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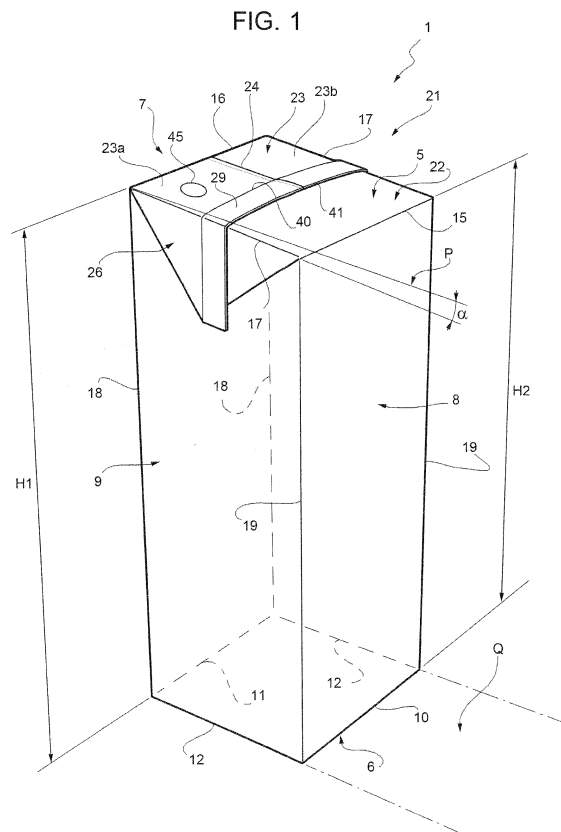
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(54) **Sealed package for pourable food products and a basic unit of sheet packaging material for producing sealed packages for pourable food products**

(57) There is described a sealed package (1, 1') for pourable food product, comprising: a first wall (6), which is adapted to define, in a normal use position, a bottom wall of package (1, 1'), and which comprises a plurality of boundary first edges (10, 11, 12) defining a first plane (Q); a second wall (5), which is opposite to first wall (6), comprises a second edge (16) and a third edge (15) opposite to each other, and is adapted to define, in said normal use position, a top wall of package (1, 1'); second edge (16) and third edge (15) define a second plane (P), which is angled with respect to first plane (Q) for a first angle (α) smaller than 90 degrees; first angle (α) ranges between 1 and 7 degrees.



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Description

[0001] The present invention relates to a sealed package for pourable food products.

[0002] The present invention also relates to a basic unit of sheet packaging material for producing sealed packages for pourable food products.

[0003] As is known, many liquid or 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 creasing and sealing laminated strip packaging material. 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.

[0007] More precisely, the tube is sealed longitudinally and transversally to its own axis.

[0008] Pillow packs are so obtained, which have a longitudinal sealing band and a pair of top and bottom transversal sealing bands.

[0009] Alternatively, the packaging material may be cut into blanks, which are formed into packages on forming spindles, and the 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).

[0010] A parallelepiped package is known which comprises:

- a rectangular bottom wall which is crossed by the bottom transversal sealing band;
- a rectangular top wall, which is crossed by the top

transversal sealing band;

- a rear wall which extends between corresponding first edges of top and bottom walls;
- a front wall which is opposite to the rear wall and extends between corresponding second edges, opposite to first edges, of top and bottom walls; and
- a pair of lateral walls interposed between bottom and top walls, and between rear and front walls.

[0011] In greater detail, the top transversal sealing band extends beyond the top wall of the package into respective flat, substantially triangular top flaps of packaging material folded coplanar with and onto respective lateral wall as of top wall.

[0012] The top transversal sealing band also forms, lengthwise, a rectangular top tab, which comprises a free edge and is folded onto top wall along a bend line formed at the base of the same tab.

[0013] The longitudinal sealing band extends perpendicularly between the transversal sealing bands and along the centerline of the rear wall.

[0014] Furthermore, the rear and the front walls are parallel to one another, the lateral walls are parallel to one another, and the lateral walls are orthogonal to both the rear and the front walls.

Parallelepiped packages are known, which have a hole for a straw on the top wall and which are completely filled with the pourable product, i.e. with the pourable product in contact with the inner side of the top wall.

[0015] On one hand, those parallelepiped packages are not optimally stackable one on the other, i.e. with the bottom wall of the top package resting on the top wall of the bottom package.

[0016] As a matter of fact, the rectangular top tab upwardly protrudes from the top wall, thus rendering the latter not perfectly flat.

[0017] On the other hand, when the user perforates the hole with the straw and exerts an action with his/her fingers on the lateral walls, the level of the pourable product at first decreases and then reaches the perforated hole due to the action of the fingers of the user. As a consequence, the pourable product leaks from the perforated hole on the top wall of the package.

[0018] This is due to the fact that the sealed packages are formed by folding a corresponding basic unit of sheet packaging material along a plurality of crease lines. The volume of each package is slightly less than the theoretical volumes, which is defined by the corresponding basic unit, so that the forming and sealing of the package slightly compresses the packaging material thereof. Accordingly, when the user perforates the holes with the straws, the inner volume of the packages increases up to the theoretical volume, thus causing a decrease in the level of the pourable product. The action of the fingers of the user causes the subsequent increase in this value, up to the level of the hole.

[0019] A need is felt within the industry to improve the vertical stackability of the known parallelepiped package-

es.

[0020] Furthermore, a need is felt to reduce the risk of leakage of the pourable product from the perforated hole for a given action exerted by the user.

[0021] Furthermore, packages are known, for example from EP-A-2392517 or EP-A-1332969 in the name of the same Applicant, in which the top wall is slanted with respect to the bottom wall and is descending from the relative first edge to the relative second edge.

[0022] In both the above-identified packages, the top wall comprises:

- a first area, which accommodates an opening device and is bounded, on opposite sides, by the second edge and the transversal seal; and
- a second area, which is bounded, on opposite sides, by the first edge and the transversal seal.

[0023] Due to the fact that the top wall is slanted with respect to the bottom wall, the extension of the first area is increased with respect to the parallelepiped packages, in which the top wall is parallel to the bottom wall.

[0024] Accordingly, the above-identified known packages allow the fitting of greater opening device in the first area.

[0025] Furthermore, in the packages known from EP-A-2392517 or EP-A-1332969, the sealing band is folded on the top wall on the side of the first edge, i.e. the higher edge of the package.

[0026] A drawback of the above-identified known packages is that they cannot be vertically stacked one on the other, i.e. with the bottom wall of a top package resting on the top wall of a bottom package.

[0027] This is because the angle existing between the top wall and the bottom wall is more than 20 degrees, thus causing the slipping, under gravity action, of the top package on the bottom package.

[0028] Furthermore, in the packages known from EP-A-2392517 or EP-A-1332969, the height of the rear wall is greater than the height of the front wall.

[0029] In other words, the taller wall, i.e. the rear wall, is crossed by the longitudinal sealing band whereas the smaller wall, i.e. the front wall, is free from that longitudinal sealing band.

[0030] In the point of sales, packages are stored with the wall free from the longitudinal sealing line on the side of the potential customers.

[0031] Accordingly, in the known solution, the potential customers are presented with the smaller wall, thus dramatically reducing the visual impression of the packages in the point of sales.

[0032] A need is felt to present the potential customers with the larger wall, so as to increase as far as possible the visual impression of the packages in the point of sales.

[0033] It is therefore an object of the present invention to provide a sheet packaging material for producing sealed packages for pourable food products, which

meets at least one of the above-identified needs.

[0034] According to the present invention, there is provided a sealed package for pourable food products, as claimed in claim 1.

[0035] The present invention also relates to a sealed package for pourable food products, as claimed in claim 9.

[0036] The present invention also relates to a basic unit of sheet packaging material for producing sealed packages for pourable food products, as claimed in claim 10.

[0037] Two preferred, non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

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

Figure 2 shows two packages of Figure 1 vertically stacked one on the other;

Figure 3 is a rear view of the package of Figures 1 and 2;

Figure 4 is a bottom view, with parts removed for clarity, of the package of Figures 1 and 3;

Figure 5 is a lateral view of the package of Figures 1 to 4;

Figures 6 and 7 show a first embodiment of a basic unit of sheet packaging material according to the present invention and adapted, once folded, to form the sealed packages of Figures 1 to 4;

Figure 8 is a perspective view of a sealed package according to a second embodiment of the present invention;

Figure 9 shows two packages of Figure 8 vertically stacked one on the other;

Figure 10 is a rear view of the package of Figures 8 and 9;

Figure 11 is a bottom view, with parts removed for clarity, of the package of Figures 8 to 10; and

Figure 12 is a second embodiment of a basic unit of sheet packaging material according to the present invention and adapted, once folded, to form the sealed packages of Figures 8 to 11.

[0038] Number 1 in Figures 1 to 5 indicates as a whole a sealed package for pourable food products, which is made of multilayer sheet packaging material 2 (shown in Figure 6).

[0039] Packaging material 2 from which package 1 is made has a multilayer structure comprising a base layer, e.g. of paper, for stiffness, and a number of lamination layers covering both sides of base layer.

[0040] In the example shown, the lamination layers comprise a first layer of oxygen-barrier material, e.g. an aluminum foil, and a number of second layers of heat-seal plastic material covering both sides of both base layer and first layer. In other words, such solution comprises, in succession and from the side eventually form-

ing the inside of package 1, a layer of heat-seal plastic material, a layer of barrier material, another layer of heat-seal plastic material, base layer, and another layer of heat-seal plastic material.

[0041] The inner layer of heat-seal plastic material contacting the food product, in use, may, for example, be made of strong, in particular, high-stretch, metallocene-catalyzed, low-linear-density (LLD) polyethylene.

[0042] Normally, layers of heat-seal plastic material are laminated on the base layer in a melted state, with successive cooling.

[0043] As a possible alternative, at least the inner layers of plastic material may be provided as prefabricated films, which are laminated on the base layer; this technique allows reducing any risk of formation of holes or cracks at or around the removable portion during the forming operations for producing sealed package 1.

[0044] Package 1 has preferably a volume between 80 ml and 375 ml.

[0045] With reference to Figures 1 to 5, package 1 comprises:

- a quadrilateral (in the example shown, rectangular or square) top wall 5;
- a quadrilateral (in this case, rectangular or square) bottom wall 6, which is opposite to top panel 5;
- a flat wall 7, which extends between top panel 5 and bottom panel 6;
- a flat wall 8, which extends between top panel 5 and bottom panel 6, and is opposite to wall 7; and
- two lateral walls 9 opposite to each other, and which extend between top wall 5 and bottom wall 6, and between walls 7, 8.

