

(19)



(11)

EP 2 845 816 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.03.2015 Bulletin 2015/11

(51) Int Cl.:
B65D 5/06 (2006.01) B65D 47/20 (2006.01)

(21) Application number: **14460052.5**

(22) Date of filing: **28.08.2014**

(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

(71) Applicant: **K-BIS STUDIO Ismailow Muchtar 05-400 Otwock (PL)**

(72) Inventor: **Ismailow, Muchtar 05-400 Otwock (PL)**

(30) Priority: **02.09.2013 PL 40522513**

(54) **Folding packaging**

(57) The subject of this invention is a collapsible packaging (1) designed for food product storage provided with folding lines in which vertical side-wall bending lines (15a, 15b) run along the whole height of the sheet (10) of the collapsible packaging (1), and horizontal base bending line (13) runs along the whole width of the sheet

(10) of the collapsible packaging (1), whilst a bottom bending line (18), being an inward bending line of the collapsible packaging (1) is formed at the junction of the fold (6) from the base (5) of the collapsible packaging (1) and the extensions of the main walls (2a, 2b) and side walls (3a, 3b).

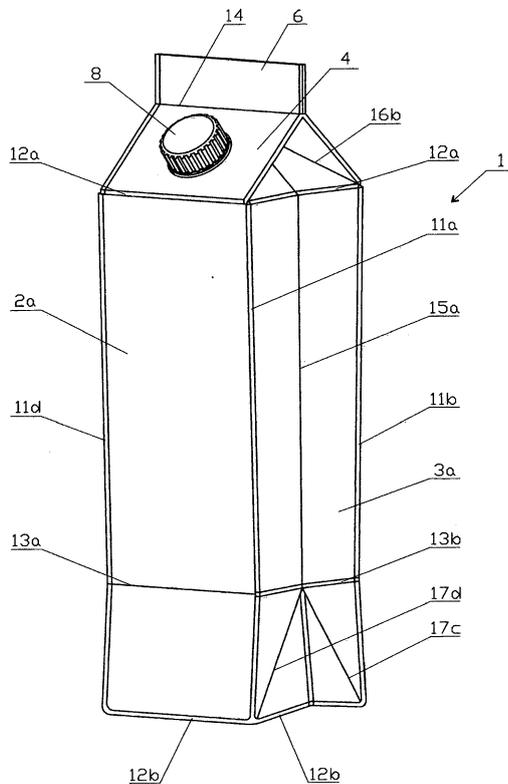


Fig. 3

EP 2 845 816 A1

Description

[0001] The subject of this invention is the collapsible packaging.

[0002] In particular, the collapsible packaging is intended for food product storage, in liquid as well as in solid (e.g. loose) form.

[0003] There are many various types of packaging in the form of containers intended for products storage e. g. foodstuff dedicated for individual households. Such containers enable easy access to commodities in shops, where they can be found in the form that is convenient for purchasers, without the necessity of additional actions, such as weighing.

[0004] Such packaging is made, for instance, of multilayer material that may contain paper cardboard, aluminium foil and plastic foil, which form together a sheet of composite material. It can be also a single-layer material, such as cardboard or plastic foil. Within the space of many years, as this type of packaging has been used, the material composition has been altered several times, but the rule of its multilayeredness has remained unchanged. Such a sheet is bent along the bending lines and next is welded, which forms the finished package.

[0005] Certain information on cardboard packaging in the form of a collapsible container can be found in the Patent Document US 3366308, which makes the closest state of the art for the present application. The container is made of one sheet of multilayer paper-based material. The finished container has two opposite main walls joined to side walls in such a way that they form the main body of the section that is, in principle, rectangular, and the main walls and side walls run vertically in the container in its basic position. The container has the base perpendicular to the main walls, and, on the side of the main body that is opposite the base, it has the triangular roof.

[0006] The main body of the container is made through gluing the sheet of material on its folds, which are to be found on the outer edges of the sheet, after its bending according to the intended bending lines.

[0007] In order to achieve that, the sheet of multilayer material is marked with the appropriate sheet bending lines. In this solution of the state of the art there are four vertical bending lines running vertically along the main walls, two main horizontal bending lines running across the main walls and side walls in such a way that they run at the point where the roof of the container begins, and at the point where the base of the container begins.

[0008] Between the two main horizontal bending lines the sheet of multilayer material is marked with the horizontal base bending line. The sheet, from which the container is formed, is also marked with the horizontal roof bending line, which closes the container from the top, and with the two vertical side-wall bending lines running along the side walls in their axis of symmetry. The vertical side-wall bending lines run along the side walls in their axis of symmetry from the horizontal base bending line to the horizontal roof bending line.

[0009] On the diagonal of the rectangles formed by the main vertical bending lines, the main horizontal bending line from the roof of the packaging and the vertical side-wall bending line, there are diagonal roof bending lines, which are inward bending lines of the collapsible packaging so that they meet at the top of the roof of the packaging.

