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(54) **LEAK-TIGHT TRAY FOR TRANSPORTING WET PRODUCTS**

(57) The present invention relates to a leak-tight tray for transporting wet products formed from a compact cardboard sheet (1) with main folding lines defining a base (3) and four side walls (4, 5) facing one another in twos. The tray comprises a tab (2) arranged in each of the four corners of the base, where each of the tabs in turn comprises two folding lines (21) joining it to two side walls and a third diagonal folding line (23) running from the corner of the base to a free edge (22) of the tab, where said tab is folded towards the inside of the tray when the side walls are raised during assembly of the tray.

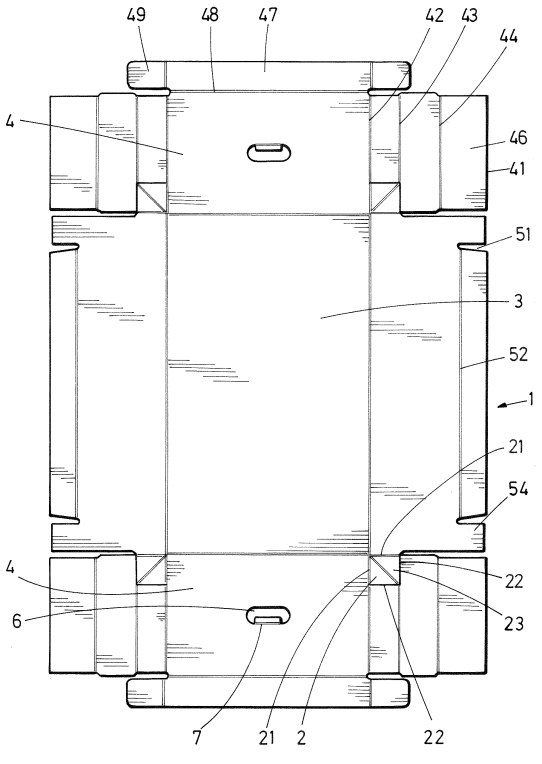

FIG.1

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Description

Technical Field of the Invention

[0001] The present invention generally relates to the technical field of containers for transporting products, and more specifically to cardboard boxes or trays for transporting wet products.

[0002] An object of the present invention is to provide, starting from a single compact cardboard sheet, a tray for transporting wet products provided with a completely leak-tight bottom.

Background of the Invention

[0003] Wet products, such as fish, meat or other perishables, are usually transported today in expanded polystyrene packages or "white cork" which allows protecting the products and keeping them fresh throughout the entire cold chain.

[0004] This type of package has serious environmental drawbacks because it is highly contaminating material which is virtually impossible to recycle. Once the packages are disposed of in a landfill, polystyrene is inert and does not break down, but rather will remain there forever, which has even caused it to be prohibited in some countries.

[0005] There are some solutions in the state of the art that deal with this problem by means of using alternative materials such as cardboard, however, although there are patent documents such as ES2384907 which use waterproof compounds for getting the material, corrugated cardboard in this case, to conserve its structural properties in wet conditions, they do not assure suitable leak-tightness because they do not provide any solution for the conventionally weaker points in this aspect, such as the lower corners. Furthermore, the handles located on the lower edges also play against the leak-tightness of the package. Finally, the need to use other elements to reinforce the structure, such as fiberglass mesh in this case, make the subsequent recycling process more complex.

[0006] A package, tray or box for transporting wet products which, without using polystyrene, has similar strength and leak-tightness features, or such features being at least sufficient to transport perishables, maintaining the cold chain, would therefore be a valuable contribution to the state of the art.

Brief Description of the Invention

[0007] The object of the present invention is a leak-tight tray for transporting wet products, such as fresh fish, for example, formed from a compact cardboard sheet with main folding lines defining a base and four side walls facing one another in twos. The tray comprises a tab arranged in each of the four corners of the base, where each of the tabs in turn comprises two folding lines joining it to two side walls and a third diagonal folding line running from the corner of the base to a free edge of the tab, where said tab is folded towards the inside of the tray when the side walls are raised during assembly of the tray.

[0008] Advantageously, the structure of the tray of the present invention provides complete leak-tightness as a result of the combination of the chosen material, i.e., compact cardboard, and the solution presented for the corners of the base. The foldable tabs assure complete insulation and prevent any damage caused by the moisture of the transported good. It must be pointed out that the corners and edges in materials of this type are critical points in that they are the weakest points with respect to moisture. Reinforcement of the base in this sense is therefore fundamental to achieve certain durability in trays containing wet products.

