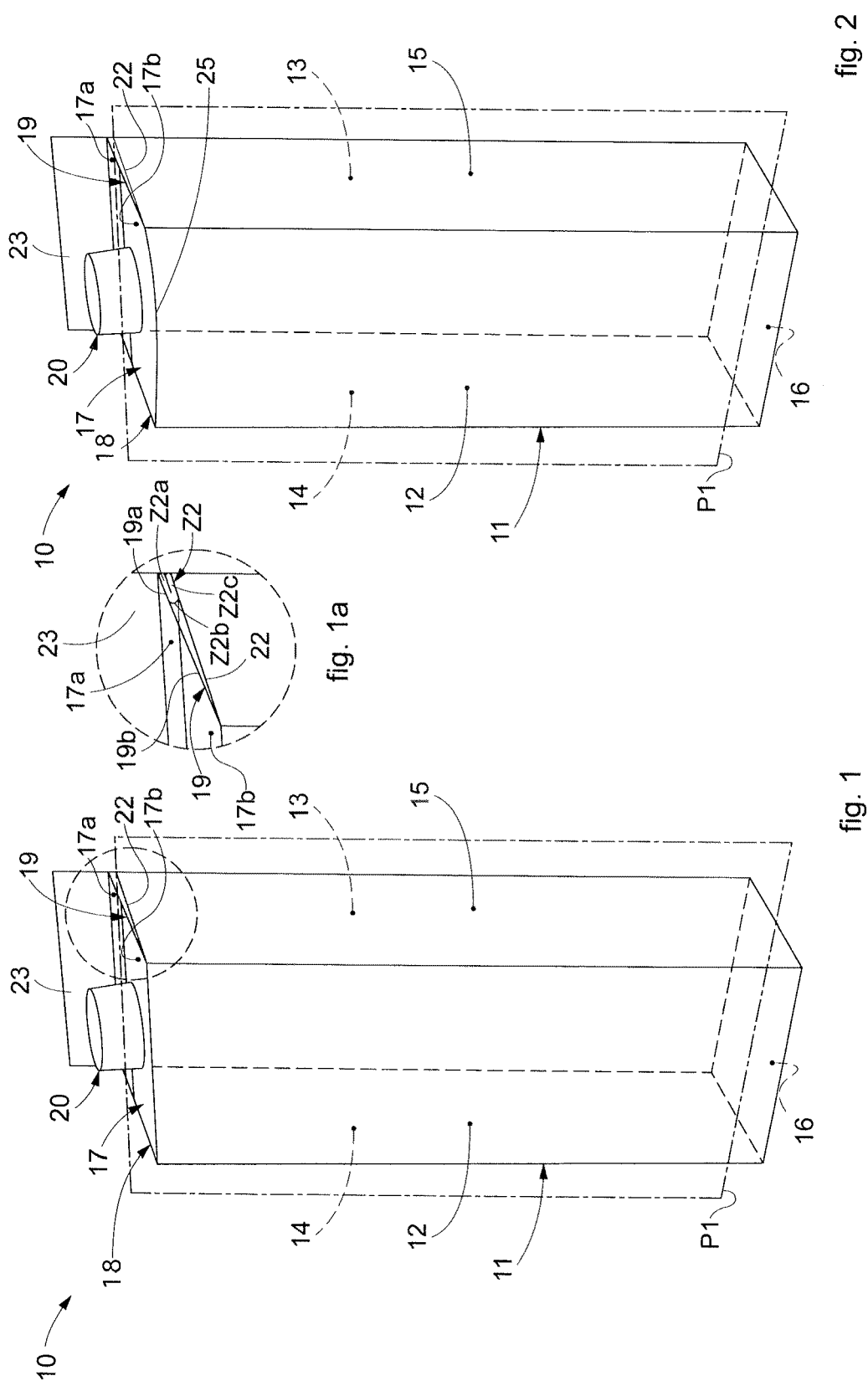
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