(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 328 144 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.02.2024 Bulletin 2024/09

(21) Application number: **22306249.8**

(22) Date of filing: **24.08.2022**

(51) International Patent Classification (IPC):
B65D 5/20 *(2006.01)* ***B65D 5/44*** *(2006.01)*
B65D 5/56 *(2006.01)* ***B29C 45/14*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B65D 5/445; B29C 45/14475; B65D 5/209; B65D 5/563

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(54) SEPARABLE CARDBOARD POLYMER COMPOSITE CONTAINER

(57) A container has a frame having interconnected frame members, the frame defining interstices between interconnected frame members, the frame being made of plastic. Panelling includes at least one cellulose sheet, plastic film laid on the at least one cellulose sheet, and an adhesive joint between the plastic film and the at least one cellulose sheet. The composite container is characterized in that the film interfaces the panelling to the frame such that the panelling closes the interstices to form a cavity of the container, and an adherence of the adhesive joint is such that the at least one cellulose sheet is manually detachable from the plastic film.

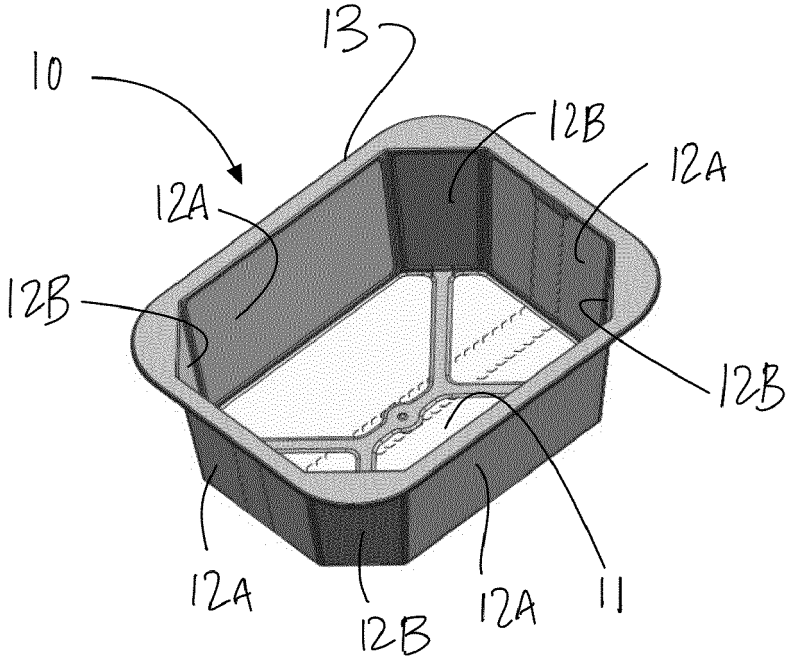

FIG. 1

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Description

TECHNICAL FIELD

[0001] The application relates to composite cardboard polymer containers used in the packaging industry for products such as foodstuff, cosmetics, or objects or materials of various types.

BACKGROUND

[0002] Containers are traditionally used when packaging foodstuff in liquid or loose form, objects, material. While plastics have been commonly used due to their properties, there remains a demand for the use of cellulose for containers, notably to reduce the polymer content in containers. There are various reasons for the popularity of cellulose for containers, notably the use of natural fibers for such containers, the compostable nature of some of these cellulose containers, the possibility of using recycled fibers, and the sustainability, to name a few advantages. However, such containers may still have adhesives, polymer films and/or sealants to preserve waterproofness and structural integrity, and this may have a negative impact on the carbon footprint of cellulose containers. Moreover, cost effectiveness may also favor plastics over cellulose containers.

[0003] It would therefore be desirable to improve manufacturing techniques and cellulose containers based on the above.

SUMMARY

[0004] In one aspect, there is provided a container comprising: a frame having interconnected frame members, the frame defining interstices between interconnected frame members, the frame being made of plastic; and panelling including at least one cellulose sheet, plastic film laid on the at least one cellulose sheet, and an adhesive joint between the plastic film and the at least one cellulose sheet; characterized in that the film interfaces the panelling to the frame such that the panelling closes the interstices to form a cavity of the container, and an adherence of the adhesive joint is such that the at least one cellulose sheet is manually detachable from the plastic film.

[0005] Further in accordance with the aspect, for example, the panelling is on an exterior of the frame relative to the cavity of the container.

[0006] Still further in accordance with the aspect, for example, frame members are exposed on an exterior of the container through slits in the panelling.

[0007] Still further in accordance with the aspect, for example, a tear strip may be defined in the at least one cellulose sheet, the tear strip being manually tearable to expose parts of the cellulose sheet free of the adhesive joint with the film.

[0008] Still further in accordance with the aspect, for example, the tear strip is unadhered to the film.

[0009] Still further in accordance with the aspect, for example, the tear strip intersects a longitudinal plane of the container.

[0010] Still further in accordance with the aspect, for example, the tear strip separates the cellulose sheet in two shells.

[0011] Still further in accordance with the aspect, for example, the adhesive joint between the plastic film and the at least one cellulose sheet represents at most 10% of a surface footprint between the at least one cellulose sheet and the plastic film.

[0012] Still further in accordance with the aspect, for example, the adhesive joint between the plastic film and the at least one cellulose sheet is only in an upper 30% of a height of the container.

[0013] Still further in accordance with the aspect, for example, the adhesive joint between the plastic film and the at least one cellulose sheet is a series of strips extending adjacent to a top peripheral contour of the container.

[0014] Still further in accordance with the aspect, for example, a comolding joint is formed between the frame and the plastic film.

[0015] Still further in accordance with the aspect, for example, the frame is a monoblock component.

[0016] Still further in accordance with the aspect, for example, the cellulose sheet is 100% fiber.

[0017] Still further in accordance with the aspect, for example, the panelling defines at least 90% of a surface of the cavity of the container.

[0018] Still further in accordance with the aspect, for example, the plastic film and the cellulose sheet have a common outline.

