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(71) Applicant: **Burke, Michael Anthony**
Nottingham, Nottinghamshire NG5 1AP (GB)

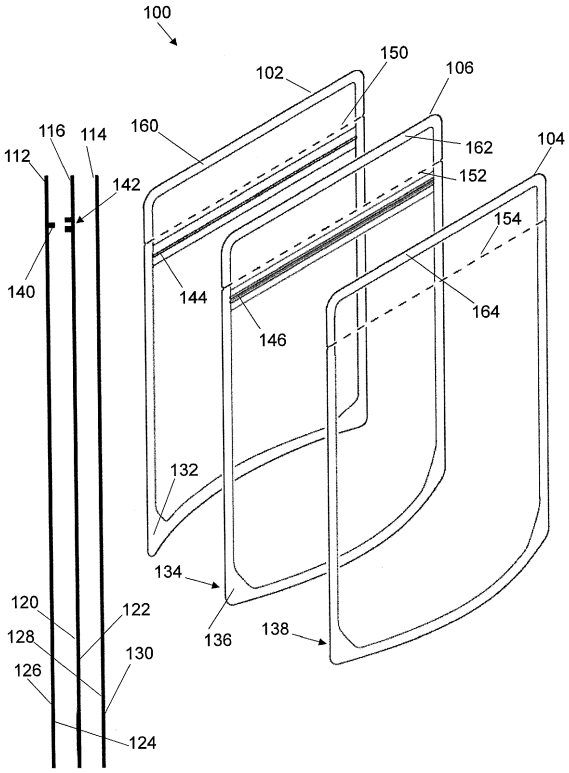
(72) Inventor: **Burke, Michael Anthony**
Nottingham, Nottinghamshire NG5 1AP (GB)

(74) Representative: **Potter Clarkson**
The Belgrave Centre
Talbot Street
Nottingham NG1 5GG (GB)

(54) FLEXIBLE FOOD PACKAGING AND ASSOCIATED METHODS

(57) A flexible food package (100) comprising: a layered containment structure comprising a first-sheet (112), a second-sheet (114) and a dividing-sheet (116), wherein the dividing sheet (116) has a first surface (120) and a second surface (122), and the first-sheet (112) is provided on the first surface (120) of the dividing-sheet (116) to define a sealed food-pouch. The second-sheet (114) is provided on the second surface (122) of the dividing-sheet (116) to define a sealed utensil-pouch. The flexible food package comprises a utensil within the utensil-pouch and one or more food items within the food-pouch. In some examples the second-sheet is provided on the second surface of the dividing-sheet to define a sealed second-pouch with one or more first food items within the food-pouch and one or more second food items within the second-pouch.

Figure 1



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Description

[0001] The present disclosure relates to flexible food packing and associated methods, and in particular, although not necessarily, to flexible food packages comprising one or more food items and a utensil.

[0002] According to a first aspect of the present disclosure there is provided a flexible food package comprising:

a layered containment structure comprising a first-sheet, a second-sheet and a dividing-sheet, wherein:

the dividing sheet has a first surface and a second surface;
the first-sheet is provided on the first surface of the dividing-sheet to define a sealed food-pouch; and
the second-sheet is provided on the second surface of the dividing-sheet to define a sealed utensil-pouch;

a utensil within the utensil-pouch; and
one or more food items within the food-pouch.

[0003] In one or more embodiments the first-sheet may be coextensive with the dividing-sheet and the first-sheet may be joined to the dividing-sheet around at least a portion of their respective edges.

[0004] In one or more embodiments the food-pouch may be enclosed by the first-sheet and the dividing-sheet.

[0005] In one or more embodiments the second-sheet may be coextensive with the dividing-sheet. The second-sheet may be joined to the dividing-sheet around at least a portion of their respective edges.

[0006] In one or more embodiments the utensil-pouch may be enclosed by the dividing-sheet and the second-sheet.

[0007] In one or more embodiments the flexible food package may further comprise resealable strips. The resealable strips may be disposed on opposing portions of the first-sheet and the dividing-sheet. In an embodiment, the resealable strips may be disposed on the first-sheet and second-sheet. The resealable strips may be configured to cooperate to seal the food pouch.

[0008] In one or more embodiments the food-pouch may be enclosed by the first-sheet, the dividing-sheet and the resealable strips. In another embodiment, the food-pouch may be enclosed by; the first-sheet, the second-sheet and the resealable strips.

[0009] In one or more embodiments a top edge of first-sheet may be sealed to a top edge of the dividing-sheet to seal the flexible food package. The top edge of the dividing-sheet may be sealed to a top edge of second-sheet, to seal the flexible food package.

[0010] In one or more embodiments the flexible food package may further comprise a gusset. The gusset may be disposed between the first-sheet and the dividing-sheet. The gusset may be configured to form a base of the food-pouch.

[0011] In one or more embodiments the food-pouch may be enclosed by the first-sheet, the dividing sheet and the gusset.

[0012] In one or more embodiments the utensil may be disposed along a main diagonal of the utensil-pouch to reinforce the flexible food package.

[0013] In one or more embodiments the utensil-pouch may comprise: a first bottom corner adjacent to a first side of a base of the utensil-pouch; and a second top corner diagonally opposite the first bottom corner, above a second side of the base of the utensil-pouch. Respective ends of the utensil may be configured to engage with the first bottom corner and the second top corner to reinforce the flexible food package.

[0014] In one or more embodiments the utensil may have a handle portion. The handle portion may have a curvature along at least a portion of its length. A concave face of the handle may be oriented towards the dividing-sheet. The concave face of the handle may be oriented towards the dividing-sheet to reduce any force exerted by the rigid utensil on the food items within the food-pouch and so, to create a synergy between the utensil, dividing-sheet and food items.

[0015] In one or more embodiments one or more of the first-sheet, the dividing-sheet and the second-sheet may comprise one or more perforations configured to enable gas to escape from the layered containment structure. In some embodiments, gas may be produced from any food items contained within the layered containment structure.

[0016] In one or more embodiments the layered containment structure may further comprise a third-sheet provided on the first-sheet to define a sealed pouch enclosed between the first-sheet and the third-sheet.

[0017] In one or more embodiments the first-sheet may have an inner surface facing the dividing-sheet and an outer surface. The third-sheet may be provided on the outer surface of the first-sheet.

[0018] In one or more embodiments there is provided a system comprising a container containing a plurality of flexible food packages. The plurality of flexible food packages comprises: a first layer, wherein each of the flexible food packages in the first layer is arranged such that the utensil is disposed in an alternate direction with respect to the utensil of an adjacent flexible food package in the first layer. The plurality of flexible food packages comprises a second layer, wherein each of the flexible food packages in the second layer is arranged such that the utensil is disposed in an alternate direction with respect to the utensil of an adjacent flexible food package in the second layer. The second layer may be disposed on top of the first layer. The utensils of the flexible food packages of the first layer may provide a reinforcing structure.

[0019] In one or more embodiments the first layer may comprise a first row of flexible food packages and a sec-

ond row of flexible food packages. The first row may be disposed next to the second row. Each flexible food package in the first row may be positioned such that the first bottom corner is next to the first bottom corner of a neighbouring flexible food package in the first row and/or the second top corner is next to the second top corner of a neighbouring flexible food package in the first row.

[0020] In one or more embodiments each flexible food package in the second row may be positioned such that a second bottom corner is next to the first bottom corner of a corresponding flexible food package in the first row.

[0021] According to a further aspect of the present disclosure there is provided a flexible food package comprising:

a layered containment structure comprising a first-sheet, a second-sheet and a dividing-sheet, wherein:

the dividing sheet has a first surface and a second surface;
the first-sheet is provided on the first surface of the dividing-sheet to define a sealed food-pouch; and
the second-sheet is provided on the second surface of the dividing-sheet to define a sealed second-pouch;

one or more first food items within the food-pouch; and
one or more second food items within the second-pouch.

[0022] In one or more embodiments the one or more first food items may be different than the one or more second food items.

[0023] In one or more embodiments the layered containment structure may be configured to be resilient with respect to one or more of boiling water, steam and microwave radiation.

[0024] In one or more embodiments the layered containment structure may be configured to be resilient with respect to:

temperatures between 100 Celsius and 200 Celsius; and/or
temperatures less than minus 18 Celsius.

[0025] In one or more embodiments the dividing sheet may be configured to segregate the one or more first food items from the one or more second food items.

[0026] In one or more embodiments the layered containment structure may be coated with visible material configured to encode information.

[0027] In one or more embodiments the layered containment structure may comprise biodegradable and/or bio-compostable material.

