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(54) COMPOSITE PACKAGING MATERIAL SHEET, METHOD FOR FORMING A COMPOSITE PACKAGING MATERIAL SHEET, COMPOSITE PACKAGE AND METHOD FOR FORMING A COMPOSITE PACKAGE

(57) There is described a composite packaging material sheet (21, 21', 21") for the formation of a composite package (1, 1', 1") comprising at least a packaging material sheet base (22, 22") having a designated opening and an opening device (3, 3', 3") applied on the packaging material sheet base (22, 22") and about the designated opening. The packaging material sheet base (22, 22") comprises at least a first face and a second face (24) opposite to the first face and a plurality of crease lines (30) delimiting a plurality of panels (31). The opening device (3, 3', 3") comprises a base frame (15) for coupling the opening device (3, 3', 3") to the packaging material sheet base (22, 22") and about the designated opening. The base frame (15) comprises at least a first flange (34) connected to the second face (24) and having a rectilinear peripheral portion (36), the rectilinear peripheral portion (36) being adjacent and parallel to one respective crease line (30) defining a reference crease line (37).

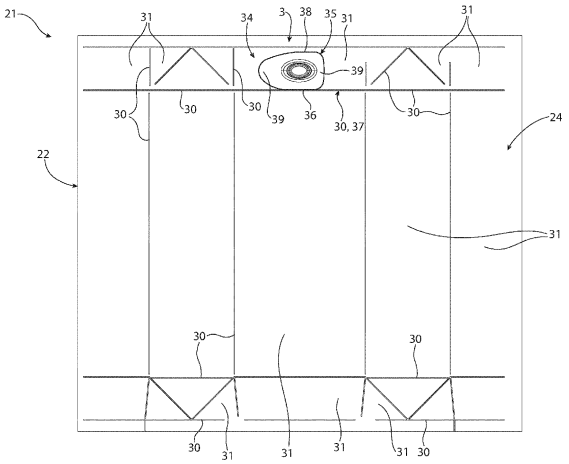

FIG. 3

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Description

TECHNICAL FIELD

[0001] The present invention relates to a composite packaging material sheet for the formation of a composite package, in particular a composite package having a sealed main body, filled with a pourable product, in particular filled with a pourable food product, and an opening device.

[0002] Furthermore, the present invention relates to a method for forming a composite packaging material sheet for the formation of a composite package.

[0003] Advantageously, the present invention also relates to a composite package, in particular a composite package having a sealed main body, filled with a pourable product, in particular filled with a pourable food product, and comprising an opening device.

[0004] Additionally, the present invention also relates to a method for forming a composite package for a pourable product, in particular a pourable food product.

BACKGROUND ART

[0005] As is known, many liquid or pourable food products, such as fruit juice, UHT (ultra-high-temperature treated) milk, wine, tomato sauce, etc., are sold in composite packages made of a multilayer composite packaging material.

[0006] A typical example is the parallelepiped-shaped package for pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by sealing and folding a laminated strip packaging material. The packaging material has a multilayer structure comprising a carton and/or paper base layer, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene. In the case of aseptic packages for long-storage products, the packaging material also comprises a layer of oxygen-barrier material, e.g. an aluminum foil, which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material forming the inner face of the package eventually contacting the food product.

[0007] Some of the known composite packages comprise each:

- a main body having a designated opening and being formed from a composite packaging material sheet having a multilayer structure; and
- an opening device connected to the main body and about the designated opening and configured to seal the designated opening, the opening device being controllable in an open configuration for freeing the designated opening.

[0008] A typical opening device comprises a base frame connecting the opening device to the main body and about the designated opening, a collar extending from the base frame having an outlet and a lid for selectively closing and opening the outlet.

[0009] It is furthermore known that such composite packages are formed in automatic packaging machines from respective composite packaging material sheets, which can be provided singularly or in the form of a web of a succession of basic units.

[0010] Even though the known composite packages work satisfyingly well, a desire is felt in the sector to provide for improved composite packaging material sheets for the formation of composite packages.

[0011] Another desire is felt in the sector to provide for an improved method for forming composite packaging material sheets for the formation of composite packages.

[0012] Additionally, a desire is felt in the sector to provide for an improved composite package for pourable products.

[0013] A further desire is felt in the sector to provide for an improved method for forming composite packages for pourable products.

DISCLOSURE OF INVENTION

[0014] It is therefore an object of the present invention to provide in a straightforward and low-cost manner an improved composite packaging material sheet for the formation of a composite package filled with a pourable product, in particular filled with a pourable food product.

[0015] It is another object of the present invention to provide in a straightforward and low-cost manner a method for forming a composite packaging material sheet for the formation of a composite package for pourable products, in particular pourable food products.

[0016] It is a further object of the present invention to provide in a straightforward and low-cost manner a composite package for a pourable product, in particular a pourable food product.

[0017] It is an even other object of the present invention to provide in a straightforward and low-cost manner a method for forming a composite package for pourable products, in particular pourable food products.

[0018] According to the present invention, there is provided a composite packaging material sheet according to independent claim 1.

[0019] Further advantageous embodiments of the composite packaging material sheet are specified in the claims being directly or indirectly dependent on claim 1.

[0020] According to the present invention, there is also provided a method for forming composite packaging material sheets according to independent claim 7.

[0021] Further advantageous embodiments of the method for forming composite packaging material sheets are specified in the claims being directly or indirectly dependent on claim 7.

[0022] According to the present invention, there is also provided a composite package according to independent claim 9.

[0023] Further advantageous embodiments of the

composite package are specified in the claims being directly or indirectly dependent on claim 9.

[0024] According to the present invention, there is also provided a method for forming composite packages according to independent claim 15.

BRIEF DESCRIPTION OF THE DRAWINGS

[0025] Three non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a composite package according to a first embodiment of the present invention, with parts removed for clarity;
Figure 2 is an enlarged perspective view of an opening device of the composite package of Figure 1, with parts removed for clarity;
Figure 3 is a top view of a packaging material sheet for the formation of a composite package according to Figure 1, with parts removed for clarity;
Figure 4 is a schematic perspective view of a composite package according to a second embodiment of the present invention, with parts removed for clarity;
Figure 5 is an enlarged perspective view of an opening device of the composite package of Figure 4, with parts removed for clarity;
Figure 6 is a top view of a packaging material sheet for the formation of a composite package according to Figure 4, with parts removed for clarity;
Figure 7 is a schematic perspective view of a composite package according to a third embodiment of the present invention, with parts removed for clarity;
Figure 8 is an enlarged perspective view of an opening device of the composite package of Figure 7, with parts removed for clarity; and
Figure 9 is a top view of a packaging material sheet for the formation of a composite package according to Figure 7, with parts removed for clarity.

BEST MODES FOR CARRYING OUT THE INVENTION

[0026] Number 1 indicates as a whole a first embodiment of a composite package for a pourable product, in particular a pourable food product, even more particular a liquid food product, comprising:

- a (composite) main body 2, in particular a sealed (composite) main body 2, being filled with a pourable product, in particular a pourable food product, even more particular a liquid food product, and having a designated opening configured to allow for an outflow of the pourable product from main body 2; and
- an opening device 3, in particular a plastic opening device 3, connected to main body 2 about the designated opening and configured to seal the designated opening, in particular prior to the first-time use of package 1.

[0027] In particular, package 1 may be obtained from a composite packaging material sheet 4, in particular having a multilayer structure, as e.g. disclosed in Figure 3.