[0009] According to one of the embodiments of the invention, the tabs are quadrangular-shaped and the diagonal folding line runs from the corner of the base to a free corner of the tab formed by two cutting lines.

[0010] Additionally, the side walls can comprise at the ends thereof prolongations defined by folding lines coinciding with the vertical edges of the tray. Said prolongations in turn comprise at least one additional folding line which allows forming a polyhedral structure when folding the prolongations towards the inside of the tray. For example, according to one of the particular embodiments of the invention, the prolongations can have two additional folding lines, therefore splitting each of the prolongations into 3 portions and forming a polyhedral structure having a triangular section when the intermediate portion is folded towards the inside of the tray and the outermost portion is folded towards the outside of the tray, being placed against the side wall. A column is thereby advantageously formed in each of the corners of the tray which structurally reinforce it and allows stacking several trays.

[0011] Optionally, it is contemplated that the side walls can comprise an upper flap defined by a longitudinal folding line which allows covering the upper section of the polyhedral structures when the flaps are folded towards the inside of the box. A support surface for stacking other trays while at the same time reinforcing the structure of the tray is thereby advantageously achieved.

[0012] It is contemplated in one of the embodiments of the invention that the upper flaps comprise at each of their ends a wing, the only contact of which with the flap being a folding line, where the wing is placed against the adjacent side wall when it is folded towards the inside of the box. The tray is advantageously structurally reinforced, trapping the adjacent side wall between one of the columns and one of the wings in a sandwich-type structure.

[0013] The use of compact cardboard in the present invention provides the tray with sufficient rigidity and strength to dispense with additional materials, unlike other solutions of the state of the art which have to use fiber meshes on the base of the tray. The recycling of the

present invention is therefore more complete and simple to process, being entirely environmentally friendly.

[0014] The leak-tightness of the base also involves the advantage of retaining any liquid derived from the transported wet products, which assures the maintenance of cleanliness and hygienic conditions of warehouses or means of transport used.

Description of the Drawings

[0015] To complement the description that is being made and for the purpose of aiding to better understand the features of the invention according to preferred practical embodiments thereof, a set of drawings is attached as an integral part of this description, in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows a plan view of a tray in the unfolded position, according to one of the embodiments of the invention.

Figure 2 shows in detail the folding of the wings forming the reinforcement columns according to one of the embodiments of the invention.

Figure 3 shows a 3-dimensional detail view of the lower tabs of the tray that is half-folded, according to one of the embodiments of the invention.

Figure 4 shows a 3-dimensional view of the leak-tight tray for transporting wet products completely assembled, according to one of the embodiments of the invention.

Preferred Embodiment of the Invention

[0016] In view of the described drawings, it can be seen how the tray proposed in the preferred embodiment of the present invention comprises a compact cardboard sheet (1) with several cuts and main folding lines defining a base or bottom and four side walls which in the unfolded position are prolongations of the base, but with the box assembled, they are vertically arranged with respect to the base and facing one another in twos.

[0017] As can be observed in Figure 1, where the unfolded sheet is depicted, there is arranged a tab (2) in each of the corners of the base (3) of the tray. Said tab is attached to two consecutive side walls by means of the corresponding folding lines (21), the other two edges of the tab being free as a result of the respective cutting lines (22). The tab thus defined is therefore a common prolongation for two consecutive side walls and for the base. The tab has an additional folding line (23) running along one of its diagonals, specifically the diagonal joining the corner of the base defined by the crossing of the main folding lines with the opposite corner of the tab, such that when assembling the tray, it allows folding, as shown in Figure 3, the tab along said folding line towards the inside of the tray, thereby achieving complete leak-tightness on the bottom of the tray.

[0018] The side walls (4) of one of the pairs of facing side walls have foldable wings (41) which can be folded by means of the corresponding folding line (42). In turn, said side wings have additional folding lines (43, 44) which, once the tray is assembled, form polyhedral structures in the form of a column in each of the corners of the tray. For example, with the two folding lines of this preferred embodiment, which is shown in detail in Figure 2, a column having a triangular section (45) is obtained, where the last part (46) of the wing, defined by the folding line (44) closest to the end, is arranged parallel to the side wall and preferably attached to it by means of glue.