[0028] According to a further aspect of the present disclosure there is provided a method of providing a sealed flexible food package, comprising:

forming a layered containment structure comprising a first-sheet, a second-sheet and a dividing-sheet, the dividing sheet having a first surface and a second surface, by:

sealing the first-sheet on to the first surface of the dividing-sheet to define a food-pouch; and
sealing the second-sheet on to the second-surface of the dividing-sheet to define a utensil-pouch,

providing a utensil within the utensil-pouch;
providing one or more food items within the food-pouch;
sealing the first-sheet to the dividing-sheet to seal the food-pouch and sealing the dividing sheet to the second-sheet to seal the utensil pouch.

[0029] While the disclosure is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and will be described in detail. It should be understood, however, that other embodiments, beyond the particular embodiments described, are possible as well. All modifications, equivalents, and alternative embodiments falling within the scope of the appended claims are covered as well.

[0030] One or more embodiments will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 shows two exploded illustrations of an example embodiment of flexible food packaging;
Figure 2 shows a front view of an example embodiment of flexible food packaging;
Figure 3 shows a perspective view and a cross-section view of an example embodiment of flexible food packaging incorporating a gusset;
Figure 4 shows a rear view of an example embodiment of a flexible food package incorporating a utensil and a plurality of food items;
Figure 5 shows a front view of an example embodiment of a flexible food package similar to that of Figure 4;
Figure 6 shows vertical and a horizontal cross-section views of an example embodiment of a flexible food package similar to those of Figures 4 and 5;
Figure 7 shows a flow chart of an example embodiment of a method for providing a flexible food package such as those shown in Figures 4, 5 and 6; and
Figure 8 shows a schematic diagram of a system made up of a container and a plurality of flexible food packages.

[0031] Many food items, particularly those that are pre-

pared ready-to-eat, need to be provided contained within suitable packaging. The packaging both contains the food items and protects the food items from possible environmental contamination. The packaging may also contain a utensil that can provide a user with a convenient means to access the food items for consumption. Excessive amounts of packaging may be used to contain both food items and utensils, which can be both wasteful and environmentally damaging. There is therefore a need to provide food packaging that employs a reduced amount of packaging material and that can successfully contain food items and a utensil in a manner that is convenient for users, while ensuring safe containment of the food items to protect the user from any possible contamination of the food items.

[0032] Figure 1 shows explode views 100 of flexible food packaging. A perspective view shows three sheets that make up the packaging: a first-sheet 102; a second-sheet 104; and a dividing sheet 106. In this example, all three sheets have approximately the same dimensions. In particular, the plane defined by each sheet has approximately the same width and length, such that each sheet can be said to be approximately coextensive with one another. However, it will be appreciated that in other examples different sheets could have different dimensions, and might therefore not be coextensive. In particular, in an embodiment the dividing-sheet 106 may be significantly shorter in length i.e. the top edge 162 may be below the resealable strips.

[0033] The exploded views 100 also show an exploded cross-section view of: a first-sheet 112; a second-sheet 114; and a dividing-sheet 116. The corresponding sheets of the two exploded views 100 have corresponding features which may only be described below in relation to one, or other, of the exploded views 100, to improve the clarity of the disclosure.

[0034] The dividing-sheet 116 has a first surface 120 and a second surface 122, which comprise opposing surfaces of the dividing-sheet 116. The first-sheet 112 has an inner surface 124, facing the dividing-sheet 116, and an outer surface 126. The inner surface 124 and the outer surface 126 comprise opposing surfaces of the first-sheet 112. The second-sheet 114 has an inner surface 128, facing the dividing-sheet 116, and an outer surface 130. The inner surface 128 and the outer surface 130 comprise opposing surfaces of the second-sheet 114.

[0035] As discussed further below in relation to the remaining Figures, the first-sheet 102, 112 can be provided on the first surface 120 of the dividing-sheet 106, 116 to define a sealed food-pouch therebetween. To render the food-pouch sealed, a periphery 132 of the inner surface of the first sheet 102 can be sealed to a corresponding periphery 134 of the first surface of the dividing sheet 106. The peripheries 132, 134 extend around respective perimeters of the first-sheet 102 and the dividing-sheet 106 respectively. Thereby, the void space formed between the sealed first-sheet 102 and dividing-sheet 106 can provide a sealed food-pouch. Thereby, the food-pouch is enclosed by the first-sheet 102 and the dividing-sheet 106.

[0036] It will be appreciated that in other examples, the periphery of the first-sheet 102 that is sealed to the periphery of the dividing-sheet 106 may extend around only a portion of the perimeter of the respective sheets.

[0037] As discussed further below in relation to the remaining Figures, the second-sheet 104,114 can be provided on the second surface 122 of the dividing-sheet 106, 116 to define a sealed utensil-pouch therebetween. To render the utensil-pouch sealed, a periphery 136 of the second side of the dividing-sheet 106 can be sealed to a corresponding periphery 138 of the inner surface of the second-sheet 104. The peripheries 136, 138 extend around respective perimeters of the dividing-sheet 106 and the second-sheet 104 respectively. Thereby, the void space formed between the sealed dividing-sheet 106 and second-sheet 104 can provide a sealed utensil-pouch. Thereby, the utensil-pouch is enclosed by the second-sheet 104 and the dividing-sheet 106.

[0038] It will be appreciated that in other examples, the periphery of the second-sheet 104 that is sealed to the periphery of the dividing-sheet 106 may extend around only a portion of the perimeter of the respective sheets.

[0039] Thereby, a flexible food package can include a layered containment structure formed from the first-sheet 102, the second-sheet 104 and the dividing-sheet 106, sealed together in a manner that is suitable for containing a utensil within the utensil-pouch and for containing one or more food items within the food-pouch. In this way, the one or more food items may be completely segregated from the utensil.

[0040] In particular, a top edge 160 of the first-sheet 102 can be sealed to a top edge 162 of the dividing sheet 106, while the top edge 162 of the dividing sheet 106 can also be sealed to a top edge of the second-sheet 104 to seal the top of the layered containment structure. The process of sealing the three sheets together may not be performed in a single operation, as described further below in relation to Figure 7.

[0041] Figure 1 also shows optional resealable strips 140, 142, 144, 146 disposed on opposing portions of the first-sheet 102, 112 and the dividing-sheet 106, 116. Specifically, a first resealable strip 140, 144 is dispose on the inner surface 124 of the first sheet 112, 102, and a second resealable strip 142, 146 is disposed on the first surface 120 of the dividing-sheet 106, 116. The first resealable strip 140, 144 is shaped to cooperate with the second resealing strip 142, 146, such that when they are interlocked they can seal the food pouch. The seal provided by the resealable strips 140, 144, 142, 146 may be one or more of water-tight, gas-tight and fluid-tight. When the resealable strips 140, 144, 142, 146 are sealed together, the food pouch is enclosed by the first-sheet 102, 112, the dividing-sheet 106, 116 and the resealable strips 140, 144, 142, 146. The resealable strips 140, 144, 142, 146 can be used to enable resealing of the food pouch after a consumer has removed one or more portions of food

items from the food pouch, such that any remaining food items may be protected from the environment.

[0042] Figure 1 shows three optional frangible strips 150, 152, 154 formed in the first-sheet 102, the dividing-sheet 106 and the second-sheet 104, respectively. The frangible strips 150, 152, 154 can facilitate the process of a user removing a top portion, via perforated lines of weakness, of the layered containment structure, by tearing the frangible strips 150, 152, 154 to open the food pouch and the utensil pouch, which would otherwise be sealed by virtue of the sealing of the top edges of the three sheets already described above.

[0043] Figure 2 shows a front view of the flexible food packaging 200. Features that correspond to features of Figure 1 have been given corresponding reference numerals and may not necessarily be discussed further here.

[0044] Figure 2 shows a front view of a first-sheet 202, similar to the first-sheet of Figure 1. Viewed from this orientation the dividing-sheet and the second-sheet are not visible as they are concealed behind the first-sheet 202. In this example, the first-sheet 202, the dividing-sheet and the second-sheet are coextensive, in that they all have the same dimensions in the plane of Figure 2. However, it will be appreciated that the three sheets can have different sizes. For example, the dividing-sheet could be bigger or smaller than the first-sheet 202 and second-sheet, while the second-sheet could also be either bigger or smaller than the dividing-sheet. However, in any case, the dividing sheet is sealed to both the first-sheet 202 and the second-sheet such that the dividing sheet segregates the food pouch from the utensil pouch. In this way, if a utensil becomes damaged, it will not be possible for any fragments of the damaged utensil to contaminate the food items. Contamination of this type can result in personal injury to a user, especially if the user ingests a utensil fragment while consuming any contaminated food items. Therefore, the present layered containment structure can provide for important advantages in protecting users from a potential source of personal injuries.

[0045] Figure 2 also shows a top edge 270 of a gusset 272 that is disposed between the first-sheet 202 and the dividing-sheet, as described further below in relation to Figure 3.