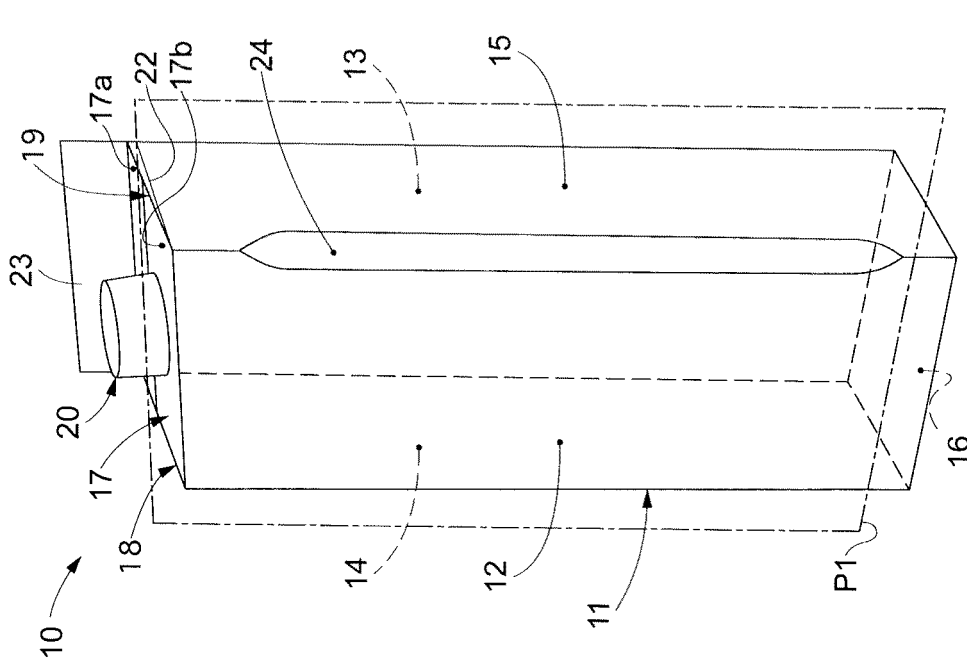
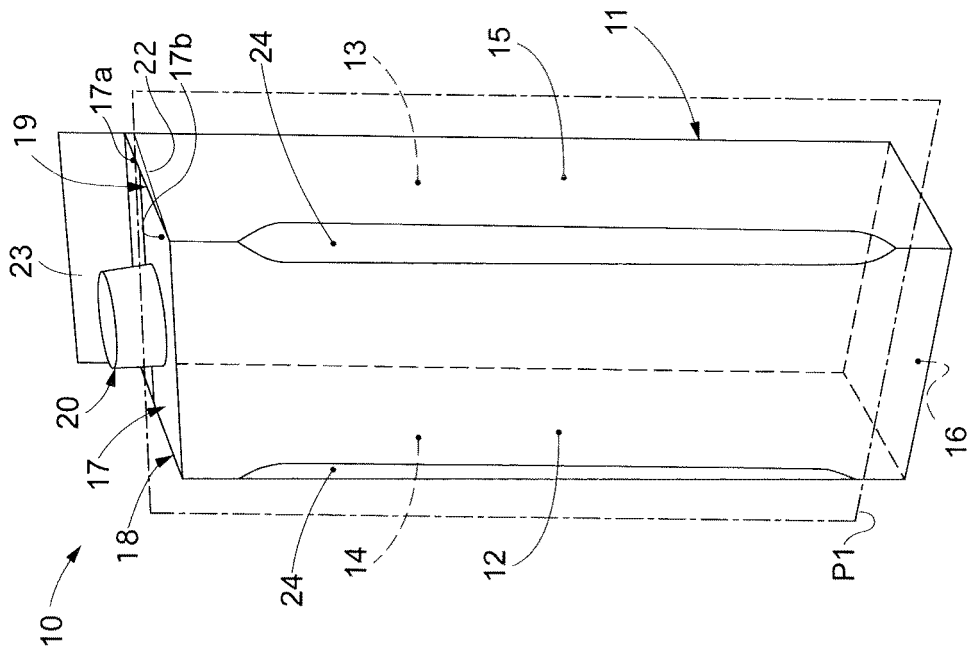