[0028] With particular reference to Figure 1, package 1, in particular main body 2, may extend along a longitudinal axis A, a first transversal axis B and a second transversal axis C. In particular, the extension of package 2 along longitudinal axis A may be larger than the extension of package 2 along first transversal axis B and second transversal axis C.

[0029] Preferentially, package 1, in particular main body 2, may be parallelepiped-shaped. Alternatively, package 1, in particular main body 2, may have a cylindrical shape or any other shape.

[0030] In more detail, main body 2 may comprise a plurality of walls, in particular a first wall 5, one or more lateral walls 6, in the specific case shown four, and at least one second wall 7, in the specific case shown one.

[0031] More specifically, first wall 5 may be transversal, in particular perpendicular, to longitudinal axis A, and main body 2 may extend from first wall 5 along longitudinal axis A. Preferentially, first wall 5 may define a support surface of package 1, in particular main body 2, which is designed to be put in contact with a support, such as e.g. a shelf, in particular when, in use, being e.g. exposed within a sales point or when being stored. In particular, when being arranged on a support first wall 5 defines a bottom wall of package 1.

[0032] Additionally, first wall 5 may define a bottom wall of package 1 during a normal use of package 1.

[0033] Furthermore, lateral walls 6 may be (fixedly) connected to first wall 5 and extend, in particular (substantially) parallel to longitudinal axis A, from first wall 5. In particular, lateral walls 6 (substantially) define the extension of package 1 along longitudinal axis A.

[0034] Additionally, second wall 7 may be positioned opposite to first wall 5 and may be (fixedly) connected to (at least some) lateral walls 6. In particular, also second wall 7 may be transversal to longitudinal axis A.

[0035] In particular, lateral walls 6 may be interposed between first wall 5 and second wall 7.

[0036] In particular, when being arranged on a support and/or during a normal use of package 1, second wall 7 may define a top wall of main body 2.

[0037] According to some non-limiting embodiments, first wall 5 and second wall 7 may be parallel to one another.

[0038] According to alternative non-limiting embodiments not shown, first wall portion 5 and second wall portion 7 may be inclined with respect to one another.

[0039] According to another alternative embodiment not shown, second wall 7 may have two portions transversal to one another (i.e. so as to form a gable-top configuration).

[0040] According to some non-limiting embodiments,

second wall 7 may carry and/or comprise the designated opening.

[0041] Furthermore, main body 2 may comprise a plurality of edges, in particular:

- a plurality of longitudinal edges 8, in the specific case shown four, each arranged and/or formed between two neighboring lateral walls 6;
- a plurality of first transversal edges 9, in the specific case shown four, each arranged and/or formed between one respective lateral wall 6 and first wall 5; and
- a plurality of second transversal edges 10, in the specific case shown four, each arranged and/or formed between one respective lateral wall 6 and second wall 7.

[0042] In particular, first transversal edges 9 and second transversal edges 10 may be transversal, in particular perpendicular, to longitudinal edges 8.

[0043] In further detail, first transversal edges 9 may define bottom transversal edges of main body 2 and second transversal edges 10 may define top transversal edges of main body 2.

[0044] Moreover, longitudinal edges 8 may be (substantially) parallel to longitudinal axis A.

[0045] Furthermore, main body 2 may comprise an inner space 11 for the pourable product. In particular, first wall 5, lateral walls 6 and second wall 7 may delimit inner space 11.

[0046] Additionally, the designated opening may be configured to allow for the outpouring of the pourable product from main body 2, in particular out of inner space 11.

[0047] Furthermore, package 1, in particular main body 2, may comprise an inner surface 12 facing inner space 11 and/or contacting the pourable product, and in particular an outer surface 13 opposite to inner surface 12.

[0048] With particular reference to Figures 1 to 3, opening device 3 is configured to close and seal the designated opening, in particular prior to the first-time use of package 1, and to be controllable in an open configuration, in which opening device 3 frees at least a portion of the designated opening so as to allow the outpouring of the pourable product from package 1, in particular main body 2.

[0049] Additionally, opening device 3 may also be controllable in a closing configuration, in which opening device 3 closes the designated opening.

[0050] Moreover, prior to the first-time use of package 1, opening device 3 is controlled in the closing configuration and is configured to seal and close the designated opening and after the first-time control of opening device 3 in the opening configuration and when controlling opening device 3 back in the closing configuration, opening device 3 is adapted to close the designated opening.

[0051] With particular reference to Figures 1 to 3, opening device 3 comprises at least a base frame 15 for coupling opening device 3 to main body 2.

[0052] Additionally, base frame 15 may be arranged about the designated opening. In particular, base frame 15 may comprise a passage, in particular being aligned with at least a portion of the designated opening.

[0053] Furthermore, opening device 3 may comprise a collar 17 extending from base frame 15 and a lid 18 coupled and/or couplable to collar 17.

[0054] In more detail, collar 17 may comprise an outlet opening, in particular aligned with the passage and the designated opening, being configured to allow for the outflow of the pourable product, and lid 18 is configured to selectively close and open the outlet opening.

[0055] In further detail, prior to a first-time use, lid 18 may be in a closing position, in which lid 18 closes and seals the outlet opening. Additionally, lid 18 may be moveable in an open position, in which lid 18 opens the outlet opening. Moreover, once lid 18 has been moved for the first time to the open position, lid 18 is repeatedly moveable between the open position and the closing position, but when being in the closing position lid 18 is configured to close the outlet opening.

[0056] In particular, opening device 3 is controlled in the open configuration and the closing configuration with lid 18 being in the open position and the closing position.

[0057] In even further detail, prior to the first-time control of lid 18 from the closing position to the open position, lid 18 is rupturably joined to a rim of collar 17, the rim delimiting the outlet opening.

[0058] Additionally, opening device 3 may comprise a tethering element 19 tethering lid 18 to collar 17 and/or base frame 15, in the specific case shown to collar 17.

[0059] Moreover, opening device 3 may comprise a retaining element 20 configured to retain lid 18 in the open position. In particular, retaining element 20 may be configured to interact with tethering element 19 so as to retain lid 18 in the open position.

[0060] In particular, retaining element 20 is (integrally) connected to, and extends from, base frame 15.

[0061] With particular reference to Figure 3, package 1 is formed from a packaging material sheet 21 comprising:

- a (composite) packaging material sheet base 22 comprising a multilayer packaging material having the designated opening; and
- opening device 3 applied on packaging material sheet base 22 and about the designated opening.

[0062] It should be noted that packaging material sheet base 22 comprises the designated opening and once package 1 has been formed from packaging material sheet 21 the designated opening of main body 2 originates from the designated opening of packaging material sheet base 22.

[0063] It should be furthermore noted that main body 2 is obtained by folding and sealing packaging material

sheet base 22 and, as opening device 3 is connected to packaging material sheet base 22 (as part of packaging material sheet 21), opening device 3 is also coupled to main body 2 after formation of package 1 as a whole.

[0064] Moreover, packaging material sheet base 22 may comprise a first face and a second face 24 opposite to the first face. In particular, the first face defines outer surface 13 and second face 24 defines inner surface 12 once package 1 has been formed from packaging material sheet 21.

[0065] In even further detail, packaging material sheet base 22 may comprise at least one layer of fibrous material, such as e.g. a paper or cardboard, and at least two layers of heat-seal plastic material, e.g. polyethylene, interposing the layer of fibrous material in between one another. One of these two layers of heat-seal plastic material defining the first face and the other one defining second face 24.