[0046] Figure 3 shows a perspective view 300 and a partly exploded cross-section view 301 of flexible food packaging similar to that shown in Figures 1 and 2. Similar features have been given similar reference numerals and may not necessarily be discussed further here.

[0047] The layered containment structure includes a gusset 372 disposed between the first-sheet 302, 312 and the dividing-sheet 316. The gusset 372 is sealed to the inner surface 324 of the first-sheet 312 and the first surface 320 of the dividing-sheet 316. Thereby, the gusset forms a base of the food pouch, which may advantageously enable the flexible food package to contain an increased quantity of food items (compared to a flexible food package without a gusset) and to stand upright on the base without requiring any other supporting means.

[0048] The gusset 372 has an upper portion or edge 370 within the food pouch, which may be surrounded/depressed by food items. The gusset 372 also has a first lower portion below a first boundary edge 374 that is sealed to the first-sheet 302, 312, and a second lower portion below a second boundary edge 376 that is sealed to the dividing-sheet 316.

[0049] In this example, the food-pouch is defined by, and enclosed by, the first-sheet 302, 312, the dividing-sheet 316 and the gusset 372, such that food items contained in the food pouch may be contained without any leakage into the environment and without being exposed to any contamination from the environment, or from the utensil pouch, such as when broken utensil fragments may be present in the utensil pouch.

[0050] Figure 4 shows a rear view of an example of a flexible food package 400. Features that correspond to features of Figures 1 to 3 have been given corresponding reference numerals and may not necessarily be discussed further here.

[0051] The front-most sheet shown in Figure 4 is the second-sheet 414. It will be appreciated that using the term 'rear view' to describe a view of the flexible food package 400 showing a plan view of the second-sheet 414 does not imply any particular structural characteristics. The present rear view could equivalently be described as a front view, however, for consistency in the present specification, the term 'front view' will be used to refer to the flexible food package shown with a plan view of the first-sheet. In this example, the first-sheet, and the dividing sheet are concealed behind the second-sheet 414. However, as described below, the contents of the utensil pouch and the food pouch are shown, as the second-sheet 414, the dividing-sheet and the first-sheet are made from transparent plastics material. In other examples, the first-sheet, the dividing-sheet and the second-sheet could alternatively be made from opaque or translucent plastics material, or any other appropriate flexible sheet materials known to persons skilled in the art.

[0052] The flexible food package 400 contains a utensil 480 within the utensil pouch. In this example the utensil 480 is a fork, however any other type of utensil, such as a spoon, spork, chop sticks or a knife, could alternatively or additionally be provided. The utensil 480 has a proximal end 482, configured to be grasped/manipulated by a user. The utensil also has a distal end 484 configured to engage with food items to enable the user conveniently to consume the food items. The flexible food package 400 also contains a plurality of food items 486a, 486b, 486c within the food pouch. While three specific food items 486a, 486b, 486c have been given reference numerals, it will be appreciated that further food items are also shown and that any number of food items may be present in different examples.

[0053] The utensil pouch in this example is approximately rectangular in plan view, although it will be appre-

ciated that other shapes are also possible. In this example, the utensil pouch has a first bottom corner 490. The base of the flexible food package 400 has a first side 494 and a second side 496 at the opposite end of the base. The first bottom corner 490 is situated at the first side 494 of the base. The utensil pouch also has a second top corner 492 that is above the second side 496 of the base. The first bottom corner 490 is situated diagonally opposite the second top corner 492. The distal end 484 of the utensil is mechanically engaged with the first bottom corner 490. The proximal end 482 of the utensil is mechanically engaged with the second top corner 492. This mechanical engagement of the utensil 480 with respective corners of the utensil pouch is possible because the utensil is disposed along a main diagonal of the utensil pouch between the first bottom corner 490 and the second top corner 492. In this way, the utensil 480 is held in a fixed, or substantially fixed, position within the utensil pouch, which enables the utensil 480 to reinforce the flexible food package 400. This reinforcement may provide advantageous structural strength and rigidity to the flexible food package 400, which may enable the flexible food package 400 to sustain impacts, such as being dropped within a vending machine, that may otherwise damage one or more of the plurality of food items 486a, 486b, 486c.

[0054] In some examples, mechanical engagement of either end of the utensil 480 can be achieved by sizing the utensil such that it fits snugly along the main diagonal of the utensil pouch. In some examples, mechanical engagement may be achieved, or promoted by sealing the second-sheet 402 to the dividing-sheet around an outline of respective ends of the utensil. When the utensil 480 is a fork, this may seal the second-sheet 402 to the dividing-sheet around a plurality of tines of the fork located at the distal end 484 of the utensil 480. The interior of the utensil pouch may thereby be appropriately shaped to engage mechanically with respective ends of the utensil 480 at respective diagonally opposed corner of the utensil pouch.

[0055] Figure 5 shows a front view of a flexible food package 500 similar to that shown in Figure 4. Corresponding features have been given corresponding reference numerals and may not necessarily be discussed further here.

[0056] The front-most sheet of the flexible food package 500 is the first-sheet 502. A plurality of food items 586a, 586b, 586c are contained within a food pouch behind the first-sheet 502 and in front of a dividing-sheet. In this example, a utensil 580 is shown behind the (transparent) dividing-sheet. By virtue of the presence of the dividing-sheet, and the way that the dividing-sheet is sealed to the first-sheet 502 and the second-sheet, the utensil 580 is completely segregated from the food items 586a, 586b, 586c, thereby preventing any contamination of the food items 586a, 586b, 586c by the utensil (or any broken fragments thereof) or any fouling/contamination of the utensil 580 by the food items 586a, 586b, 586c prior to the user opening the flexible food package 500 to access the contents therein.

[0057] Figure 6 shows vertical and horizontal cross-section views 600 of a flexible food package.

[0058] A vertical cross-section view of the flexible food package 602 shows a plurality of food items 604 contained within a food pouch. The food pouch is enclosed by a first-sheet 610, a dividing-sheet 612, a gusset 614 and a resealable strip 616. The flexible food package 602 also contains a utensil 620 in a utensil pouch defined by the dividing-sheet 612 and a second-sheet 622.

[0059] The utensil 620 comprises a handle portion 624 that is curved along its length. The concave face of the handle is oriented towards the food pouch and the food items 604 contained therein. Advantageously, the utensil 620 is therefore configured to partly wrap around the food pouch. This can help to reduce force from the located utensil on the food items and also the size of the package, therefore reducing the amount of package materials required for a given volume of food items, while still providing a utensil of adequate length to assist the user in accessing all of the food items in the food pouch.

[0060] The horizontal cross-section view of the flexible food package 630 also shows the food-items 604 contained within a food pouch formed by the first-sheet 610 and the dividing-sheet 612. The utensil 620 is shown contained within the utensil pouch formed by the dividing-sheet 612 and the second-sheet 622. Again, it is clearly shown that the utensil 620 is completely and safely segregated from the food items 604.

[0061] In this example, the utensil 620 is not sized to fit along a main diagonal of the utensil pouch. However, it will be appreciated that in some examples the utensil may be configured both to engage with diagonally opposing corners of the utensil pouch and to have a concave curvature oriented towards the food items in the food pouch.

[0062] In some examples (not shown) one or more of the first-sheet, the dividing-sheet and the second-sheet may comprise one or more perforations designed to enable a build-up of gas to escape from the layered containment structure, and in particular from the food pouch. This may be especially advantageous when the flexible food package contains food items such as mango pieces, as ripe mango flesh can emit substantial quantities of gases, such as ethylene.

[0063] To enable this escape of gasses, one or more perforations may be disposed in the first-sheet. The perforations may be micro-perforations, that is perforations with a diameter in the range of 1 micron to 500 microns. Appropriate choice of micro-perforation size may enable the escape of a build-up of gases, without allowing the escape of liquids, and without allowing the ingress of any liquid contaminants from the environment into the flexible food package.

[0064] In some examples (not shown) any flexible food package of the present disclosure may additionally have an optional third-sheet disposed on the outer surface of

the first-sheet, sealed to the first-sheet, to define a sealed pouch enclosed between the third-sheet and the first-sheet. Alternatively, the third-sheet (or a fourth or additional sheet) may be disposed on the outer surface of the second-sheet to provide an auxiliary sealed pouch.

[0065] These additional or auxiliary sealed pouches may contain further food items or utensils. Such additional utensils may also provide a reinforcing effect similar to that described above in relation to Figure 4.

[0066] As a further alternative, one or more food items, such as sealed sachets of seasoning or condiment, may be provided in the utensil pouch to keep them segregated form the food items in the food pouch.

[0067] Figure 7 shows a flow chart 700 of a method for making a sealed flexible food package of the present disclosure.