[0010] The packaging, according to this Patent Document, has diagonal base bending lines running along the diagonal of the rectangles formed by the main vertical bending lines, the main horizontal bending line from the base of the packaging and the axis made by the main vertical side-wall bending line, so that they meet at the main vertical bending line of the packaging from the base, at the mid-point of the base of the packaging and on the main horizontal bending line from the base.

[0011] The solution described above, according to US 3366308, is opened through rending a piece of the roof so that it makes an opening that allows to empty the container.

[0012] As the container has been emptied completely, it is possible to be fold up through its side walls being bent towards the middle of the container, and its base being unfolded only onto one of the side walls along the base bending lines. Until the container has been folded by using force, its section remains unchanged.

[0013] As soon as the container has been opened, it becomes unsealed and the air flows inside, which may affect the quality on the contents of the packaging.

[0014] A cardboard packaging in the form of a collapsible container is known from the description of WO 2005102848. The container is made of one sheet of multilayer paper-based material. The finished container may have two opposite main walls joined to side walls in such a way that it forms the main body of the section that is, in principle, rectangular, and the main walls and side walls run vertically in the container in its basic position. The container has the base perpendicular to the main walls, and, on the side of the main body that is opposite the base, it has the roof which is triangular in the axial section. The sheet, from which the container is made, according to this application, is marked with the bending lines that are similar to those indicated in the description US 3366308; however, the system of bending lines being marked onto the sheet allows the side walls of the packaging to be bent only outwards and that comes after the container has been completely emptied. Folding the emptied container is aimed at reducing its volume for the purposes of storage or transporting the waste that is intended to be recycled.

[0015] A packaging made from a sheet of cardboard, and intended for middle- and high-volumed solid articles is known from Patent Document US 4094458. The packaging has two pairs of opposite walls and one of the pairs is marked with bending lines that run along the vertical axis of the packaging and allow folding up the container through bending down the walls towards the inside of the container. The packaging has the closing top and the

closing bottom, which are flat. When the container is unfolded, it has a shape of a cuboid. In order to store the container, its side walls are folded inwards after its top and bottom have been opened.

[0016] A packaging for liquid articles is known from the Patent Document PL 198329. The packaging contains a collapsible sachet with at least two flexible parts that are mutually connected on the edges of the inward area, which remains non-connected, and that are separated from each other in the part of the rim in the edge area, which makes an opening leading to the inward area limited by flexible parts in their inward area. The packaging is equipped with the dosing device, which has the empty base tightly attached to the flexible parts along the opening; it has the lip sticking out from the base and finished with the tip with the exhaust outlet, and it also has the outlet duct stretching from the inward area of the packaging, through the base and the lip, to the exhaust outlet. The empty base has two opposite walls that include part of the outlet duct having been formed by them; the walls end at the proper edge ends, at which they meet and where each wall outlines the outward surface part tightly attached to one of the flexible parts along the sachet opening.

[0017] Across the outlet duct, the packaging has the resilient valve that is fastened tightly and has the self-sealing gap, which opens in response to the pressure increased in comparison with the outer pressure, and can be found on the side of the valve that faces inwards so that it allows the flow.

[0018] A packaging for liquid articles, which, in section, has oval shape similar to the shape of a bottle with discharge neck and has the non-return valve in the discharge neck, is known from the Patent Document US 6578740. The packaging keeps the position upright and secures the inside of the packaging against the air flow. As the packaging is made of plastic, it also, to some degree, secures the contents against damages in case of a fall.

[0019] The types of packaging already known either do not provide suitable protection against the air flowing inside, which can significantly precipitate the process of perishing of the contents, or do not provide good conditions for recycling of packaging waste.

[0020] Those problems have been solved by the present collapsible packaging, according to the invention.

[0021] According to the invention, the rectangular-based collapsible packaging is made from one sheet of material that is bent and joint at several points through folds placed on at least three edges of the sheet of material. The collapsible packaging has two main walls and two side walls joined to the main walls in such a way that they form the main body of the collapsible packaging that is, in principle, rectangular in section and matches the shape of the base. The main walls and the side walls are joined to the bottom that constitutes the base, as well as with the upper part that constitutes the roof, which is tri-

angular in axial section through the side walls. The sheet of material is a flat template, with its height running along the main walls and its width running across the main walls, and has the following:

- 5 - four main vertical bending lines, which run vertically along the main walls and the side walls of the collapsible packaging;
- 10 - two main horizontal bending lines, which run across the main walls and the side walls in such a way that the first main horizontal bending line runs through the point where the roof of the collapsible packaging begins and the second main horizontal bending line runs through the point where the base of the collapsible packaging begins;
- 15 - the horizontal base bending line passing between the main horizontal bending lines from the longitudinal axis of the first side wall to the longitudinal axis of the second side wall;
- 20 - the horizontal roof bending line closing the roof from the top of the collapsible packaging;
- two vertical side-wall bending lines running vertically along the axis of symmetry of the side walls from the horizontal base bending line to the horizontal roof bending line;
- 25 - diagonal roof bending lines, which are the collapsible bending lines of the packaging inward and run along the diagonal of the rectangles formed by the main vertical bending lines, the main horizontal bending line from the roof of the collapsible packaging, the horizontal roof bending line and the vertical side-wall bending lines in such a way that they meet at the top of the roof of the collapsible packaging;
- 30 - diagonal base bending lines running along the diagonal of the rectangles formed by the main vertical bending lines, the main horizontal bending line from the base of the collapsible packaging, the straight line, on which the horizontal base bending line is situated, the line going through the centre of the bottom and the axis made by the vertical side-wall bending lines, in such a way that they meet at the intersection of the main vertical bending lines of the collapsible packaging and the main horizontal bending line from the base, and on the axes made by the vertical side-wall bending lines.
- 40
- 45

[0022] The collapsible packaging is characterized by the fact that the vertical side-wall bending lines run throughout the whole height of the sheet of the collapsible packaging, and the horizontal base bending line run throughout the whole width of the sheet of the collapsible packaging, and the sheet of material has the bottom bending line, which is the inward bending line of the collapsible packaging, made at the junction of the fold from the base of the collapsible packaging and the extensions of the main walls and the side walls.

[0023] It is favourable when the horizontal base bend-

ing line is divided into: the first horizontal base bending line running across the first main wall, the second horizontal base bending line running across the first side wall, the third horizontal base bending line running across the second main wall, and the fourth horizontal base bending line running across the second side wall; and the vertical side-wall bending lines between the horizontal roof bending line and the horizontal base bending line are the inward bending lines of the collapsible packaging; and, between the horizontal base bending line and the main horizontal bending line from the base, are the outward bending lines of the collapsible packaging; and, between the main horizontal bending line from the base and the horizontal bottom bending line, are the inward bending lines of the packaging; and the first horizontal base bending line and the third horizontal base bending line, both running along the main walls of the collapsible packaging, are the inward bending lines of the collapsible packaging; and the second horizontal base bending line and the fourth horizontal base bending line, both running along the packaging's side walls, are the outward bending lines of the collapsible packaging.

[0024] It is also favourable when in the sheet of the collapsible packaging, in the base, along the extensions of the side walls, one can find recesses running, in principle, along the main vertical bending lines as well as along the diagonal base bending lines from the outward of the template of the collapsible packaging.

[0025] It is favourable, too, when in the sheet, in one of the walls of the roof of the packaging, one can find the opening, in which the outlet pipe is planted in the collapsible packaging.

[0026] It is favourable, too, when the outlet pipe is supplied with the cap.

[0027] It is favourable when the outlet pipe is supplied with the non-return valve.

[0028] It is also favourable when the non-return valve, with which the outlet pipe is supplied, is placed in the cap.

[0029] It is favourable when the outlet pipe's cap is supplied with the closure top.

[0030] It is also favourable when the non-return valve planted in the outlet pipe, in one of the walls of the roof of collapsible packaging, is a plate valve.

[0031] It is also favourable when the non-return valve is supplied with the plate flap, which, in the closed position of the valve, leans on the protrusions in the outlet pipe.

[0032] It is favourable, too, when the non-return valve is supplied with the lip flap, which, in the closed position of the valve, leans on the inside walls of the outlet pipe.

[0033] The subject of the invention has been illustrated in the execution examples, where Fig. 1 shows the template of the sheet of material of which the collapsible packaging is made; Fig. 2 shows the template of the sheet of material of which the collapsible packaging is made with the recesses formed therein; Fig. 3 shows the collapsible packaging in standing position in the perspective view from the side; Fig. 4 shows the collapsible packaging in tilted position in the perspective view from the other

side from the bottom; Fig. 5 shows the collapsible packaging in standing position in a slightly compressed state, in the perspective view from the side; Fig. 6 shows the collapsible packaging in standing position in fully compressed state, in the perspective view from the side; Fig. 7 shows the details of the outlet pipe of the collapsible packaging with the non-return valve in the section through the outlet pipe; Fig. 8 shows the details of the outlet pipe of the collapsible packaging with the non-return valve in the section through the outlet pipe in compressed position with the non-return valve being open; Fig. 9 shows the details of the outlet pipe with the closing flaps leaning on the protrusions in the inner side of the outlet pipe; Fig. 10 shows the details of the outlet pipe with the closing flaps leaning on the inner side of the outlet pipe; and Fig. 11 shows the details of the outlet pipe of the collapsible packaging with the non-return valve placed in the top supplied with the crown cap, in the section through the outlet pipe in compressed position with the non-return valve being open.

[0034] The collapsible packaging 1 for foodstuff, but not only, particularly in a liquid or semi-liquid state, but not limited to, has the rectangular base 5, from which the two parallel main walls 2a, 2b diverge. The edges of the main walls 2a, 2b are joined to the edges of the side walls 3a, 3b, which are opposed to each other; that forms the section of the collapsible packaging 1 that is basically rectangular in filled state.

