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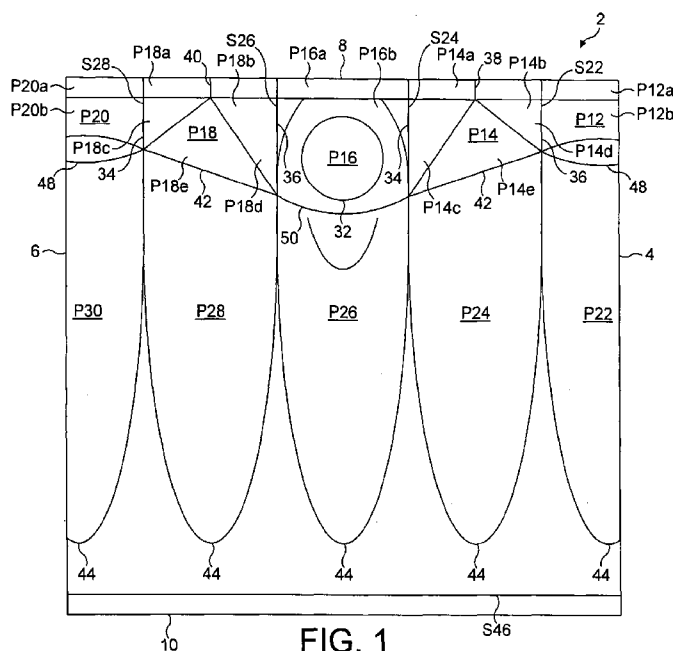


FIG. 1

(57) Abstract: A container blank (2), a container and a method of forming the container blank are disclosed wherein the blank (2) is provided with opposite, substantially rectilinear, first and second lateral edges (4,6) substantially parallel to each other, the blank including a row of top closure panels (P12-P20) extending from the first edge (4) to the second edge (6) and bounded by a third edge (8), the top closure panels being separated from each other by lines of weakness for providing fold lines (S22-S28) and extending away from the third edge, and a bottom fourth edge (10) extending between the first and second edges (4,6) and substantially parallel to the third edge (8), the fourth edge (10) being substantially free from any lines of weakness extending away therefrom. In this way, the container made from the blank may have a top and a bottom of respective, different geometric shapes, but formed from a substantially rectangular blank, for example, rectangular tops and circular bottoms.

CONTAINER MADE OF MATERIAL, BLANK AND METHODS

This invention relates to a container blank, a container, and methods for forming a container blank and a container.

5 It is known to produce containers having a circular base and a rectangular top from a blank of laminate material of a fan-like shape having converging opposite side edges.

In practice, the cutting-out of these blanks from a web of laminate material can lead to a relatively large amount of waste laminate material which can be difficult to recycle.

10 According to a first aspect of the present invention, there is provided a container blank, with opposite, substantially rectilinear, first and second lateral edges substantially parallel to each other, said blank including a row of top closure panels extending from the first edge to the second edge and bounded by a third edge, the top closure panels being separated from each other by lines of weakness for providing fold lines and extending away from the third edge, and a bottom fourth edge extending between the first and second edges and substantially parallel to the third edge, the fourth edge being substantially free from any lines of weakness extending away therefrom.

20 According to a second aspect of the present invention, there is provided a container comprised of a piece of material, said piece having opposite, substantially parallel, downwardly extending, first and second edges, said container having a downwardly extending seam bounded by said first and second edges respectively internally and externally of the container, said container including a loop of top closure panels bounded by a top third edge of said piece extending substantially perpendicularly to said seam, the top closure panels being sealed together adjacent said third edge and separated from each other by lines of weakness providing fold lines extending away from the third edge, and said piece having a bottom fourth edge being substantially free from any lines of weakness extending away therefrom.

According to a third aspect of the present invention, there is provided a method of forming a container blank, comprising cutting out the blank from material so that the blank has opposite, substantially rectilinear, first and second lateral edges substantially parallel to each other, and scoring said material so as to form lines of weakness for providing fold lines and extending away from a top third edge of the blank and separating from each other a plurality of top closure panels of the blank, and leaving a fourth lower edge opposite and substantially parallel to the third edge substantially free from any lines of weakness extending away therefrom.

Owing to these aspects of the invention, it is possible to form the container from the blank so as to have tops and bottoms of respective, different geometric shapes, but formed from a substantially rectangular blank. In this way, conventionally-shaped rectangular blanks can be cut from the laminate material with minimal waste and formed into containers having, preferably, circular bottoms and rectangular tops.

The use of substantially rectangular blanks results in a more efficient converting process compared to that using blanks of a fan-like shape, through the much better nesting of substantially rectangular blanks on the web of laminate material from which the blanks are cut. This, in comparison with blanks of a fan-like shape, leads to cost savings for the following reasons:-

- less laminate material used,
- less waste of the laminate material,
- easier handling during the converting process,
- logistically easier transportation between the converting plant and the container production plant,
- easier handling of the blanks in the container filling machine

Further lines of weakness, which are not for providing fold lines, may be provided in the blank, which either are substantially parallel to the fourth edge or extend away from that edge, but these are for purposes other than folding, such as for aesthetic purposes or for improving the grip properties of the container. The lines of weakness which separate the top closure panels are present to promote intentional folding of the material to form the rectangular top of the container.

The type of top closure can be any desired, such as gable-top, flat-top or slant-top and may comprise a suitable plastics top insert, but is, preferably, a slanted asymmetric fin-seal type of top closure. The blank is preferably formed of a laminate material.

Advantageously, the circular base of the container can be closed in a similar manner to that described in WO2005/120964 using a bottom insert comprising a substantially flat floor and a downwardly directed flange about which the fourth edge of the present blank is folded.

One further advantage of using a rectangular container blank for forming a container with a substantially circular bottom and a substantially rectangular top is that containers of differing internal volumes can be formed on a rotary mandrel system in which the mandrels are of a substantially constant rectangular cross-section along their entire length. Therefore, just by adjusting the height of the container blank, different container sizes, with the same bottom diameter and the same cross-sectional area of the top, can be formed without having to change the mandrels. With known containers having substantially rectangular tops and substantially circular bottoms and which are formed from fan-shaped blanks being loaded onto mandrel systems, in order to produce containers of differing internal volumes, different mandrels are needed for each size.

According to a fourth aspect of the present invention, there is provided a container including a piece of material,

the piece having opposite substantially rectilinear, first and second edges substantially parallel to each other, said container having a base portion of larger external cross-sectional area than a top portion of the container.

5 According to a fifth aspect of the present invention, there is provided a method of forming a container comprising receiving a blank with opposite, substantially rectilinear, first and second edges substantially parallel to each other for providing a container sleeve, forming a bottom closure to
10 form a base portion, and folding top closure panels of the blank to form a top portion, wherein the base portion is of larger external cross-sectional area than said top portion.

Owing to these aspects of the invention, it is possible to form a container with a base portion of larger external
15 cross-sectional area than the top portion and therefore provide a relatively more stable container.

A substantially circular base portion of larger cross-sectional area than a substantially rectangular top portion results in a particularly advantageous arrangement to resist
20 toppling forces and so remain upright. The base portion is advantageously formed by applying a bottom insert as previously mentioned.

At a mid-portion of the container body at the transition from circular cross-section to rectangular cross-section,
25 lines of weakness can be present to reduce stresses on the laminate material that may result in creasing and/or cracking thereof.

According to a sixth aspect of the present invention, there is provided a container comprising a top-sealed carton, said carton including a top closure including a quadrangular
30 roof obturating sub-panel, a pour spout fitment having a flange attached to said obturating sub-panel, and, disposed outwardly of said obturating sub-panel, a top sealing sub-panel, the obturating sub-panel and the top sealing sub-panel
35 lying in the same plane, wherein a portion of said flange overlaps a boundary between the obturating sub-panel and the

top sealing sub-panel.

According to a seventh aspect of the present invention, there is provided a method of forming a container comprising receiving a container blank with opposite, substantially
5 rectilinear, first and second edges substantially parallel to each other for providing a container sleeve, forming and sealing a bottom closure arrangement, and attaching a pour spout fitment to a quadrangular roof obturating sub-panel of a top closure arrangement, the top closure arrangement
10 including a top sealing sub-panel disposed outwardly of and lying in the same plane as said obturating sub-panel, said attaching comprising attaching a flange of said pour spout fitment to said obturating sub-panel such that a portion of said flange overlaps a boundary between said obturating sub-
15 panel and said top sealing sub-panel.

Owing to these aspects of the present invention, it is possible to provide a flat-top or slant-top carton, particularly one of a relatively small internal volume, having a pour spout fitment of relatively large through-flow
20 cross-sectional area.