DESCRIPTION OF THE DRAWINGS

[0019] Reference is now made to the accompanying figures in which:

Fig. 1 is a first perspective view of a separable cardboard polymer composite container in accordance with the present disclosure;

Fig. 2 is a second perspective view of the separable cardboard polymer composite container of Fig. 1;

Fig. 3 is a perspective view of a polymer frame of the separable cardboard polymer composite container of Figs. 1 and 2;

Fig. 4 is a perspective view of a cardboard panelling with film of the separable cardboard polymer composite container of Figs. 1 and 2, as formed into a three-dimensional shape;

Fig. 5 is a perspective view of the cardboard panelling of Fig. 4, prior to forming;

Fig. 6 is a perspective view of the cardboard panelling of Fig. 5, with adhesive strips for film adhesion;

Fig. 7 is an assembly view of the cardboard panelling with adhesive strips of Fig. 6 relative to a film;

Fig. 8 is a perspective view of the separable cardboard polymer composite container of Fig. 1, with a tear strip being removed from the cardboard panelling;

Fig. 9 is a perspective view of the separable cardboard polymer composite container subsequent to Fig. 8, with the tear strip and the cardboard panelling being detached; and

Fig. 10 is a perspective view of the separable cardboard polymer composite container subsequent to Fig. 9, showing the cardboard panelling detached.

DETAILED DESCRIPTION

[0020] Referring to the drawings and more particularly to Figs. 1 and 2, a separable cardboard polymer composite container in accordance with the present disclosure is generally shown at 10. For simplicity, the separable cardboard polymer composite container 10 will be referred to as container 10 herein. The container 10 may be referred to as a receptacle, a cup, a pot, a package, a tray, among other possible names. Moreover, while a container is shown, other objects may be made using the configuration in accordance with the present disclosure, such as cups, trays, bowls, among examples. The container 10 may be used with a lid that may be releasably secured to a top of the container 10 to close a top opened end of the container 10. The lid may or may not be made of transparent plastic, of cellulose, etc. The container 10 may be used for packaging various items, whether in liquid, solid, gel, viscous forms, or as loose material or matter, granules, etc.

[0021] From a general standpoint, the container 10 shown in Figs. 1 and 2 defines an inner cavity or receptacle, by a bottom wall 11 and side walls 12. As observed, the bottom wall 11 is shown defining an irregular octagonal shape (eight sides), when seen from a top view, but any other appropriate polygonal shape may be used with other possible geometries. The shapes may include, rectangular, square, hexagonal, among possible straight-edge peripheral shapes. Geometries may include prisms and boxes, among possible geometries. In the illustrated embodiment, the container 10 may be constituted of flat surfaces and straight edges between surfaces, but other configurations are possible, including curved edges and/or curved walls. It can also be cylindrical.

[0022] Reference will now be made to the container 10 when laid on a horizontal surface as in Fig. 1 and thus with its open top end. In such an orientation, the container 10 may be said to have the side walls 12 projecting generally upwardly from the bottom wall 11 (e.g., perpendicular to the bottom wall 11, or at other angles). There are eight different side walls 12 shown based on the exemplary geometry, with four larger side walls, shown as 12A, and four smaller side walls, shown as 12B. In the figures, reference numerals are shown as 12A and 12B, and concurrent reference to the side walls is made as side walls 12 in the present text. The eight different side walls 12 is a configuration among others, as fewer or more side walls may be present. For example, a single cylindrical side wall may be present. The combination of the bottom wall 11 and the side walls 12 define a concavity that may be referred to as the inner cavity of the container 10. It is the inner cavity that acts as a receptacle for receiving material in the container 10. The volume of the inner cavity may depend on the contemplated use. The inner cavity is shown as defined by the continuous, smooth surfaces of the bottom wall 11 and side walls 12.

[0023] A rim 13 may optionally be present to define the top open end of the container 10. The rim 13 may also be known as a ridge, sealing flange, flange, sealing rim, etc. Alternatively, the top open end of the container 10 could be defined by the edges of the side walls 12. The rim 13 is shown as being generally planar, in that it may lie in a single plane, though this is optional. Moreover, the rim 13 may have a continuous arcuate contour, known for example as oblong. However, it is considered to have features such as ledges, waves, surface features, in the rim 13 to form part of connection features to releasably secure a lid to the container 10, for instance by complementary connection features on such a lid.

[0024] The container 10 may include a plastic frame(s) 20, a cellulose sheet(s) 30, a plastic film(s) 40, and an adhesive joint(s) 50, all of which may contribute to defining the bottom wall 11, side wall(s) 12 and/or rim 13. There may be more than a single one of any of the plastic frame 20, the cellulose sheet 30, the plastic film 40 and/or the adhesive joint 50, such as for example two cellulose sheets 30, etc. For simplicity, reference will be made to these constituents in the singular, though more than one of these constituents may be present in the same container 10. Other components may be present, such as labels, printing, decorative features, but are not detailed herein.

[0025] The plastic frame 20 forms the skeleton of the container 10. Accordingly, the structural integrity of the container 10 may be provided by the plastic frame 20, the structural integrity including resistance to compression for example when filled containers 10 are stacked on one another, and/or the container 10's capacity to remain its shaped when filled. However, for afore-mentioned concerns, it may be desired to limit the weight of plastic in the container 10 and thus limit the plastic frame 20 to being a skeleton with interstices, whereby panelling may be present to define larger surfaces of the container 10, such as the bottom wall 11 and the side walls 12.

[0026] Panelling used with the plastic frame 20 may include the cellulose sheet 30, the plastic film 40 and/or

the adhesive joint 50, among other possible components (e.g., labels). In an embodiment, the panelling defines at least 90% of a surface of the cavity of the container 10.

[0027] The cellulose sheet 30 forms the structural panels that define the bottom wall 11 and/or the side walls 12 (e.g., the bottom wall 11 and/or some or all of the side walls 12 could be part of the plastic frame 20, though not as in Figs. 1 and 2).