[0068] The method consists of the following steps. Forming 702 a layered containment structure comprising a first-sheet, a second-sheet and a dividing-sheet, the dividing sheet having a first surface and a second surface, by sealing the first-sheet on to the first surface of the dividing-sheet to define a food-pouch and sealing the second-sheet on to the second-surface of the dividing-sheet to define a utensil-pouch. In this example, the first-sheet is not sealed to the dividing-sheet along at least one portion, such as the top edge, of the respective sheets. Similarly, the dividing-sheet is not sealed to the second-sheet along at least one portion, such as the top edge, of the respective sheets, because in this particular embodiment the dividing-sheet (top edge) is lower than the resealable strips on the first and second-sheets.

[0069] Optionally, the method further includes providing 703 a resealable strip between the first-sheet and dividing-sheet or alternatively, disposed on the first-sheet and second-sheet.

[0070] The method further includes providing 704 a utensil within the utensil-pouch and providing 706 one or more food items within the food-pouch. Then the method includes sealing the first-sheet to the dividing-sheet to seal the food-pouch and sealing the dividing sheet to the second-sheet to seal the utensil pouch. In this way, the food items and utensil are sealed inside their respective pouches ready for use by a consumer.

[0071] Where the first-sheet, the dividing-sheet and the second-sheet are co-extensive, the method may advantageously require only a single step for each sealing operation. For example, if the sheets are all made from a suitable thermoplastics material, a single application of heat around a suitable portion of the perimeter of the sheets may seal all three together in a single heating operation, thereby providing for an efficient manufacturing process.

[0072] Figure 8 shows a schematic diagram of a system 800 comprising a container 802 containing a plurality of flexible food packages 810a-c, 820a-c. In some examples, the container 802 may be a cardboard box. The plurality of flexible food packages 810a-c, 820a-c is arranged into a first layer 830 and a second layer 832, which is disposed on top of the first layer 830.

[0073] Each one of the flexible food packages 810a-c, 820a-c contains a utensil 812a-c, 822a-c, which is illustrated schematically as a solid line.

[0074] Each of the flexible food packages 820a-c in the first layer 830 is arranged such that the utensil 822a-c is disposed in an alternate direction with respect to the utensil 822a-c of an adjacent flexible food package 820a-c in the first layer 830. Each of the flexible food packages 810a-c in the second layer 832 is arranged such that the utensil 812a-c is disposed in an alternate direction with respect to the utensil 812a-c of an adjacent flexible food package 810a-c in the second layer 832.

[0075] In this example, an optional dividing sheet 834, which may be made of cardboard, is provided between the first layer 830 and the second layer 832.

[0076] The arrangement of the utensils 812a-c in the first layer 830 provides a reinforcing structure that may advantageously reduce the likelihood that food items within the flexible food packages 820a-c are bruised, crushed, or otherwise damaged by the weight of the flexible food packages 810a-c in the second layer 832. It will be appreciated that while only two layers 830, 832 are shown in this example, any number of layers greater than two can be contained in a suitable container and can benefit from the reinforcing properties of the present arrangement of utensils.

[0077] Figure 8 also shows a first row of flexible food packages 820a-c in the first layer 830. The first layer 830 also comprises a second row of flexible food packages that are located directly behind the first row of flexible food packages 820a-c. Thereby, the first row is disposed next to the second row. The position of each of the utensils 840a-c in each of the flexible food packages in the second row is illustrated with dashed lines.

[0078] Each flexible food package 820a-c in the first row is positioned such that the first bottom corner is next to the first bottom corner of a neighbouring flexible food package in the first row. For example, the first bottom corner 824b of a middle flexible food package 820b is positioned next to the first bottom corner 824c of a right flexible food package 820c. Additionally, or alternatively, the second top corner of each flexible food package is next to the second top corner of a neighbouring flexible food package in the first row. For example, the second top corner 826a of a left flexible food package is next to the second top corner 826b of the middle flexible food package 820b. It will be appreciated that flexible food packages, such as the left flexible food package 820a and the right flexible food package 820c are positioned next to only one other flexible food package in the first row. While only three flexible food packages 820a-c are shown, any number greater than or equal to two may be contained in a row.

[0079] Flexible food packages 810a-c in the second layer 832 are positioned such that they each contain a utensil 812a-c in a complementary orientation with respect to the utensil 822b of the flexible food package

820a-c in the first layer 830 that is directly below the flexible food package 810a-c in the second layer 832. The first bottom corner of each flexible food package 810a-c in the second layer 832 is positioned next to the second top corner of the flexible food package 820a-c in the first layer 830. In this way, the utensils are positioned to cooperate to provide a reinforcing structure.

[0080] Each flexible food package in the second row is positioned such that a second bottom corner is next to the first bottom corner of a corresponding flexible food package in the first row. Consequently, the utensils 822a-c in the first row have a complementary orientation and position with respect to the utensils 840a-c in the second row. In this way, the utensils are positioned in a criss-cross configuration to cooperate to provide a reinforcing structure. It will be appreciated that any number of rows greater than two are possible.

[0081] The flexible food packages are arranged in a criss-cross formation i.e. one food package with the utensil in one direction and another package with the utensil in the opposite direction on the first layer. This arrangement may offer improved structural strength and support to the second layer of packages in some applications. The criss-cross formation is applicable for both layers 830, 832 of food packages 810a-c, 820a-c that are packed or stacked in the container 802.

[0082] There are substantial advantages of the present system over other soft food systems that are packaged in a food pouch that cannot offer the additional reinforcement presented by the utensil, which is located along the main along the main diagonal of the utensil pouch. The criss-cross packing formation offers the opportunity to transport more food packages without the risk of damage to the food contents.

[0083] In some examples, the flexible food package may comprise a second-sheet that is provided on the second surface of the dividing-sheet to define a sealed second-pouch. In such cases there may be one or more first food items within the food-pouch and one or more second food items within the second-pouch. The first food items may be different than the second food items. For example, the first food items may comprise mashed potato while the second food items may comprise one or more sausages. In such cases, the dividing sheet may be configured to segregate the first food items from the second food items. This may be advantageous where the food items are heated to a temperature suitable to cook the food items or suitable for consumption of the food items. Thus, mashed potatoes and sausages may be conveniently heated at the same time using the same heating appliance. It can be beneficial for the mashed potato and sausages to be separated during the cooking process due to the fat content in the sausages affecting/contaminating the presentation of the potatoes. It will be appreciated that in these examples, resealable strips are purely optional and may not be required.

[0084] In one or more embodiments the layered containment structure may be configured to be resilient with respect to one or more of boiling water, steam and microwave radiation. The materials used to make the layered containment structure may thus allow for the food pouch to be heated in e.g. a microwave oven, boiling or heated water, or a steam combination oven. In some examples the layered containment structure may also enable the food pouch to be stored in a fridge or freezer prior to use. Thus, the materials used for the layered containment structure may need to be able to withstand heating to temperatures between 100 Celsius and 200 Celsius; and/or refrigeration to temperatures less than minus 18 Celsius.

[0085] As previously described in relation to figure 1 above, the layered containment structure may comprise three optional frangible strips formed in the first-sheet, the dividing-sheet and the second-sheet, respectively. The frangible strips can facilitate the process of a user removing a top portion, via perforated lines of weakness, of the layered containment structure, by tearing the frangible strips to open the food pouch and the second pouch, which would otherwise be sealed by virtue of the sealing of the top edges of the three sheets already described above. The frangible strips may advantageously be used to provide for a small tear in the packaging to avoid an undesirable increase in internal gas pressure during microwave heating, for example. The frangible strips may also be used to fully open the packaging, after cooking, to access the food items contained therein.

[0086] In some examples, the layered containment structure/pouch can have formations to facilitate tearing. For instance, notches or similar formations, typically 'V' or 'U' shaped, may be present at the sides of the layered containment structure/pouch and/or a line of weakness may be present extending across the pouch between the notches to facilitate opening of the flexible food package by tearing.

[0087] In some examples the layered containment structure may comprise biodegradable and/or bio-compostable material.

[0088] Advantages of the flexible food packages according to the present disclosure over a typical rigid plastic carton or tray include that less plastic can be used during the manufacture of the flexible food package and therefore, less packaging is offered with the food product for the end consumer. Furthermore, in addition to the environmental benefits using reduced amounts of plastic for the present packaging system, the layered containment structure can additionally enable cooking instructions and product branding to be incorporated by printing directly onto the film used to manufacture the layered containment structure. The printing may include the deposition on, or coating of, the exterior of the layered containment structure with visible materials, such as ink, arranged to encode the required information. This can advantageously eliminate the need for secondary cardboard or plastic packaging for consumer information such as for ingredients, cooking times and best before dates. Furthermore, reducing or eliminating any additional

packaging can beneficially reduce the cost and complexity of the required manufacturing process.