[0019] Preferably, the last part of the wing (46) is adhered at a point of the side wall such that the first part of the wing is arranged perpendicular to the side wall and the second part of the wing runs diagonally from the corresponding folding line (43) to the following folding line (44), which is in contact with the side wall.

[0020] Greater compressive strength of the tray is thereby assured, which allows stacking several trays.

[0021] The two pairs of facing side walls are of a different size such that the assembled tray has, as can be seen in Figure 4, two sides having a greater height (4) and two sides having a smaller height (5). Advantageously, stacking trays according to this preferred embodiment assures the entrance of air for aerating the transported products. In other embodiments, the side walls can be of the same dimensions, being able to achieve the same aeration effect for the products transported in the tray by means of different folding lines in the upper part of the side walls or directly by means of a recess in the central part thereof.

[0022] The sides having a greater height, according to the preferred embodiment, are narrower than the sides having a smaller height, these measurements being defined by the base, but the proportions may vary according to other embodiments of the invention and even be identical in width in the case of a square base.

[0023] Two of the facing sides, preferably the ones having a greater height, have openings or grooves in the form of handles (6) for transporting the trays. Preferably, these handles are located in a central or upper position of the side walls so as to not jeopardize the leak-tightness of the tray.

[0024] The handles have a small tab (7) in their upper part which is joined to the side wall by means of a folding line. This tab can be folded towards the inside of the tray to make transport easier for an operator who, upon introducing their hands in the handles, finds a larger contact surface and prevents or reduces possible discomforts or even cuts.

[0025] The side walls having a greater height have an upper portion (47) defined by a folding line (48), where said upper portion in turn has a wing (49) at each of its ends, also defined by its corresponding folding line. The upper portion is configured for being folded towards the inside of the tray along its folding line such that with the tray in assembled position, it covers the upper end of the

columns having a triangular section and furthermore provides a surface for stacking other trays. The wings of the ends are configured for being folded along the corresponding folding line and being fixed to the adjacent side wall, preferably by means of gluing, in order to reinforce the structure of the tray.

[0026] The side walls having a smaller height (5) have two cutting lines (51) close to their upper corners and arranged perpendicular to the main folding line. There has been provided between the cutting lines a folding line (52) parallel to the main folding line such that a flap (53) is defined between the cutting lines and said folding line. The flap is folded along the folding line in order to reinforce the structure of the box and eliminate sharp edges in the upper part of the tray. Preferably, the flap is fixed by means of gluing to the inner face of the side wall on which it is folded. The upper ends (54) which are arranged on both sides of the flap, between the cutting lines and the outer edges of the side wall, are trapped once the tray is assembled, between the columns (45) and the wings (49) in a sandwich-type structure in order to reinforce the structure of the tray.

[0027] As regards the process for assembling the tray, starting from the unfolded sheet as shown in Figure 1, such process starts by folding the wings (41), as illustrated in Figure 2. Then the compact cardboard sheet (1), with the columns (45) already formed, is sent to an erecting machine which erects all the side walls, arranging them in a perpendicular position with respect to the base (3) of the tray. During erection, a tool of the erecting machine pushes the tabs (2) in each of the corners of the base towards the inside of the tray, such that the tab, as can be seen in Figure 3, is folded along the diagonal (23) and the base of the tray is completely leak-tight as its four corners are closed, as shown in Figure 4. Additionally, a line of hot melt-type glue is dispensed in the area of the sides close to the tab to assure leak-tightness from bottom to top.

[0028] Generally each of the parts which are folded over others receives gluing which reinforces the attachment and maintains the shape and structure of the tray.

[0029] The preferred material for this embodiment is compact cardboard, given that its structural properties of hardness, rigidity, strength and impermeability are suitable for the envisaged use of transporting wet products without requiring additional materials or treatments. Nevertheless, other embodiments of the present invention contemplate other similar materials for the sheet, such as corrugated cardboard, reinforcement materials at given points or waterproof treatments.

Claims

1. Leak-tight tray for transporting wet products formed from a compact cardboard sheet (1) with main folding lines defining a base (3) and four side walls (4, 5) facing one another in twos, **characterized in that** it comprises a tab (2) arranged in each of the four corners of the base, where each of the tabs in turn comprises two folding lines (21) joining it to two side walls and a third diagonal folding line (23) running from the corner of the base to a free edge (22) of the tab, where said tab is folded towards the inside of the tray when the side walls are raised during assembly of the tray.