[0028] The plastic film 40 lays on a surface of the cellulose sheet 30 and is the interface of the panelling with the plastic frame 20. Stated differently, the panelling is connected to the plastic frame 20 by way of the plastic film 40. Moreover, the plastic film 40 may contribute to the waterproofness and/or airtightness of the container 10, if the container 10 has such properties.

[0029] The adhesive joint(s) 50 is between the plastic film 40 and the cellulose sheet 30, for the cellulose sheet 30 to be attached to the container 10. An adherence of the adhesive joint 50 is such that the cellulose sheet 30 is manually detachable from the plastic film 40.

[0030] Referring now to Fig. 3, the frame 20 is shown on its own, separated from a remainder of the components of the container 10. In a variant, the frame 20 is comolded with the panelling, such that the frame 20 may not be on its own in the manner shown in Fig. 3. However, if the panelling is completely removed from the frame 20, the frame 20 would have the appearance of Fig. 3, with a monoblock construction, i.e., molded from a single plastic (a.k.a., polymer) in a single injection molding step. The plastic that may be used for the frame 20 may be any appropriate polymeric resin, with food grade, such as polypropylene, polystyrene, etc. In a variant, the polymer selected has a relatively low viscosity when molten for injection, to facilitate the injection process. However, this is merely an option.

[0031] The frame 20 may be said to be a skeleton of the container 10, as it is made of elongated frame members 21, that may also be referred to as struts or bones. The frame members 21 can be observed to emulate a shape of the container 10, as the frame members 21 are typically located at the edges between the bottom wall 11 and side walls 12 of the container 10, and can be seen between slits of panels of the cellulose sheet 30, as shown in Fig. 8. Moreover, still in Fig. 3, some frame members 21 may be located where the bottom wall 11 of the container 10 is located. Such frame members 21 may be optional, but at the bottom wall 11 covers a large surface, these frame members 21 may contribute to prevent a sagging action of panelling at the bottom wall 11. In the illustrated variant, the frame members 21 at the bottom wall 11 are shown at 21', and can be described as being a pair of Ys interconnected at their stems. A point of injection of the frame 20 may optionally be at a center of the frame member 21', as shown, but other locations and/or more than one point of injection is/are possible.

[0032] Still referred to Fig. 3, the frame 20 is shown as having interstices 21A, 22A, 22B between some of the frame members 21/21'. The interstices 21A, 22A, 22B may also be referred to as windows surrounded by frame members 21/21', openings, empty spaces. The interstices 21 A are at the bottom wall 11 of the container 10. The interstices 22A are at the side walls 12A. The interstices 22B are at the side walls 12B. Other arrangements are possible. The interstices 21A, 22A and 22B are blocked, occluded, closed, by the panelling as described below.

[0033] The frame 20 may further include a rim frame member 23, that may also be regarded as being a frame member 21. The rim frame member 23 generally corresponds to the rim 13 of the container 10. Accordingly, the rim frame member 23 may also be known as a ridge, sealing flange, flange, sealing rim, etc. The rim frame member 23 is shown as having a top planar surface, in that it may lie in a single plane, though this is optional, for an operculum (i.e., sealing firm) to be optionally sealingly deposited on the plane of the rim frame member 23.

[0034] Still in Fig. 3, a tab(s) 24 may project downwardly from the rim frame member 23. One such tab 24 is shown, but another tab may be present, mirroring the tab 24 that is visible in Fig. 3. The tab(s) 24 is optional, but may be aligned with a tear strip of the cellulose sheet 30, as described below.

[0035] Referring to Figs. 4-6, the cellulose sheet 30 is in the form of a sheet or panel, and may be known as paper, paperboard, cardboard, that may be die cut, folded, formed, etc. The cellulose may be said to be the main material of the container 10 in that it makes up the greatest proportion by weight and/or by volume of the empty container 10, though this is optional. In a variant, the container 10 is said to be 100% fiber, in that no other materials are present in the cardboard sheet formed into the container 10. The cellulose may have any appropriate natural fibers such as wood fibers, plant fibers, straw, cereals, annual plants, etc. The cellulose may be made from recycled paper and water, cardboard, virgin cellulose. The sheet or panel making up the container 10 may be kraft paper. Additives can be added to the pulp to give given characteristics to the cellulose. The given characteristics may include colour, moisture resistance, enhanced shock resistance. Moreover, the cardboard sheet or panel making up the container 10 may be printed. For this reason, the cardboard sheet may also be known as a coated cardboard sheet (a.k.a., coated cardboard), and may have one or both of its surfaces coated, for receiving and containing ink. The coating may be of different types, but a mineral-based coating is particularly well suited to be used due to its eco-friendliness, and its capacity to act as an ink-receiving coating. For example, the coating may be a clay or limestone based coating. Other coatings may be used, including polymeric coatings. Also, adjuvants or solutes may be part of the coatings. In an embodiment, the coating may be said to be an integral part of the cardboard sheet, in that the coating is impregnated into the surface of the cardboard sheet and cannot be detached from it, unlike a film laminated to a surface of

the cardboard. Stated differently, the cardboard sheet may be said to be non-laminated, or non-layered. The coating may be said to be a non-film coating, the coating may be applied in a liquid state onto the cardboard sheet, such that the coating may penetrate the surface(s) of the cardboard sheet.

[0036] The cellulose sheet 30 may be cut so as to have a peripheral contour P, the peripheral contour P having a container specific outline. For example, the peripheral contour P may define an outer edge adjacent to the rim 13 of the container 10 of Figs. 1 and 2, when the cellulose sheet 30 is folded into the three-dimensional shape of Fig. 4, which shape matches that of the frame 20. In another embodiment of the container 10 without the rim 13, the peripheral contour P may define a top edge of the side walls 12 of the container 10. In an embodiment, the sheet 30 is cut into the shape of Figs. 4 to 6 by a die cutter, through other options are contemplated (e.g., laser cutting).