[0089] It will be appreciated that any components said to be sealed together, coupled or connected may be sealed together, coupled or connected either directly or indirectly. In the case of indirect coupling, additional components may be located between the two components that are said to be coupled.

[0090] In this specification, example embodiments have been presented in terms of a selected set of details. However, a person of ordinary skill in the art would understand that many other example embodiments may be practiced which include a different selected set of these details. It is intended that the following claims cover all possible example embodiments.

Claims

1. A flexible food package comprising:

a layered containment structure comprising a first-sheet, a second-sheet and a dividing-sheet, wherein:

the dividing sheet has a first surface and a second surface;
the first-sheet is provided on the first surface of the dividing-sheet to define a sealed food-pouch; and
the second-sheet is provided on the second surface of the dividing-sheet to define a sealed utensil-pouch;

a utensil within the utensil-pouch; and
one or more food items within the food-pouch.

2. The flexible food package of claim 1, wherein the first-sheet is coextensive with the dividing-sheet and the first-sheet is joined to the dividing-sheet around at least a portion of their respective edges.

3. The flexible food package of claim 1 or claim 2, wherein the food-pouch is enclosed by the first-sheet and the dividing-sheet.

4. The flexible food package of any preceding claim, wherein the utensil-pouch is enclosed by the dividing-sheet and the second-sheet.

5. The flexible food package of any preceding claim, further comprising resealable strips disposed on opposing portions of the first-sheet and the dividing-sheet and configured to cooperate to seal the food pouch.

6. The flexible food package of claim 5, wherein the food-pouch is enclosed by the first-sheet, the dividing-sheet and the resealable strips.

7. The flexible food package of any preceding claim, wherein a top edge of first-sheet is sealed to a top edge of the dividing-sheet and the top edge of the dividing-sheet is sealed to a top edge of second-sheet, to seal the flexible food package.

8. The flexible food package of any preceding claim, wherein the utensil is disposed along a main diagonal of the utensil-pouch to reinforce the flexible food package.

9. The flexible food package of any preceding claim, wherein the utensil-pouch comprises:

a first bottom corner adjacent to a first side of a base of the utensil-pouch; and
a second top corner diagonally opposite the first bottom corner, above a second side of the base of the utensil-pouch,
wherein respective ends of the utensil are configured to engage with the first bottom corner and the second top corner to reinforce the flexible food package.

10. The flexible food package of any preceding claim, wherein the utensil has a handle portion that has a curvature along at least a portion of its length and a concave face of the handle is oriented towards the dividing-sheet.

11. The flexible food package of any preceding claim, wherein one or more of the first-sheet, the dividing-sheet and the second-sheet comprises one or more perforations configured to enable gas to escape from the layered containment structure.

12. A system comprising a container containing a plurality of flexible food packages of claim 9, wherein the plurality of flexible food packages comprises:

a first layer, wherein each of the flexible food packages in the first layer is arranged such that the utensil is disposed in an alternate direction with respect to the utensil of an adjacent flexible food package in the first layer; and
a second layer, wherein each of the flexible food packages in the second layer is arranged such that the utensil is disposed in an alternate direction with respect to the utensil of an adjacent flexible food package in the second layer,
wherein the second layer is disposed on top of the first layer and the utensils of the flexible food packages of the first layer provide a reinforcing structure.

13. The system of claim 12, wherein the first layer com-

prises a first row of flexible food packages and a second row of flexible food packages, the first row disposed next to the second row, each flexible food package in the first row is positioned such that the first bottom corner is next to the first bottom corner of a neighbouring flexible food package in the first row and/or the second top corner is next to the second top corner of a neighbouring flexible food package in the first row.

14. The system of claim 13, wherein each flexible food package in the second row is positioned such that a second bottom corner is next to the first bottom corner of a corresponding flexible food package in the first row.

15. A method of providing a sealed flexible food package, comprising:

forming a layered containment structure comprising a first-sheet, a second-sheet and a dividing-sheet, the dividing sheet having a first surface and a second surface, by:

sealing the first-sheet on to the first surface of the dividing-sheet to define a food-pouch; and
sealing the second-sheet on to the second-surface of the dividing-sheet to define a utensil-pouch,

providing a utensil within the utensil-pouch;
providing one or more food items within the food-pouch;
sealing the first-sheet to the dividing-sheet to seal the food-pouch and sealing the dividing sheet to the second-sheet to seal the utensil pouch.

Figure 1

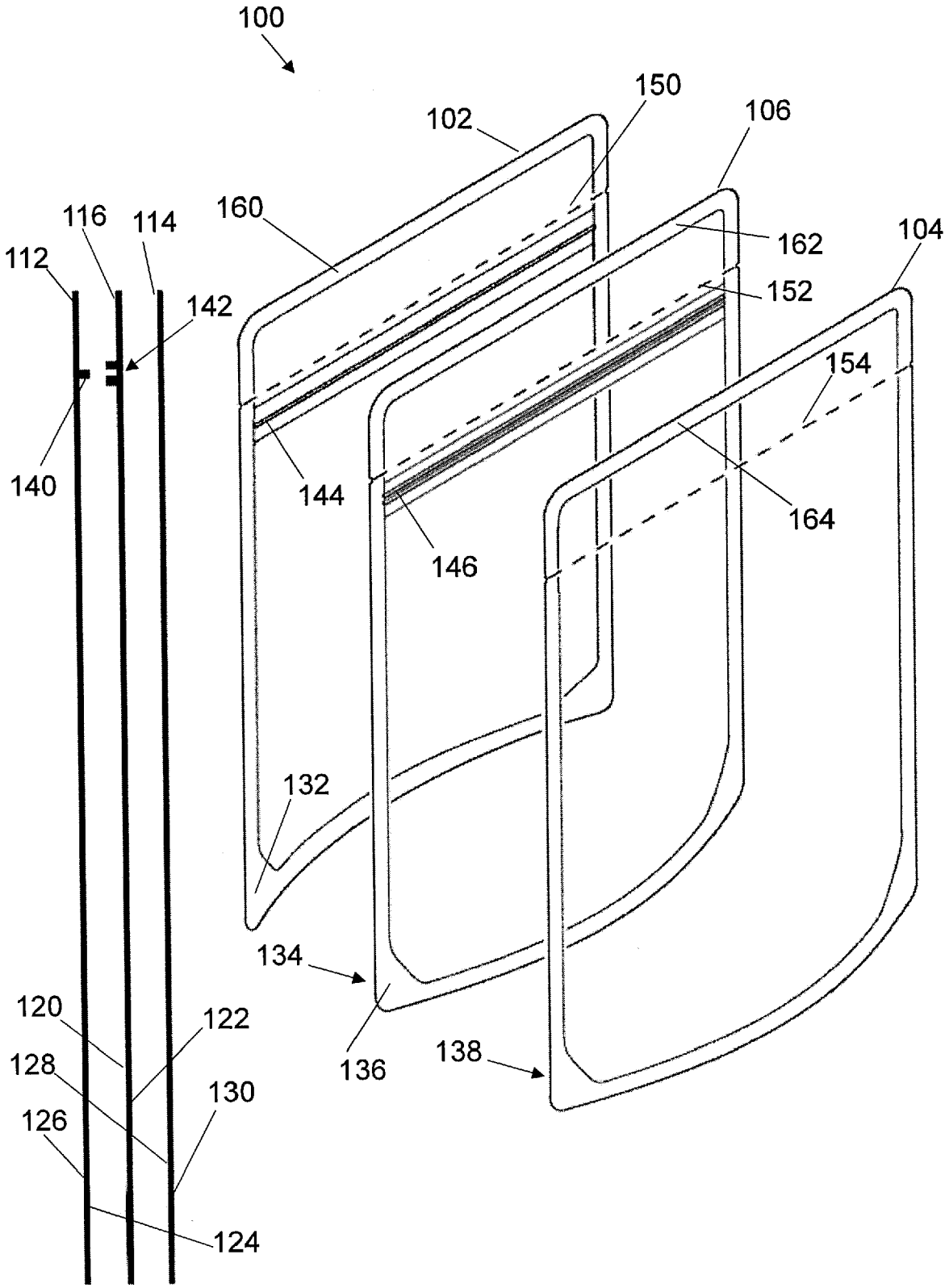
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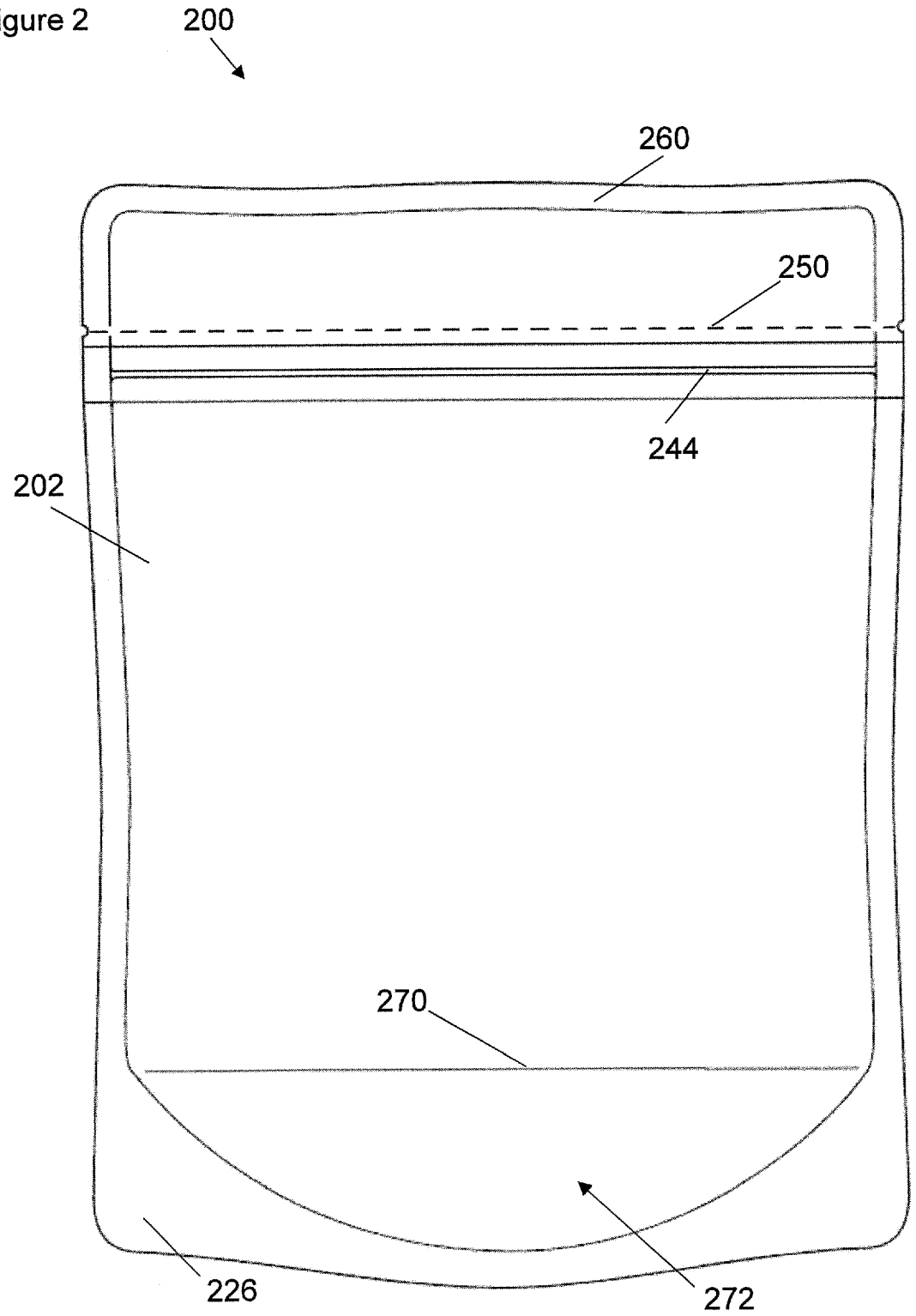
Figure 2