[0066] Moreover, packaging material sheet base 22 may also comprise a layer of gas- and light-barrier material, e.g. aluminum foil or ethylene vinyl alcohol (EVOH) film, in particular being arranged between one of the layers of the heat-seal plastic material and the layer of fibrous material. Preferentially, the packaging material may also comprise a further layer of heat-seal plastic material being interposed between the layer of gas- and light-barrier material and the layer of fibrous material.

[0067] With particular reference to Figure 3, packaging material sheet 21, in particular packaging material sheet base 22, comprises a plurality of crease lines 30 delimiting and/or defining a plurality of panels 31 of packaging material sheet 21, in particular packaging material sheet base 22.

[0068] More specifically, packaging material sheet 21, in particular packaging material sheet base 22, is folded along crease lines 30 so as to obtain package 1.

[0069] In particular, at least some crease lines 30 define and/or correspond to longitudinal edges 8, at least some crease lines 30 define and/or correspond to first transversal edges 9 and at least some crease lines 30 define and/or correspond to second transversal edges 10.

[0070] In further detail, each panel 31 may define at least partially a respective wall (first wall 5 or one lateral wall 6 or second wall 7) of main body 2.

[0071] Moreover, at least one panel 31 may comprise the designated opening. In particular, according to the specific embodiment shown in Figure 3, exactly one panel 31 comprises the designated opening.

[0072] Preferentially, the panel 31 comprising the designated opening may at least partially form second wall 7 after formation of package 1.

[0073] In more detail, the panel 31 having the designated opening may be sealed during the formation of package 1 with another panel 31 so as to form second wall 7.

[0074] Moreover, the panel 31 having the designated opening may be delimited by a plurality of crease lines 30 and/or may have a rectangular shape.

[0075] With particular reference to Figures 2 and 3, base frame 15 may comprise at least a first flange 34 connected to, in particular fused to, even more particular molded onto, second face 24.

[0076] In more detail, first flange 34 may have at least a peripheral portion 35, in particular having an annular shape.

[0077] In even more detail, first flange 34, in particular peripheral portion 35, may comprise a rectilinear peripheral portion 36 being adjacent and parallel to one respective crease line 30 defining a reference crease line 37. In particular, reference crease line 37 has a rectilinear shape, too.

[0078] Additionally, first flange 34, in particular peripheral portion 35, may comprise an auxiliary peripheral portion 38 spaced apart from rectilinear peripheral portion 36 and facing away from and being distanced from reference crease line 37. In the specific example shown, auxiliary peripheral portion 38 has a rectilinear shape, in particular being (substantially) parallel to rectilinear peripheral portion 36. Alternatively, auxiliary peripheral portion 38 may have a shape different from the rectilinear one.

[0079] Moreover, first flange 34, in particular peripheral portion 35, may comprise further auxiliary peripheral portions 39 connecting rectilinear peripheral portion 36 and auxiliary peripheral portion 38 to one another. In particular, auxiliary peripheral portions 39, rectilinear peripheral portion 36 and auxiliary peripheral portion 38 may define an annular shape.

[0080] In further detail, first flange 34 may comprise the passage.

[0081] Furthermore, first flange 34 may comprise an inner portion 40 being connected to peripheral portion 35. In particular, peripheral portion 35 may be radially arranged outside and inner portion 40 may be radially arranged inside.

[0082] Moreover, peripheral portion 35 may extend within a first plane and inner portion 40 may extend within a second plane displaced from the first plane. In particular, inner portion 40, even more particular the second plane, may be flush with the first face.

[0083] Moreover, first plane may be flush with second face 24.

[0084] Moreover, collar 17 is integral to first flange 34 and extends from first flange 34.

[0085] According to some possible non-limiting embodiments, a distance between rectilinear peripheral portion 34 and reference crease line 37 may be equal or less than 2,0 mm, in particular equal or less than 1,0 mm, even more particular equal or less than 0,9 mm. In particular, the distance between rectilinear peripheral portion 34 and reference crease line 37 is determined with respect to a direction normal to crease line 37 and rectilinear peripheral portion 34.

[0086] According to some possible embodiments, rectilinear peripheral portion 36 may be in contact with ref-

erence crease line 37. In particular, rectilinear peripheral portion 36 may abut against reference crease line 37 or may extend into reference crease line 37 (i.e. rectilinear peripheral portion 36 may superimpose a portion of reference crease line 37).

[0087] Once package 1 has been formed form packaging material sheet 21, first flange 34 may be connected, in particular fused, to inner surface 12 (i.e. first flange 34 is arranged within inner space 11). Additionally, rectilinear peripheral portion 36 may be adjacent and parallel to reference crease line 37. In particular, reference crease line 37 corresponds and/or defines one respective second transversal edge 10.

[0088] Moreover, rectilinear peripheral portion 36 may be adjacent to one respective lateral wall 6. In particular a distance between rectilinear peripheral portion 36 and the respective lateral wall 6 may be equal or less than 2,0 mm, in particular equal or less than 1,0 mm, even more particular equal or less than 0,9 mm.

[0089] According to some possible embodiments, rectilinear peripheral portion 36 may abut against the respective lateral wall 6.

[0090] With particular reference to Figure 2, retaining element 20 is (integrally) connected to and extends from first flange 15, in particular peripheral portion 35.

[0091] According to the specific embodiment of Figures 1 to 3, peripheral portion 35 may be arranged within inner space 11.

[0092] Furthermore, the forming of one respective packaging material sheet 21 comprises at least the steps of:

- providing the respective packaging material sheet base 22 having the designated opening;
- arranging a mold around the designated opening; and
- feeding a molten polymer to the mold and molding the respective opening device 3 onto packaging material sheet base 21 and about the designated opening.

[0093] In particular, the mold has a cavity corresponding to the shape of opening device 3.

[0094] According to some possible embodiments, in particular for improving the preciseness of the positioning of opening device 3, the formation of packaging material sheet 21 also comprises the step of:

- reading a mark applied on packaging material sheet base 22; and
- aligning the mold around the designated opening in dependence of the position of the mark.

[0095] In particular, the mark may be a magnetic mark or a different kind of mark. Preferentially, the mark may be a magnetic mark as allowing for a precise positioning of the mold and therewith of opening device 3.

[0096] In further detail, packaging material sheet bases 22 may be provided in the form of a web. In particular, the web comprises a plurality of basic units, each basic unit corresponding to one respective packaging material sheet base 22. Thus, during the step of providing, the web of packaging material sheet bases 22 is advanced, in particular intermittently advanced, to a molding station, at which opening devices 3 are molded onto the respective packaging material sheet bases 22. In this way, one obtains a web of packaging material sheets 21.

[0097] Moreover, the formation of packages 1 comprises the following steps:

- providing packaging material sheet 21;
- folding packaging material sheet 21 according to crease lines 30 for obtaining package 1;
- sealing, in particular longitudinally and transversally sealing, package 1; and
- filling package 1 with the pourable product.

[0098] In more detail, packaging material sheet 21 may be provided in the form of a web of packaging material sheets 21 and the web of packaging material sheets 21 may be (continuously) advanced to a tube forming station, at which the web of packaging material sheets 21 may be formed into a tube.

[0099] Moreover, during the step of sealing, the tube may be longitudinally sealed and transversally sealed.

[0100] Additionally, during the step of filling, the tube may be filled with the pourable product.

[0101] The formation of packages 1 may also comprise the step of forming, during which the tube is formed and the step of transversally cutting the tube so as to obtain the single packages 1.

[0102] With reference to Figure 4, number 1' indicates an alternative embodiment of a package according to the present invention; as package 1' is similar to package 1, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0103] In particular, package 1' differs from package 1 in comprising opening device 3'.