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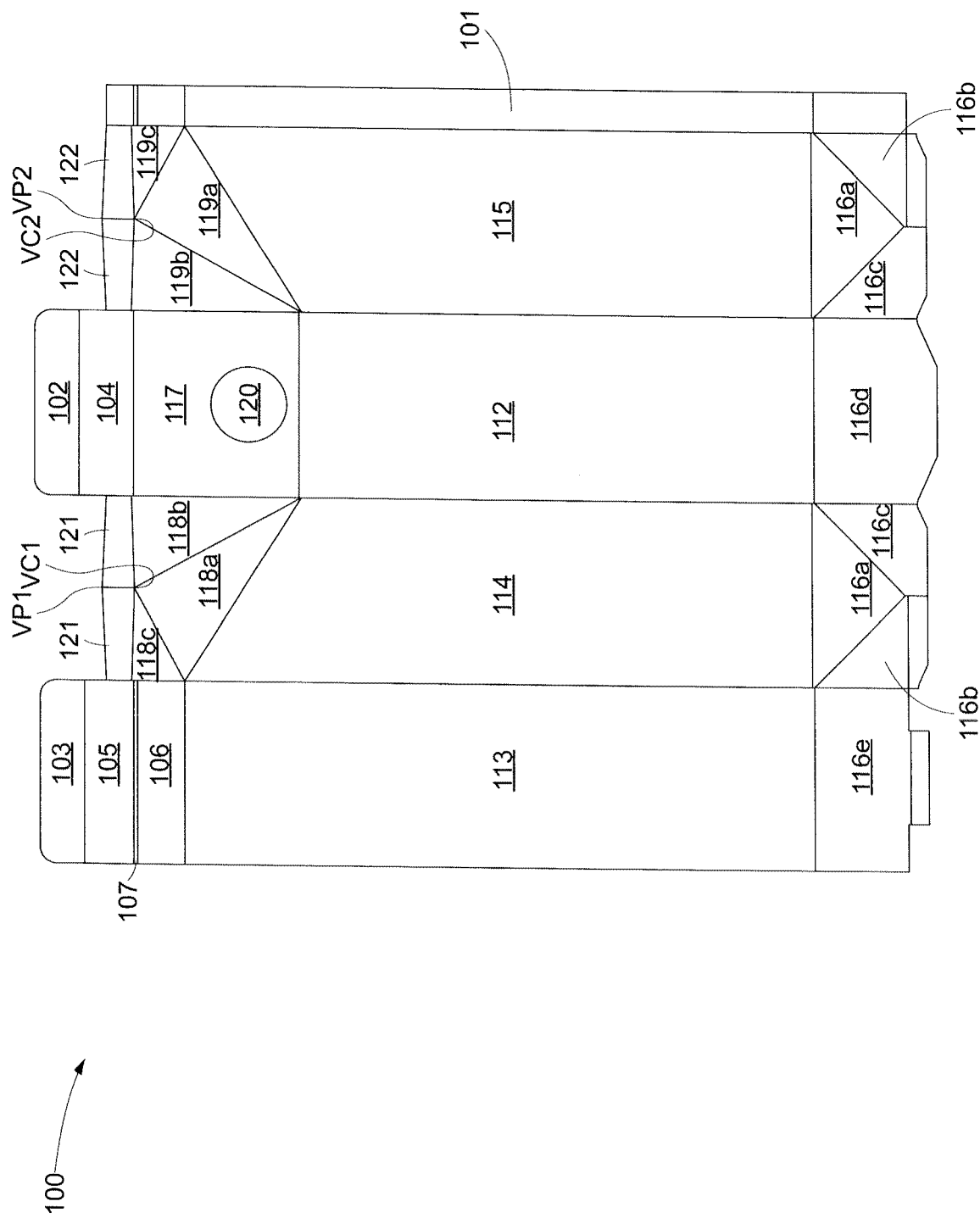