[0035] As shown in this embodiment, of the collapsible packaging 1, the-section of the collapsible packaging 1 is a square. The main walls 2a, 2b of the collapsible packaging 1 in the upper part evolve into the roof 4, which is triangular in the longitudinal section through the main wall 2a, 2b. The side walls 3a, 3b in the upper part evolve into the roof 4 of the collapsible packaging 1. The roof 4 of the collapsible packaging 1 is closed with the folds 6, which are the extensions of the main walls 2a and 2b.

[0036] The collapsible packaging 1 presented above is shown in the execution example in Fig. 3, where both the main wall 2a and the side wall 3a can be found. In Fig. 3 one can also see the roof 4 closing the collapsible packaging 1 from the upper part and coming from the main walls 2a and 2b on their extension, and joined at the top with the folds 6, and Fig. 3 fully depicts only this part of the roof 4 that comes from the main wall 2a and, partly, the roof 4 side wall coming from the side wall 3a of the collapsible packaging 1.

[0037] Fig. 4 presents the collapsible packaging 1 in another perspective, showing the walls of the collapsible packaging 1 which are opposite to those shown in Fig. 3, i.e. both the main wall 2a and the side wall 3b can be seen. One can also see the base 5 of the collapsible packaging 1, which is its bottom.

[0038] As shown in Fig. 4, the collapsible packaging 1, on one of the sides of the roof 4, can be supplied with the outlet pipe 71, closed with the cap 8.

[0039] The collapsible packaging 1 shown in Fig. 3 and Fig. 4 is made of one sheet of material which, in this case,

is a composite material containing a layer of cardboard, plastic and aluminium foil. Obviously, the collapsible packaging 1, according to the invention, can be made of any material, both single-layer and multi-layer, and the used material may be e.g. only cardboard or cardboard combined with plastic foil. And the choice of material sheet 10, of which the collapsible packaging 1 is made, is irrelevant from the point of view of the present invention. It is important, however, that the material of which the sheet 10 used for the collapsible packaging 1 is made, shall be possible to bend along the intended bending lines, both inwards and outwards the packaging. The term 'inwards' the collapsible packaging means in this case such bending that in the finished collapsible packaging 1 on the bending line results in convex surface relative to the inside of the packaging 1 from the product placed therein. The term 'outwards' the collapsible packaging 1 means in this case such bending that in the finished collapsible packaging 1 on the bending line results in concave surface relative to the inside of the collapsible packaging 1 from the product placed therein.

[0040] The sheet material 10 from which the collapsible packaging 1 is made is shown in an embodiment in Fig. 1, which shows actual or theoretical bending lines of the same sheet 10 to form the collapsible packaging 1 as well as for its subsequent use.

[0041] As shown in Fig. 1, the sheet material 10 is a flat template, with its height running along the main walls 2a and 2b of the collapsible packaging 1, and its width running across the main walls 2a and 2b of the collapsible packaging 1, and has the following:

- four main vertical bending lines 11a, 11b, 11c, 11d;
- two main horizontal bending lines 12a, 12b;
- horizontal base bending line 13;
- horizontal roof bending line 14;
- two vertical side-wall bending lines 15a, 15b;
- diagonal roof bending lines 16a, 16b, 16c, 16d;
- diagonal base bending lines 17a, 17b, 17c, 17d, 17e, 17f, 17g, 17h,
- bottom bending line 18

[0042] The four main vertical bending lines 11a, 11b, 11c, 11d run vertically along the main walls 2a and 2b and the side walls 3a and 3b of the collapsible packaging 1.

[0043] The two main horizontal bending lines 12a and 12b run across the main walls 2a and 2b and the side walls 3a and 3b of the collapsible packaging 1.

[0044] The horizontal roof bending line 14 closes the roof 4 from the upper part of the collapsible packaging 1.

[0045] The two vertical side-wall bending lines 15a, 15b run throughout the whole height of the template 10 of the collapsible packaging 1, and the horizontal base bending line 13 run throughout the whole width of the sheet 10 of the collapsible packaging 1. The sheet material 10 has the bottom bending line 18, which is the inward bending line of the collapsible packaging 1, made

at the junction of the fold 6 from the bottom 5 of the collapsible packaging 1 and the extensions of the main walls 2a, 2b and the side walls 3a, 3b.

[0046] The diagonal roof bending lines 16a, 16b, 16c, 16d, which are the inward bending lines of the collapsible packaging 1, run along the diagonal of the rectangles formed by the main vertical bending lines 11a, 11b, 11c, 11d, the main horizontal bending line 12 from the roof 4 of the collapsible packaging 1, the vertical side-wall bending lines 15a, 15b and the horizontal roof bending line 14.

[0047] In the collapsible packaging 1 on the material sheet 10 the horizontal base bending line 13 is divided into: the first horizontal base bending line 13a, the second horizontal base bending line 13b, the third horizontal base bending line 13c, and the fourth horizontal base bending line 13d.