[0104] As well, package 1' differs from package 1 in being formed from a packaging material sheet 21' (see Figure 6).

[0105] As packaging material sheet 21' is similar to packaging material sheet 21, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0106] In particular, also packaging material sheet 21' differs from packaging material sheet 21 in comprising opening device 3'.

[0107] In more detail and with particular reference to Figures 4 and 5, opening device 3' differs from opening device 3 in that base frame 15 further comprises a second flange 40 spaced apart from, and in particular being parallel to, first flange 34.

[0108] Preferentially, first flange 34 and second flange

40 may be connected to one another.

[0109] In particular, second flange 40 is connected to, in particular fused to, even more particular molded onto, the first face or after formation of package 1 onto outer surface 13.

[0110] Furthermore, first flange 34 and second flange 40 define a respective interspace interposing between one another a portion of packaging material sheet base 22 or after formation of package 1 of second wall 7.

[0111] In further detail and with particular reference to Figures 4 and 5, second flange 40 may comprise a peripheral portion 42, in particular having the same shape as peripheral portion 35. Alternatively, peripheral portion 42 may have a shape at least partially differentiating from the shape of peripheral portion 35.

[0112] As the formation of packaging material sheets 21' is similar to the formation of packaging material sheets 21, we refer to the description as provided with respect to the formation of packaging material sheets 21.

[0113] Additionally, as the formation of package 1' is similar to the formation of package 1, we refer to the description as provided with respect to the formation of package 1.

[0114] With reference to Figure 7, number 1" indicates an alternative embodiment of a package according to the present invention; as package 1" is similar to package 1, the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0115] In particular, package 1" differs from package 1 in comprising opening device 3" and in that the designated opening extends over two respective walls, in particular second wall 7 and one lateral wall 6.

[0116] As well, package 1" differs from package 1' in being formed from a packaging material sheet 21" (see Figure 9).

[0117] As packaging material sheet 21" is similar to packaging material sheet 21', the following description is limited to the differences between them, and using the same references, where possible, for identical or corresponding parts.

[0118] In particular, packaging material sheet 21" differs from packaging material sheet 21' in comprising opening device 3" and packaging material sheet base 22".

[0119] In more detail, packaging material sheet base 22" differs from packaging material sheet base 22 in that the designated opening comprises a first opening portion and a second opening portion.

[0120] Furthermore, one panel 31, in particular the one at least partially defining second wall 7, comprises the first opening portion and another panel 31, in particular the one defining one lateral wall 6, comprises the second opening portion.

[0121] In more detail, one crease line 30, in particular being transversal, even more particular perpendicular, to reference crease line 37, is interposed between the panel 31 having the first opening portion and the panel 31 having the second opening portion.

[0122] In even more detail, the crease line 30 being interposed between the panel 31 having the first opening portion and the panel 31 having the second opening portion defines an auxiliary reference crease line 46 being transversal, in particular perpendicular, to reference crease line 37. In addition, and with particular reference to Figures 7 to 9, opening device 3" differs from opening device 3'in that first flange 34 may comprise a first flange portion 47, a second flange portion 48 and a fold line 49 interposed between first flange portion 47 and second flange portion 48. In particular, fold line 49 is configured such that during formation of package 1, i.e. during the folding of the respective packaging material sheet 21", first flange 34 is folded along fold line 49 such that first flange portion 47 and second flange portion 48 are arranged transversal, in particular (substantially) perpendicularly to one another.

[0123] Preferentially, fold line 49 may be parallel to auxiliary reference crease line 46. In particular, fold line 49 may be aligned with auxiliary reference crease line 46.

[0124] According to some possible non-limiting embodiments, a distance between auxiliary reference crease line 46 and fold line 49 may be equal or less than 2, 0 mm, in particular equal or less than 1,0 mm, even more particular equal or less than 0,5 mm.

[0125] Moreover, first flange portion 47 may be associated to the first opening portion and second flange portion 48 may cover and seal the second opening portion.

[0126] Additionally, auxiliary reference crease line 46 may comprise a first section 50 and a second section 51 detached from one another.

[0127] Advantageously, fold line 49 may be parallel to and interposed between first section 50 and second section 51. In particular, fold line 49 may extend between first section 50 and second section 51.

[0128] Furthermore, first flange portion 47 may comprise peripheral portion 35, in particular rectilinear peripheral portion 36.

[0129] Moreover, first flange portion 47 may comprise the passage and collar 17 may be connected to and extend from first flange portion 47. As well, retaining element 20 may extend from first flange portion 47.

[0130] It is to be noted that once package 1" has been formed from packaging material sheet 21", one respective wall of main body 2 comprises the first opening portion and another wall the second opening portion, in particular the two walls being transversal to one another. In more detail, second wall 7 comprises the first opening portion and one transversal wall 6 the second opening portion.

[0131] As the formation of packaging material sheets 21" is similar to the formation of packaging material sheets 21, we refer to the description as provided with respect to the formation of packaging material sheets 21.

[0132] Additionally, as the formation of package 1" is similar to the formation of package 1, we refer to the description as provided with respect to the formation of

package 1.

[0133] The advantages of packaging material sheet 21, 21', 21" and/or of package 1, 1', 1" and/or the method for forming a packaging material sheet 21, 21', 21" and/or the method for forming a package 1, 1', 1" according to the present invention will be clear from the foregoing description.

[0134] In particular, by relying on packaging material sheets 21, 21', 21" for the formation of packages 1, 1', 1", it is possible to improve the transportation and reclosing properties of packages 1, 1', 1". In particular, by having rectilinear peripheral portion 35 being adjacent and parallel to reference crease line 37 (the respective second transversal edge 10) it is possible to transfer a load acting on the respective opening device 3, 3', 3" onto one or more lateral walls 6. This again allows to avoid any risk of possible deformations of the respective main body 2.

[0135] A further advantage resides in providing for a first flange 34 having a first flange portion 47 and a second flange portion 48 further enhancing the effects of rectilinear peripheral portion 35 being adjacent and parallel to reference crease line 37 (the respective second transversal edge 10).

[0136] An additional advantage resides in that having rectilinear peripheral portion 35 being adjacent and parallel to reference crease line 37 improves the folding of packaging material sheets 21, 21', 21", into the respective packages 1, 1', 1".

[0137] Clearly, changes may be made to packaging material sheet 21, 21', 21" and/or package 1, 1', 1" and/or the method for forming a packaging material sheet 21, 21', 21" and/or the method for forming a package 1, 1', 1" as described herein without, however, departing from the scope of protection as defined in the accompanying claims.

[0138] According to some possible embodiments not shown, opening device 3" may not comprise a second flange 41.

Claims

1. Composite packaging material sheet (21, 21', 21") for the formation of a composite package (1, 1', 1") filled with a pourable product comprising at least:

   - a packaging material sheet base (22, 22") comprising a multilayer packaging material having a designated opening; and
   - an opening device (3, 3', 3") applied on the packaging material sheet base (22, 22") and about the designated opening and designed to seal the designated opening and being controllable in an open position so as to free at least a portion of the designated opening;

   wherein the packaging material sheet base (22, 22",) comprises at least a first face and a second face (24) opposite to the first face;
   wherein the second face (24) is designed to define an inner surface (12) of the composite package (1, 1', 1") to be formed from the composite packaging material sheet (21, 21', 21");
   wherein the packaging material sheet base (22, 22",) comprises a plurality of crease lines (30) delimiting a plurality of panels (31);
   wherein the opening device (3, 3', 3") comprises a base frame (15) for coupling the opening device (3, 3', 3") to the packaging material sheet base (22, 22",) and about the designated opening;
   wherein the base frame (15) comprises at least a first flange (34) connected to the second face (24) and having a rectilinear peripheral portion (36);
   wherein the rectilinear peripheral portion (36) is adjacent and parallel to one respective crease line (30) defining a reference crease line (37).