[0046] Bottom wall 6 comprises two horizontal edges 10, 11 parallel to one another, and two horizontal edges 12 interposed between and orthogonal to edges 10, 11. Edges 12 are parallel to one another.

[0047] Top wall 5 comprises two horizontal edges 15, 16 opposite to each other and parallel to one another. More precisely, horizontal edges 15, 16 are parallel to and arranged over edges 10, 11 respectively.

[0048] Top wall 5 also comprises two edges 17, which extend between edges 15, 16 and are parallel to one another.

[0049] Edges 17 are arranged over respective edges 12.

[0050] Wall 7 extends between edges 11, 16 and comprises two vertical opposite edges 18, which are parallel to one another and extend between edges 11, 16.

[0051] Wall 8 extends between edges 10, 15 and comprises two vertical opposite edges 19, which extend between edges 10, 15.

[0052] Each lateral wall 9 is bounded by edges 12, 17, by a relative edge 18, and by a relative edge 19.

[0053] Package 1 also comprises a top transversal sealing band 21 (Figure 1) and a bottom transversal sealing band 25 (Figure 4), which extends across respective

top and bottom walls 5, 6.

[0054] Sealing band 21 divides top wall 5 into two portions 22, 23, one (22) of which is adjacent to front wall 8 and bounded by edge 15. The other portion (23), adjacent to rear panel 7 and bounded by edge 16, comprises along the centerline, a top end portion of a flat longitudinal sealing band 24 of package 1 (Figure 4).

[0055] More specifically, longitudinal sealing band 24 extends perpendicularly between transversal top and bottom sealing bands 21, 25, and, in the embodiment shown, substantially along the centerline of wall 7.

[0056] Top transversal sealing band 21 extends beyond top wall 5 of package 1 into respective flat, substantially triangular lateral top flaps 26 (only one of which is shown in Figures 1 and 2) of packaging material folded coplanar with and onto respective lateral walls 9 as of top wall 5.

[0057] With reference to Figures 1 and 2, top transversal sealing band 21 also forms, lengthwise, a rectangular flat top tab 29 projecting from portions 22, 23 and from lateral top flaps 26 and folded onto wall 5 along a bend line 40 formed at the base of tab 29.

[0058] Tab 29 is bounded, on the opposite side of bend line 40, by a free edge 41.

[0059] In the points of sales, wall 8 free of longitudinal sealing band 24 is positioned on the side of the potential customers and is, therefore, commonly regarded as the front wall of package 1.

[0060] On the contrary, wall 7 is positioned on the opposite side of the potential customers and is, therefore, commonly regarded as the back wall of package 1.

[0061] With reference to Figure 4, bottom transversal sealing band 25 divides bottom wall 6 into two portions 27, 28.

[0062] Portion 27 is adjacent to wall 7, is bound by edge 11 and comprises along the centerline a bottom end portion of longitudinal sealing band 24.

[0063] Portion 28 is adjacent to wall 8 and is bound by edge 10.

[0064] Bottom transversal sealing band 25 comprises (Figure 4) a main portion 30 and a pair of end portions 31, which are arranged on opposite lateral sides of portion 30.

[0065] Portion 30 is folded onto wall 6 while portions 31 form two respective flat, substantially triangular lateral bottom flaps 32 of packaging material folded over portion 30.

[0066] Furthermore, bottom transversal sealing band 25 also forms, lengthwise, a flat rectangular bottom tab 33 projecting from portions 27, 28 and which extends into bottom flaps 32. Tab 33 comprises, in turn, a main portion folded over bottom wall 8 and a pair of lateral portions folded onto the main portion of tab 33 itself along a bend line formed at the base of tab 33.

[0067] Edges 15, 16 of top wall 5 define a plane P.

[0068] Edges 10, 11, 12 of bottom wall 6 define a plane Q, in use, horizontal and onto which package 1 normally rests, as shown in Figures 1 and 5.

[0069] With reference to Figures 1 and 5, plane P is angled with respect to plane Q for an angle α smaller than 90 degrees.

[0070] Advantageously, angle α ranges between 1 and 7 degrees (Figure 5).

[0071] Still more precisely, angle α ranges between 3 and 5 degrees.

[0072] In greater detail, edge 16 is at first distance H1 from edge 11 measured orthogonally to plane Q while edge 15 is at a second distance H2 from edge 10 measured orthogonally to plane Q.

[0073] First distance H1 is greater than second distance H2.

[0074] As a result, the height of wall 7 is higher than the height of wall 8.

[0075] Advantageously, tab 29 is folded on the side of edge 15, i.e. on portion 22 and on the side of wall 8, so that edge 41 is interposed between bend-line 40 and edge 15 (Figures 1, 2 and 5).

[0076] In this way, thanks to the thickness of the bottom transversal sealing band 25, edge 41 and edge 16 define a plane R, as shown in Figure 5.

[0077] Plane R is angled relative to **plane Q** for an angle smaller than angle α .

[0078] In the embodiment shown, **plane R and plane Q** are parallel to one another.

[0079] In this way, as shown in Figure 2, a further top package 1a can be stacked on a bottom package 1, with its wall 6a resting on edges 16, 41 of wall 5 of bottom package 1.

[0080] With reference to Figures 1 and 2, top end of longitudinal sealing band 24 divides portion 23 in two areas 23a, 23b.

[0081] Package 1 also comprises a closed hole 45, circular in the embodiment shown, from which the base layer has been removed.

[0082] Hole 45 is adapted to be perforated by a not-shown straw, so as to allow a user to drink the pourable product contained in package 1.

[0083] In the embodiment shown, hole 45 is arranged in area 23a.

[0084] Furthermore, in the embodiment shown, package 1 does not comprise any opening device fitted on wall 5.

[0085] Letter M in Figures 6 and 7 indicate a basic unit of packaging material 2, by which to produce package 1, and which may be a pre-cut blank, or a portion of a web of packaging material comprising a succession of units M.

[0086] In the first case, basic unit M is folded on a known crease spindle (not shown), is filled with the food product, and is sealed at the top and bottom to form package 1. In the second case, the web of packaging material 2, comprising a succession of basic units M, is:

- folded into a cylinder to form a vertical tube having constant circumference;
- filled continuously with the food product; and

- sealed transversely and cut into basic units M, which are then folded to form respective packages 1.

[0087] The theoretical volume defined by basic unit M is greater than the volume of sealed package 1. As a result, the packaging material of sealed package 1 is slightly compressed.

[0088] Crease pattern 60 substantially comprises:

- a transversal crease **line 67** for forming edges 10, 11, 12 of finished package 1;
- a transversal crease **line 63** for forming edges 15, 16, 17 of finished package 1; and
- a pair of transversal crease lines 61, 62 for allowing the folding of top transversal sealing band 21 and of the bottom transversal sealing band 25.

[0089] Crease lines 67, 61, 62 are straight, i.e. they do not have any angles.

[0090] Crease lines 67, 61, 62 are parallel to one another.

[0091] Crease lines 63, 67 are interposed between crease lines 61, 62.

[0092] Crease pattern 60 comprises:

- a pair of longitudinal crease lines 65, 66 parallel to each other;
- a pair of longitudinal crease lines 68, 69 parallel to each other and interposed between crease lines 65, 66;
- a pair of longitudinal end edges 64, 57 opposite to each other; and
- an edge area 59 bounded by edge 64 and a longitudinal crease line 58, and which is intended to be sealed on opposite edge 57 of basic unit M to form a cylinder.

[0093] In detail, crease lines 58, 65, 68, 69, 66 and edges 64, 57 are parallel to each other and orthogonal to **crease lines 67, 61, 62**.

[0094] Crease lines 65, 66 are interposed between crease line 58 and edge 57.

[0095] Crease pattern 60 also comprises (Figure 6):

- a rectangular end area 78, which is bounded by crease line 61 and by a transversal end edge 77 of basic unit M on the opposite side of crease line 61; and
- a rectangular end area 79, which is bounded by crease line 62 and by a further transversal end edge, opposite to edge 77, of basic unit M on the opposite side of crease line 62.

[0096] End area 78 is adapted to form top tab 29 and end area 79 is adapted to form bottom tab 33 of finished package 1, once basic unit M has been folded.

[0097] When package 1 is formed by a tube of packaging material 2, end edge 77 and further transversal

end edge are formed by the transversal cutting of the tube.

[0098] Crease line 61 is adapted to form bend line 40 of top tab 29 and edge 77 is adapted to form edge 41 of tab 29 of finished package 1.

[0099] Crease line 61 intersects crease lines 58, 65, 68, 69, 66 and end edge 57 respectively at intersection points 80, 81, 82, 83, 84, 85.

[0100] Crease line 63 intersects crease lines 58, 65, 68, 69, 66 and end edge 57 respectively at intersection points 90, 91, 92, 93, 94, 95.

[0101] Crease line 67 intersects crease lines 58, 65, 68, 69, 66 and end edge 57 respectively at intersection points 100, 101, 102, 103, 104, 105.

[0102] Crease line 62 intersects crease lines 58, 65, 68, 69, 66 and end edge 57 respectively at intersection points 110, 111, 112, 113, 114, 115.

[0103] Pattern 60 comprises (Figure 7):

- a panel 150, which is bounded by points 92, 93, 102, 103 and is adapted to define wall 8 of the finished package 1, once basic unit M has been folded;
- a pair of panels 151 arranged on opposite sides of panel 150, one of which is defined by points 91, 92, 101, 102 and the other one of which is defined by points 93, 94, 103, 104, and adapted to define lateral walls 9 of the finished package 1; and
- a pair of panels 152 arranged on opposite sides of panels 151 relative to panel 150, one of which is defined by points 90, 91, 100, 101 and the other one of which is defined by points 94, 95, 104, 105, and adapted to define rear wall 7 of finished package 1, once basic unit M has been folded and edge area 59 has been sealed on **edge 57**.

[0104] Pattern 60 also comprises (Figure 7):

- a rectangular panel 153 defined by points 82, 83, 92, 93, and adapted to define portion 22 of top wall 5;
- a pair of rectangular panels 154 arranged on opposite lateral sides of panel 153, defined respectively by points 80, 81, 90, 91 and 84, 85, 94, 95 and adapted to define portion 23 of top wall 5 of finished package 1;
- a rectangular panel 155 defined by points 102, 103, 112, 113, and adapted to define portion 28 of bottom wall 6; and
- a pair of rectangular panels 156 arranged on opposite lateral sides of panel 155, defined respectively by points 100, 101, 110, 111 and 104, 105, 114 and 115, and adapted to define portion 27 of bottom wall 6.