Advantageously, at the boundary between the obturating sub-panel and a container body panel opposite the boundary with the top sealing sub-panel, there is a downwardly bowed fold line to enable maximisation of the through-flow cross-
25 sectional area of the pour spout fitment.

In aseptic filling systems, the pour spout fitment is preferably attached to the obturating sub-panel after filling and top sealing of the container, and the obturating sub-panel would include a partial depth cut, preferably in the
30 form of an open loop, would be present so that the piece of material surrounded by the partial depth cut does not fall into the container contents upon first opening.

In order that the invention may be clearly and completely disclosed, reference will now be made, by way of
35 example, to the accompanying drawings, in which:-

Figure 1 is a top plan view of a container blank of

laminate material;

Figure 2 is a top plan view of a second embodiment of a container blank of laminate material;

Figure 3 is a perspective view of a container formed
5 from a blank similar to Figure 2;

Figure 4 is a top plan view of a third embodiment of a container blank of laminate material;

Figure 5 is a perspective view of a container formed from the blank of Figure 4;

10 Figure 6 is a top plan view of a fourth embodiment of a container blank of laminate material;

Figure 7 is a perspective view of a container formed from the blank of Figure 6;

Figure 8 is a top plan view of a fifth embodiment of a
15 container blank of laminate material;

Figure 9 is a perspective view of a container formed from the blank of Figure 8;

Figure 10a shows respective front and side views of two different containers having differing forms of flat top
20 closure;

Figure 10b shows a diagrammatic representation of the bottom and top portions of the containers of Figure 10a;

Figure 11a shows respective front and side views of two different containers having differing forms of gable top
25 closure; and

Figure 11b shows a diagrammatic representation of the bottom and top portions of the containers of Figure 11a.

Referring to Figure 1, a substantially rectangular container blank 2 of laminate material comprises
30 substantially rectilinear, first and second edges 4 and 6 parallel to each other. The blank 2 further comprises upper and lower, third and fourth edges 8 and 10 parallel to each other and extending between the first and second edges 4 and 6. The angles between the edges 4, 8 and 10 and 6, 8 and 10
35 are substantially 90°.

Extending along the third edge 8 there is a row of top

closure panels P12, P14, P16, P18 and P20 separated from each other by fold lines S22, S24, S26 and S28. The top closure panels P12 to P20 comprise a row of top sealing sub-panels P12a to P20a arranged along the straight third edge 8 of the blank 2 and a row of obturating sub-panels P12b to P20b between the sealing sub-panels P12a to P20a and corresponding body panels P22, P24, P26, P28 and P30.

The edge 4 is to slightly overlap the edge 6 in a manner known per se when the container is formed from the blank 2. The obturating sub-panels P12, P16 and P20 are substantially rectangular as are the sealing sub panels P12a to P20a, which are of substantially identical height to each other. In a direction transverse to the row of body panels P22 to P30, the obturating sub-panels P12b and P20b are of an extent significantly smaller than the obturating sub-panel P16b, which is formed with a through hole 32 for receiving or underlying a pour spout fitment. For an aseptic package, the hole 32 would not be present, but there would be a circular partial depth cut in the laminate material which be fully cut and pushed inwardly of the carton upon opening in a known manner.

The obturating sub-panels P14b and P18b are each comprised of triangular sub-sub-panels P14c, P14d and P14e/P18c, P18d and P18e of which P14c and P14d/P18c and P18d have boundaries 34 and 36 with extents substantially co-extensive with extents of the respective obturating sub-panels P12b, P16b and P20b. The sub-sub panels P14c and P14d/P18c and P18d meet at a point centrally of the length of the sealing sub-panels P14a and P18a, whence central fold lines 38 and 40 of the respective sealing sub-panels P14a and P18a extend to the edge 8. Each further triangular sub-sub panel P14e/P18e has a boundary 42 inclined away from the edge 8 and common with the adjacent body panel P24 and P28.

The body panels P22 to P30 are defined by lines of weakness 44 which are not fold lines but are for allowing a smooth translation between the substantially rectangular top

portion of the formed container and the substantially circular base portion. The lines of weakness 44 prevent potential cracking of the laminate material and thus allows a smooth bending of the laminate material when the carton from the blank 2 is formed. The lines of weakness 44 are substantially U-shaped for body panels P24, P26 and P28 and substantially half-U-shaped for body panels P22 and P30.

Arranged substantially parallelly to the edge 10 and extending from the edge 4 to the edge 6 is a fold line S46 about which the edge 10 is folded when forming the bottom closure of the carton.

When forming a carton from the blank shown in Figure 1, the blank may have the pour spout fitment applied whilst in its flat state before being converted into a carton sleeve in which the body panels P22 to P30 form a loop round the sleeve, or it can be applied, as is conventional, after the body of the carton has been formed and bottom sealed and either before or after filling and top sealing. The bottom closure is then formed in any per se known manner, but in particular to a similar way as described in WO2005/120964. Then, there is preferably pre-breaking of the fold lines of the top closure. After filling of the carton (aseptically or non-aseptically) the obturating sub-panels P12b/P20b and P16b are turned about their inner boundaries 48 and 50 respectively, whilst the triangular sub-sub-panels P14e and P18e are turned outwardly about their respective boundaries 42 and relative to the respective pairs of sub-sub-panels P14c and P14d/P18c and P14d. At the same time, each of the sealing sub-panels P14a and P18a is folded outwardly on itself about the fold lines 38 and 40 thereof. Next, the inside faces of the top sealing sub-panels P12a/P20a and P16a are sealed to each other while the inside surface of each of the folded sealing sub-panels P14a and P18a is sealed to itself, thereby forming a fin-seal. Thereupon, the fin-seal is turned away from the fitment and thereafter, respective end regions of the fin-seal, i.e. those regions being the

sealing sub-panels P14a and P18a, and the remainders of the respective closure panels P14 and P18 are turned down about the boundaries 42 towards respective outside surfaces of the now side body panels P24 and P28 and then tacked to those outside surfaces.

The version of the blank 2 shown in Figure 2 is particularly suitable for forming an aseptically-filled carton. The blank 2 of Figure 2 differs from that of the blank of Figure 1 in that the top closure sub-panel P16b has a partial depth cut 52 in the form of an open loop. When a pour spout fitment is applied to the formed, filled and sealed container, a flange of the fitment is attached to the obturating sub-panel P16b. The broken line in Figure 2 denotes the outer edge 57 of the flange when attached to the sub-panel P16b, of which a small upper portion overlaps the boundary 54 between the obturating sub-panel P16b and the top-sealing sub-panel P16a so as to protrude into the top sealing sub-panel P16a. Furthermore, the blank 2 of Figure 2 includes, in addition to the fold line S46, a plurality of transverse lines of weakness 56 substantially parallel to the edges 8 and 10 and which extend between but do not cross the body panels P22 to P30. The lines of weakness 56 are present to improve a user's grip on the completed carton.

As a result of the flange overlapping the boundary 54, the use of a pour spout fitment with a relatively large through-flow cross-sectional area can be made, which is particularly suitable for cartons of relatively small internal volume where the top closure panel P16 will be of a correspondingly smaller surface area.

A further difference between the blanks 2 of Figures 1 and 2 is that the angle to the horizontal of the boundaries 42 is significantly greater in Figure 1. This difference highlights the difference in the blank configurations needed for containers where the pour spout fitment is attached to the container through a hole from the inside surface of the laminate material (the configuration of Figure 1) and those

where the pour spout fitment is attached to the container after filling and top sealing (the configuration of Figure 2). The configuration of Figure 2 allows for a relatively small roof obturating sub-panel P16b and the use of a pour
5 spout fitment having a flange overlapping the boundary 54, as already discussed. With the configuration of Figure 1, the flange of the pour spout fitment is attached to the inside surface of the laminate material and it would be impractical to have a portion of the flange overlapping the boundary 54,
10 since this would greatly complicate the sealing together of the top-sealing sub-panels P12a-P20a. The greater angle of the boundaries 42 gives a relatively larger size of the sub-panel P16b.

Figure 3 shows an aseptically filled carton 100 made
15 from a blank similar to that of Figure 2. The carton 100 has a substantially circular end closure or base and a substantially rectangular top closure of an asymmetric fin-seal nature, the top closure including a pour spout fitment in the form of a screw cap fitment 58 which overlies a
20 partial depth cut (not seen). The base of the carton 100 has a larger cross-sectional area than the substantially rectangular top closure, the cross-sectional area decreasing progressively upwardly of the carton 100. This results in a relatively stable carton.