2. Composite packaging material sheet according to claim 1, wherein the reference crease line (37) delimits at least one panel (31) comprising at least a portion of the designated opening.

3. Composite packaging material sheet according to claim 1 or 2, wherein the rectilinear peripheral portion (36) is in contact with the reference crease line (37).

4. Composite packaging material sheet according to claim 3, wherein the rectilinear peripheral portion (36) abuts against the reference crease line (37).

5. Composite packaging material sheet according to claim 3, wherein the rectilinear peripheral portion (36) extends into the reference crease line (37).

6. Composite packaging material sheet according to any one of the preceding claims, wherein the designated opening comprises a first opening portion and a second opening portion;

   wherein a first panel (31) comprises the first opening portion and a second panel (31) comprises the second opening portion;
   wherein the first flange (34) comprises a first flange portion (47), a second flange portion (48) and a fold line (49) connecting the first flange portion (47) and the second flange portion (48) with one another;
   wherein the second flange portion (48) is configured to cover and seal the second opening portion;

wherein one crease line (30) being transversal to the reference crease line (37) is interposed between and in contact with the first panel (31) and the second panel (31) and defines an auxiliary reference crease line (46);
wherein the fold line (49) is parallel to the auxiliary reference crease line (46).

7. Method for forming a composite packaging material sheet (21, 21', 21") according to any one of the preceding claims, comprising at least the steps of:

- providing a packaging material sheet base (22, 22") having a designated opening;
- arranging a mold around the designated opening; and
- feeding a molten polymer to the mold and molding the opening device (3, 3', 3") onto the packaging material sheet base (22, 22") and about the designated opening.

8. Method according to claim 7, and further comprising the step of:

- reading a mark applied on the packaging material sheet base (22, 22''); and
- aligning the mold around the designated opening in dependence of the position of the mark.

9. Composite package (1, 1', 1") for a pourable product comprising:

- a main body (2) formed from a composite packaging material having a designated opening and an inner space (11); and
- an opening device (3, 3', 3") coupled to the main body (2) and about the designated opening and being configured to seal the designated opening and being controllable at least in an open position so as to free at least a portion of the designated opening;

wherein the main body (2) comprises a plurality of walls (5, 6, 7), each delimited by a plurality of respective crease lines (30) of the packaging material;
wherein the main body (2) comprises an inner surface (12) facing the inner space (11) and an outer surface (13) opposite to the inner surface (12);
wherein the opening device (3, 3', 3") comprises a base frame (15) coupling the opening device (3, 3', 3") to the main body (2) and about the designated opening;
wherein the base frame (15) comprises at least a first flange (34) connected to the inner surface (12) and having a rectilinear peripheral portion (36);
wherein the rectilinear peripheral portion (36) is adjacent and parallel to one respective crease line (30) defining a reference crease line (37).

10. Composite package according to claim 9, wherein the reference crease line (37) is interposed between a first wall (7) of the package (1, 1', 1"), and a second wall (6) of the package (1, 1', 1") being transversal to one another.

11. Composite package according to claim 9 or 10, wherein the rectilinear peripheral portion (36) is in contact with the reference crease line (37).

12. Composite package according to claim 11, wherein the rectilinear peripheral portion (36) abuts against or extends into the reference crease line (37).

13. Composite package according to any one of claims 9 to 12, wherein the designated opening comprises a first opening portion and a second opening portion;

wherein a first wall (7) comprises the first opening portion and a second wall (6) comprises the second opening portion;
wherein the first flange (34) comprises a first flange portion (47), a second flange portion (48) and a fold line (49) connecting the first flange portion (47) and the second flange portion (48) with one another;
wherein the second flange portion (48) is configured to cover and seal the second opening portion;
wherein one crease line (30) being transversal to the reference crease line (37) is interposed between and in contact with the first panel (31) and the second panel (31) and defines an auxiliary reference crease line (46);
wherein the fold line (49) is parallel to the auxiliary reference crease line (46).

14. Composite package formed from a composite packaging material sheet (21, 21', 21") according to any one of claims 1 to 6.

15. Method for forming a composite package according to any one of claims 9 to 14, comprising at least the steps of:

- providing a composite packaging material sheet (21, 21', 21") according to any one of claims 1 to 6;
- folding the composite packaging material sheet according to the crease lines for obtaining the composite package (1, 1', 1");
- sealing the composite package (1, 1', 1"); and
- filling the composite package (1, 1', 1") with the

pourable product.

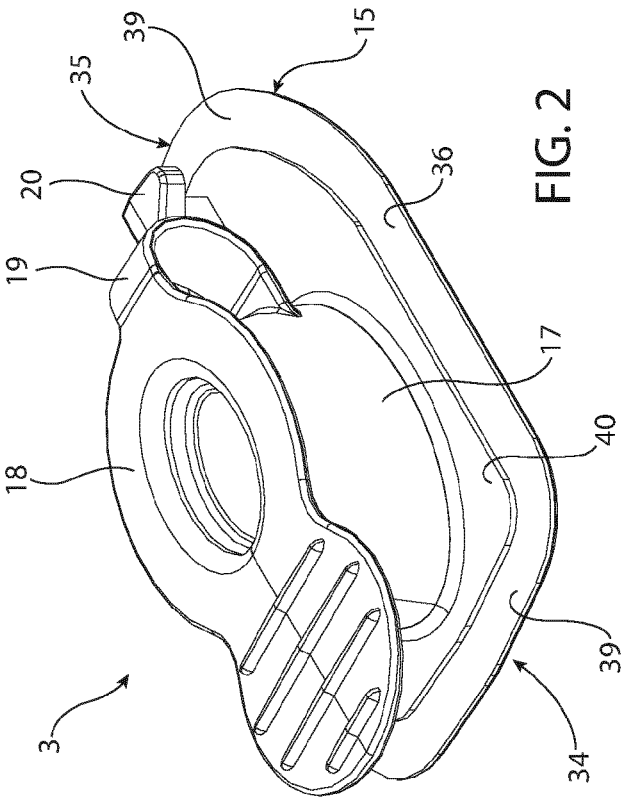
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FIG. 2