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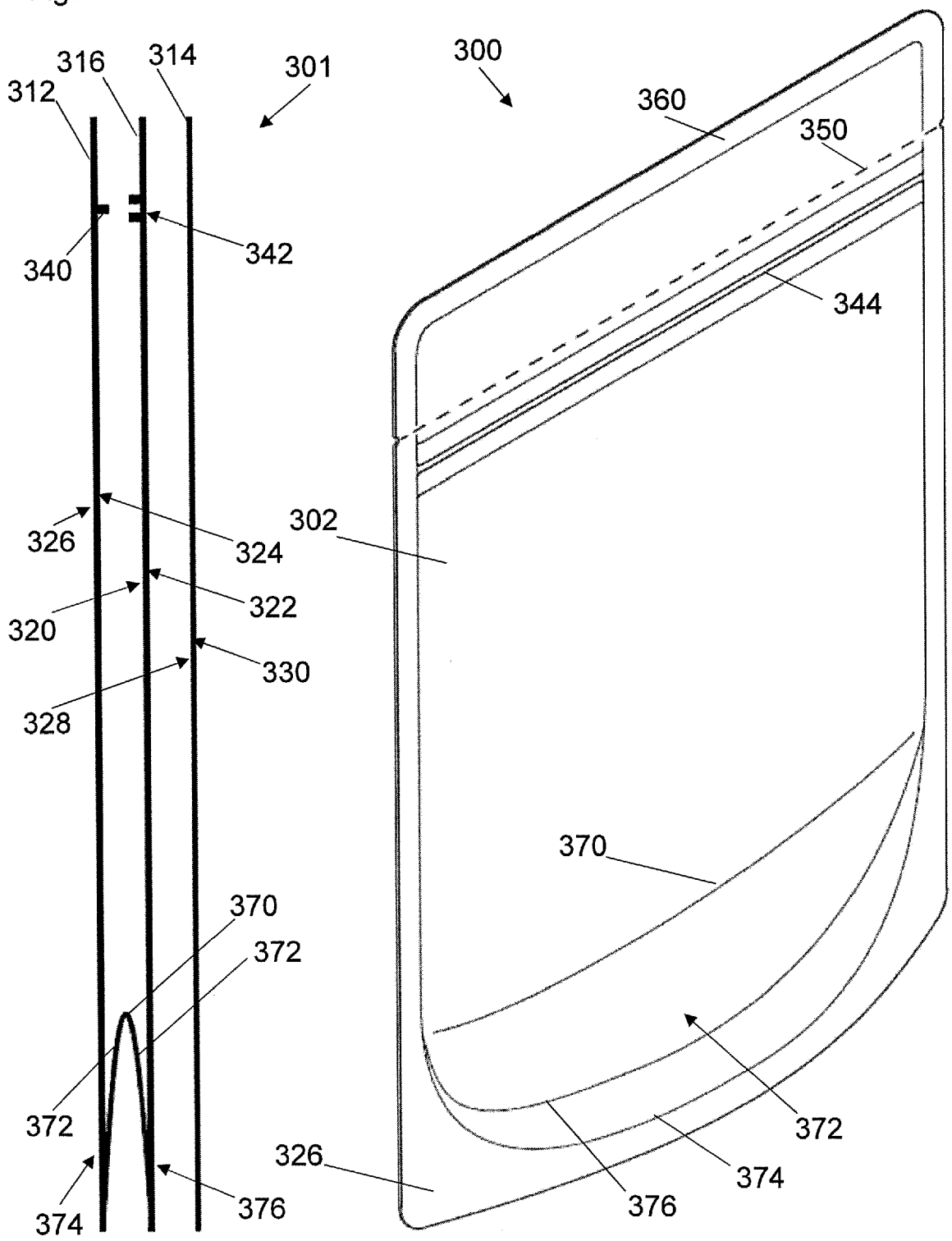
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Figure 4