[0037] In the cellulose sheet 30, die cutting or like precutting of the cellulose sheet 30 may be performed to facilitate the forming of the 3D geometry of Fig. 4, such as when positioning the cellulose sheet 30 in a mold as detailed below. As a result of die cutting or like action, bottom wall portion 31 would correspond to the bottom wall 11 of the formed container 10, and occludes the interstices 21A in the frame 20. Likewise, side wall portions 32 would correspond to the side walls 12 of the formed container 10. For example, side wall portions 32A correspond to side walls 12A and occludes the interstices 22A in the frame 20, while side wall portions 32B correspond to side walls 12B occludes the interstices 22B in the frame 20. There may be different configurations of the die cutting as a function of the geometry of the container 10.

[0038] Referring to Figs. 5 and 6, slits 33 may optionally be defined between the bottom wall portion 31, side wall portion 32A and/or side wall portion 32B, to further facilitate the forming of the cellulose sheet 30 into the 3D geometry of Fig. 4. As a result of the slits 33, the bottom wall portion 31, side wall portion 32A and/or side wall portion 32B may be retained by webs of the cellulose sheet material. Although not shown, creases (or like weakening lines) may be defined in a surface of the sheet 30, at locations of fold lines in the cellulose sheet 30. The fold lines may be positioned so as to be covered by frame members 21 of the frame 20 (Fig. 3). In an embodiment, the creases penetrate a surface of the sheet 30 but do not perforate through the whole thickness of the sheet 30. If present, creases may also be a flattening of the sheet 30, a weakening of the material of the sheet 30, etc. The creases may be straight lines, or series of dashes or points arranged in a linear pattern. Different types of tools may be used to form the creases or like weakening lines, if present, such as wheel cutters, laser cutters, knives, heated edges, etc. There results in the sheet 30 localized linear weaknesses and/or slits 33 facilitating a folding of the sheet 30, to the 3D geometry of Fig. 4. In another embodiment, there are no such creases, slits 33 and/or equivalent weakening features, with the sheet 30 folded using appropriate folding tools or techniques for the sheet 30 to be folded at a desired location of the fold lines (Figs. 5 and 6).

[0039] Referring to Figs. 4 to 6, a tear strip 34 may be defined in the cellulose sheet 30. The tear strip 34 may be delimited by weakenings in the cellulose sheet 30. The weakenings may be partial perforations, through perforations, and/or creases. As observed, the weakenings are arranged to form relative straight lines. Therefore, when a user grabs one end of the tear strip 34 and performs a pulling action, the tear strip 34 tears along the lines of weakenings. It may also be considered to add a strap, tongue, etc that can contribute to the tearing, etc. Hence, the tear strip 34 is optionally provided to facilitate a removal thereof from a remainder of the cellulose sheet 30, and equivalent tear-assistance items could be provided.

[0040] The tear strip 34 is shown oriented along a length of the cellulose sheet 30, and as being centered. Stated differently, the tear strip 34 may intersect a longitudinal plane of the container 10, as a possibility. However, this is merely an option as the tear strip 34 may be located elsewhere. Moreover, the tear strip 34 is shown as going from end to end, and this is also optional. The tear strip 34 is shown as being in register with depressions in the peripheral contour P of the sheet 30, which depressions are aligned with the tabs 24. This may be to facilitate a locating and grasping of an end or end(s) of the tear strip 34.

[0041] . Referring to Fig. 7, the plastic film 40 is in the form of a sheet or panel that may be die cut, etc. The plastic film 40 may be said to be the interface between the frame 20 and the cellulose sheet 30, as the plastic film 40 may physically separate the frame 20 from the cellulose sheet 30, while being connected to both the frame 20 and the cellulose sheet 30. The plastic film 40 may be a thin layer of plastic, and may be made from a material that is compatible with that of the frame 20, such as polypropylene, polystyrene, etc, to assist in generating a comolding joint (if the frame 20 and the plastic film 40 are interconnected by comolding, as this is only an option). For example, both the frame 20 and the plastic film 40 may be polypropylene, or polystyrene, or the frame 20 may be polyethylene while the plastic film 40 is polypropylene. In a variant, the plastic film 40 may have multiple layers, or plies, to give the plastic film 40 given properties, such as being an odor or air barrier. The layers of the plastic film 40 may be polypropylene layer(s)-EVOH layer(s)-polypropylene layer(s), such that the polypropylene layer(s) forms the exterior of the plastic film 40 for comolding compatibility (if desired). The polypropylene layer(s)-EVOH layer(s)-polypropylene layer(s) is given as an example, as any arrangement of layers of film including polypropylene, polyethylene, polystyrene and/or EVOH are considered. In a variant, EVOH is present with another layer of polymer, as EVOH is present for its barrier properties, while the other layer of polymer is used

for comolding capacity. A monolayer configuration may be used if barrier properties are not as important, for instance for dry goods to be received in the container 10.

[0042] The plastic film 40 may be cut so as to have a peripheral contour that matches the peripheral contour P of the cellulose sheet 30. Thus, the plastic film 40 and the cellulose sheet 30 may have a common outline, though this is optional. The plastic film 40 is laid on the cellulose sheet 30, and hence it may be desired for the cellulose sheet 30 and the plastic film 40 to generally have the same shape, though this may not be necessary. In an embodiment, the plastic film 40 is cut into the shape of Fig. 7 by a die cutter, through other options are contemplated (e.g., laser cutting).

[0043] In the plastic film 40, die cutting or like precutting may be performed to facilitate the forming of the 3D geometry of Fig. 4, such as when positioning the cellulose sheet 30 with the plastic film 40 in a mold as detailed below. As a result of die cutting or like action, bottom wall portion 41 would correspond to the bottom wall portion 31 of the cellulose sheet and bottom wall 11 of the formed container 10, and occludes the interstices 21A in the frame 20. Likewise, side wall portions 42 would correspond to the side wall portions 32 of the cellulose sheet 30 and side walls 12 of the formed container 10. For example, side wall portions 42A would be on the side wall portions 32A and correspond to side walls 12A to occlude the interstices 22A in the frame 20, while side wall portions 42B correspond to side wall portions 32B of the cellulose sheet 30, to concurrently form side walls 12B that occlude the interstices 22B in the frame 20. There may be different configurations of the die cutting as a function of the geometry of the container 10. As an example, the plastic film 40 comes as a plain sheet without the geometry shown, notably to overlay the slits 33 in the cellulose sheet 30.