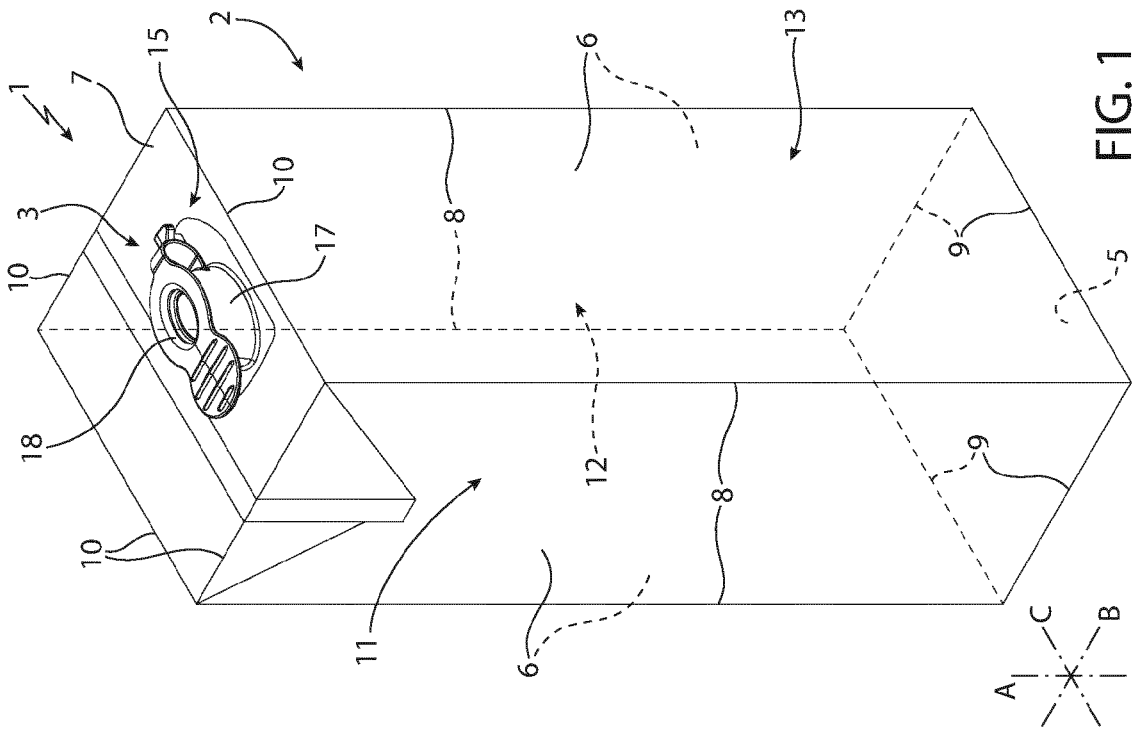
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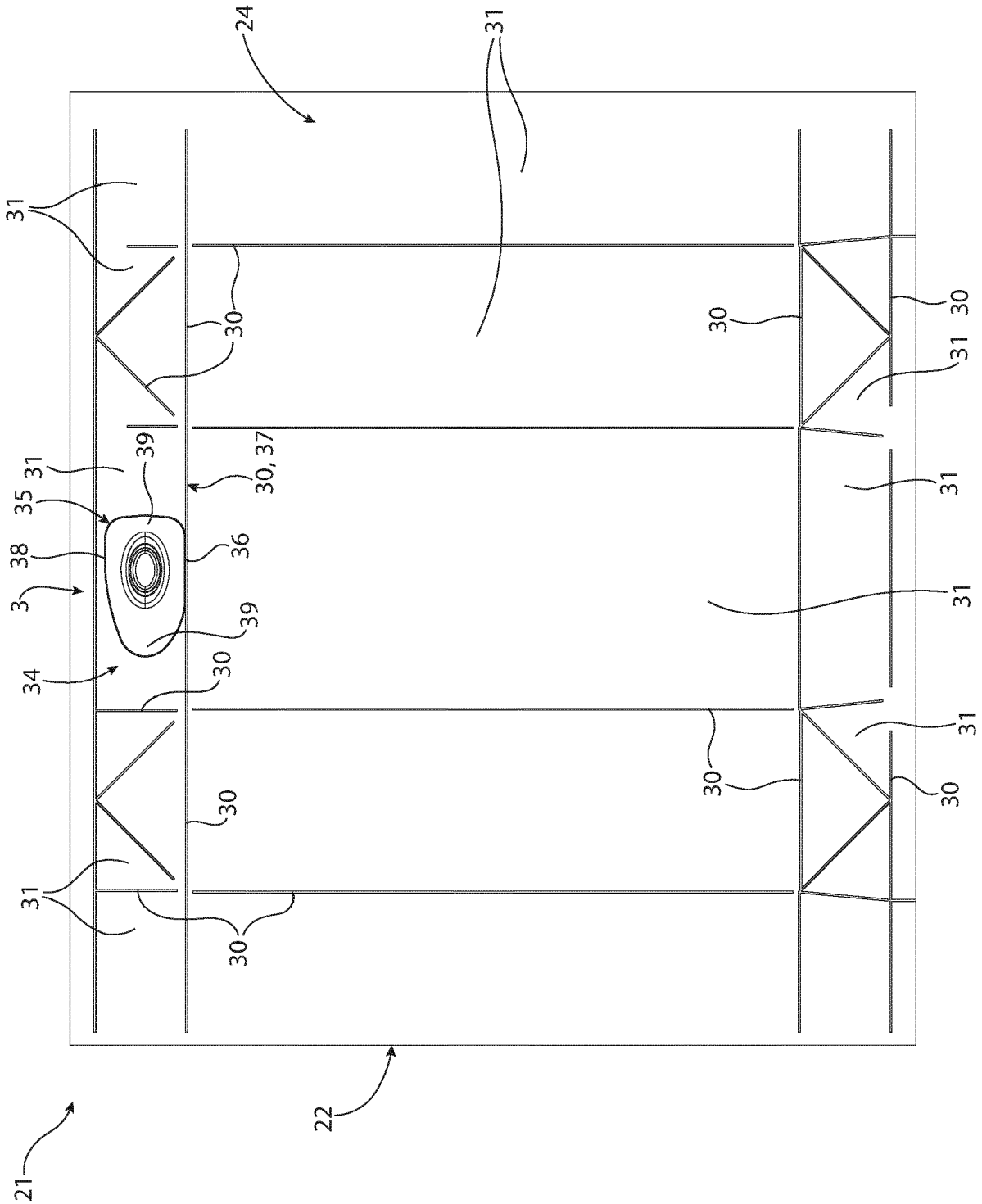
FIG. 1

FIG. 3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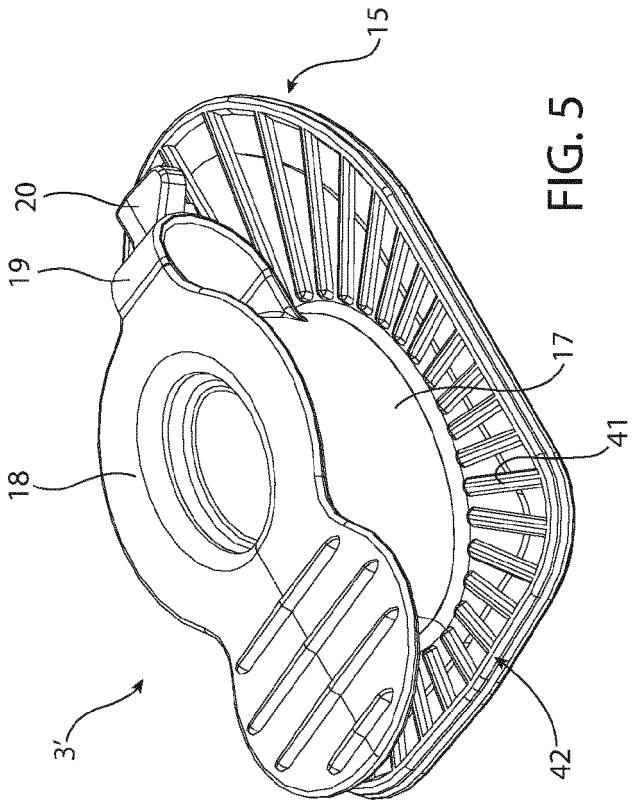