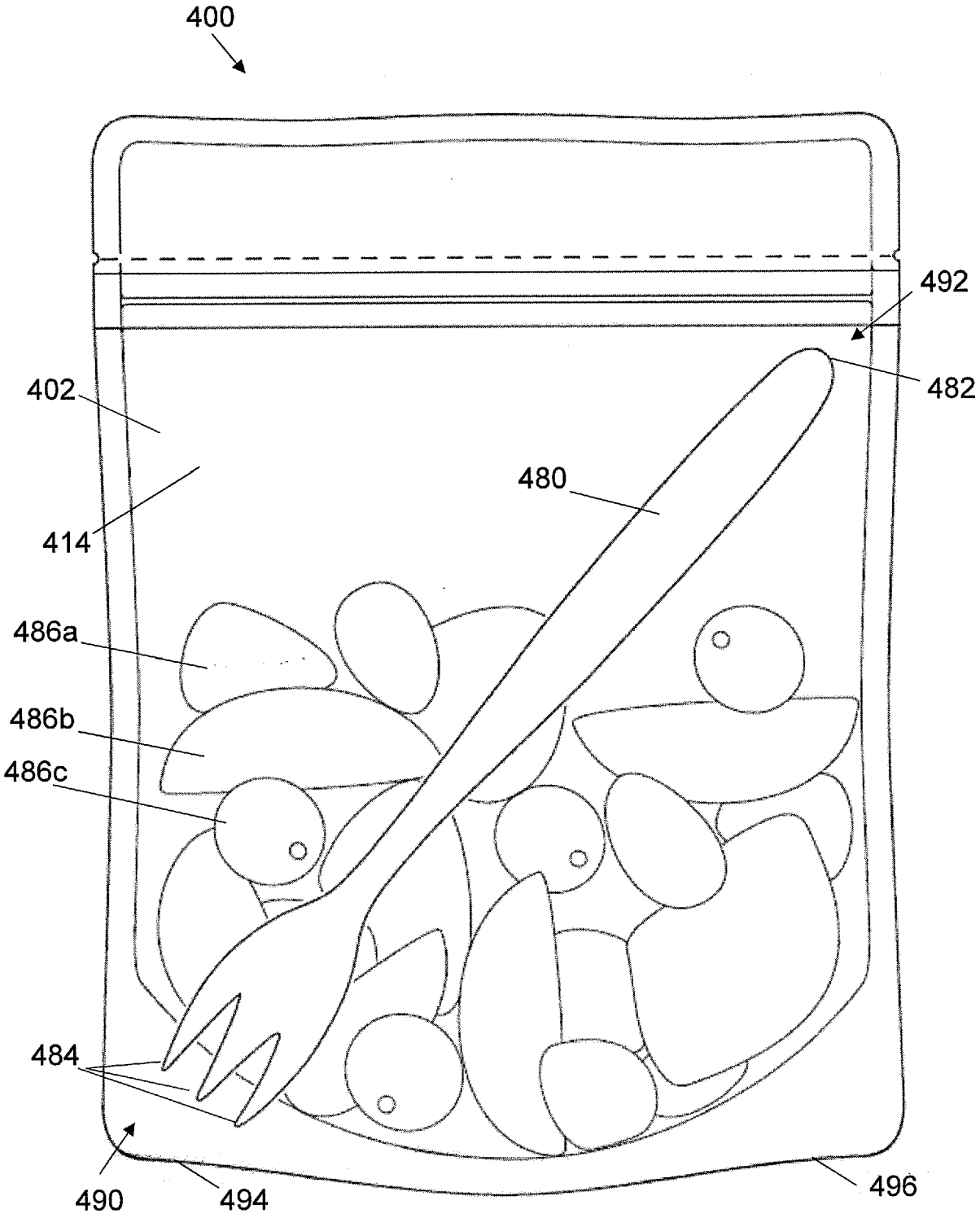
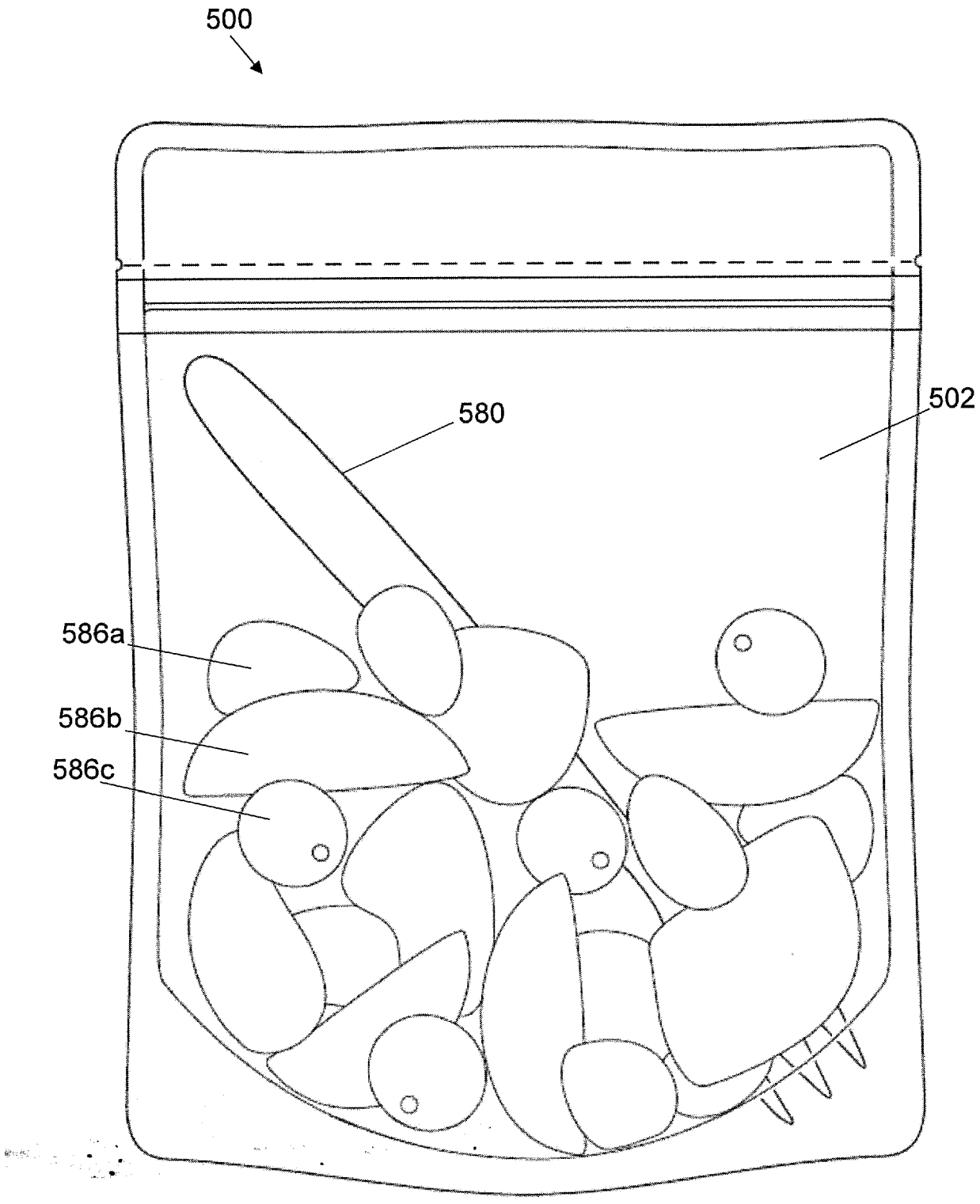