Referring to Figure 4, a third version of the blank 2 is
25 shown in which the body panels P24 and P28 are substantially V-shaped and bounded by the lines of weakness 44. In this version of the blank 2, the lines of weakness 56 to assist a user in gripping the finished carton are on the body panels
30 P24 and P28 and are inclined substantially parallelly to the boundaries 42 between the body panels P24 and P28 and the respective adjacent triangular sub-sub panels P14e and P18e.

Figure 5 shows a carton 100 made from the blank 2 of
Figure 4 with the screw cap 58 attached to the obturating top
35 closure panel P16. As in Figure 3, the base is substantially circular with a larger cross-sectional area than the

substantially rectangular top closure.

Referring to Figure 6, the blank 2 is similar to that shown in Figure 4 in that the lines of weakness 44 define substantially V-shaped body panels P24 and P28, but there are no further lines of weakness for assisting the user to grip the formed carton. In this embodiment, the top closure sub-panel P16b also includes a partial depth cut 52' similar to that of Figure 2 in that the cut 52' is in the form of an open loop and is wholly contained within the boundaries of the top closure sub-panel P16b but has one free end further from the central zone of the loop than the other end, as described in WO 2006/000881. Furthermore, in the top sealing sub-panels P14a and P18a the upper edge 8 has a shallow V-shape resulting in a shortening of the central fold lines 38 and 40, but which do not alter the substantially rectangular profile of the whole blank 2. This shortening of the central fold lines 38 and 40 is necessary owing to the angle of the boundary lines 42 in relation to the horizontal. It can be seen from Figure 7 that the boundaries 42 create a relatively large degree of slanting of the top closure sub-panel P16b. When the carton of the blank 2 of Figure 6 is formed (shown in Figure 7), the respective end regions of the fin-seal, as described above in relation to Figure 1, would, in the absence of the shallow V-shape in the sealing sub-panels P14a and P18a and the shortened fold lines 38 and 40, extend beyond the rear body panel of the carton and result in a less aesthetic package. Figure 7 shows a carton 100 constructed from the blank 2 of Figure 6 with a screw cap fitment 58 attached to the top closure panel P16 which in a known manner, when opened, will completely cut through the laminate material along the partial depth cut 52' in order to gain access to the contents of the carton 100. As with Figure 2, the blank 2 of Figure 6 and the corresponding carton 100 of Figure 7 are particularly suitable for aseptic applications.

The version of the blank 2 shown in Figure 8 has the lines of weakness 44 defining four lanceolate body sub-panels

60 between the body panels P22 to P30. The lanceolate body sub-panels 60 include the transverse lines of weakness 56 for grip-assistance. The blank 2 of Figure 8 can be used to form the carton 100 of Figure 9.

5 Referring to Figure 10a, two cartons 100 are shown, the carton 100 on the left-hand side having an asymmetric fin-seal form of top closure (i.e. a slanting roof) and the carton on the right-hand side having a flat, symmetrical fin-seal form of top closure. Figure 10b shows diagrammatically,
10 by way of the dot-dot-dash lines, that the diameter d of the substantially circular base portion (in the lower part of Figure 10b) is greater than the width w of the rectangular top portion (in the upper part of Figure 10b). Figures 11a and 11b show a similar comparison, but the cartons 100 in
15 Figure 11a are of a gable-top nature, the carton on the left-hand side of Figure 11a being an asymmetric gable-top closure and the carton 100 on the right-hand side being of a standard flat gable-top form.

It can be seen from the blanks 2 of Figures 4, 6 and 8
20 (and to some extent the blanks 2 of Figures 1 and 2), that the lines of weakness 44 do not extend away from the edge 10, but extend away from a region which is spaced from the edge 10 by a noticeable distance.

CLAIMS

1. A container blank, with opposite, substantially
rectilinear, first and second lateral edges
5 substantially parallel to each other, said blank
including a row of top closure panels extending from the
first edge to the second edge and bounded by a third
edge, the top closure panels being separated from each
other by lines of weakness for providing fold lines and
10 extending away from the third edge, and a bottom fourth
edge extending between the first and second edges and
substantially parallel to the third edge, the fourth
edge being substantially free from any lines of weakness
extending away therefrom.
15
2. A container blank according to claim 1, wherein the
blank is a substantially rectangular blank.
3. A container blank according to claim 1 or 2, and further
20 comprising other lines of weakness, which either are
substantially parallel to said fourth edge or extend
away from that edge.
4. A container blank according to any preceding claim,
25 wherein said top closure panels comprise a row of top
sealing sub-panels arranged along said third edge and a
row of obturating sub-panels between said sealing sub-
panels and a row of corresponding body sub-panels.
- 30 5. A container blank according to claim 4, wherein a pair
of said obturating sub-panels are each comprised of a
plurality of triangular sub-sub-panels which have
boundaries with extents substantially co-extensive with
extents of the remaining respective said obturating sub-
35 panels.

6. A container blank according to claim 5, wherein one of said plurality of triangular sub-sub panels of each pair has a boundary inclined away from said third edge and common with the adjacent corresponding body sub-panel.

5

7. A container blank according to any one of claims 4 to 6 as appended to claim 3, wherein said body sub-panels are defined by said other lines of weakness which extend away from said fourth edge.

10

8. A container blank according to claim 7, wherein said other lines of weakness are substantially U-shaped.

9. A container blank according to claim 7, wherein said other lines of weakness are substantially V-shaped.

15

10. A container blank according to claim 7, wherein said other lines of weakness are of lanceolate form.

11. A container blank according to any one of claims 4 to 10 as appended to claim 3, wherein said other lines of weakness comprises a line substantially parallelly to said fourth edge and extending from said first edge to said second edge about which said fourth edge is folded when forming the container.

20

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12. A container blank according to any one of claims 4 to 11, and further comprising a plurality of transverse gripping lines of weakness associated with the body sub-panels.

30

13. A container blank according to claim 12, wherein said plurality of transverse gripping lines of weakness are substantially parallel to said third and fourth edges.

35

14. A container blank according to claim 12 as appended to

claim 6, wherein said plurality of transverse gripping lines of weakness are substantially parallel to the inclined boundary.

- 5 15. A container blank according to any preceding claim and having a pour spout fitment applied thereto.
16. A container blank according to claim 15 as appended to claim 5, wherein one of said obturating panels, other
10 than said pair, includes a partial depth cut in the form of an open loop over which said pour spout fitment is applied.
17. A container blank according to claim 6 or any one of
15 claims 7 to 16 as appended to claim 5, wherein the corresponding top-sealing sub-panels to said pair of said obturating sub-panels, at said third edge, each comprise a shallow V-shaped profile.
- 20 18. A container comprised of a piece of material, said piece having opposite, substantially parallel, downwardly extending, first and second edges, said container having a downwardly extending seam bounded by said first and second edges respectively internally and externally of
25 the container, said container including a loop of top closure panels bounded by a top third edge of said piece extending substantially perpendicularly to said seam, the top closure panels being sealed together adjacent said third edge and separated from each other by lines
30 of weakness providing fold lines extending away from the third edge, and said piece having a bottom fourth edge being substantially free from any lines of weakness extending away therefrom.
- 35 19. A container according to claim 18, wherein said piece is substantially rectangular.

20. A container according to claim 18 or 19, and having a top and a bottom of respective, different geometric shapes.

5

21. A container according to claim 20, and having a circular bottom and a rectangular top.

10

22. A container according to any one of claims 18 to 21, and further comprising other lines of weakness which extend away from said bottom fourth edge.

15

23. A container according to any one of claims 20 to 22, wherein said top is a slanted asymmetric fin-seal type of top closure.

20

24. A container according to any one of claims 20 to 23, wherein said bottom comprises a bottom insert comprising a substantially flat floor and a downwardly directed flange about which said bottom fourth edge of said piece is folded.

25

25. A container according to any one of claims 20 to 24, and formed on a rotary mandrel system in which the mandrels are of a substantially constant rectangular cross-section along their entire length.

30

26. A container according to any one of claims 20 to 25, wherein said bottom is of larger external cross-sectional area than said top.

35

27. A container according to claim 26, wherein the cross-sectional area decreases progressively upwardly of said container.

28. A container according to any one of claims 23 to 27 as appended to claim 22, wherein at a mid-portion of the container body at a transition from circular cross-section to rectangular cross-section, said other lines of weakness are present.

29. A container according to claim 28, wherein said other lines of weakness define body sub-panels of said container.

30. A container according to any one of claims 18 to 29, wherein said container comprises a top-sealed carton, one of said top closure panels includes a quadrangular roof obturating sub-panel, a pour spout fitment having a flange attached to said obturating sub-panel, and, disposed outwardly of said obturating sub-panel, a top sealing sub-panel, the obturating sub-panel and the top sealing sub-panel lying in the same plane, wherein a portion of said flange overlaps a boundary between the obturating sub-panel and the top sealing sub-panel.