[0048] The first horizontal base bending line 13a run across the first main wall 2a, the second horizontal base bending line 13b run across the first side wall 3a, the third horizontal base bending line 13c run across the second main wall 2b, and the fourth horizontal base bending line 13d run across the second side wall 3b.

[0049] The vertical side-wall bending lines 15a, 15b between the horizontal roof bending line 14 and the horizontal base bending line 13 are the inward bending lines of the collapsible packaging 1; and between the horizontal base bending line 13 and the main horizontal bending line 12b from the base 5 are the outward bending lines of the collapsible packaging 1; and between the main horizontal bending line 12b from the base 5 and the horizontal bottom bending line 18 are the inward bending lines of the collapsible packaging 1. The first horizontal base bending line 13a and the third horizontal base bending line 13c, both running along the main walls 2a, 2b of the collapsible packaging 1, are the inward bending lines of the collapsible packaging 1; and the second horizontal base bending line 13b and the fourth horizontal base bending line 13d, both running along the side walls 3a, 3b of the collapsible packaging 1, are the outward bending lines of the collapsible packaging 1. The vertical bending side-wall bending lines 15a, 15b, between the main horizontal bending line 12b from the base 5 and the horizontal bottom bending line 18 are the inward bending lines of the collapsible packaging 1.

[0050] As shown in Fig. 1, the diagonal base bending lines 17a, 17b, 17c, 17d, 17e, 17f, 17g, 17h running along the diagonal of the rectangles formed by the main vertical bending lines 11a, 11b, 11c, 11d, the main horizontal bending line 12a from the base 5 of the collapsible packaging 1, the straight line, on which the horizontal base bending line 13 is situated, the edge of the sheet 10 from the base 5 and the axis made by the vertical side-wall bending lines 15a, 15b in such a way that they meet at the intersection of the main vertical bending lines 11a, 11b, 11c, 11d of the collapsible packaging 1 and the main horizontal bending line 12b from the base 5, and on the axes made by the vertical side-wall bending lines 15a, 15b.

[0051] The bending lines shown in Fig. 1 are the basis to make the collapsible packaging 1 according to the principles of the invention; however, some modifications to the template of the sheet 10 itself are possible without departure from the essence of the invention. And, as shown in Fig. 2, in the sheet 10 one can make the recesses that run, in principle, in the base 5 on the extensions of the side walls 3a, 3b and basically run along the main vertical bending lines 11a, 11b, 11c, 11d and along the diagonal bottom bending lines 17a, 17b, 17e, 17f from the outside of the sheet 10 of the collapsible packaging 1. Implementation of the above-mentioned recesses involves removing the unnecessary portions of the material, and as a result, on the junction areas of the collapsible packaging 1 one can find a smaller number of layers of combined material that are overlapping, which is advantageous for use the collapsible packaging 1.

[0052] The collapsible packaging 1 is formed from a sheet of material 10 during a more or less complex process of bending the sheet 10 and its joint, but the process is not the subject of the invention.

[0053] In Fig.3, Fig. 4 and Fig. 5, which shows the collapsible packaging 1 in several views, one can see the above-mentioned bending lines. Fig. 3 shows the collapsible packaging 1 from the side perspective view and shows the first main wall 2a and the first side wall 3a. Both walls are joined by the edge, which is the first main vertical bending line 11a. This first main vertical bending line 12a run along the main wall 2a and the side wall 3a, the latter being connected with the former, also in the section where the main wall 2a and the side wall 3a evolve into the section that constitutes the base 5. The other main vertical bending lines: the second 12b, the third 12c and the fourth 12d run, analogically, relative to the associated walls. Fig. 4 shows the collapsible packaging 1 in the perspective view from the side and from below, and shows the second main wall 2b and the second side wall 3b as well as the roof 4 from the side that does not have the opening 7. The side wall 3b and the main wall 2b are joined with the edge, which constitutes the third main vertical bending line 11c.

[0054] In the embodiment shown in Fig. 3, Fig. 4, Fig. 5 and Fig. 6 the collapsible packaging is provided with the outlet pipe 71, which is located at the point where the opening 7 is made in the sheet 10. The outlet pipe 71 is provided with the non-return valve 9 being the one-way valve and enabling the contents of the collapsible packaging 1 escape to the outside under the influence of an external force applied to the collapsible packaging 1, and in particular to its main walls 2a and 2b. However, after removal of the external forces the non-return valve 9 prevents the air from coming inside the collapsible packaging 1 and the collapsible packaging 1 remains in the compressed position. This position is all the more compressed the less the content remains in the collapsible packaging 1.

[0055] In the extreme case, when the collapsible packaging 1 is completely or almost completely empty of con-

tents, the main walls 2a and 2b are adjacent to each other, through side walls 3a and 3b, with the surfaces located inside the collapsible packaging 1.

[0056] The base 5 together with the extensions of the main walls 2a and 2b provides a stable support for the collapsible packaging 1 to facilitate its storage in vertical position. As the collapsible packaging 1 becomes empty, the base 5 is transformed into a bipod, which as a stable support eases the use of the collapsible packaging 1.