Figure 5



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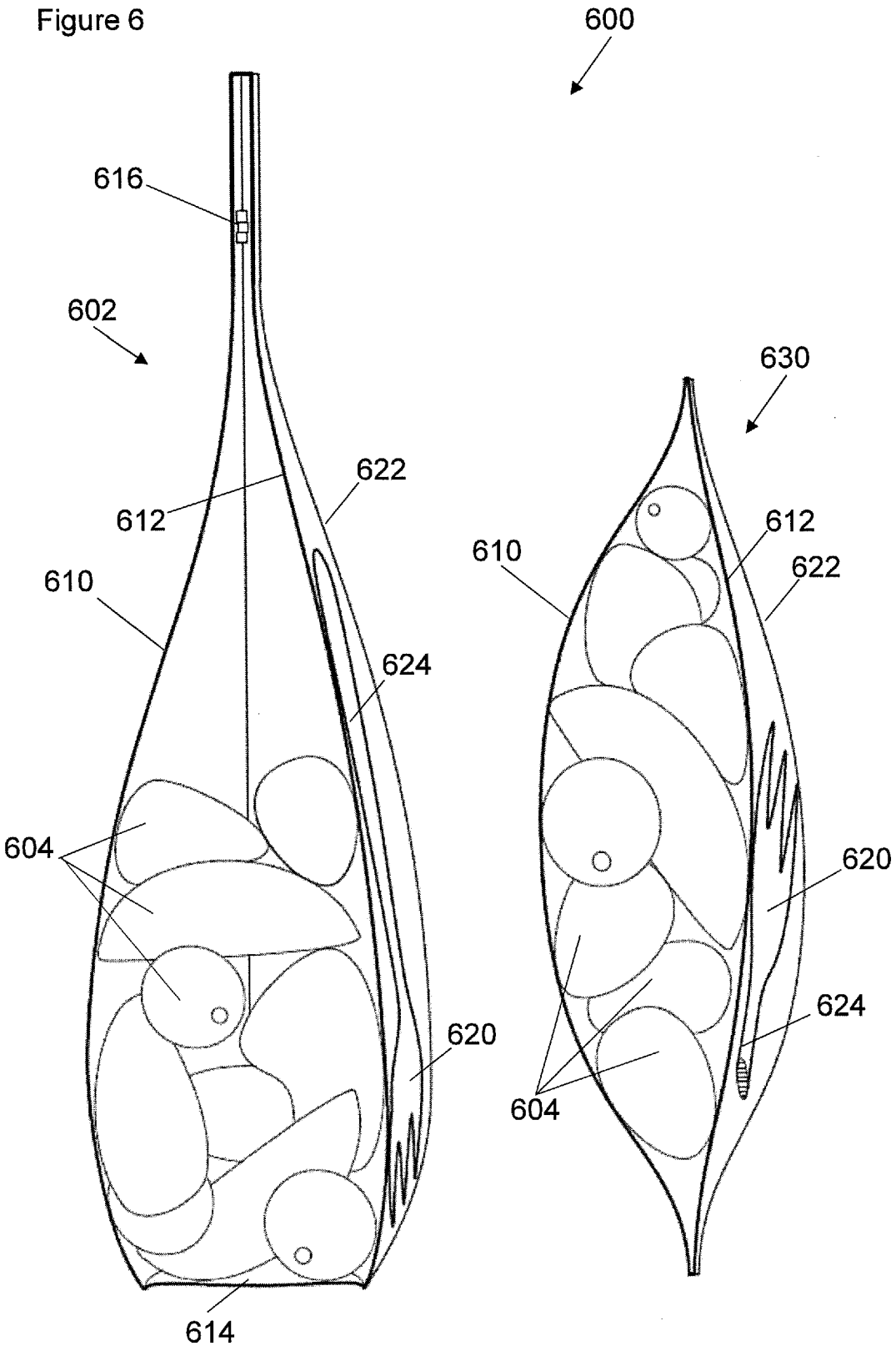
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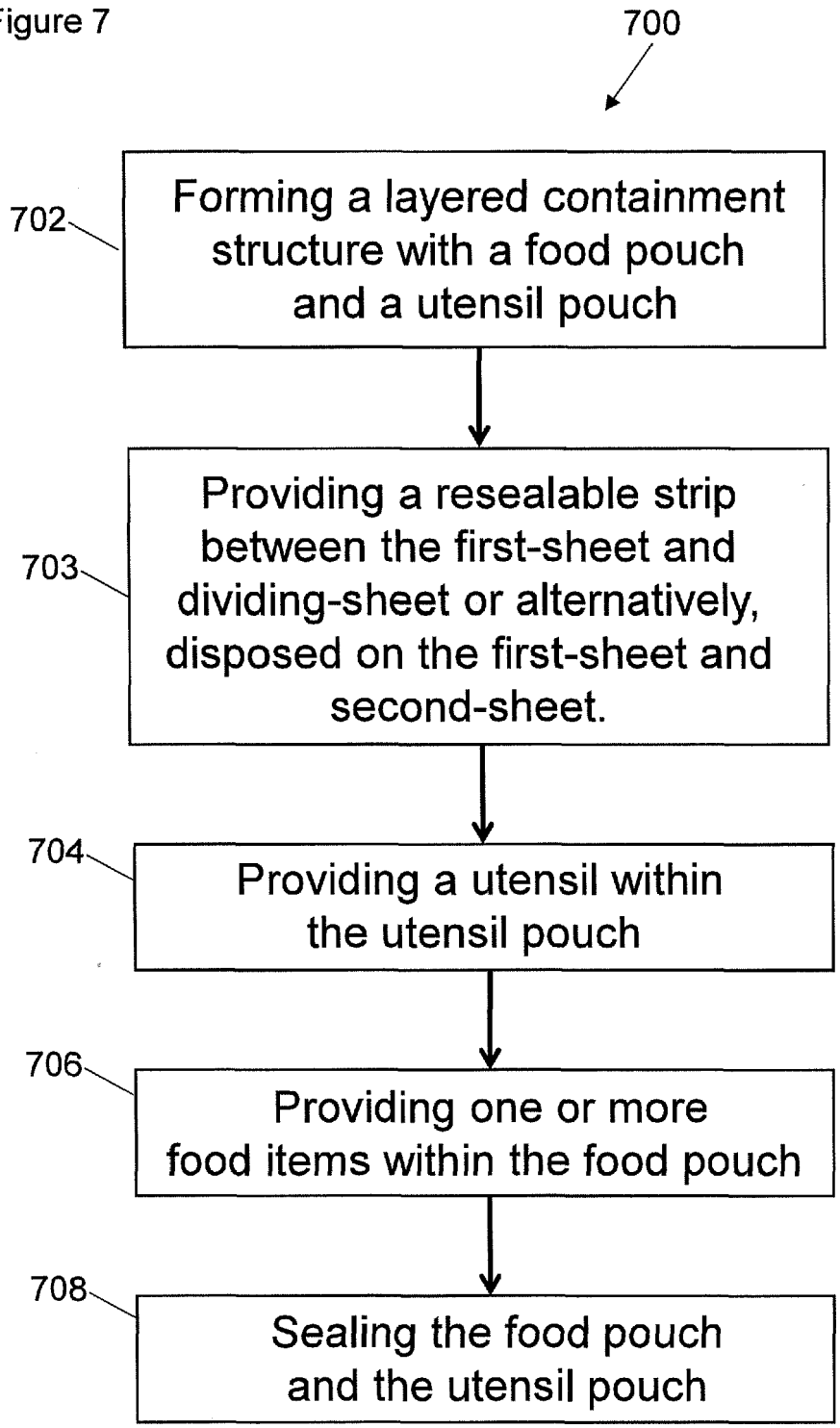
Figure 7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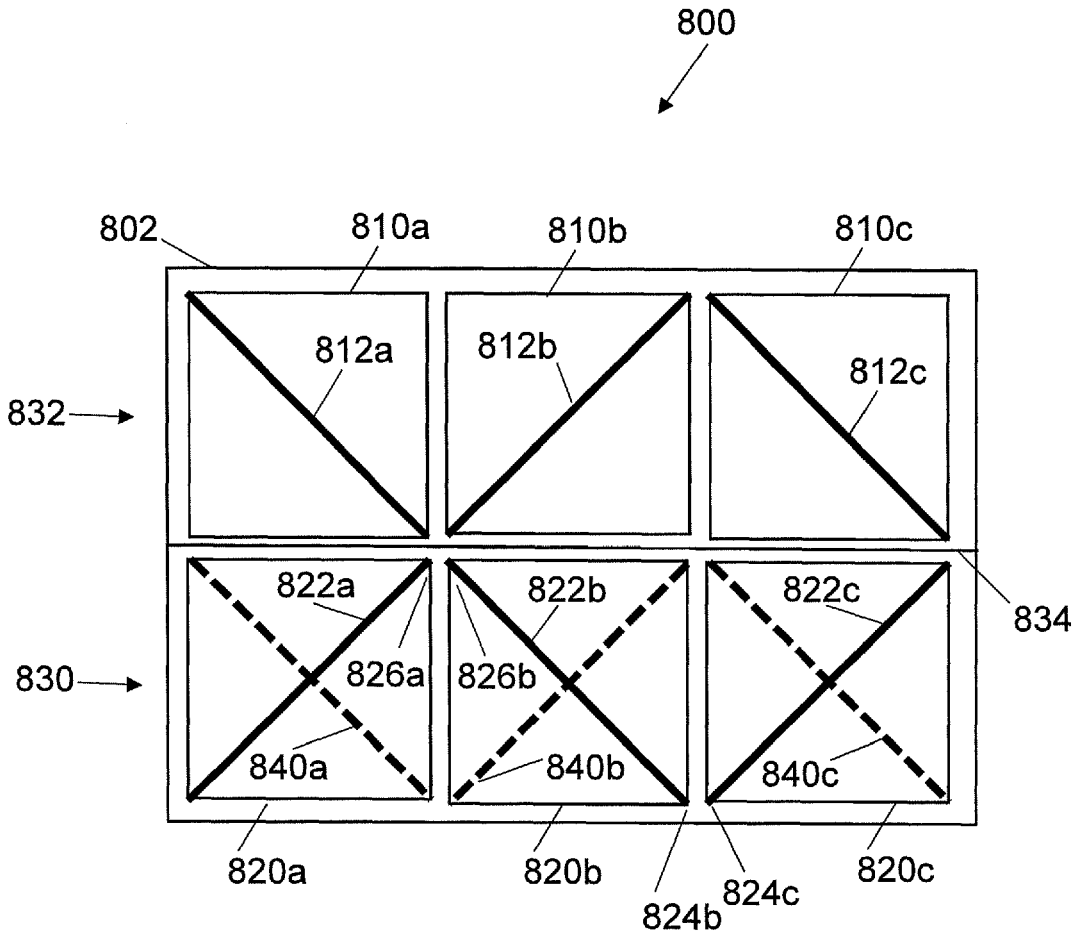
702
Forming a layered containment structure with a food pouch and a utensil pouch
703
Providing a resealable strip between the first-sheet and dividing-sheet or alternatively, disposed on the first-sheet and second-sheet.
704
Providing a utensil within the utensil pouch
706
Providing one or more food items within the food pouch
708
Sealing the food pouch and the utensil pouch

Figure 8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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 June 2019	Rodriguez Gombau, F

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