[0105] Pattern 60 further comprises (Figure 6):

- a pair of crease lines 70, 71 (72, 73), which extend each between a respective point 91, 92 (93, 94) and

a common point 86 (87) on crease line 61 and in position interposed between points 81, 82 (83, 84); and

- a pair of crease lines 74, 75 (76, 77), which extend each between a respective point 101, 102 (103, 104) and a common point 116 (117) on crease line 62 and in position interposed between points 111, 112 (113, 114).

[0106] Crease lines 70, 71, 72, 73, 74, 75, 76, 77 are sloped with respect to crease lines 61, 67, 63, 62, edges 64, 57 and crease lines 65, 68, 69, 66, 60.

[0107] Thanks to the presence of crease lines 70, 71, 72, 73, 74, 75, 76, 77, pattern 60 comprises (Figure 7):

- a pair of top triangular panels 160, 161 defined by points 86, 91, 92 and points 87, 93, 94, and arranged on respective opposite sides of panel 153;
- a triangular panel 162 transversally interposed between panel 160 and panel 154, and defined by points 91, 81, 86;
- a triangular panel 163 transversally interposed between panel 160 and panel 153, and defined by points 82, 86, 92;
- a triangular panel 164 transversally interposed between panel 161 and panel 153, and defined by points 83, 87, 93; and
- a triangular panel 165 transversally interposed between panel 161 and panel 154, and defined by points 84, 87, 94.

[0108] Once basic unit M has been folded to form finished package 1, panels 163, 162 and 160 form one top flap 26 while panels 165, 161, 164 form other top flap 26.

[0109] Still more precisely, panels 160, 161 define inner surfaces of respective top flaps 26 superimposed on the upper portion of respective lateral walls 9 while panels 162, 163 and 164, 165 define outer surfaces of respective top flaps 26 with respect to lateral walls 9 of finished package 1.

[0110] Furthermore, pattern 60 comprises (Figures 6 and 7) :

- a pair of bottom triangular panels 170, 171 defined by points 101, 102, 116 and points 103, 104, 117;
- a triangular panel 172 interposed between panel 170 and panel 156, and defined by points 101, 111, 116;
- a triangular panel 173 interposed between panel 170 and panel 155, and defined by points **102, 112, 116**;
- a triangular panel 174 interposed between panel 171 and panel 155, and defined by points 103, 113, 117; and
- a triangular panel 175 interposed between panel 171 and panel 156, and defined by **points 104, 117, 114**.

[0111] Once basic unit M has been folded to form finished package 1, panels 173, 172 and 170 form one bottom flap 32 while panels 175, 171, 174 form other bottom

flap 32.

[0112] Still more precisely, panels 172, 173 and 174, 175 define inner surfaces of respective bottom flaps 32 superimposed on respective bottom walls 6 while panels 170, 171 define outer surfaces of respective flaps 32 with respect to bottom walls 6 of finished package 1.

[0113] Crease line 63 comprises, in turn, (Figure 7):

- a segment 200, which extends between points 92, 93 and is adapted to define edge 15 of the finished package 1;
- a pair of segments 201, which are consecutive to and are arranged on opposite lateral sides of segment 200, extend respectively between points 91, 92; 93, 94, and are adapted to define edges 17 of finished package 1; and
- a pair of segments 202, which are consecutive to respective segments 201 and are arranged on opposite lateral sides of segments 201 with respect to segment 200, extend respectively between points 90, 91; 93, 94 and are adapted to define edge 16 of finished package 1.

[0114] Each segment 201 is advantageously angled relative to segment 200 for an angle β smaller than 90 degrees and ranging between 1 and 7 degrees.

[0115] In this way, plane P of finished package 1 is angled relative to plane Q defined by wall 5 once basic unit M has been folded

[0116] More precisely, each angle β ranges, in the embodiment shown, between 3 and 5 degrees.

[0117] Once basic unit M has been folded to form finished package 1, each angle β form a relative angle α .

[0118] Furthermore, segments 201 diverge from crease line 67, proceeding from segment 200 towards respective segments 202.

[0119] In other words, the distance between the points of each segment 201 and crease line 67 is increasing, proceeding from points 92, 93 towards respective points 91, 94.

[0120] Crease pattern 60 also comprises a closed, circular in the embodiment shown, line 190, which is arranged inside panel 154 bounded by crease lines 58, 65, and defines a closed area 191 from which the paper layer has been removed.

[0121] Area 191 is adapted to define hole 45, once basic unit M has been folded to from finished package 1.

[0122] Crease line 67 is straight, i.e. with no angles, and defines edges 10, 11, 12 of wall 6.

[0123] Crease line 67 lies on plane Q, once basic unit M of packaging material 2 has been folded to form finished package 1.

[0124] In greater detail, crease line 67 comprises (Figure 7) :

- a segment 210, which extends between points 102, 103 and is adapted to define edge 10 of finished package 1;

- a pair of segments 211, which are consecutive to and are arranged on opposite lateral sides of segment 210, extend respectively between points 101, 102 and 103, 104, and are adapted to define respective edges 12 of finished package 1; and
- a pair of segments 212, which are consecutive to respective segments 211 and are arranged on opposite lateral sides of segment 211 with respect to segment 210, and are adapted to define **edge 11** of finished package 1.

[0125] The distance between segments 200, 210 equals height H2 while the distance between segments 202, 212 equals height H1, which is greater than height H2.

[0126] As a result, panel 150 has an area smaller than the sum of areas of panel 152.

[0127] Finally, crease lines 65, 66 define respective segments which extend between points 91, 101; 94; 104 and are adapted to define edges 18 of finished package 1, once basic unit M has been folded to form it.

[0128] Crease lines 68, 69 define respective segments which extends between points 92, 102; 93, 103 and are adapted to define edges 19 of finished package 1, once basic unit M has been folded to form it.

[0129] In use, package 1 is positioned, in the points of sales, with wall 8 having smaller height H2 in front of the potential customers.

[0130] Furthermore, packages 1 can be vertically stacked one on the other, as shown in Figure 2, with wall 6a of top package 1a resting on edge 16 of wall 5 of bottom package 1 and on free edge 41 of tab 29.

[0131] In order to drink the pourable product contained in package 1, the user keeps walls 7, 8, 9 with his/her fingers and perforates hole 45 with a straw (not-shown).

[0132] When the user perforates hole 45 with packages 1 gripped between his/her fingers, the level of the pourable product at first decreases due to the fact the package 1, 1' returns to the theoretical volume defined by basic unit M and then increases, but remains slightly spaced from hole 45 at least if the load exerted on the walls 7, 8, 9 is not excessive.

[0133] Number 1' in Figures 8 to 11 indicates a second embodiment of a sealed package in accordance with the present invention; sealed packages 1, 1' being similar to each other, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0134] Sealed package 1' differs from sealed package 1 in that longitudinal sealing band 24' extends along the centerline of portion 22' of wall 5, of portion 28 of wall 6, and substantially along the centerline of smaller wall 8'.

[0135] As a result, taller wall 7' is free from longitudinal sealing band 24.

[0136] Accordingly, in the points of sales, smaller wall 8' of height H2 defines a rear wall of packages 1' positioned on the opposite side of the potential customers. On the contrary, taller wall 7' of height H1 defines, in the

point of sales, a front wall of package 1' which is on the side of potential customers.

[0137] Furthermore, sealed package 1' differs from sealed package 1 in that hole 45' is arranged in the centerline of portion 23' of wall 6.

[0138] Finally, sealed package 1' differs from sealed package 1 in that top end of longitudinal sealing band 24' divides portion 22' in two areas 22a', 22b'.

[0139] Letter M' in Figure 12 indicates a second embodiment of a basic unit of packaging material 2', by which to produce package 1'; basic units M, M' of packaging material 2, 2' are similar to each other, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0140] Basic unit M' differs from basic unit M in that segments 201' converge towards crease line 67, proceeding from segment 200 towards respective segment 202.

[0141] In other words, the distance between the points of each segment 201' and crease line 67 is decreasing, proceeding from points 92, 93 towards respective points 91, 94.

[0142] Furthermore, basic unit M' differs from basic unit M in that the distance between segments 200, 210 equals height H1 while the distance between segments 202, 212 equals height H2 smaller than height H1.

[0143] In this way, panel 150 has an area greater than the sum of the areas of panels 152.

[0144] Finally, basic unit M' differs from basic unit M in that area 191' is arranged inside panel 153 and, in the embodiment shown, in a central position inside panel 153.

[0145] The advantages of packages 1, 1' and sheet packaging material 2, 2' according to the present invention will be clear from the above description.

[0146] In particular, plane P defined by edges 15, 16 of wall 5 is angled with respect to plane Q defined by wall 6 by angle α ranging between 1 and 7 degrees.

[0147] Accordingly, packages 1, 1' are stackable one on the other (as shown in Figures 2 and 9) more efficiently than the known parallelepiped packages described in the introductory part of the present description.

[0148] As a matter of fact, the inclination of plane P is recovered by the thickness of tab 29, thus containing any risk of sliding between packages 1, 1' stacked one on the other.

[0149] Furthermore, the Applicant has found that due to these values of angle α , the load on walls 7, 8, 9; 7', 8', 9 required to generate the leakage of the pourable product from the boundary of perforated hole 45; 45' is increased with respect to the known parallelepiped packages described in the introductory part of the present description.

[0150] In other words, the risk of leakage of the pourable product, when the straw has perforated hole 45, 45' and a given load is exerted by the user on walls 7, 8, 9; 7', 8', 9 is reduced with respect to the known parallele-

pipied packages described in the introductory part of the present description.

[0151] As a matter of fact, being plane P angled with respect to plane Q, which is horizontal in use, the level of pourable product inside package 1, 1' is slightly lower than the level of hole 45 perforated by the straw.

[0152] Accordingly, after hole 45 has been perforated by straw and the user applies a given load onto walls 7, 8, 9; 7', 8', 9, the level of pourable product inside packages 1, 1' at first decreases due to the fact that packages 1, 1' returns to the greater original volume and then increases due to the action of the user, but remains slightly below the level of hole 45, thus reducing the risk of leaking towards the contour of perforated hole 45, 45' engaged by straw.