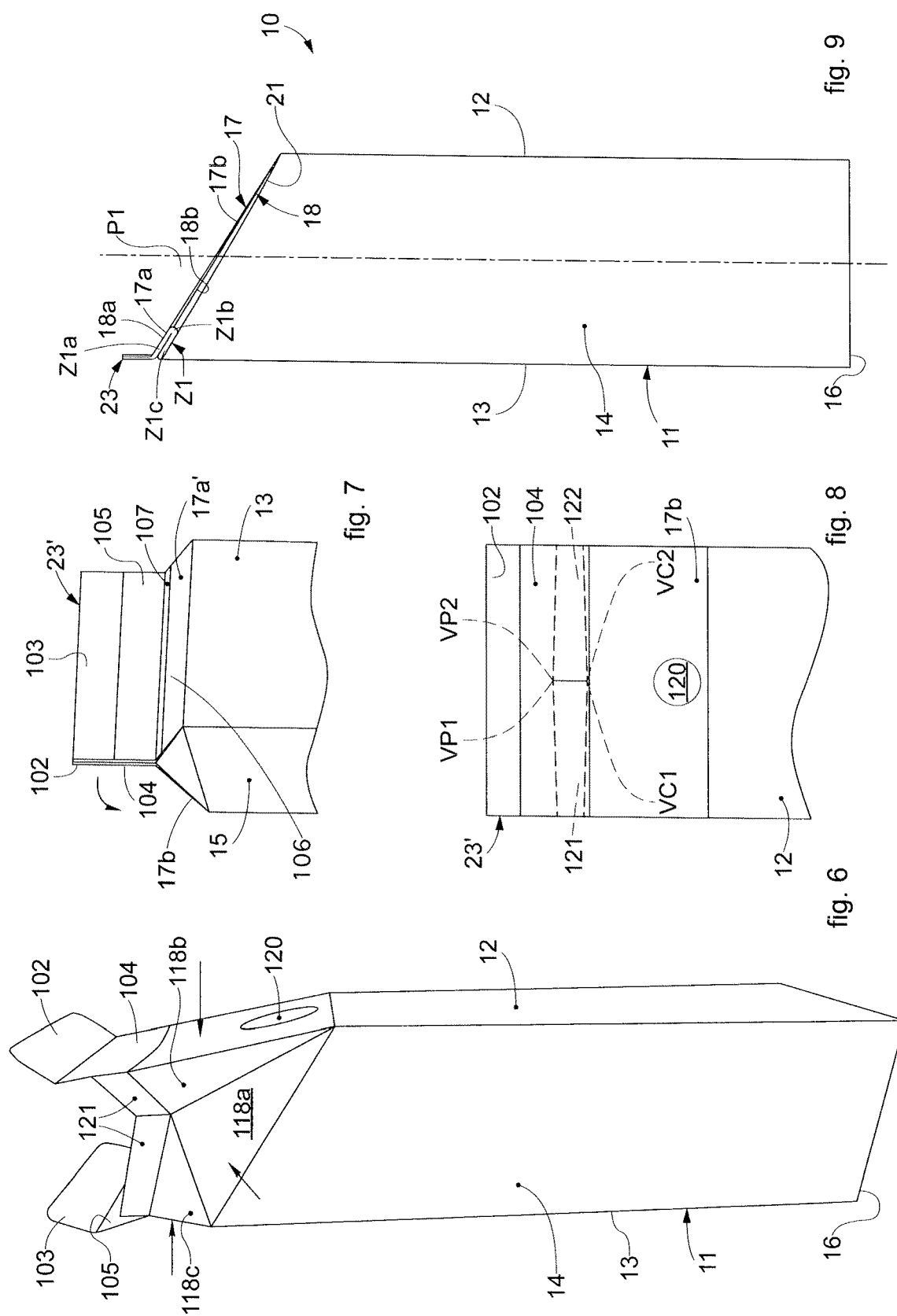


fig. 5





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