31. A container according to claim 30 as appended to claim 29, and further comprising, at the boundary between said obturating sub-panel and a respective one of the container body sub-panels opposite the boundary with the top sealing sub-panel, a downwardly bowed fold line.

32. A container according to claim 30 or 31, wherein the obturating sub-panel to which said pour spout fitment is attached includes a partial depth cut over which said pour spout fitment is positioned.

33. A container according to any one of claims 29 to 32, and further comprising a plurality of transverse gripping lines of weakness associated with said body sub-panels.

34. A container according to claim 33, wherein said plurality of transverse gripping lines of weakness are substantially parallel to said third and fourth edges.
- 5 35. A container according to claim 33 as appended to claim 23, wherein said plurality of transverse gripping lines of weakness are at substantially the same angle of slant as the top closure.
- 10 36. A container according to any one of claims 22 to 35, wherein said other lines of weakness are substantially U-shaped.
- 15 37. A container according to any one of claims 22 to 35, wherein said other lines of weakness are substantially V-shaped.
- 20 38. A container according to any one of claims 22 to 35, wherein said other lines of weakness are of lanceolate form.
- 25 39. A method of forming a container blank, comprising cutting out the blank from material so that the blank has opposite, substantially rectilinear, first and second lateral edges substantially parallel to each other, and scoring said material so as to form lines of weakness for providing fold lines and extending away from a top third edge of the blank and separating from each other a plurality of top closure panels of the blank, and leaving a fourth lower edge opposite and
- 30 substantially parallel to the third edge substantially free from any lines of weakness extending away therefrom.
- 35 40. A container including a piece of material, the piece having opposite substantially rectilinear, first and

second edges substantially parallel to each other, said container having a base portion of larger external cross-sectional area than a top portion of the container.

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41. A container according to claim 40, wherein the base and top portions are of respective, different geometric shapes.

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42. A container according to claim 40 or 41, wherein the cross-sectional area decreases progressively upwardly of the container.

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43. A container according to any one of claims 40 to 42, wherein said top portion comprises a top closure including a quadrangular roof obturating sub-panel, a pour spout fitment having a flange attached to said obturating sub-panel, and, disposed outwardly of said obturating sub-panel, a top sealing sub-panel, the obturating sub-panel and the top sealing sub-panel lying in the same plane, wherein a portion of said flange overlaps a boundary between the obturating sub-panel and the top sealing sub-panel.

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44. A method of forming a container comprising receiving a blank with opposite, substantially rectilinear, first and second edges substantially parallel to each other for providing a container sleeve, forming a bottom closure to form a base portion, and folding top closure panels of the blank to form a top portion, wherein the base portion is of larger external cross-sectional area than said top portion.

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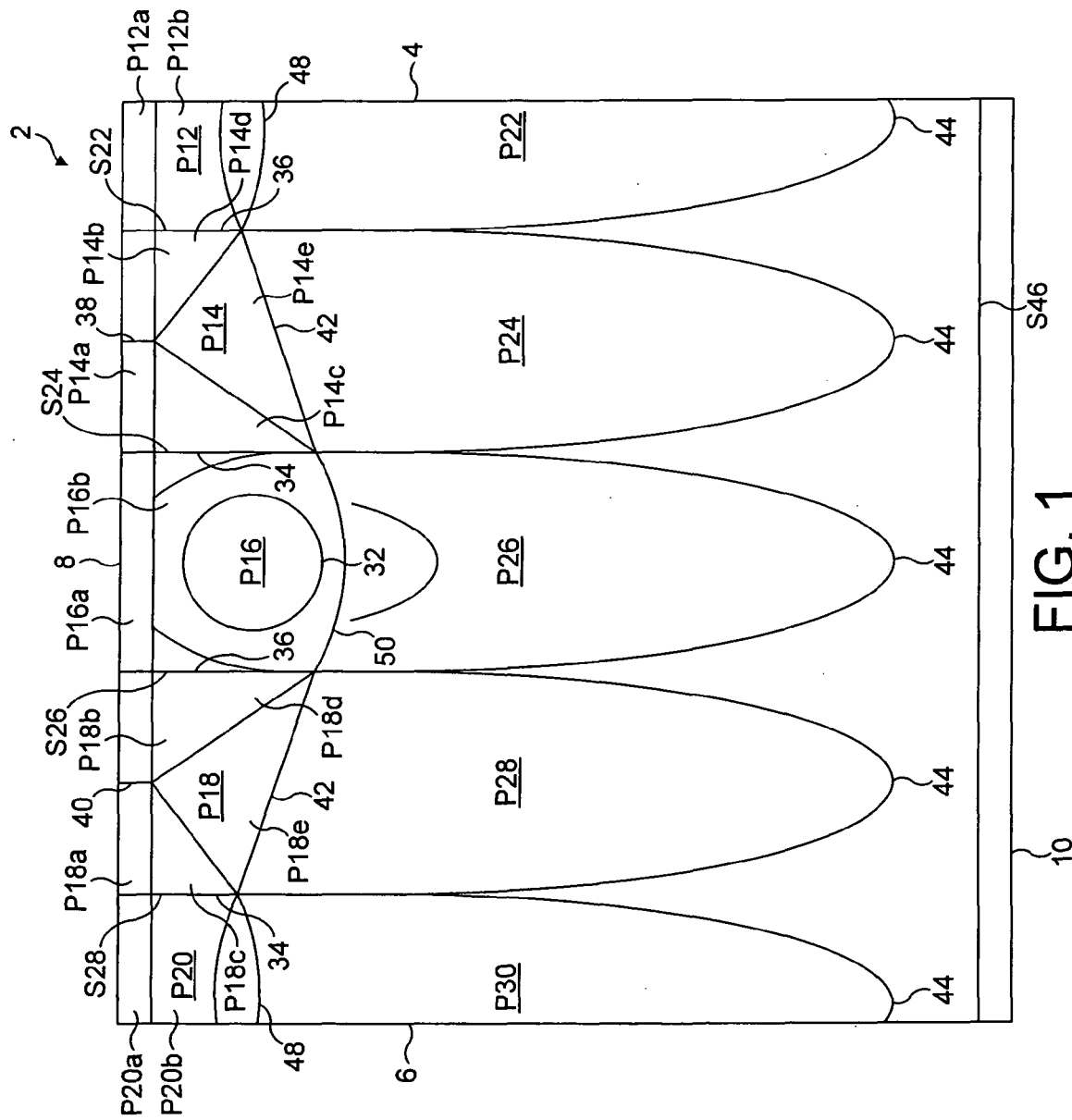
45. A method according to claim 44, wherein said forming a bottom closure consists of forming a substantially circular base portion and said folding consists of

forming a substantially rectangular top portion.

46. A method according to claim 44 or 45, and further comprising attaching a pour spout fitment to a quadrangular roof obturating sub-panel of a top closure arrangement, the top closure arrangement including a top sealing sub-panel disposed outwardly of and lying in the same plane as said obturating sub-panel, said attaching comprising attaching a flange of said pour spout fitment to said obturating sub-panel such that a portion of said flange overlaps a boundary between said obturating sub-panel and said top sealing sub-panel.
47. A container comprising a top-sealed carton, said carton including a top closure including a quadrangular roof obturating sub-panel, a pour spout fitment having a flange attached to said obturating sub-panel, and, disposed outwardly of said obturating sub-panel, a top sealing sub-panel, the obturating sub-panel and the top sealing sub-panel lying in the same plane, wherein a portion of said flange overlaps a boundary between the obturating sub-panel and the top sealing sub-panel.
48. A container according to claim 47, wherein said top closure is a flat-top type of closure.
49. A container according to claim 47 or 48, and further comprising at the boundary between the obturating sub-panel and a container body panel opposite the boundary with the top sealing sub-panel, there is a downwardly bowed fold line.
50. A method of forming a container comprising receiving a container blank with opposite, substantially rectilinear, first and second edges substantially parallel to each other for providing a container sleeve,

forming and sealing a bottom closure arrangement, and attaching a pour spout fitment to a quadrangular roof obturating sub-panel of a top closure arrangement, the top closure arrangement including a top sealing sub-panel disposed outwardly of and lying in the same plane as said obturating sub-panel, said attaching comprising attaching a flange of said pour spout fitment to said obturating sub-panel such that a portion of said flange overlaps a boundary between said obturating sub-panel and said top sealing sub-panel.

51. A method according to claim 50, and further comprising, prior to said attaching, forming and sealing said top closure arrangement so as to be a flat-top type of closure.