[0153] As a matter of fact, packages 1, 1', when sealed, define a volume less than the geometrical volume defined by sheet packaging material 2, 2'. This happens because the packaging material 2, 2' forming package 1, 1' is slightly compressed when forming package 1, 1'.

[0154] In the end, angles α ranging between 1 and 7 degrees, packages 1, 1' are, on one hand, stackable better than the known parallelepiped packages and, on the other hand, less affected by the leakage problem associated to these known parallelepiped packages.

[0155] The Applicant has also found that the above-identified advantages can be especially achieved by using angles α ranging between 3 and 5 degrees.

[0156] Hole 45, 45' is closer to edge 16, which is at a greater distance than edge 15 from plane Q. Accordingly, the risk that pourable product leaks through the boundary of perforated hole 45, 45' is reduced also for even higher loads exerted by user onto walls 7, 8, 9; 7', 8', 9.

[0157] Furthermore, tab 29 is folded on the side of edge 15, which is closer to plane Q than edge 16.

[0158] In this way, due to the thickness of the packaging material, free edge 41 of tab 29 and edge 16 define plane R which is less angled than plane P with respect to plane Q and, in the embodiment shown, substantially parallel to plane Q horizontal in use.

[0159] Accordingly, when two or more packages 1, 1' are vertically stacked one on the other (as shown in Figures 2 and 9), bottom wall 6 of top package 1, 1' can be firmly supported on edges 16, 41, even if plane P is slightly angled relative to plane Q.

[0160] Wall 7' of packages 1' has height H1 greater than height H2 of wall 8' and is free from longitudinal band 24.

[0161] Accordingly, packages 1' can be stored in the point of sales with larger wall 7' in front of the customers, thus increasing their visual impression.

[0162] Segments 201 define with segments 200 angles β , which range between 1 and 7 degrees.

[0163] In this way, blanks M, M' of sheet packaging material 2, 2', once folded, can form packages 1, 1', which have the previously discussed advantages.

[0164] Clearly, changes may be made to package 1, 1' and blanks M, M' of sheet packaging material 2, 2' as

described and illustrated herein without, however, departing from the scope defined in the accompanying claims.

[0165] In particular, finished packages 1, 1' could comprise one or more further walls interposed between wall 9 and wall 7, 7' or 8, 8'.

[0166] Furthermore, holes 45, 45' could be replaced by through holes in the packaging material 2, 2', which are closed on the inner side of package 1, 1' by tightness layer, e.g. polyethylene, and on the outer side by a barrier layer.

[0167] The tightness layer and the barrier layer may be either perforated by a straw or manually removed by the user.

Claims

1. A sealed package (1, 1') for pourable food product, comprising:

- a first wall (6), which is adapted to define, in a normal use position, a bottom wall of said package (1, 1'), and which comprises a plurality of boundary first edges (10, 11, 12) defining a first plane (Q); and
- a second wall (5), which is opposite to said first wall (6), comprises a second edge (16) and a third edge (15) opposite to each other, and is adapted to define, in said normal use position, a top wall of said package (1, 1');

said second edge (16) and said third edge (15) defining a second plane (P), which is angled with respect to said first plane (Q) for a first angle (α) smaller than 90 degrees;

characterized in that said first angle (α) ranges between 1 and 7 degrees.

2. The sealed package of claim 1, **characterized in that** said angle (α) ranges between 3 and 5 degrees.

3. The sealed package of claim 1 or 2, **characterized by** comprising:

- a third wall (7, 7'), which extends between said first wall (6) and said second wall (5), and is bounded by said second edge (16);
- a fourth wall (8, 8'), which extends between said first wall (6) and said second wall (5), is opposite to said third wall (7, 7'), and is bounded by said third edge (15);

said third wall (7, 7') having a first height (H1) measured orthogonally to said first plane (Q);

said fourth wall (8, 8') having a second height (H2) measured orthogonally to said first plane (Q);

said first height (H1) being greater than said second

height (H2).

4. The sealed package of claim 3, **characterized in that** said second wall (5) defines a closed hole (45, 45'); said hole (45, 45') being closer to said second edge (16) than to said third edge (15).

5. The sealed package of claims 3 or 4, **characterized by** comprising a first sealing band (21), which is folded, at least partially, on said second wall (5), and forms a tab (29) bounded by a fourth free edge (41) and by a bend line (40) formed at the base of said first sealing band (25); said bend line (40) and said fourth free edge (41) being opposite to one another; said first sealing band (21) being folded on the side of said third edge (15), so that said fourth free edge (41) is interposed between said bend line (40) and said third edge (15).

6. The sealed package of claim 5, **characterized in that** said fourth free edge (41) and said second edge (16) define a third plane (R) which is angled with respect to said first plane (Q) for a second angle smaller than said first angle (α).

7. The sealed package of claim 6, **characterized in that** said third plane (R) is parallel to said first plane (Q).

8. The sealed package of any one of claims 3 to 7, **characterized by** comprising a second sealing band (24'), which extends transversally to said first sealing band (21) along said fourth wall (8'), so as to leave free said third wall (7') from any sealing band.

9. A sealed package (1, 1') for pourable food product, comprising:

- a first wall (6), which is adapted to define, in a normal use position, a bottom wall of said package (1, 1'), and which comprises a plurality of boundary first edges (10, 11, 12) defining a first plane (Q); and
- a second wall (5), which is opposite to said first wall (6), comprises a second edge (16) and a third edge (15) opposite to each other, and is adapted to define, in said normal use position, a top wall of said package (1, 1');

a first distance (H1) of said second edge (16) from said first plane (Q) being greater than a second distance (H2) of said third edge (15) from said first plane (Q);

said package (1, 1') further comprising a sealing band (21), which is folded, at least partially, on said second wall (6), and forms a tab (29) bounded by a

fourth free edge (41) and by a bend line (40) formed at the base of said first sealing band (21); said bend line (40) and said fourth free edge (41) being opposite to one another;

characterized in that said first sealing band (21) is folded on the side of said third edge (15), so that said fourth free edge (41) is interposed between said bend line (40) and said third edge (15).

10. A basic unit (M, M') of a sheet packaging material for producing a sealed package (1, 1') of a pourable food product, comprising:

- at least one first crease line (63), which is adapted to define first edges (15, 16, 17) of a top first wall (5) of said finished package (1, 1') once said basic unit (M, M') has been folded;

- at least one straight second crease line (67), which is adapted to define second edges (10, 11, 12) of a bottom second wall (6), opposite to said first wall (5), of said finished package (1, 1') once said basic unit (M, M') has been folded;

- a first panel (153), which is adapted to define at least a portion (22, 22') of said top first wall (5) of said finished package (1, 1') once said basic unit (M, M') has been folded; and

- at least one second panel (151), which is arranged on the opposite side of said first panel (153) with respect to said first crease line (63), and is adapted to define a lateral third wall (9), interposed between said top first wall (5) and said bottom second wall (6) of said finished package (1, 1') once said basic unit (M, M') has been folded;

said first crease line (63) comprising, in turn,:

- a first segment (200), which bounds said first panel (153) and is adapted to define one (15) of said first edges (15, 16, 17) of said finished package (1, 1') once said basic unit (M, M') has been folded; and

- at least one second segment (201, 201'), which is adjacent and consecutive to said first segment (200), bounds said second panel (151) and is adapted to define another one (17) of said first edges (15, 16, 17) once said basic unit (M, M') has been folded;

said first segment (200) and second segment (201, 201') being angled at an angle (β) smaller than 90 degrees;

characterized in that said angle (β) ranges between 1 and 7 degrees.

11. The basic unit of claim 10, **characterized in that** said angle (β) ranges between 3 and 5 degrees.

12. The basic unit of claim 10 or 11, **characterized in that** said second segment (201) diverges from said

second crease line (67), starting from said first segment (200) and proceeding along said first crease line (63).

5 13. The basic unit of claim 12, **characterized by** comprising:

- a third panel (154) arranged on the same side of said first panel (153) with respect to said first crease line (63) and adapted to define an additional portion (23a) of said top first wall (5) of said package (1), once said basic unit (M) has been folded; and

- a closed third crease line (191) arranged inside said third panel (153) and adapted to define a boundary for a hole (45) of said package (1);

said first crease line (63) comprising a third segment (202), which bounds said third panel (154) and is arranged on the opposite side of said second segment (201) relative to said first segment (200).

14. The basic unit of claim 10 or 11, **characterized in that** said second segment (201') converges towards said second crease line (67), starting from said first segment (200) and proceeding along said first crease line (63).

15. The basic unit of claim 14, **characterized by** comprising a closed third crease line (191'), which is arranged inside said first panel (153) and is adapted to define a boundary for a hole (45') of said package (1') and intended to be perforated by a straw.

16. The basic unit of any one of claims 10 to 15, **characterized by** comprising a pair of said second panels (151), which are arranged on respective lateral sides of said first panel (153) and are adapted to define respective lateral second walls (9) of said finished package (1, 1'), once said basic unit (M, M') has been folded;

said first crease line (63) comprising a pair of second segments (201, 201'), which bound respective said second panels (151), extend on opposite lateral sides of said first segment (200) and are adapted to define respective first edges (17), once said basic unit (M, M') has been folded.