[0044] In Fig. 7, slits 43 may optionally be defined between the bottom wall portion 41, side wall portion 42A and/or side wall portion 42B, though the slits 43 are optional. Indeed, due to the thinness of the film 40, the slits 43 may not be necessary to assist in folding the film 40. Moreover, the absence of slits 43 may increase a contact interface between the film 40 and frame members 21 of the frame 20, contributing to the bond and to the waterproofness of the assembly. Finally, cutouts 44 may be present, so as to be in register with depressions in the peripheral contour P of the sheet 30, which depressions are aligned with the tabs 24. This may be to facilitate a locating and grasping of an end or end(s) of the tear strip 34.

[0045] Adhesive joints 50 are shown in Figs. 5 and 6, and are present to secure the plastic film 40 to the cellulose sheet 30. However, as observed from the illustrated embodiment, the adhesive between the cellulose sheet 30 and the plastic film 40 does not cover the entire interface surface between the cellulose sheet 30 and the plastic film 40 (though it could). In an embodiment, the adhesive joints 50 are solely in the form of strips adjacent to the peripheral contour P, at the ends of the side wall portions 32A/32B of the cellulose sheet 30, and thus at the ends of the side wall portions 42A/42B of the film 40. There may be adhesive located between the bottom wall portions 31 and 41, though not shown. In a variant, there is no adhesive between the bottom wall portions 31 and 41. Accordingly, the cellulose sheet 30 may only be retained to a remainder of the container 10 by way of the adhesive joints 50 near the peripheral contour P, thereby facilitating a detaching of the cellulose sheet 30 from a remainder of the container 10. As can be observed in Fig. 7, there may not be any adhesive at the tear strip 34. The type of adhesive or like varnish for the adhesive joint(s) 50 may be specifically selected to have an adherence by which the cellulose sheet 30 is manually detachable from the plastic film 40.

[0046] Accordingly, the cellulose sheet 30 and the plastic film 40 may be positioned one over the other as shown in Fig. 7, with the adhesive present on the cellulose sheet 30 and/or on the plastic film 40, for subsequent lamination of the cellulose sheet 30 and of the plastic film 40, featuring the adhesive joints 50 for the securement. In a variant the surface of the adhesive joint(s) 50 represents at most 10% of the surface footprint between the cellulose sheet 30 and the plastic film 40, though this is an option. Stated differently, of the overall surface of contact between the cellulose sheet 30 and plastic film 40, only 10% at most has adhesive (though it could be more). The surface of the adhesive joint(s) 50 may be said to be only in an upper 30% of the height of the container 10, in a variant, though this is an option. The adhesive joint 50 may be said to be a series of strips extending adjacent to a top peripheral contour of the container 10. In an embodiment, as shown, the tear strip portion of the cellulose sheet 30 is unadhered to the film 40, i.e., there is no adhesive between the tear strip 34 and the plastic film 40.

[0047] Now that the various components of the container 10 have been described, a manufacturing process therefor is set forth.

[0048] The panelling is firstly assembled, for instance via steps shown in Figs. 5 to 7, with the cellulose sheet 30 and the plastic film 40 adhered to one another (a.k.a., bonded, laminated, glued) by the adhesive joint(s) 50. The panelling featuring the cellulose sheet 30, the plastic film 40 and the adhesive joint(s) 50 may be formed or folded into the 3D shape, such as in Fig. 4. This may be done manually, by robot, etc. In a variant, the folding may be performed as part of fitting the panelling in a mold.

[0049] With the panelling in the mold in its 3D shape of Fig. 4, with the plastic film 40 preferably being positioned to be in the inner cavity of the container 10 (and cellulose sheet 30 defining the majority exterior of the container 10), molten plastic may be injected in the mold to form the plastic frame 20 (Fig. 3, though integrally formed with the panelling). Due to the temperature and pressure in the mold, and/or because of the molten condition of the plastic material, a bond is formed between

the plastic frame 20 and the plastic film 40, which may be known as a comolding joint. The bond may be said to be permanent, in that attempts to separate the plastic film 40 from the plastic frame 20 may result in a tearing of the plastic film 40. In an embodiment, it may be said that the connection force between the plastic film 40 and the plastic frame 20 is greater than an adherence provided by the adhesive joint(s) 50 between the plastic film 40 and the cellulose sheet 30.

[0050] Consequently, there results the container 10 of Figs. 1 and 2. The container 10 may be said to be a composite container having a frame having interconnected frame members, the frame defining interstices between interconnected frame members, the frame being made of plastic; and panelling including at least one cellulose sheet, plastic film laid on the at least one cellulose sheet, and an adhesive joint between the plastic film and the at least one cellulose sheet. The container 10 may be said to be characterized by the film interfacing the panelling to the frame such that the panelling closes the interstices to form a cavity of the container, and by an adherence of the adhesive joint is such that the at least one cellulose sheet is manually detachable from the plastic film. The method may be described as being a comolding method, as the frame 20 is molded onto the panelling. The above is merely an example of how the container 10 may be fabricated. For example, the frame 20 may be molded separately, and then glued to the panelling.

[0051] Now that an exemplary manufacturing process for the container 10 has been described, a separation process therefor is set forth.

[0052] As shown in Fig. 8, the tear strip 34 is manually pulled, such as at an end thereof. The end of the tear strip 34 that is pulled may be opposite one of the tabs 24, where there may be no adhesive joint between the film 40 - see cutout 44 in Fig. 7. In the illustrated embodiment, the absence of adhesive at the end of the tear strip 34 facilitates its grasping, pulling and detachment in the manner shown in Fig. 8. As also observed in Fig. 8, as the tear strip 34 is pulled, it is separated from the plastic film 40, that remains secured to the frame 20.