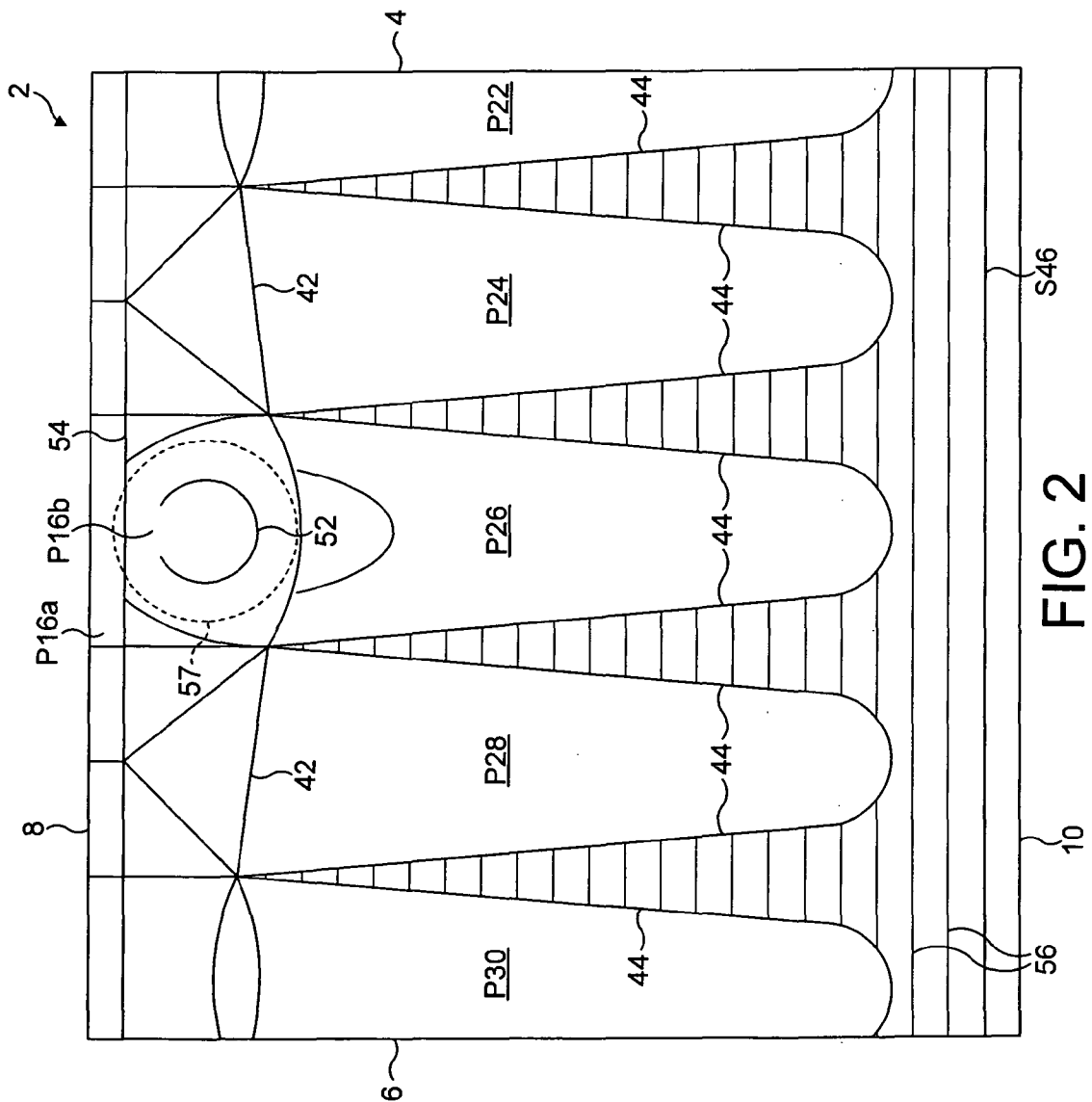


FIG. 2

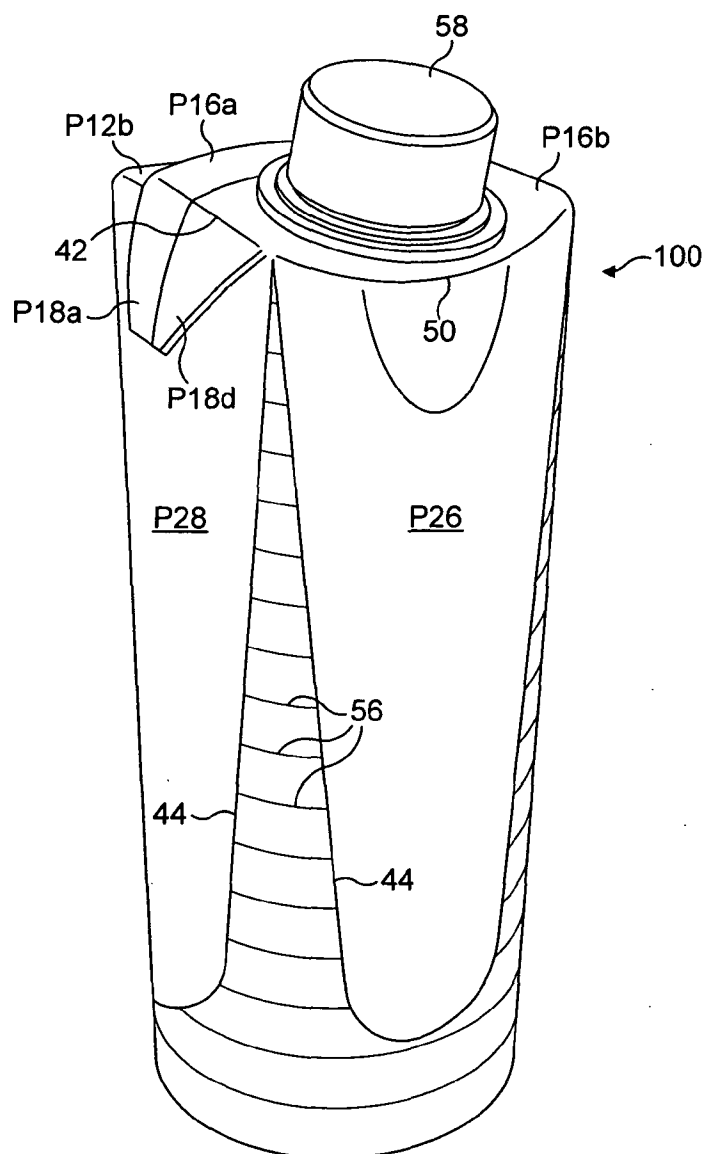


FIG. 3