2. Tray according to claim 1, where the tab is quadrangular-shaped and where the diagonal folding line runs from the corner of the base to a free corner of the tab formed by two cutting lines.

3. Tray according to any of the preceding claims, where at least one of the side walls further comprises at the ends thereof prolongations (41) defined by folding lines (42) coinciding with the vertical edges of the tray, where said prolongations in turn comprise at least one additional folding line (43) which allows forming a polyhedral structure when folding the prolongations towards the inside of the tray.

4. Tray according to claim 3, where the prolongations comprise two additional folding lines (43, 44) splitting each of the prolongations into 3 portions and forming a polyhedral structure having a triangular section when the intermediate portion is folded towards the inside of the tray and the outermost portion is folded towards the outside of the tray, being placed against the side wall.

5. Tray according to any of claims 3, 4, where at least one of the side walls comprises an upper flap defined by a longitudinal folding line which allows covering the upper section of the polyhedral structures when the flaps are folded towards the inside of the box.

6. Tray according to claim 5, where the flap further comprises at each of its ends a wing the only contact of which with the flap being a folding line, where the wing is placed against the adjacent side wall when it is folded towards the inside of the box.

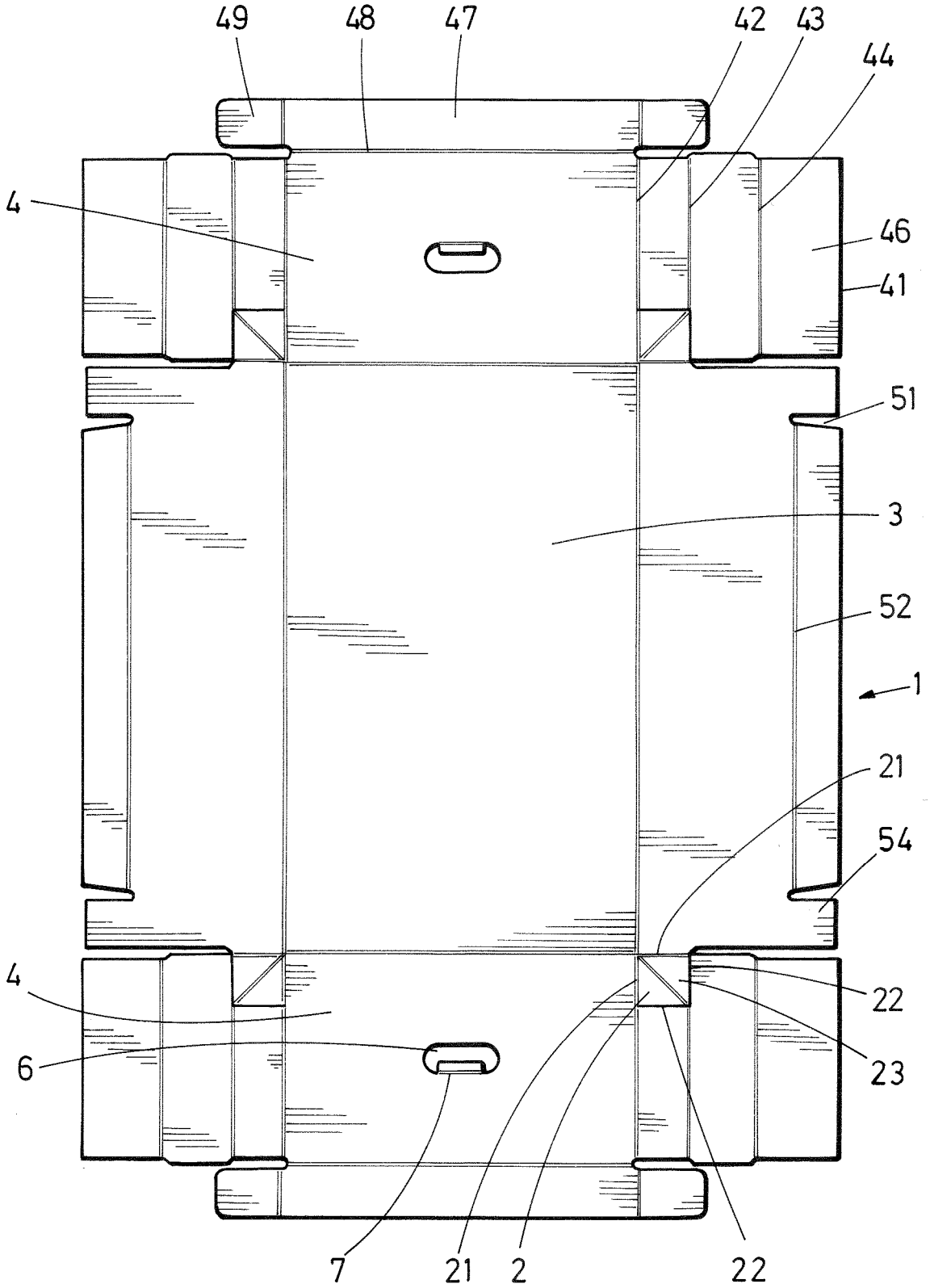

FIG.1

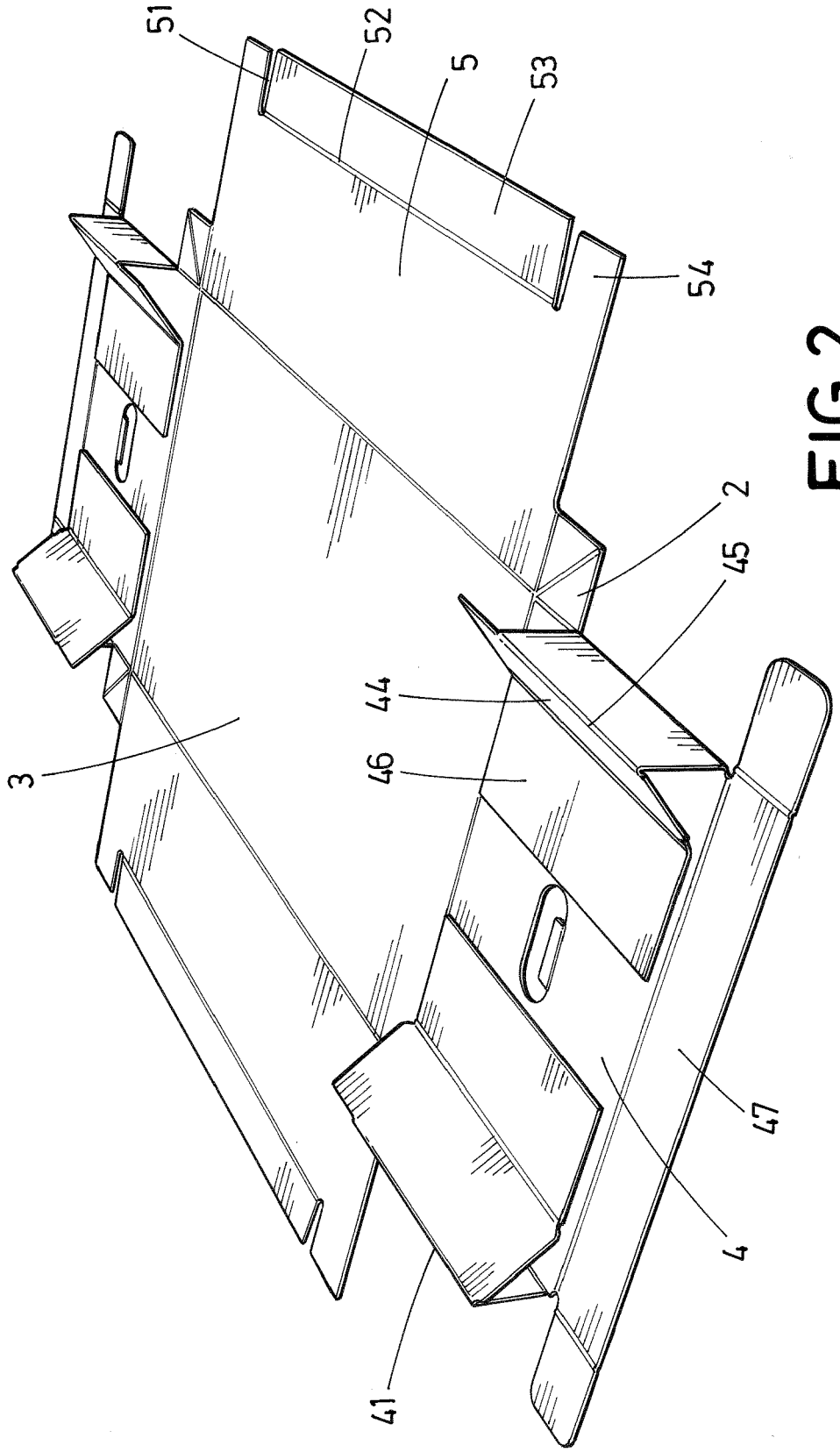

FIG.2

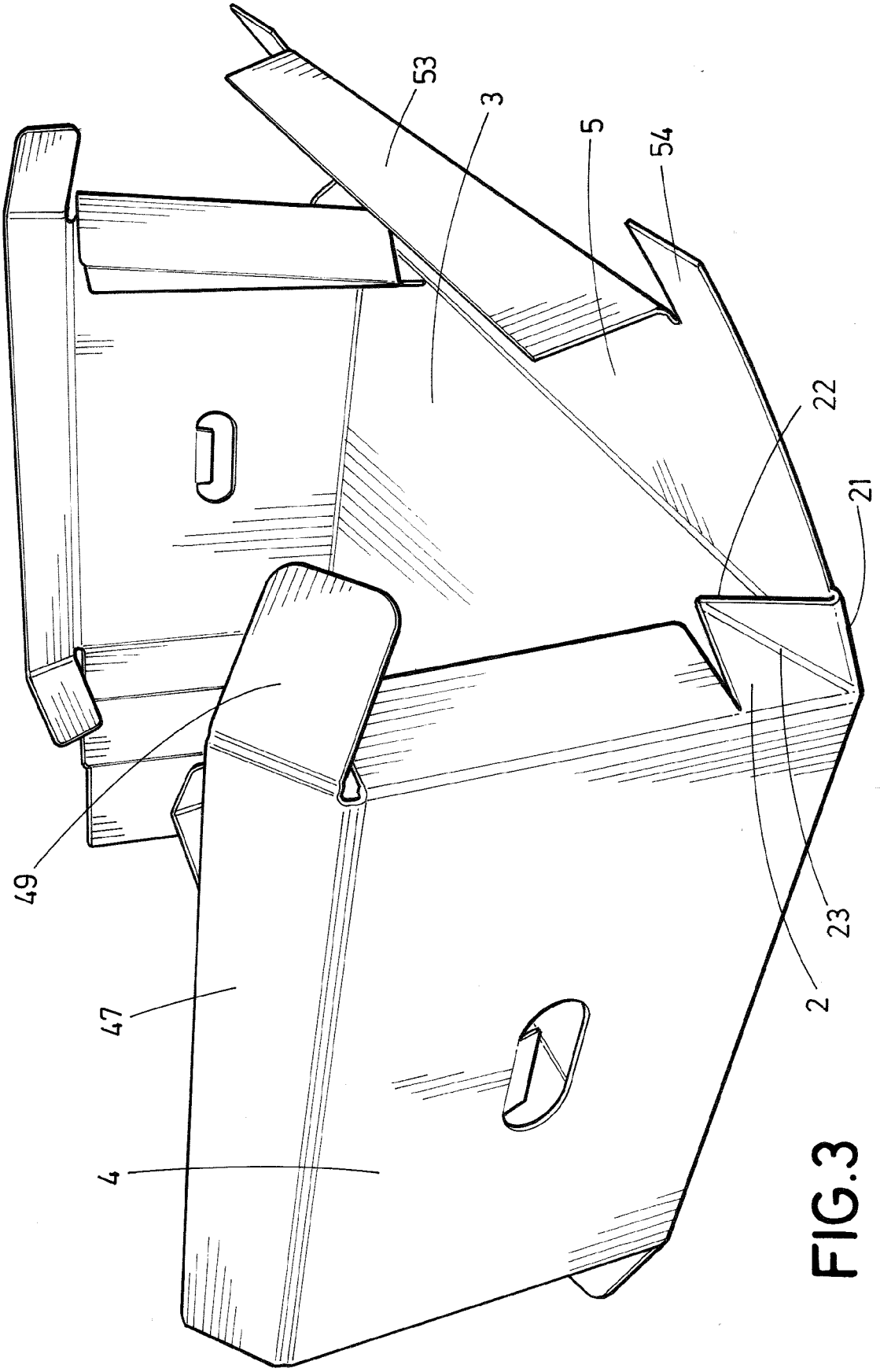

FIG.3

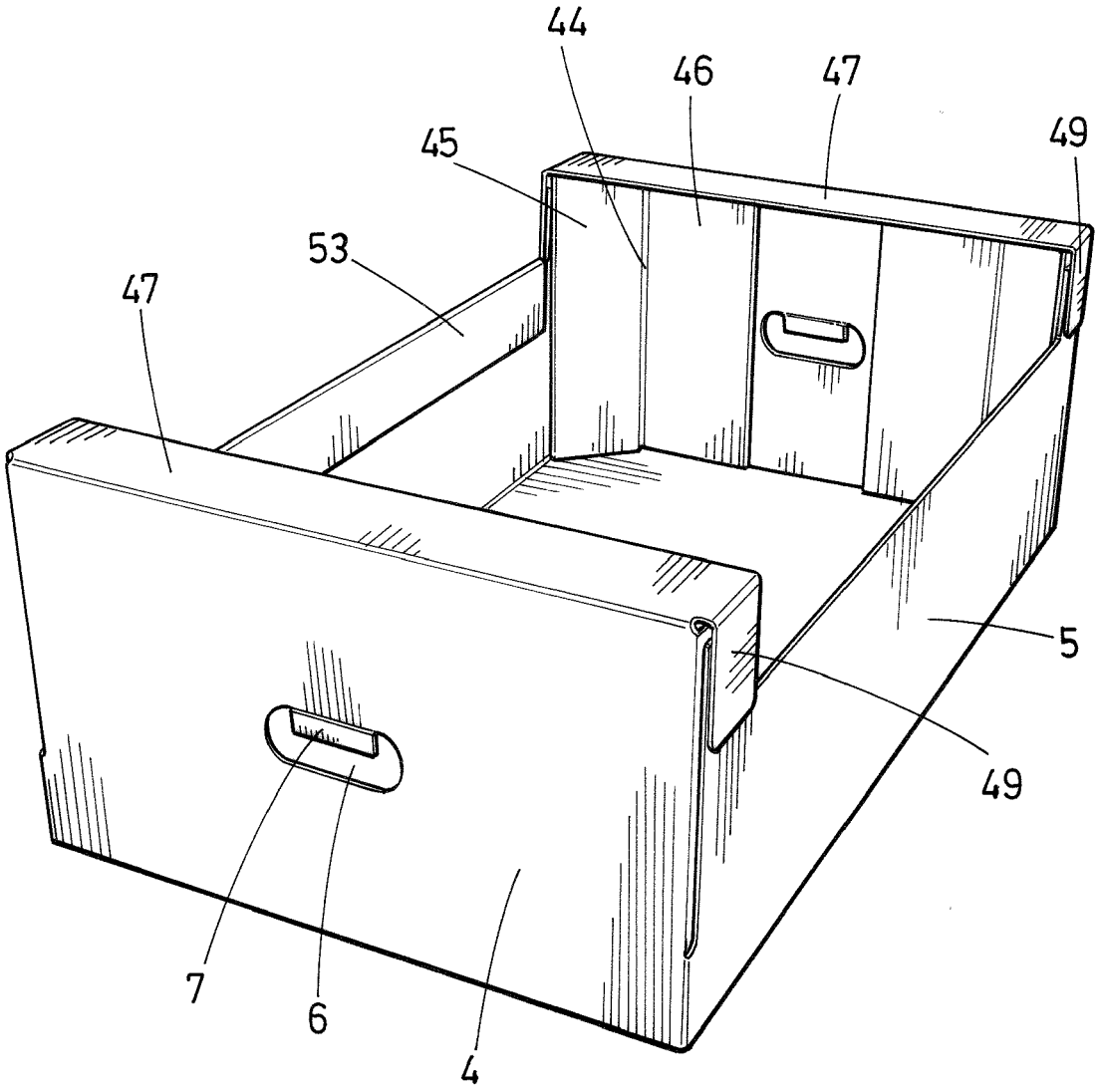

FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 15 38 2357

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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	28 January 2016	Leijten, René

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Application Number
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