FIG. 5

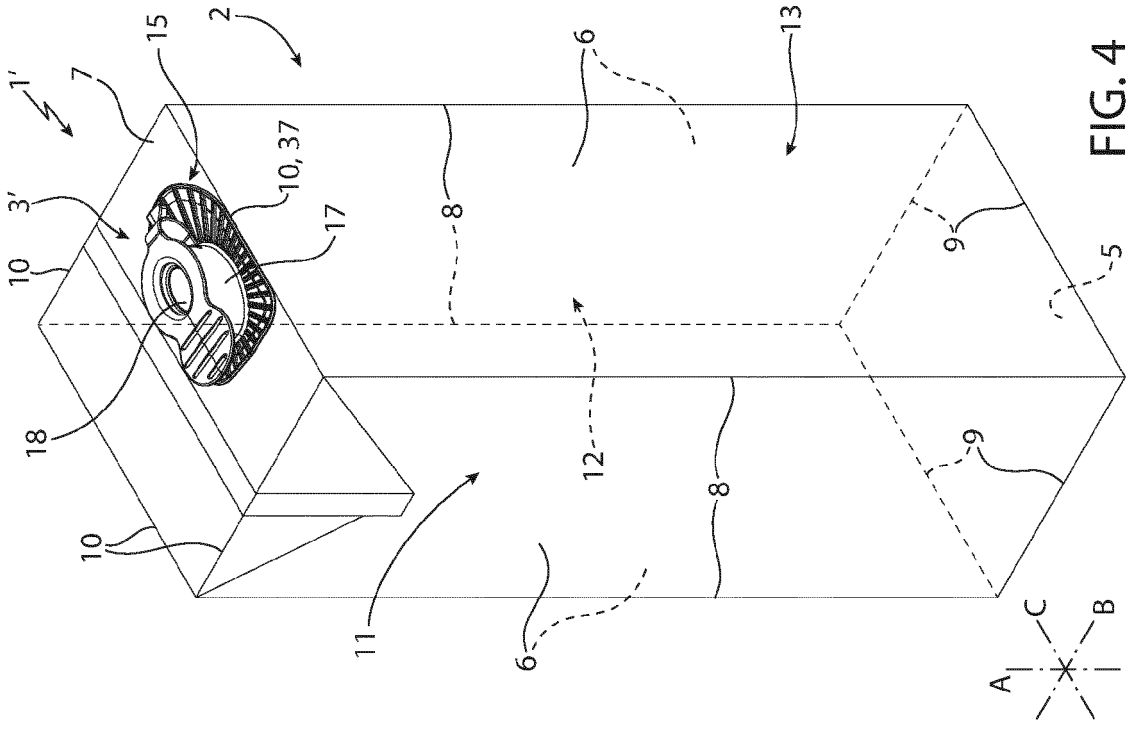
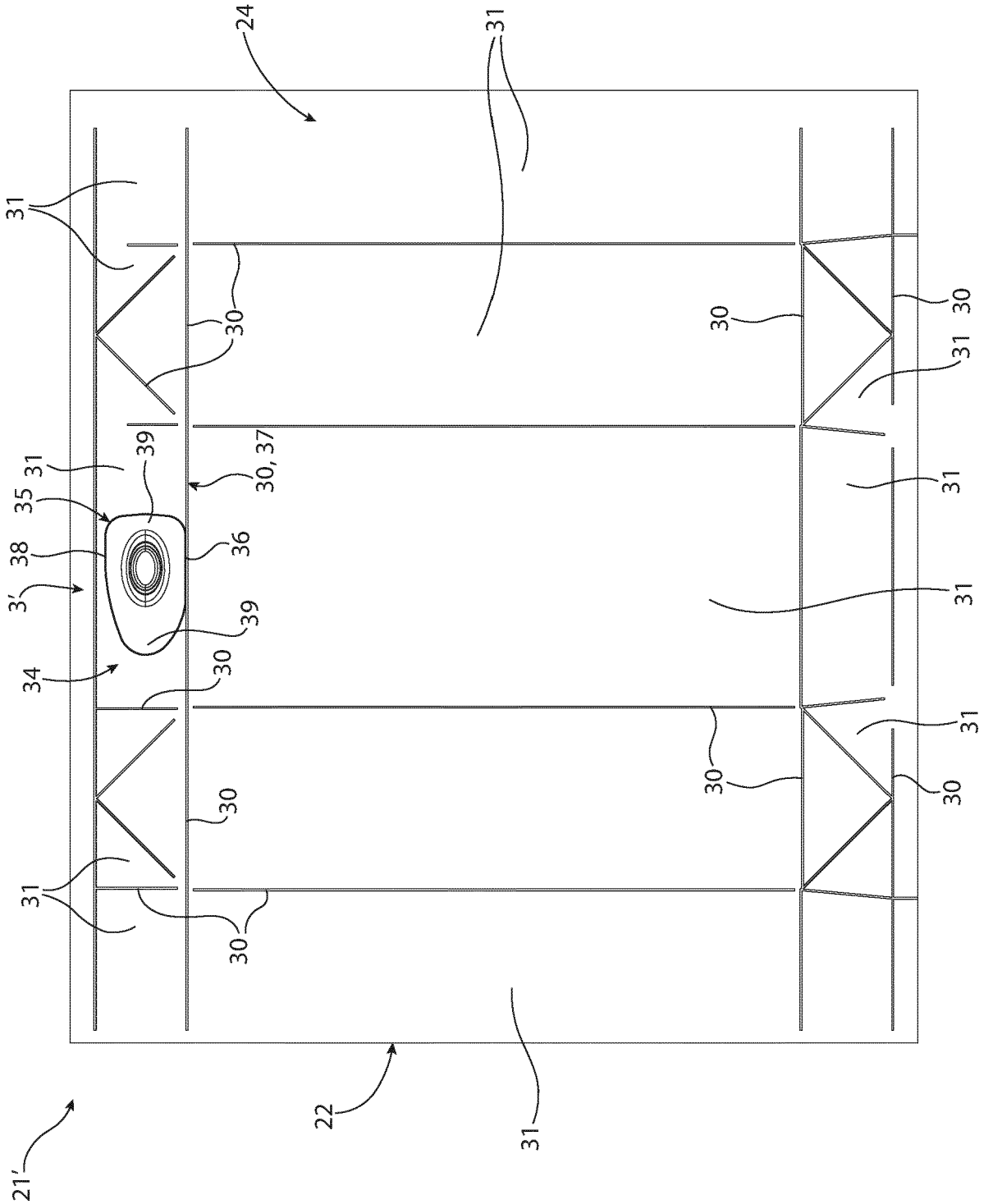
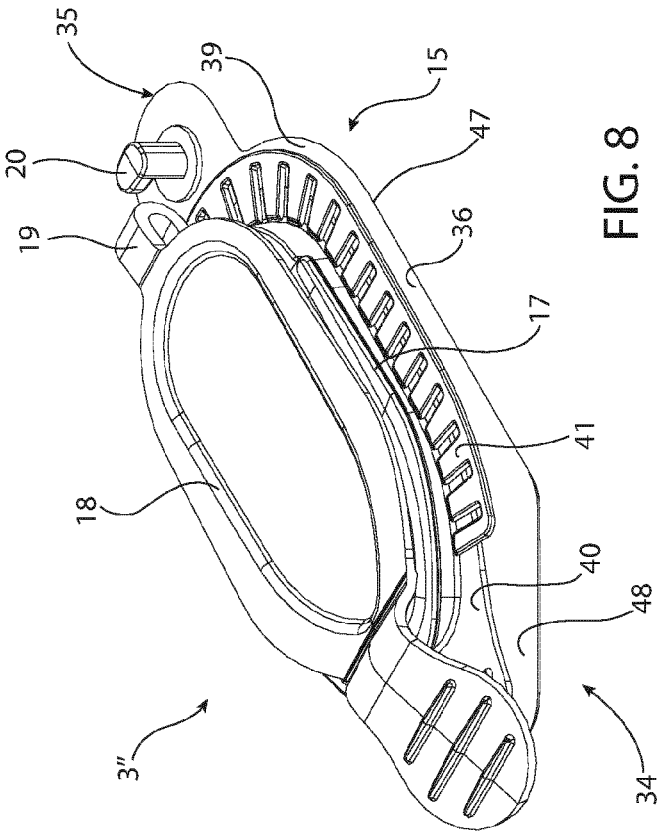