FIG. 1

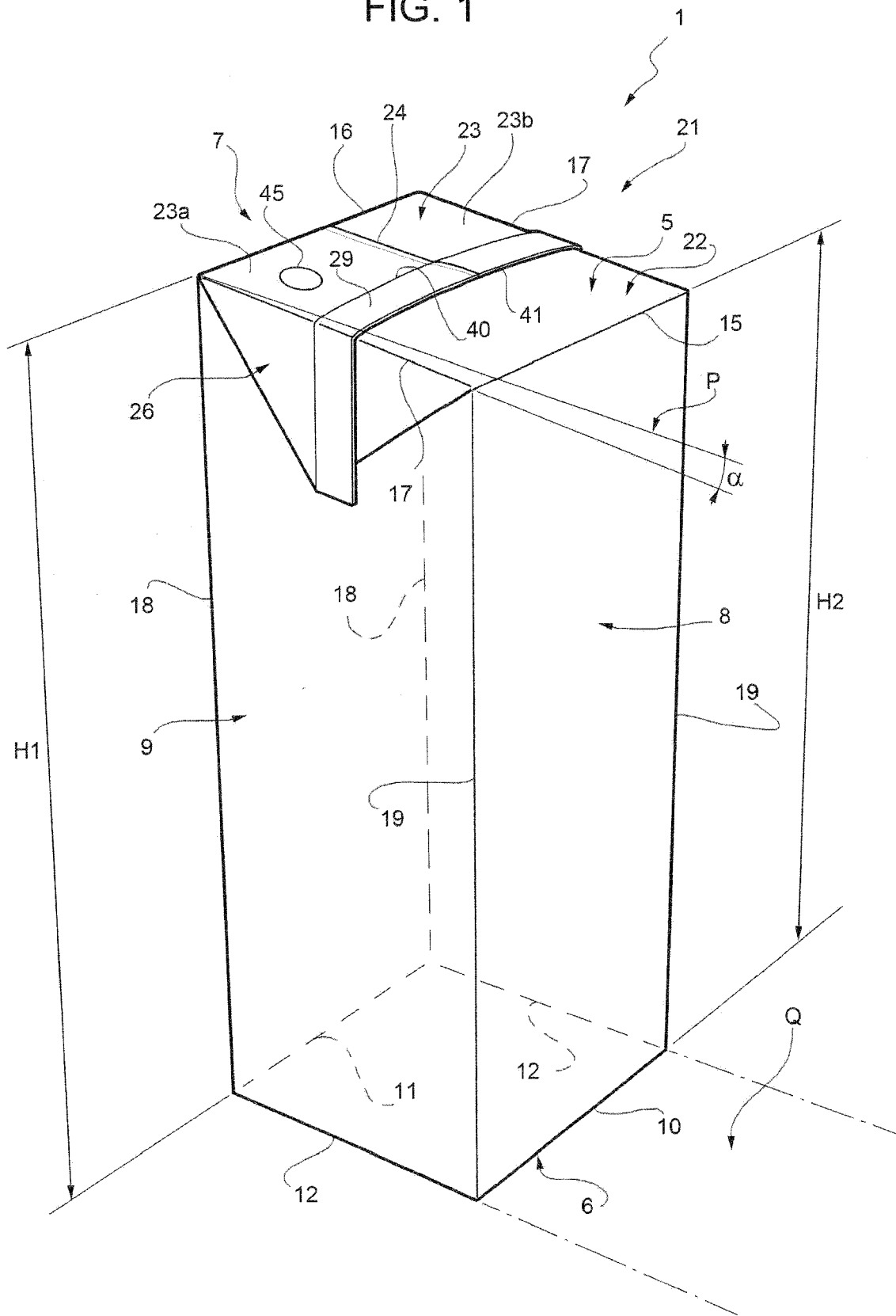


FIG. 2

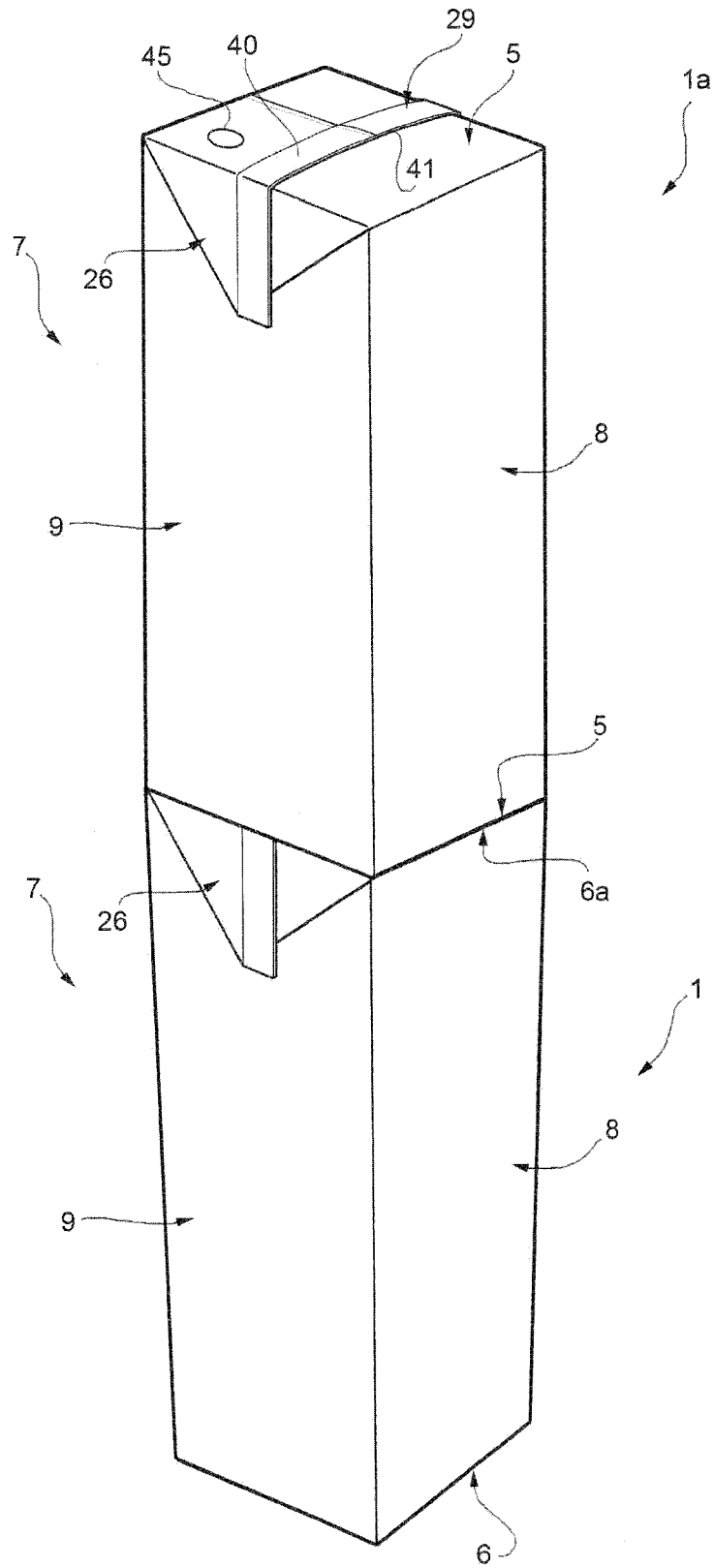


FIG. 3

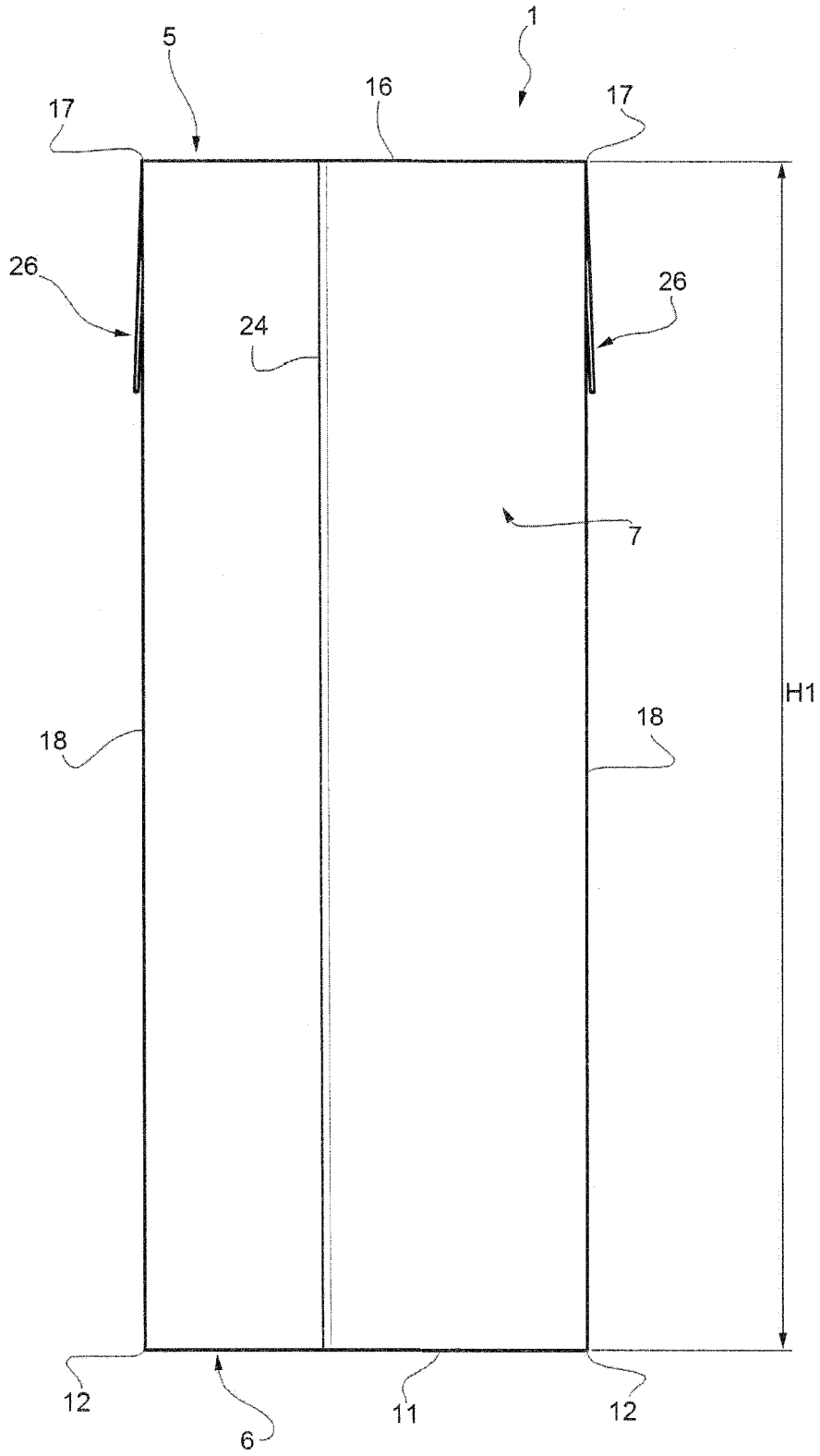


FIG. 4

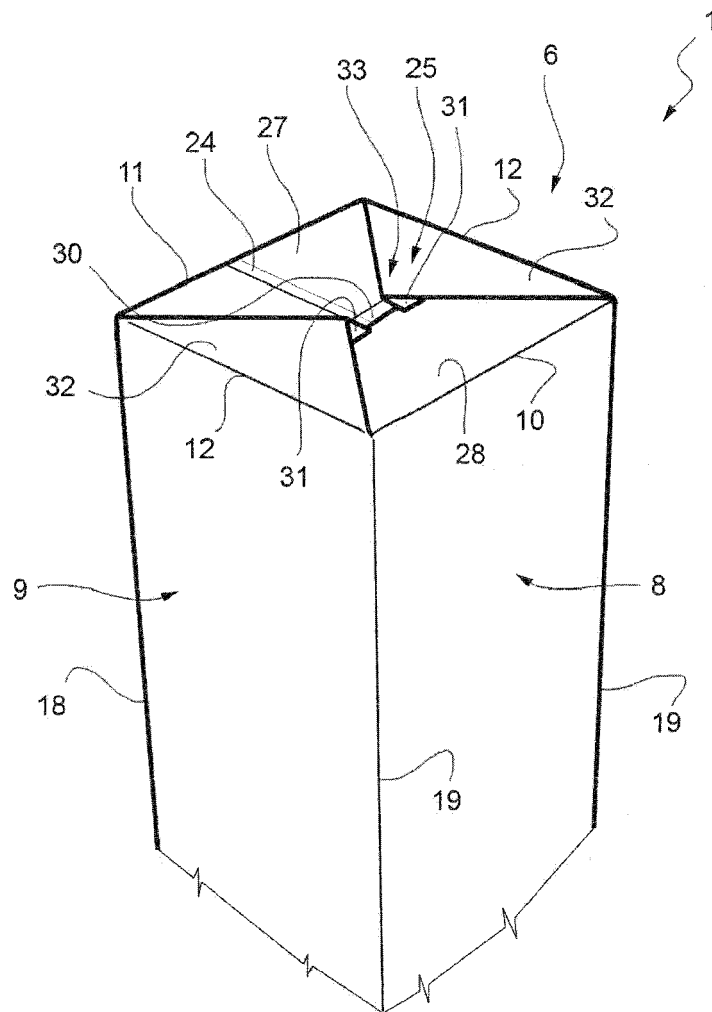