[0053] As the tear strip 34 is fully removed, a remainder of the cellulose sheet 30 is divided into two parts (or shells), shown as 30A and 30B in Fig. 9. The parts 30A and 30B are connected to the plastic film 40 by the adhesive joints 50. In the illustrated embodiment, the adhesive joints 50 are adjacent the peripheral contour P, and thus large surfaces of the parts 30A and 30B are not adhered to the plastic film 40. Moreover, an adherence of the adhesive joints 50 is such that the cellulose sheet 30 is manually detachable from the plastic film 40. For example, a user may distance the parts 30A and 30B from one another by grasping parts of the base panel 31. Indeed, due to the fact that the adhesive is only between limited interface surfaces of the cellulose sheet 30 and plastic film 40, in an optional embodiment, there are large flaps of cellulose sheet 30 that may be grasped and pulled. Consequently, the parts 30A and 30B may separate from the assembly of frame 20 and plastic film 40, in the manner shown in Figs. 9 and 10. Accordingly, the frame 20 and plastic film 40 may define a one-piece plastic component that may be recycled with other plastics, while the cellulose sheet 30 may be separated into the parts 30A and 30B, and the tear strip 34 that may be composted or recycled. Stated differently, the cellulose is separated from the plastic for post-use treatment (e.g., recycling, composting, etc). The tear strip 34, may thus be manually tearable to expose parts of the cellulose sheet 30 free of the adhesive joint with the film 40, such as parts of the side panels 32A and the bottom panel 31.

[0054] The above description is meant to be exemplary only, and one skilled in the art will recognize that changes may be made to the embodiments described without departing from the scope of the invention disclosed. For example, lids may also be made according to the technique described for the container 10. Still other modifications which fall within the scope of the present invention will be apparent to those skilled in the art, in light of a review of this disclosure, and such modifications are intended to fall within the appended claims.

Claims

1. A container comprising:

a frame having interconnected frame members, the frame defining interstices between interconnected frame members, the frame being made of plastic; and
panelling including at least one cellulose sheet, plastic film laid on the at least one cellulose sheet, and an adhesive joint between the plastic film and the at least one cellulose sheet;
characterized in that
the film interfaces the panelling to the frame such that the panelling closes the interstices to form a cavity of the container, and
an adherence of the adhesive joint is such that the at least one cellulose sheet is manually detachable from the plastic film.

2. The container according to claim 1, wherein the panelling is on an exterior of the frame relative to the cavity of the container.

3. The container according to any one of claims 1 and 2, wherein frame members are exposed on an exterior of the container through slits in the panelling.

4. The container according to any one of claims 1 to 3, including a tear strip defined in the at least one cellulose sheet, the tear strip being manually tearable to expose parts of the cellulose sheet free of the adhesive joint with the film.

5. The container according to claim 4, wherein the tear strip is unadhered to the film.

6. The container according to claim 4 or claim 5, wherein the tear strip intersects a longitudinal plane of the container.

7. The container according to any one of claims 4 to 6, wherein the tear strip separates the cellulose sheet in two shells.

8. The container according to any one of claims 1 to 7, wherein the adhesive joint between the plastic film and the at least one cellulose sheet represents at most 10% of a surface footprint between the at least one cellulose sheet and the plastic film.

9. The container according to any one of claims 1 to 8, wherein the adhesive joint between the plastic film and the at least one cellulose sheet is only in an upper 30% of a height of the container.

10. The container according to any one of claims 1 to 9, wherein the adhesive joint between the plastic film and the at least one cellulose sheet is a series of strips extending adjacent to a top peripheral contour of the container.

11. The container according to any one of claims 1 to 10, wherein a comolding joint is formed between the frame and the plastic film.

12. The container according to any one of claims 1 to 11, wherein the frame is a monoblock component.

13. The container according to any one of claims 1 to 12, wherein the cellulose sheet is 100% fiber.

14. The container according to any one of claims 1 to 13, wherein the panelling defines at least 90% of a surface of the cavity of the container.

15. The container according to any one of claims 1 to 14, wherein the plastic film and the cellulose sheet have a common outline.