FIG. 4

FIG. 6




35
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47
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41
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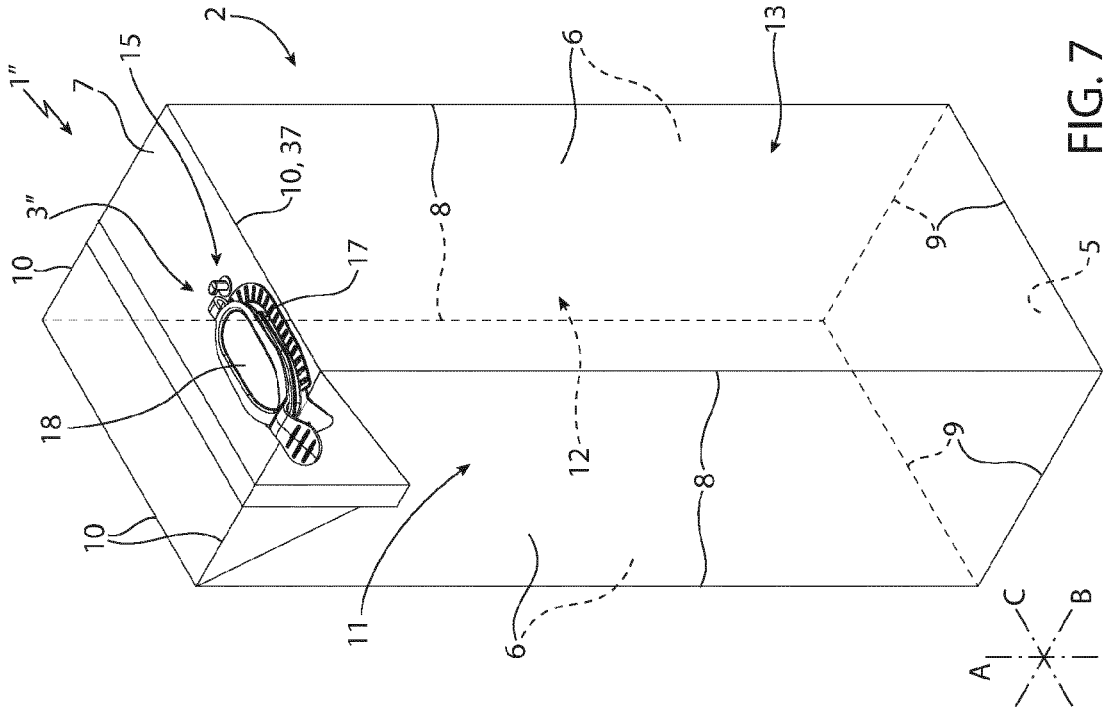
40
48
3"
34

FIG. 8


1"
2
15
7
6
13
10, 37
3"
8
9
10
17
5
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12
9
8
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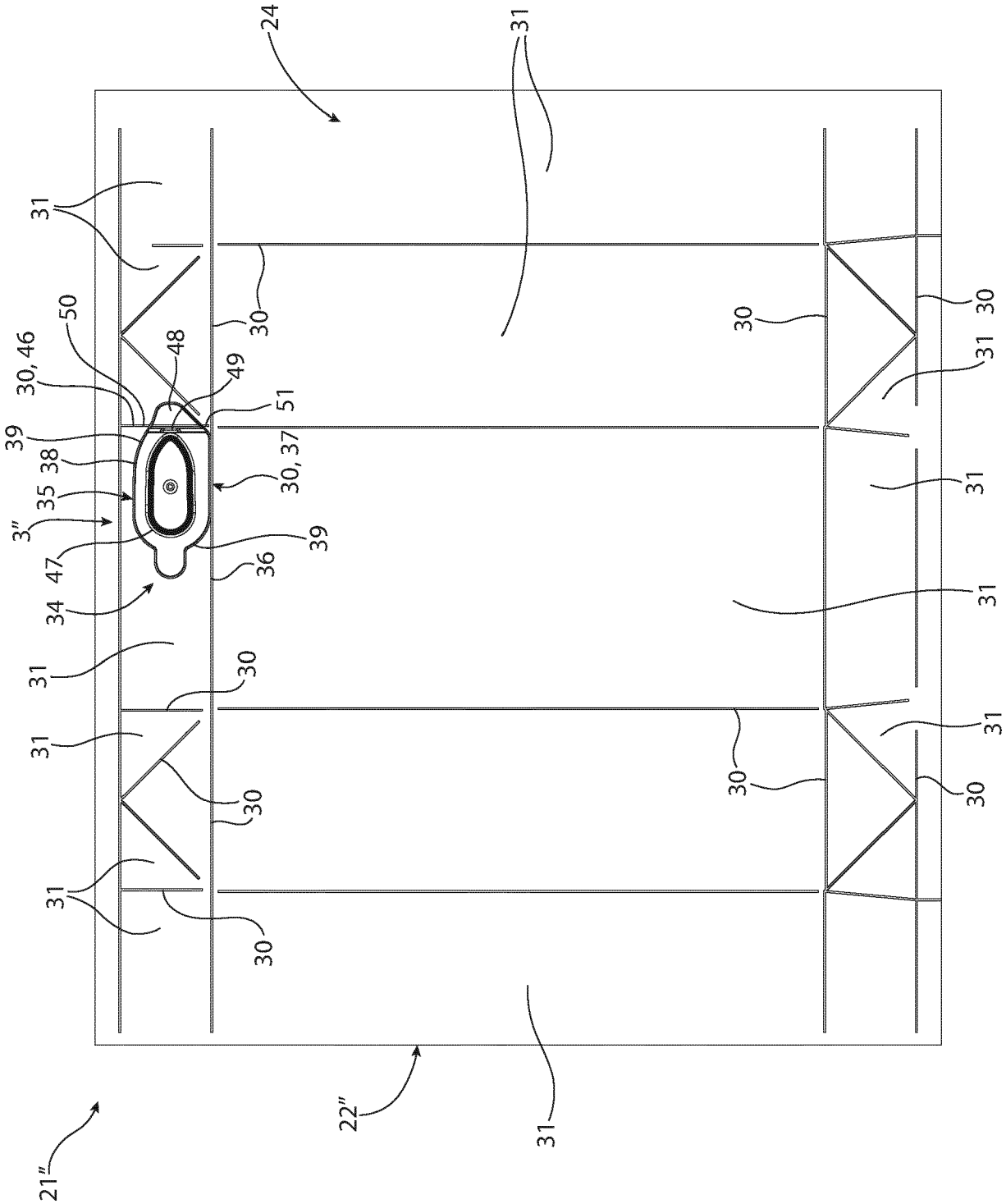
11
6
A
C
B

FIG. 7

FIG. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 22 17 2889

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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	7 October 2022	Grondin, David

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