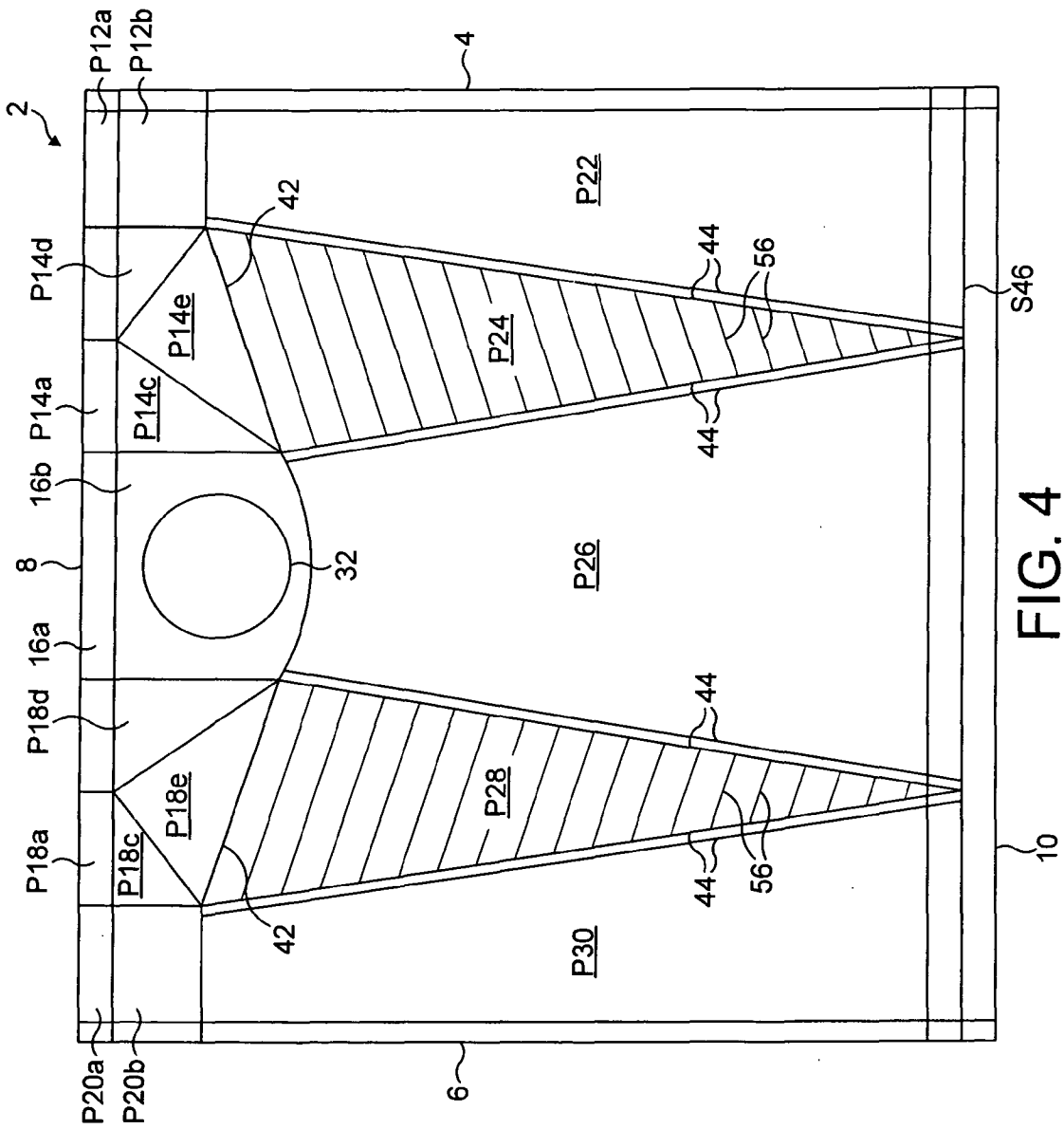


FIG. 4

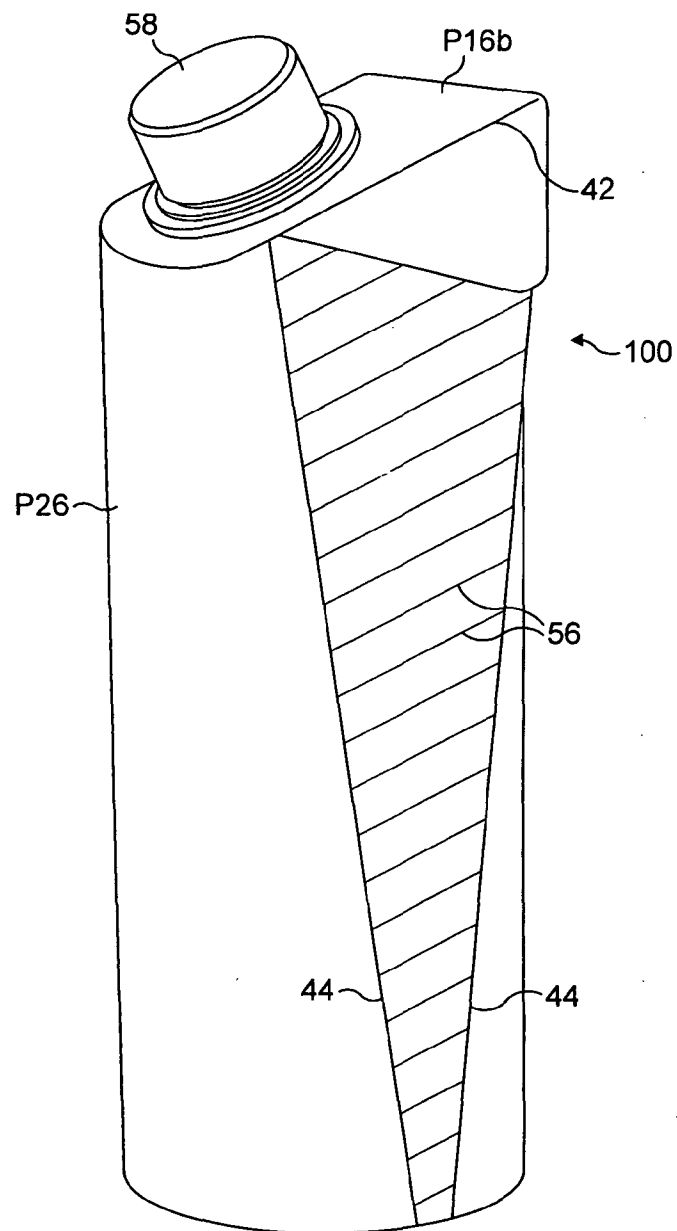
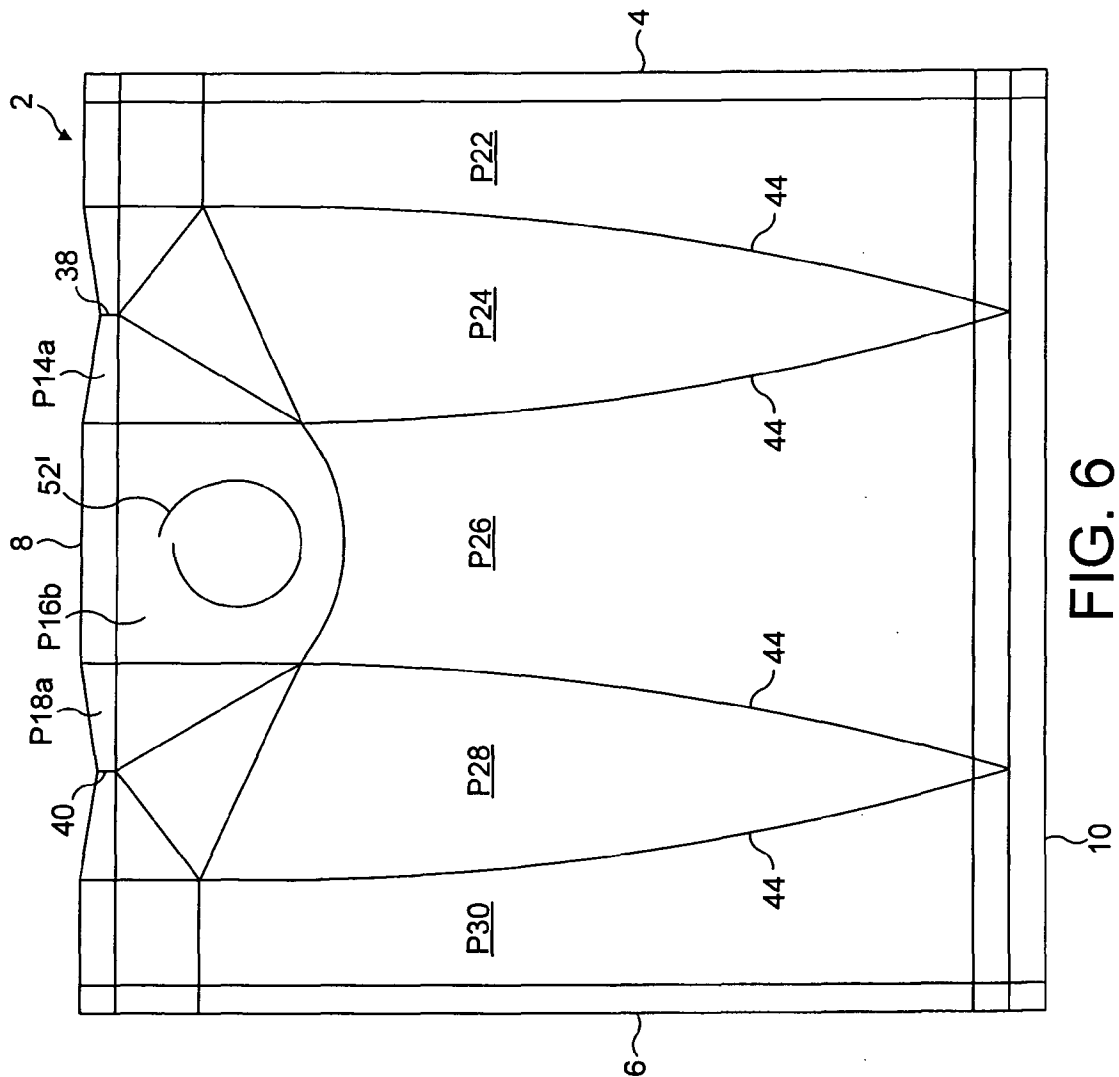