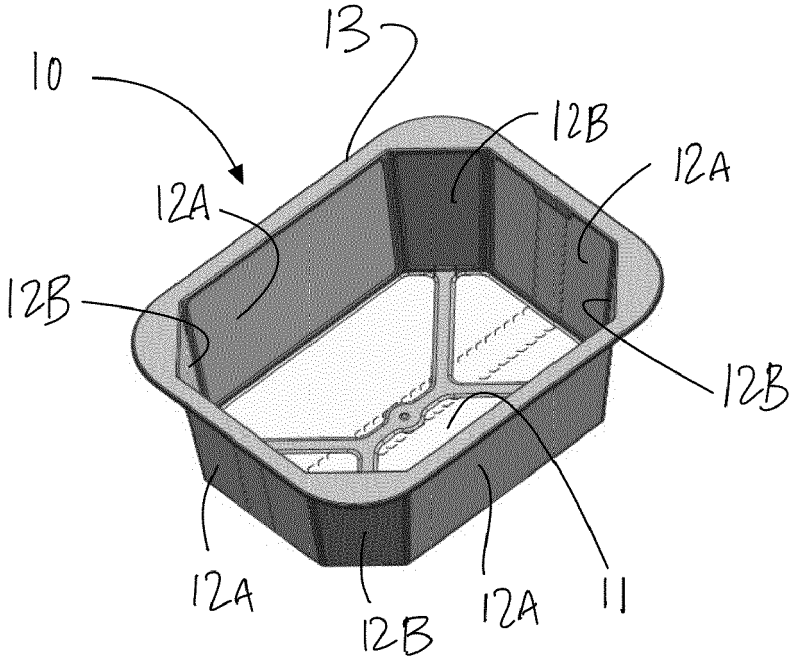

FIG. 1

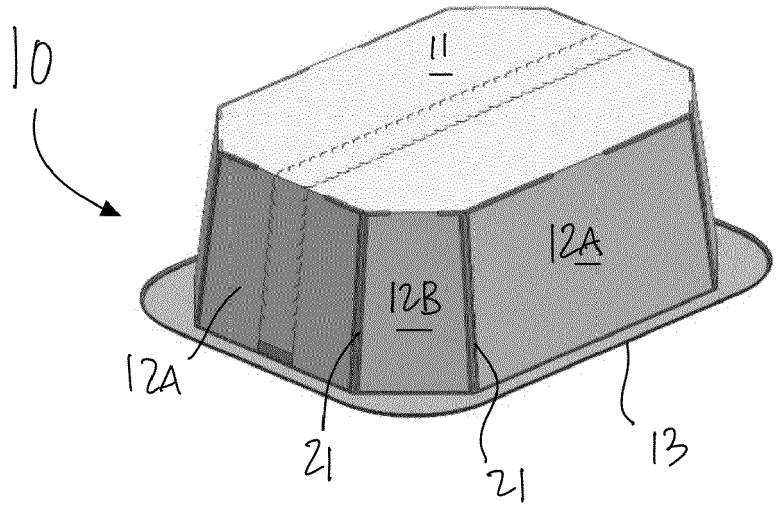

FIG. 2

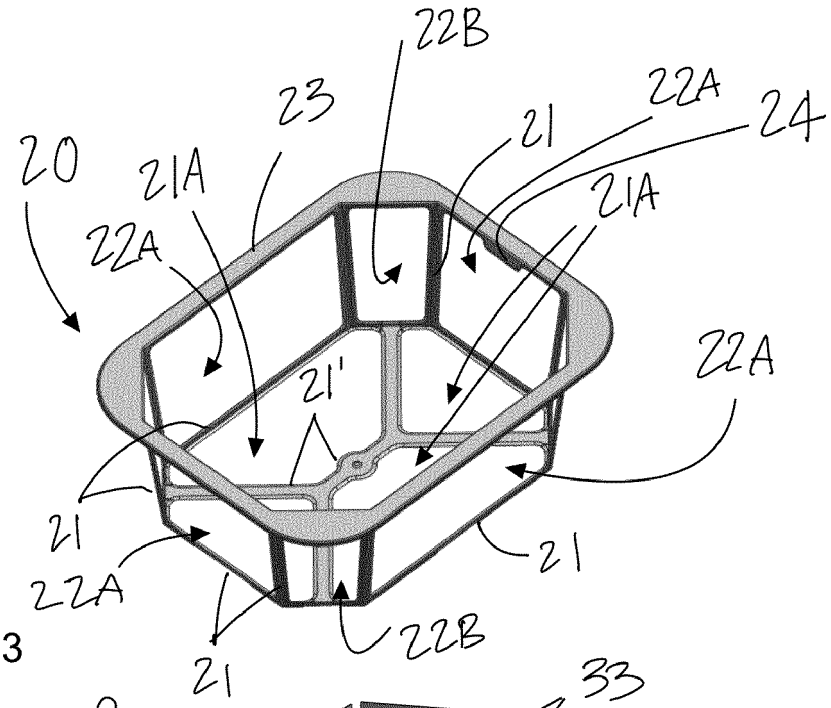
22B
23
22A
24
21
20
21A
21A
22A
22A
21'
21
21
22A
22B
21

FIG. 3

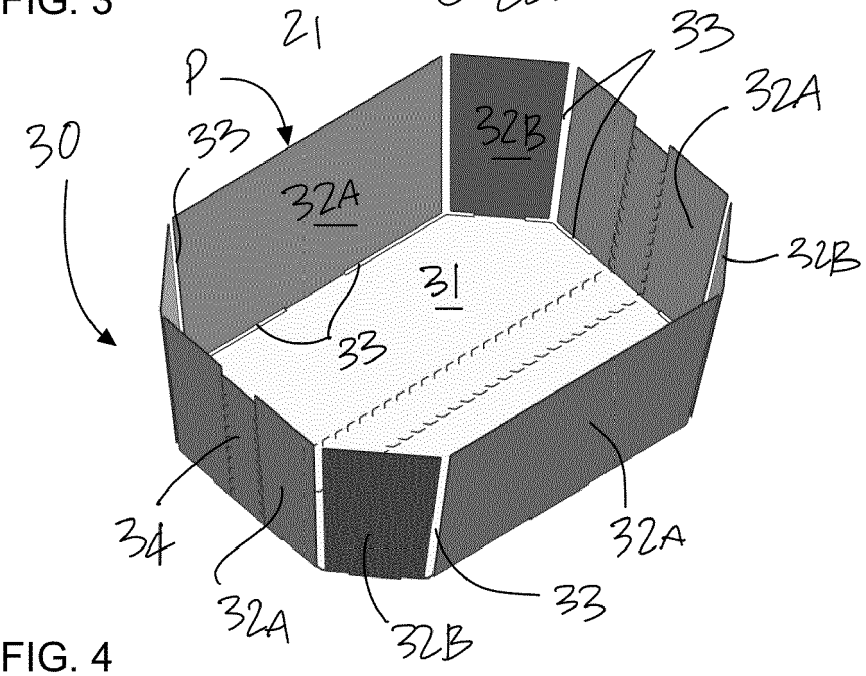
P
33
32B
32A
30
33
32A
32B
31
33
34
32A
32A
33
32B