[0057] The non-return valves 9 used in the collapsible packaging 1 may have, of course, various design, and only by way of example preferred embodiments of this aspect of the invention have been shown here.

[0058] As shown in Fig. 7 and Fig. 8, it is possible to place the non-return valve 9 of the flap type in the outlet pipe 71 embedded in the sheet 10, in the opening 7 of the collapsible packaging 1. The flap or flaps of the non-return valve 9 remain in the closed position, if inside the collapsible packaging 1 the pressure is not greater than or close to the external pressure. In this situation, the interior of the collapsible packaging 1 contains only the stored product without the air content of the atmosphere. Exerting pressure on the main walls 2a and 2b of the collapsible packaging 1, preferably combined with tilting of the collapsible packaging, causes deflection of the flaps of the non-return valves 9 and the release of the contents.

[0059] The non-return valve 9 may be provided with a plate flap or flaps 91, which in the closed position, lean against the protrusions 92 disposed in the outlet pipe 71. The interaction between the plate flaps 91 and the protrusions 92 ensure a tight seal of the non-return valve 9.

[0060] The non-return valve 9 may be provided with a lip flap or flaps 93, which in the closed position lean against the inner wall of the outlet pipe 71. The interaction between the lip flaps 91 and the wall of the outlet pipe 71 provides a tight seal of the non-return valve 9.

[0061] A very important feature of the submitted solution of the collapsible packaging 1 according to the invention, is to protect the interior against air, which contributes to multiplying extension of the expiry date of the products contained in the collapsible packaging 1 after opening.

[0062] Another, not less important feature of the submitted solution of the collapsible packaging 1 according to the invention is to reduce the volume of the collapsible packaging to the state when the collapsible packaging becomes flat after completely emptying the contents and it remains in this position. Such a reduction in the volume of the collapsible packaging 1 radically reduces the problems with the utilization or transferring to recycle the collapsible packaging 1, when its contents have been used.

55 Claims

1. The rectangular-based collapsible packaging, made from one sheet of material that is bent and joint at

several points through folds placed on at least three edges of the sheet of material, and the collapsible packaging has two main walls and two side walls joined to the main walls in such a way that they form the main body of the collapsible packaging that is, in principle, rectangular in section and matches the shape of the base; and the main walls and the side walls are joined to the bottom that constitutes the base, as well as with the upper part that constitutes the roof, which is triangular in axial section through the side walls. and the sheet of material is a flat template, with its height running along the main walls and its width running across the main walls, and has the following:

- four main vertical bending lines, which run vertically along the main walls and the side walls of the collapsible packaging;
- two main horizontal bending lines, which run across the main walls and the side walls of the collapsible packaging in such a way that the first main horizontal bending line runs through the point where the roof of the collapsible packaging begins and the second main horizontal bending line runs through the point where the base of the collapsible packaging begins;
- the horizontal base bending line passing between the main horizontal bending lines from the longitudinal axis of the first side wall to the longitudinal axis of the second side wall;
- horizontal roof bending line closing the roof from the top of the collapsible packaging;
- two vertical side-wall bending lines running vertically along the axis of symmetry of the side walls from the horizontal base bending line to the horizontal roof bending line;
- diagonal roof bending lines, which are the inward bending lines of the collapsible packaging and run along the diagonal of the rectangles formed by the main vertical bending lines, the main horizontal bending line from the roof of the collapsible packaging, the horizontal roof bending line and the vertical side-wall bending lines in such a way that they meet at the top of the roof of the collapsible packaging;
- diagonal base bending lines running along the diagonal of the rectangles formed by the main vertical bending lines, the main horizontal bending line from the base of the collapsible packaging, the straight line, on which the horizontal base bending line is situated, the line going through the centre of the bottom and the axis made by the vertical side-wall bending lines, in such a way that they meet at the intersection of the main vertical bending lines of the collapsible packaging and the main horizontal bending line from the base, and on the axes made by the vertical side-wall bending lines.

characterized in that:

the vertical side-wall bending lines 15a, 15b run throughout the whole height of the sheet 10 of the collapsible packaging 1, and the horizontal base bending line 13 run throughout the whole width of the sheet 10 of the collapsible packaging 1, and the sheet material 10 has the bottom bending line 18, which is the inward bending line of the collapsible packaging 1, made at the junction of the fold 6 from the bottom 5 of the collapsible packaging 1 and the extensions of the main walls 2a, 2b and the side walls 3a, 3b.