FIG. 5



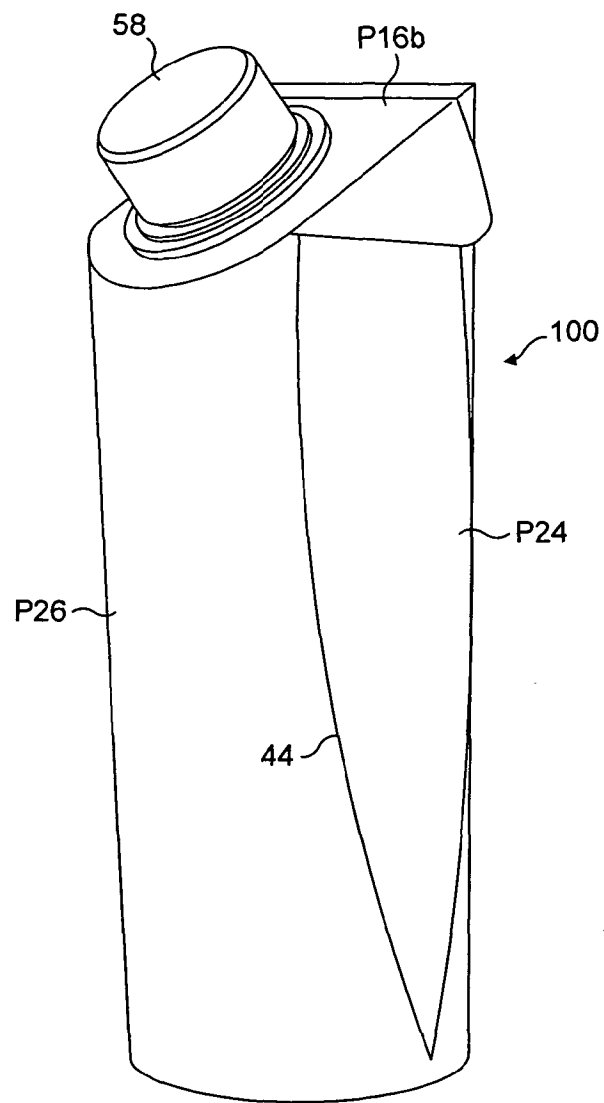
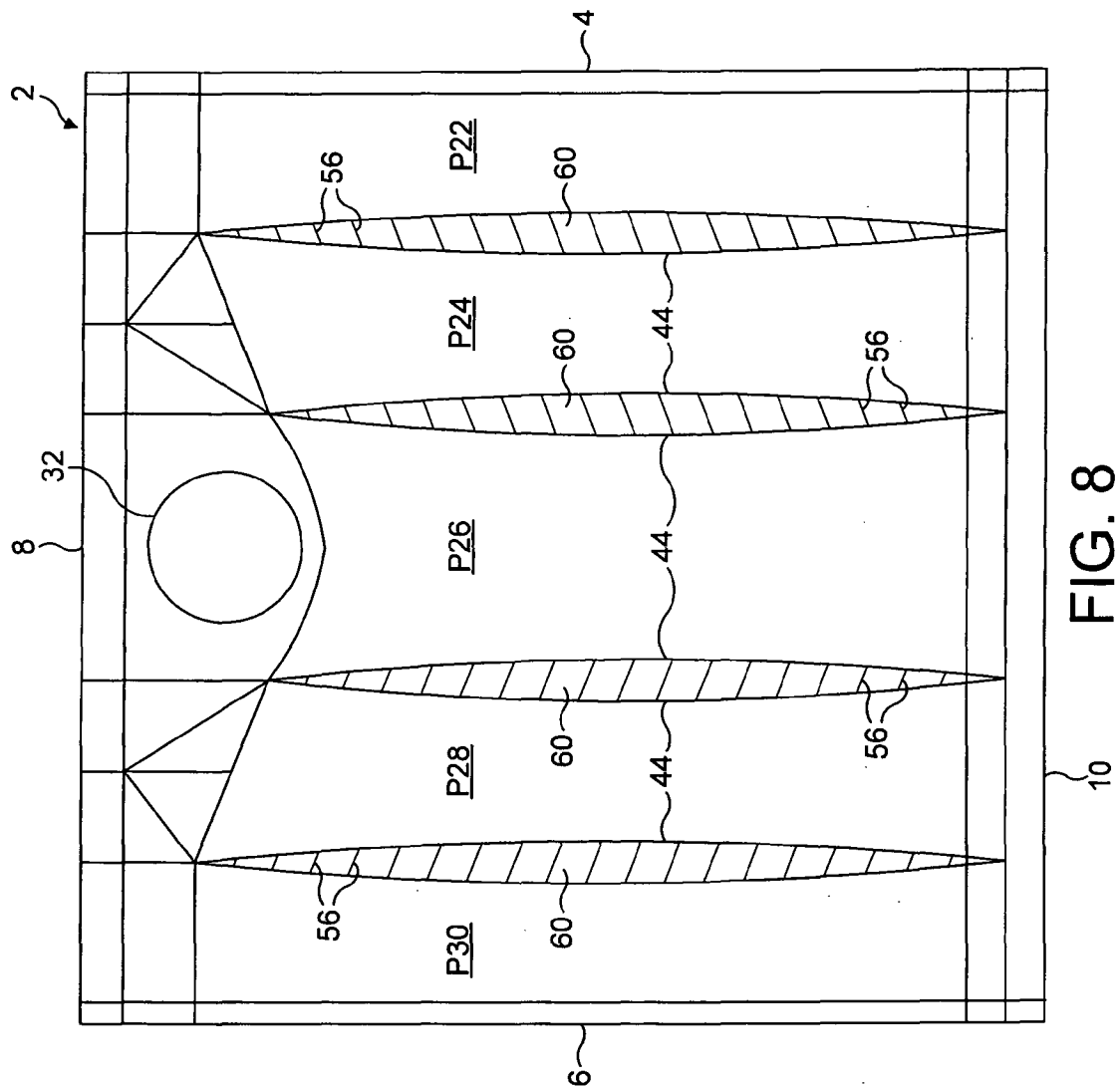