FIG. 5

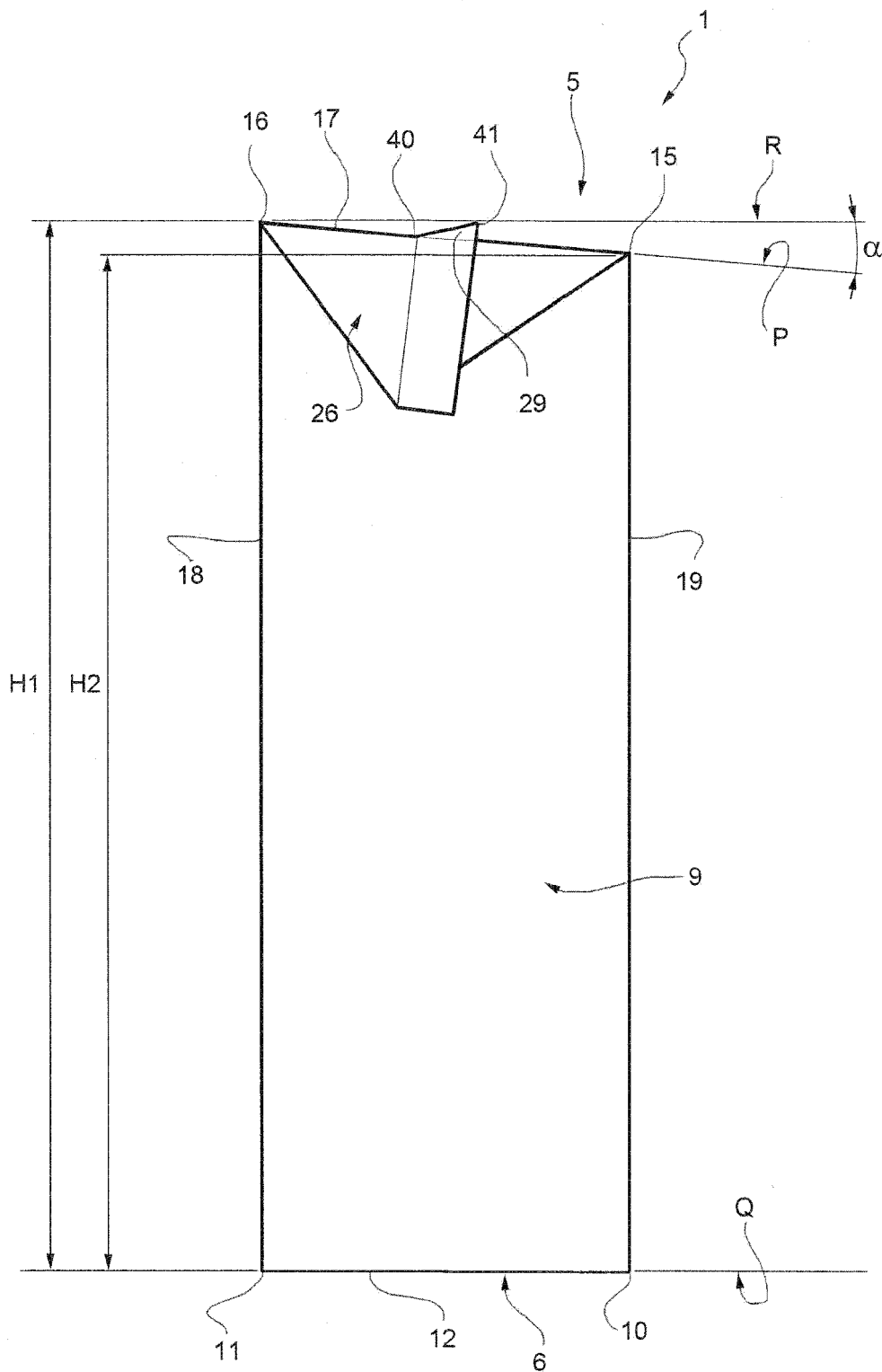


FIG. 6

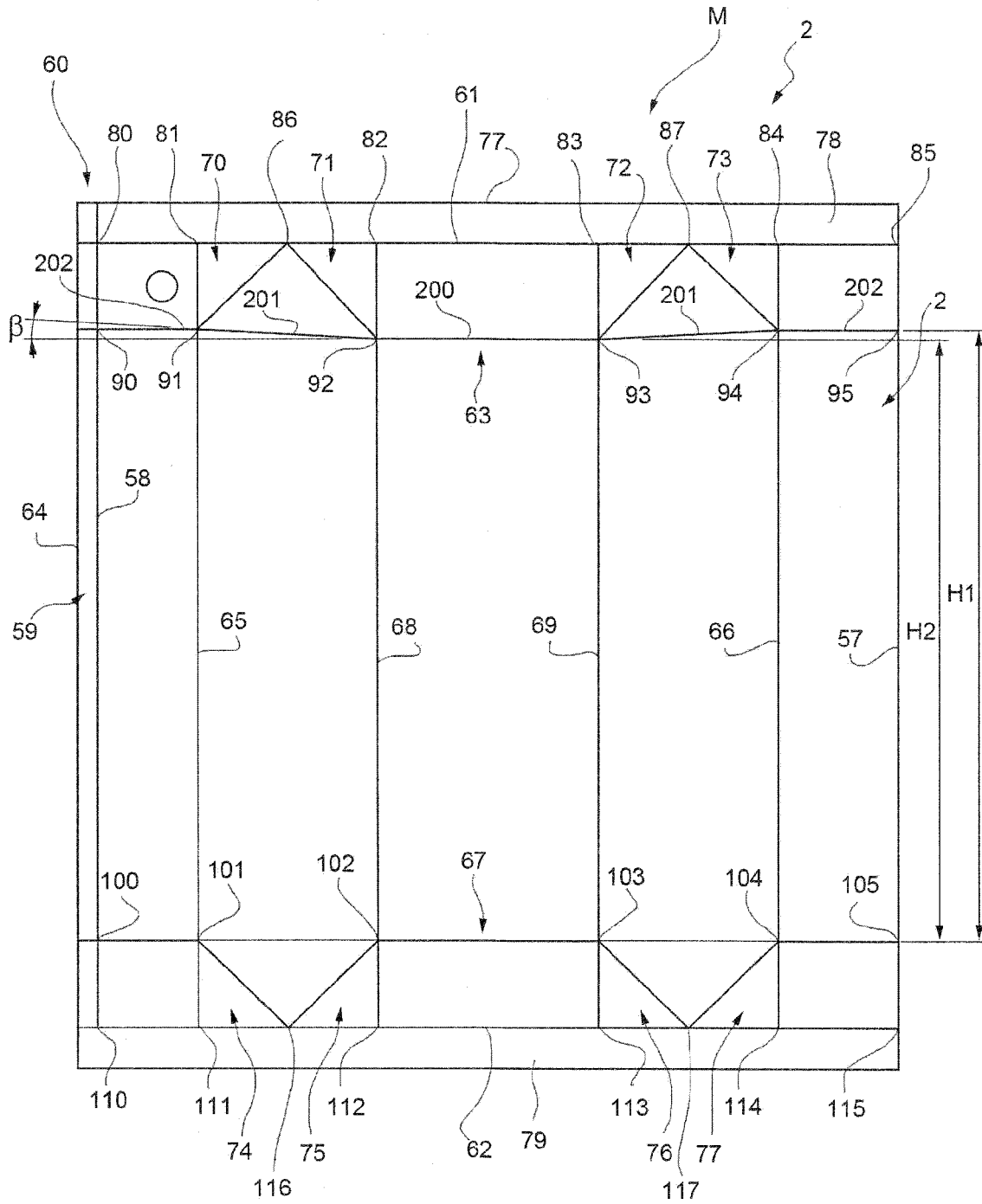


FIG. 7

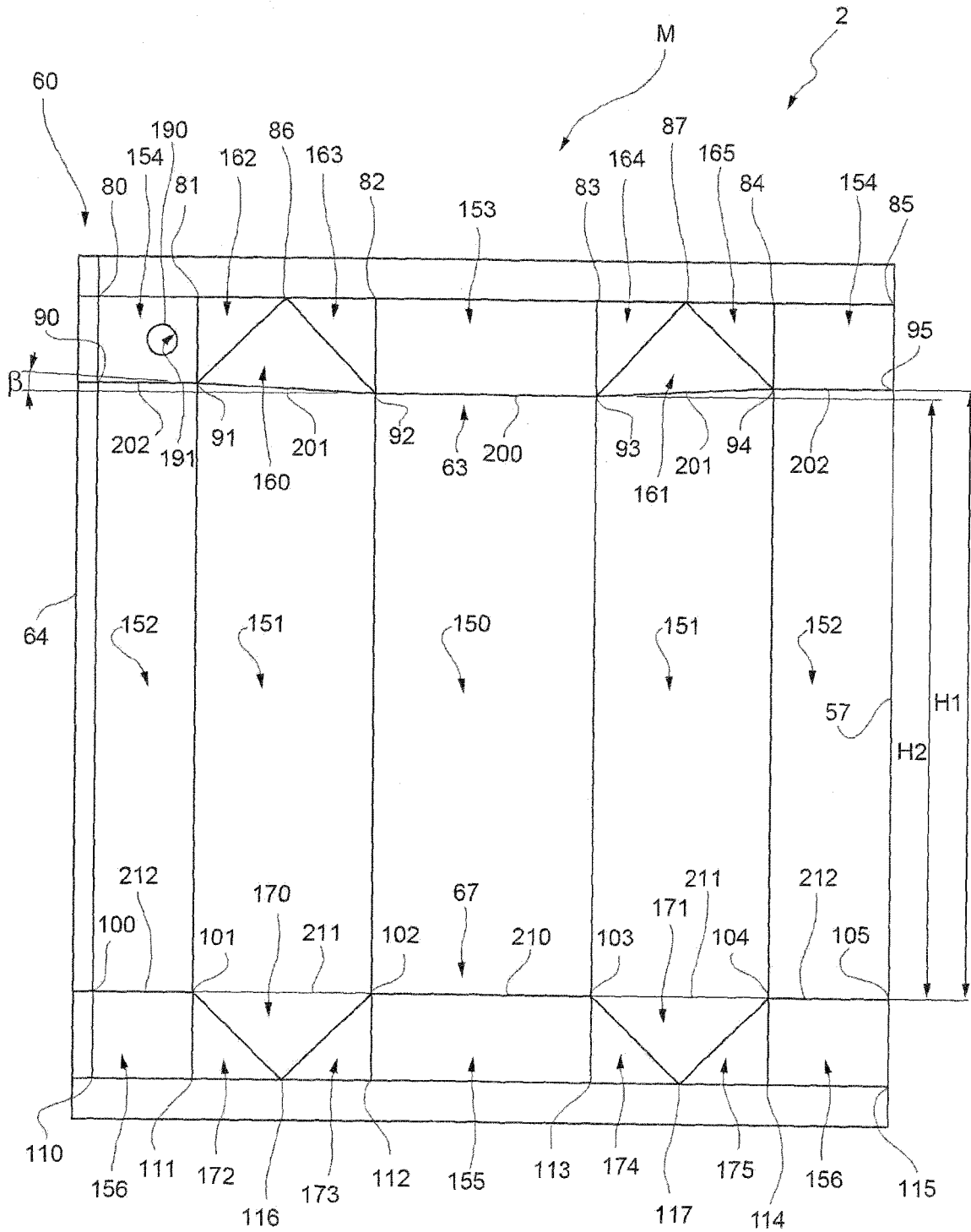


FIG. 8

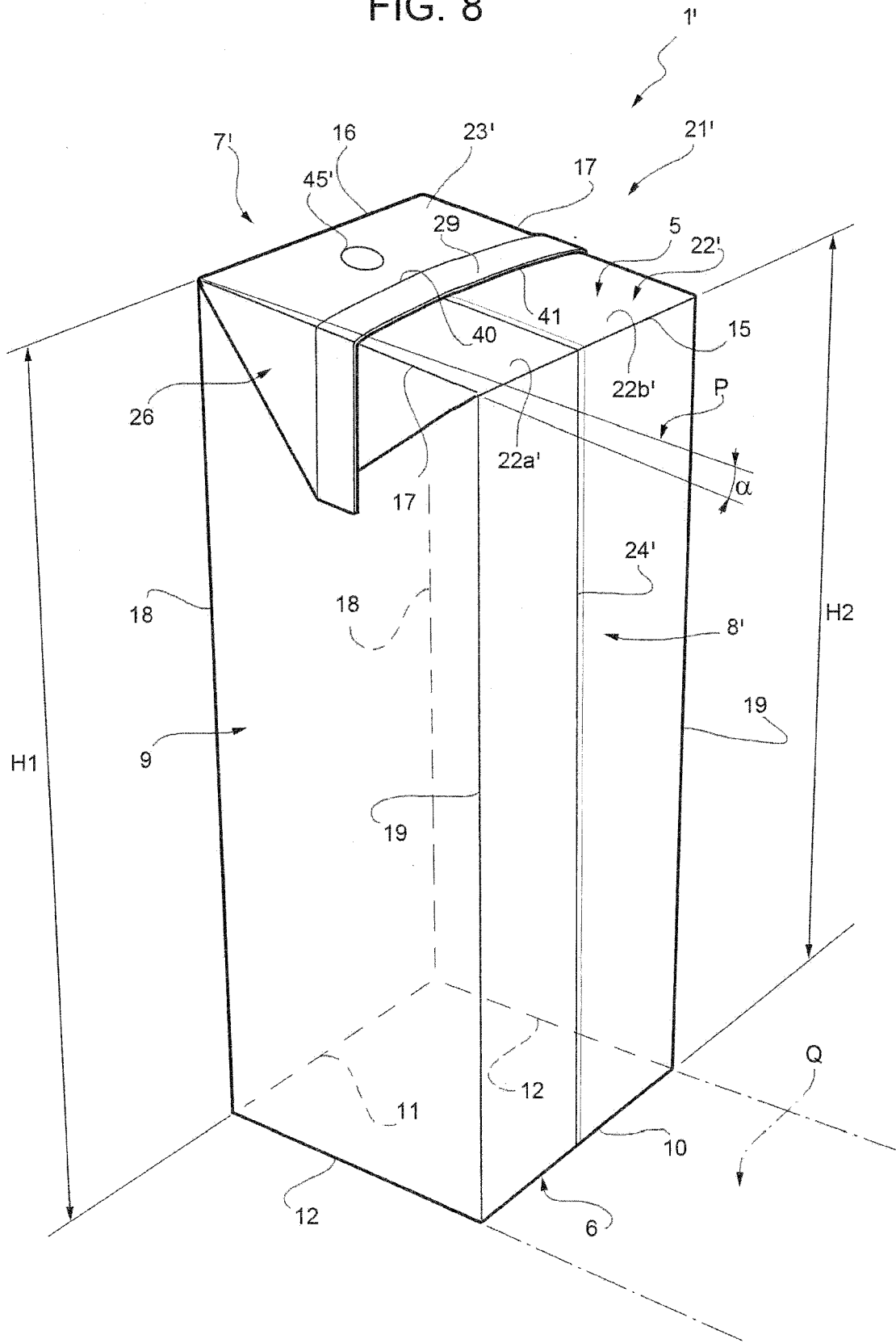


FIG. 9