2. The collapsible packaging according to claim 1 **characterized in that** the horizontal base bending line 13 is divided into: the first horizontal base bending line 13a running across the first main wall 2a, the second horizontal base bending line 13b running across the first side wall 3a, the third horizontal base bending line 13c running across the second main wall 2b, and the fourth horizontal base bending line 13d running across the second side wall 3b; and the vertical side-wall bending lines 15a, 15b between the horizontal roof bending line 14 and the horizontal base bending line 13 are the inward bending lines of the collapsible packaging 1; and, between the horizontal base bending line 13 and the main horizontal bending line 12b from the base 5, are the outward bending lines of the collapsible packaging 1; and, between the main horizontal bending line 12b from the base 5 and the horizontal bottom bending line 18 are the inward bending lines of the packaging; and the first horizontal base bending line 13a and the third horizontal base bending line 13c, both running along the main walls 2a, 2b of the collapsible packaging 1, are the inward bending lines of the collapsible packaging 1; and the second horizontal base bending line 13b and the fourth horizontal base bending line 13d, both running along the side walls 3a, 3b of the packaging, are the outward bending lines of the collapsible packaging 1.
3. The collapsible packaging according to claim 1 **characterized in that** in the sheet 10 of the collapsible packaging 1, in the base 5, on the extensions of the side walls 3a and 3b, one can find the recesses running, in principle, along the main vertical bending lines 11a, 11b, 11c, 11d and along the diagonal base bending lines 17a, 17b, 17c, 17d from the outwards of the sheet 10 of the collapsible packaging 1.
4. The collapsible packaging according to claim 1 **characterized in that** in the sheet 10, in one of the walls of the roof 4 of the collapsible packaging 1, one can find the opening 7, in which the outlet pipe 71 is planted in the collapsible

- 5. The collapsible packaging according to claim 4 **characterized in that** the outlet pipe 71 is supplied with the cap 8.
- 6. The collapsible packaging according to claim 4 **characterized in that** the outlet pipe 71 is supplied with the non-return valve 9. 5
- 7. The collapsible packaging according to claim 6 **characterized in that** the non-return valve 9, with which the outlet pipe 71 is supplied, is placed in the cap 8. 10
- 8. The collapsible packaging according to claim 5 or Claim 7 **characterized in that** the cap 8 is supplied with the closure top 81. 15
- 9. The collapsible packaging according to claim 6 or Claim 7 **characterized in that** the non-return valve 9 is a plate valve. 20
- 10. The collapsible packaging according to claim 6 or Claim 7 **characterized in that** the non-return valve 9 is supplied with the plate flap 91, which, in the closed position of the non-return valve 9, leans on the protrusions 92 in the outlet pipe 71. 25
- 11. The collapsible packaging according to claim 6 or Claim 7 **characterized in that** the non-return valve 9 is supplied with the lip flap 93, which, in the closed position of the non-return valve 9, leans on the inside walls of the outlet pipe 71. 30