FIG. 4

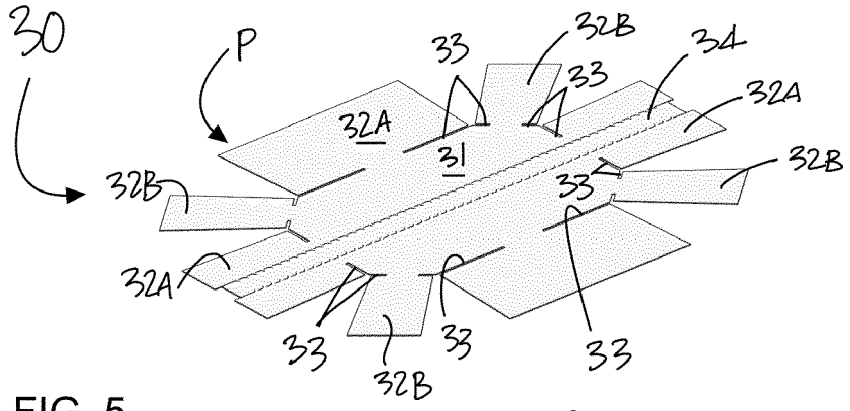

FIG. 5

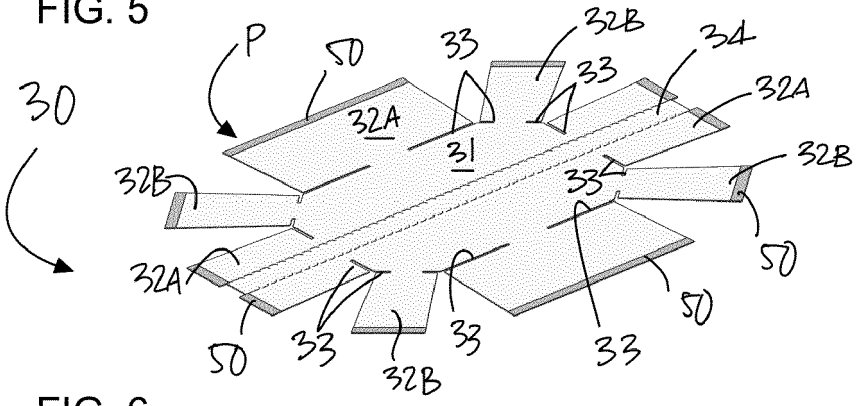

FIG. 6

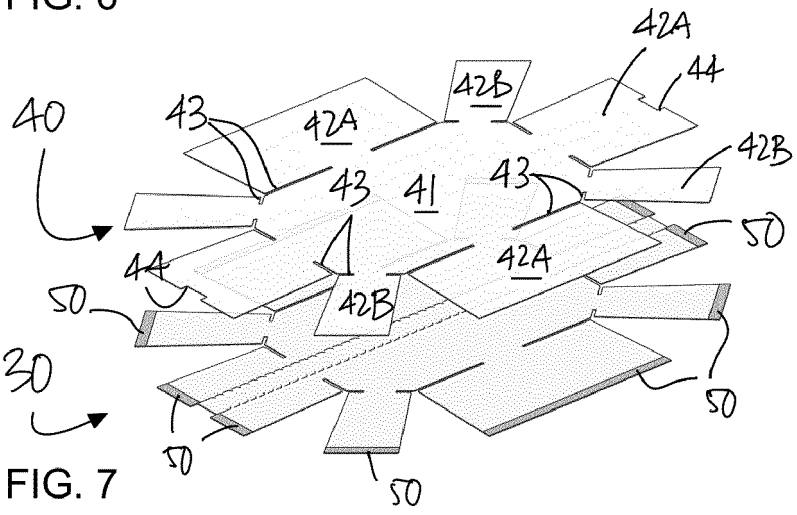

FIG. 7

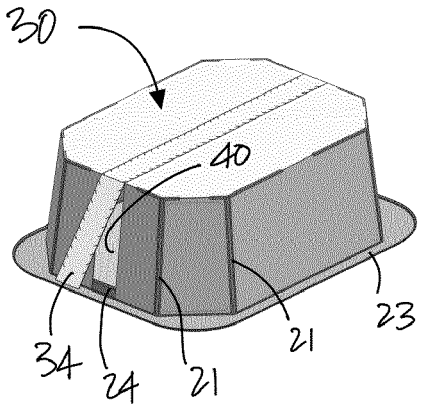

FIG. 8

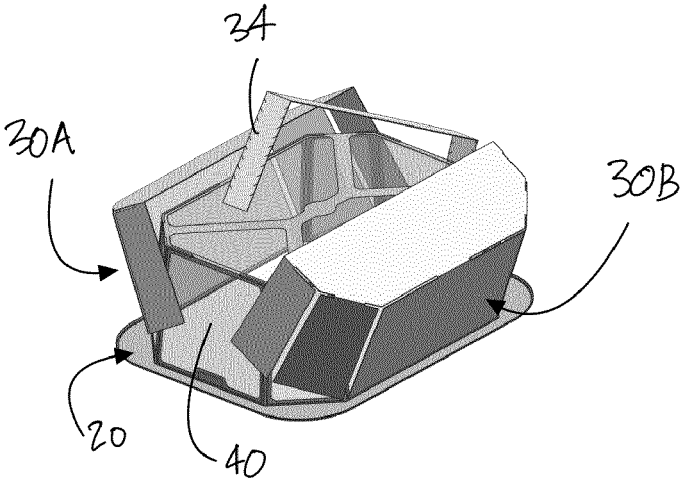

FIG. 9

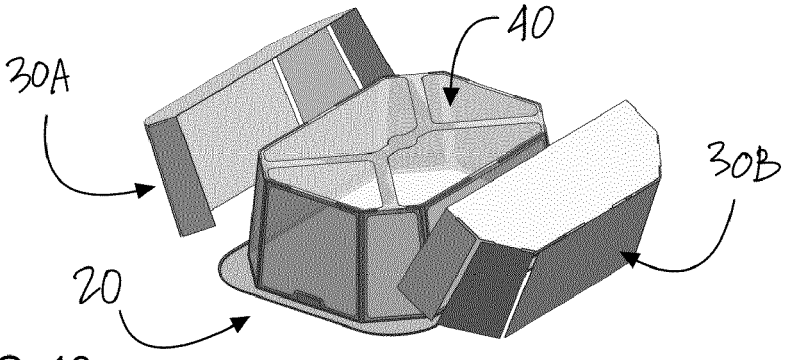

FIG. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 22 30 6249

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 4 930793 B2 (DAINIPPON PRINTING CO LTD) 16 May 2012 (2012-05-16) * page 2, paragraph 6 - page 8, paragraph 40 * * figures 1-3 *	1-15	INV. B65D5/20 B65D5/44 B65D5/56 B29C45/14
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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	16 January 2023	Piolat, Olivier

CATEGORY OF CITED DOCUMENTS

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16-01-2023

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