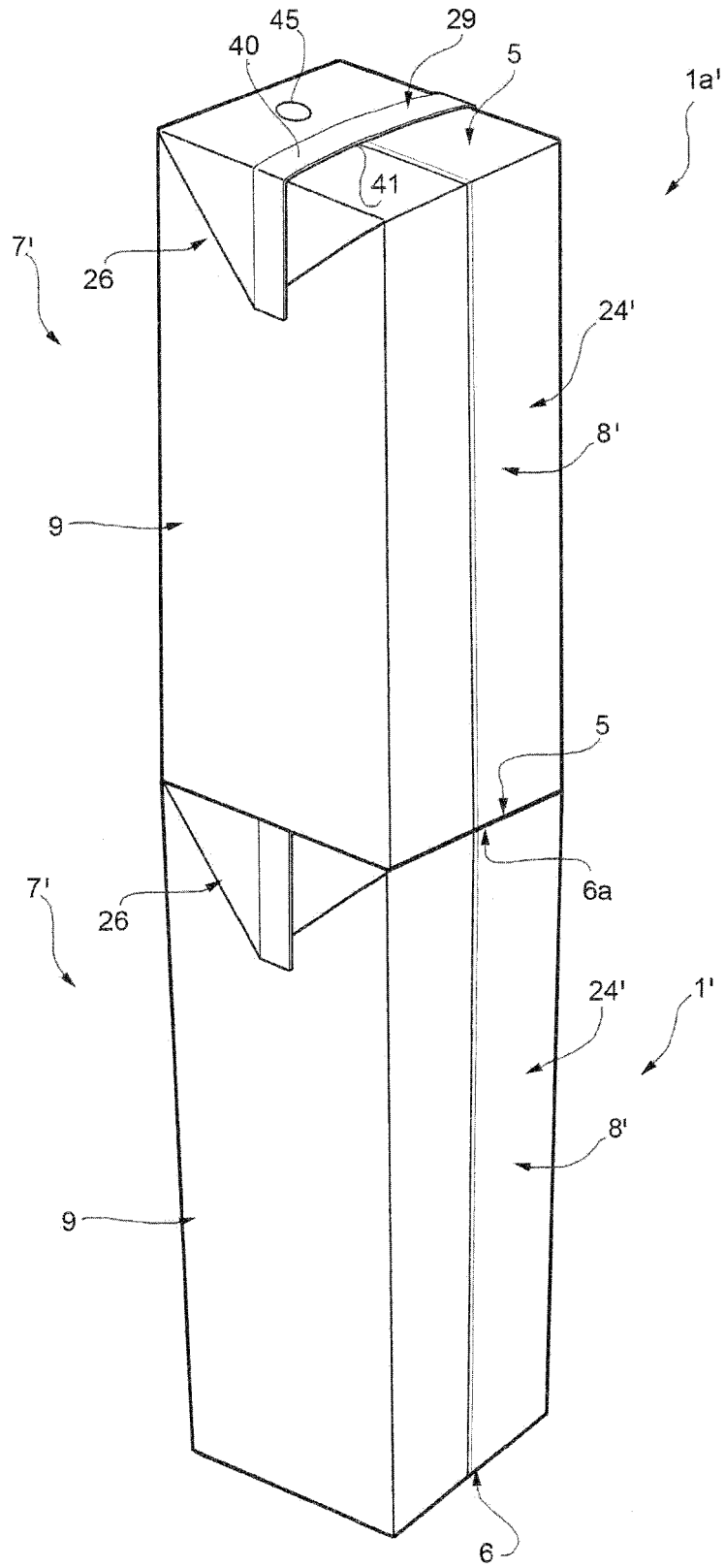


FIG. 10

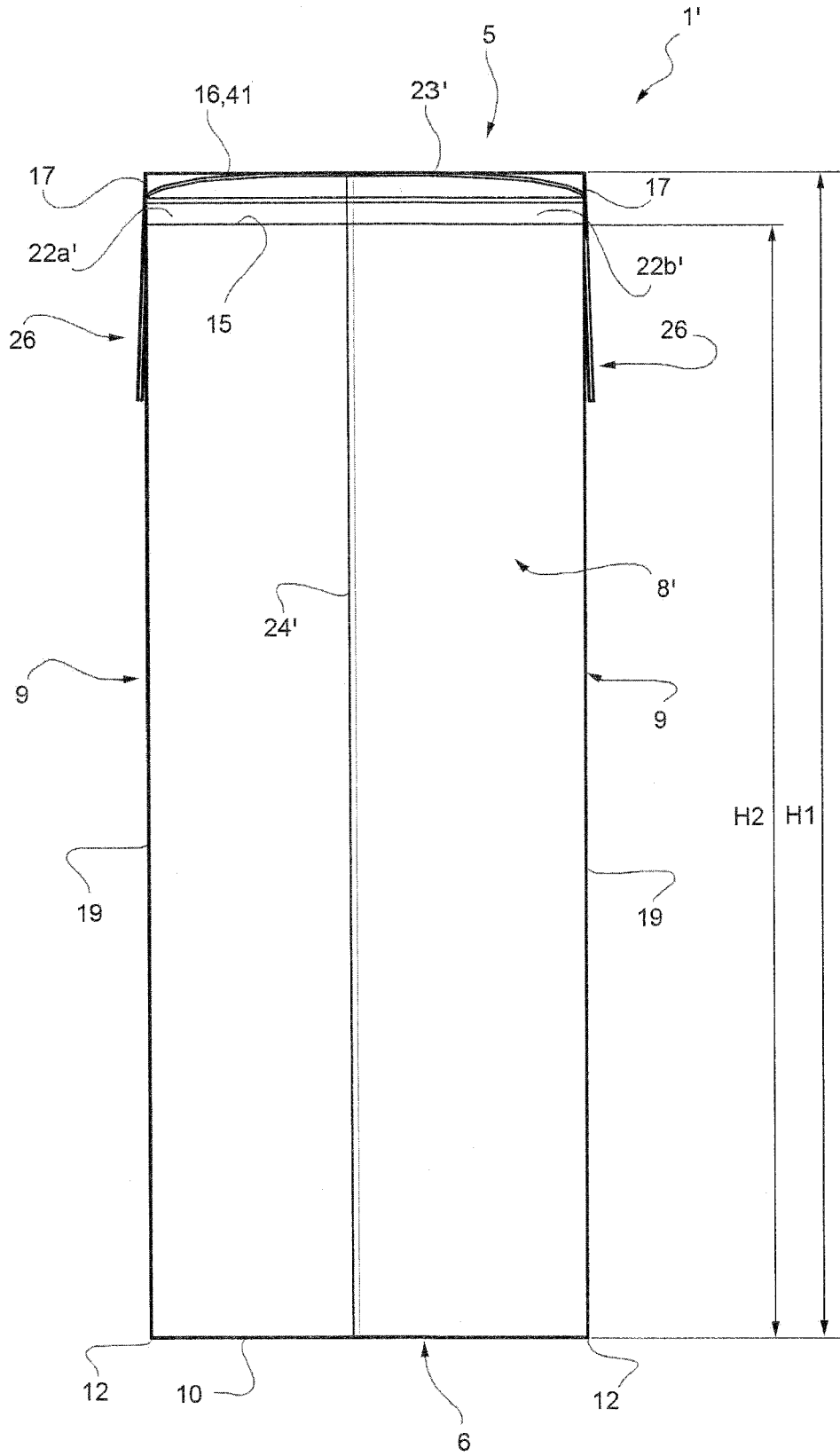


FIG. 11

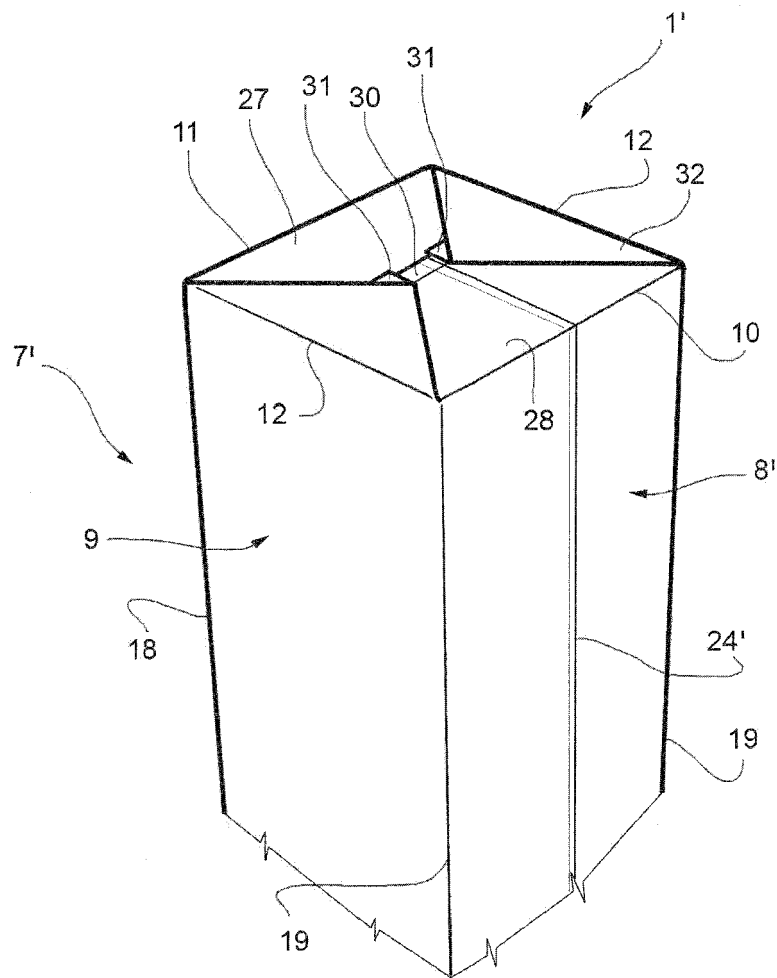
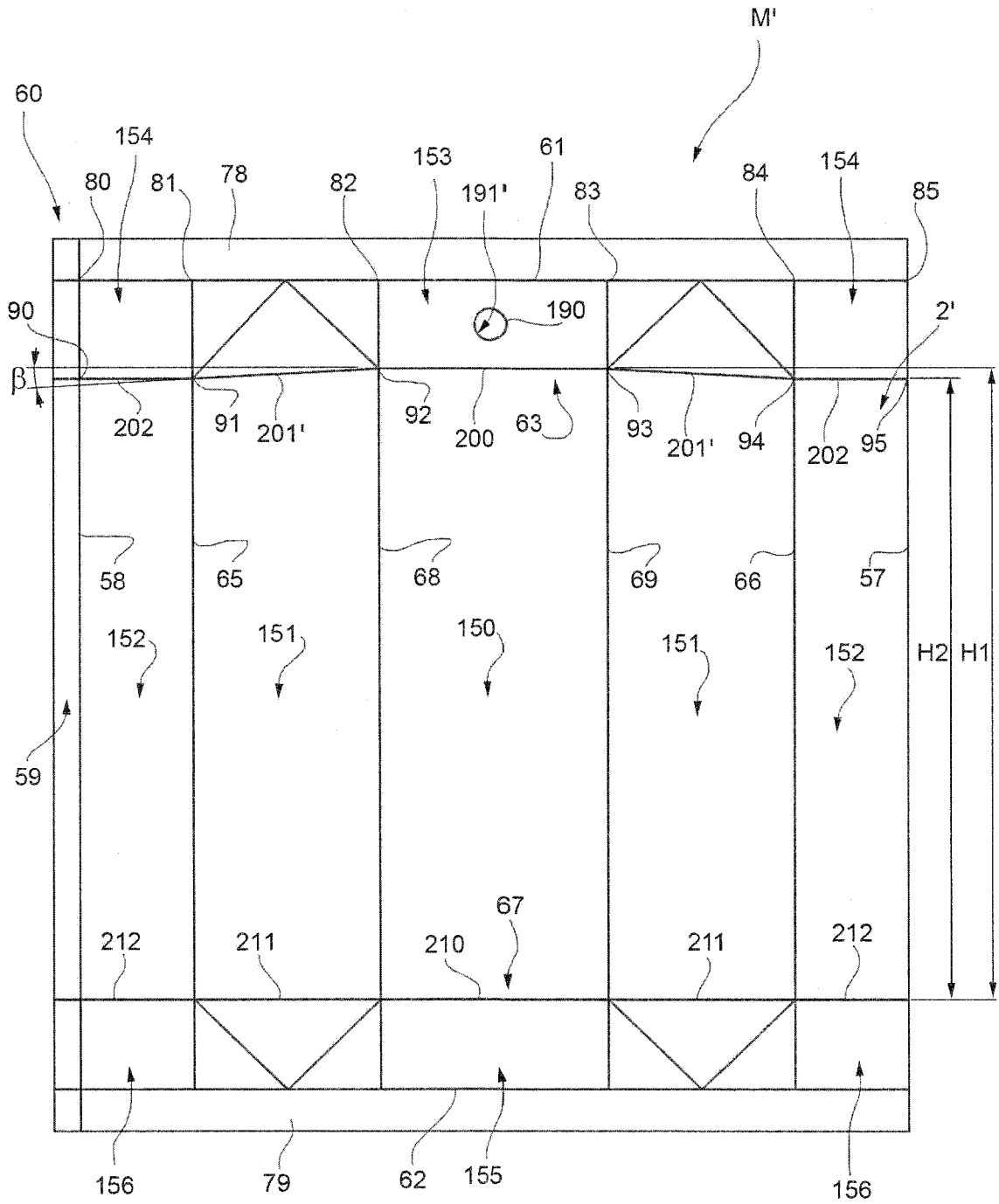


FIG. 12





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| Place of search Munich | | Date of completion of the search 24 April 2014 | Examiner Vesterholm, Mika |
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