FIG. 7



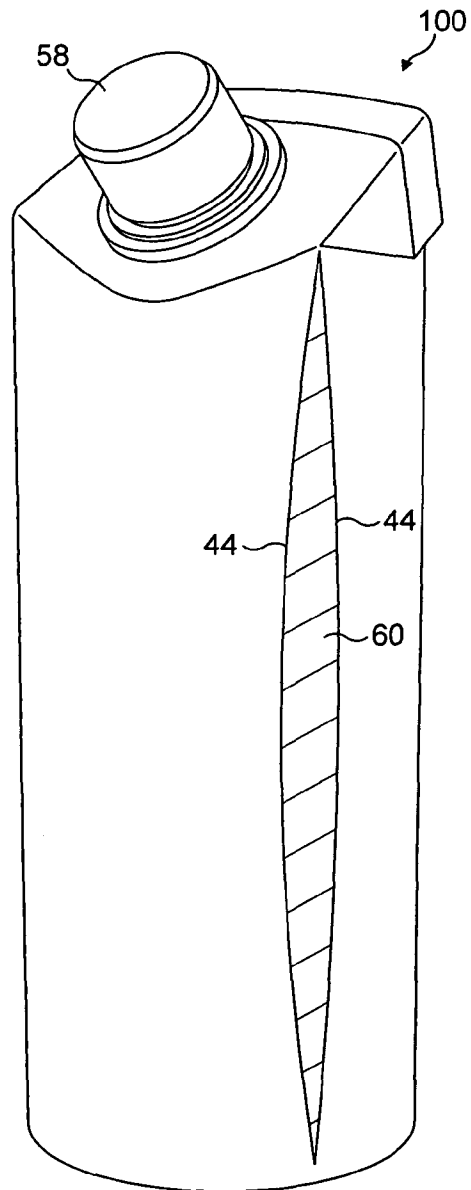


FIG. 9

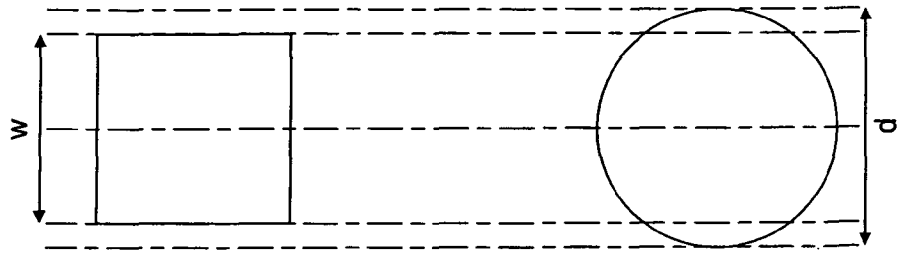


FIG. 10b

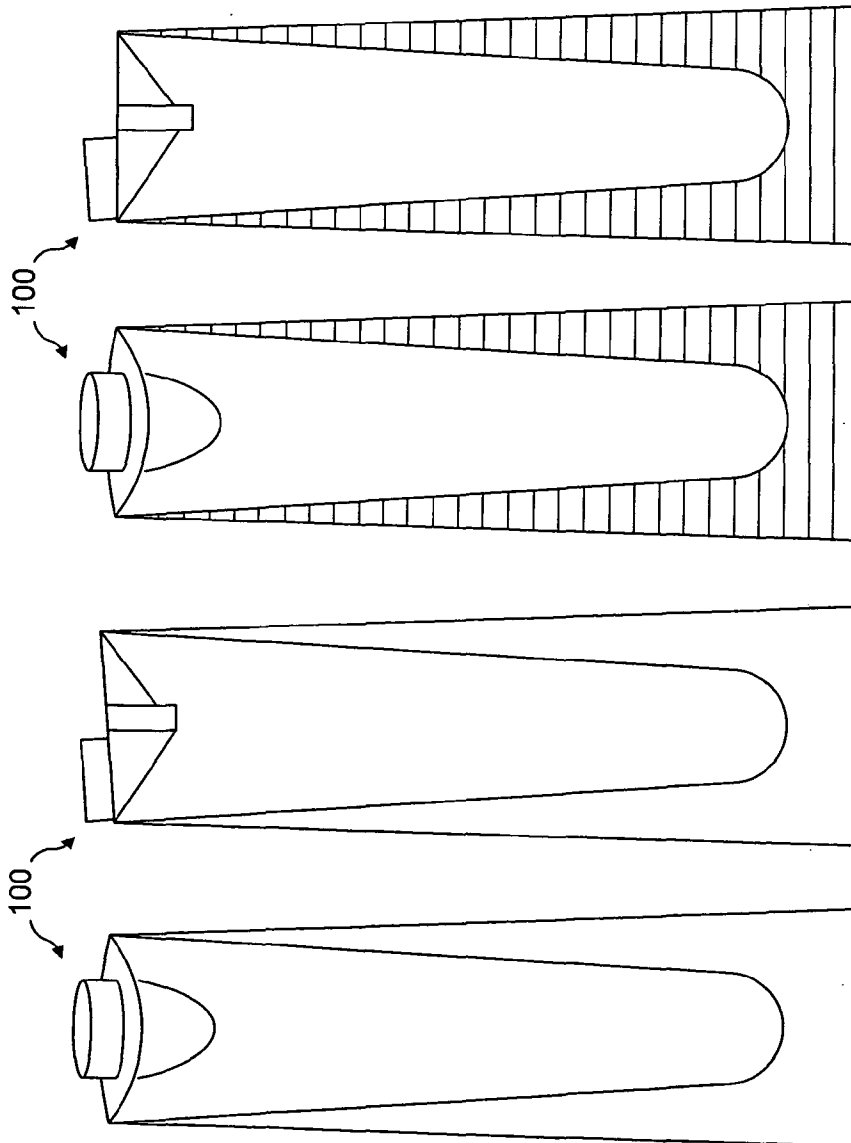
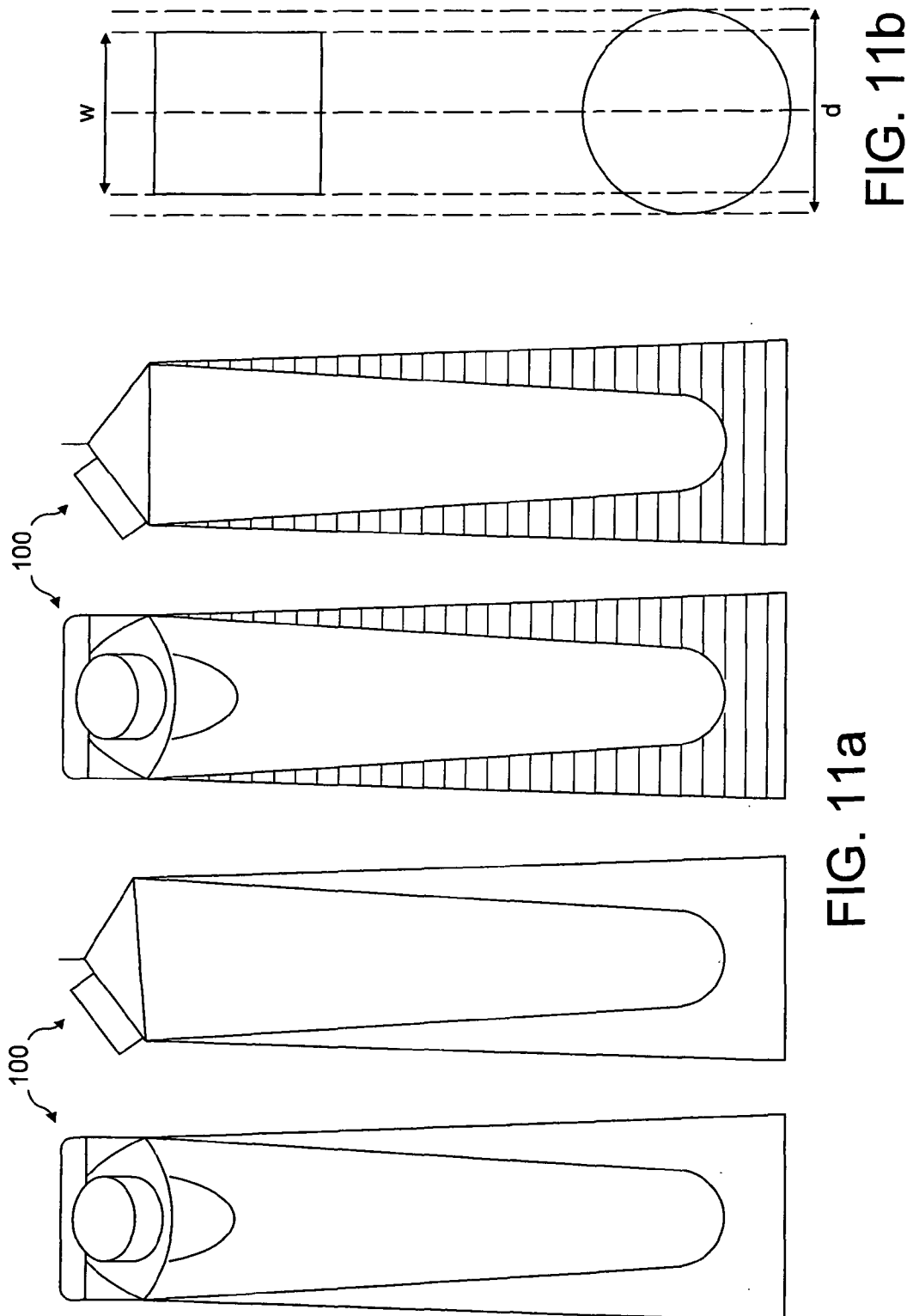


FIG. 10a



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/051325

A. CLASSIFICATION OF SUBJECT MATTER

INV. B65D3/08 B65D3/20 B65D5/02 B65D5/06 B65D5/74
ADD. B65D5/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 058 592 A (ALBERT KARLSSON-YGGER) 27 October 1936 (1936-10-27)	1-8, 18-22, 24, 26-29, 36, 39-42, 44,45
Y	page 2, column 1, line 29 - page 3, column 2, line 6; figures 1-15 ----- -/--	9-17,23, 30-35, 37,38, 43,46

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

30 June 2009

Date of mailing of the international search report

17/07/2009

Name and mailing address of the ISA/

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Fax: (+31-70) 340-3016

Authorized officer

Fitterer, Johann

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/051325

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 144 736 A (TETRA PAK DEV [CH]) 19 June 1985 (1985-06-19) page 6, line 25 - page 9, line 28 figures 1-4 -----	1,2,4-6, 18-21, 26,27, 39-42, 44,45
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Y	WO 2005/097606 A (ELOPAK SYSTEMS [CH]; FRANIC IVICA [AT]; BURROWS ANTHONY GREGORY [GB] E) 20 October 2005 (2005-10-20) page 5, paragraph 2; figures 1-28 -----	10, 12-14, 33-35,38
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A	US 2007/228128 A1 (KIESER WOLFGANG [DE]) 4 October 2007 (2007-10-04) paragraph [0014]; figures 1,2 -----	16,32

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2009/051325

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-29,33-42,44,45

A blank, a container and a method, wherein the container is made from a rectangular blank and comprises a top and a bottom of different geometric shapes, the body sub-panels comprising gripping lines of weakness.

2. claims: 30-32,43,46-51

A container and a method, wherein a pour spout fitment is attached to a quadrangular roof obturating sub-panel of a top closure arrangement of the container such that a flange of said fitment overlaps a boundary between said obturating sub-panel and a top sealing sub-panel.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2009/051325

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2009/051325

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