35

40

45

50

55

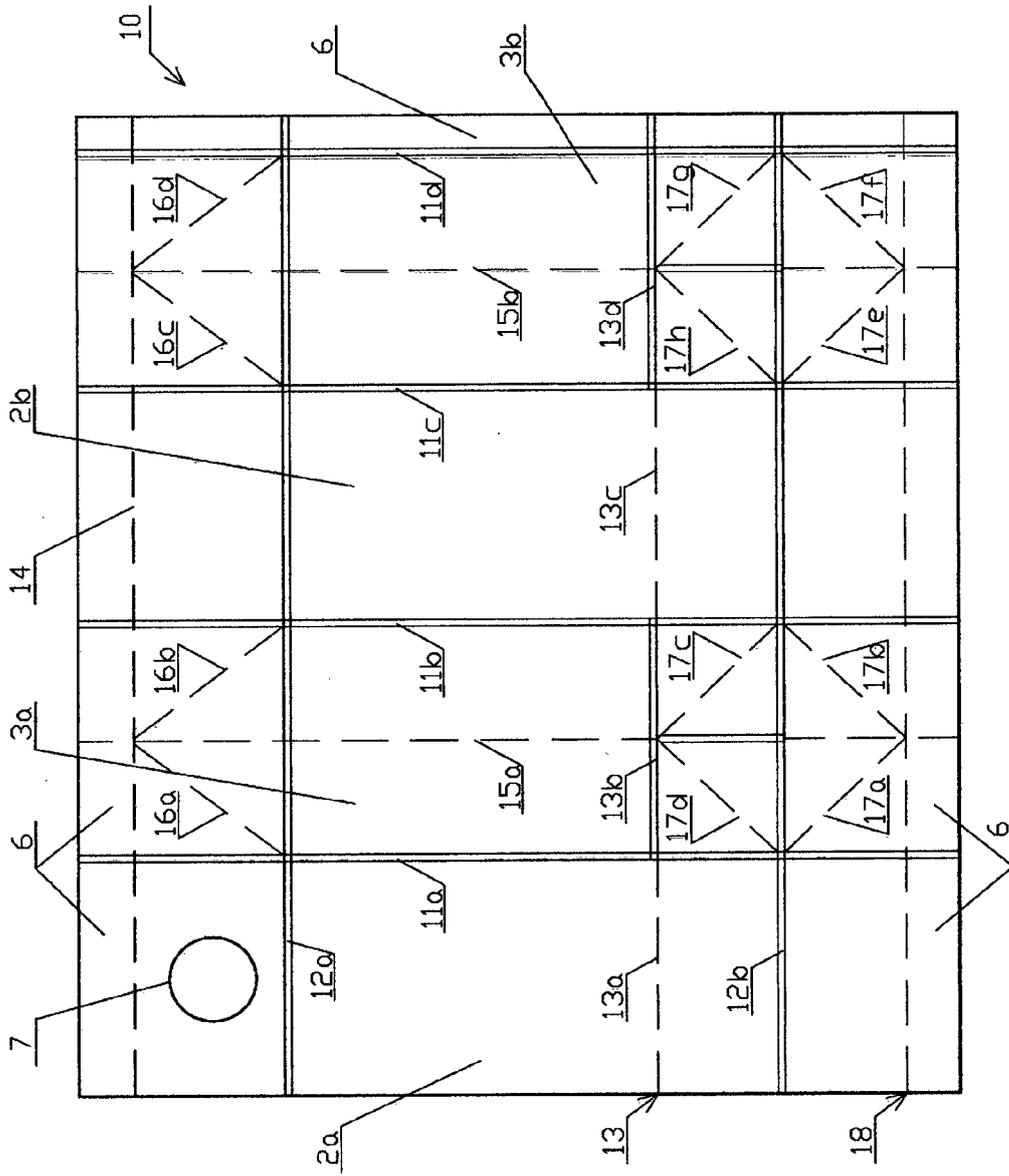


Fig. 1

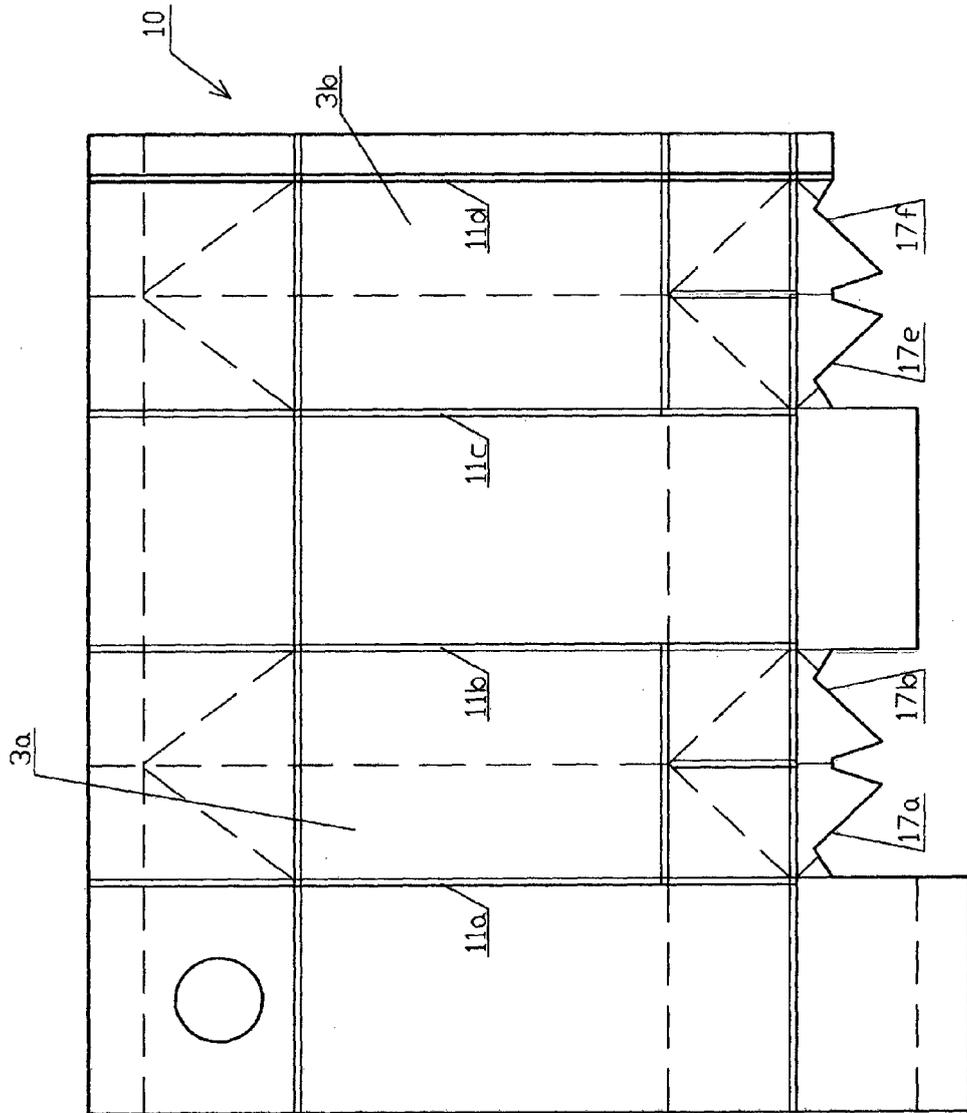


Fig. 2

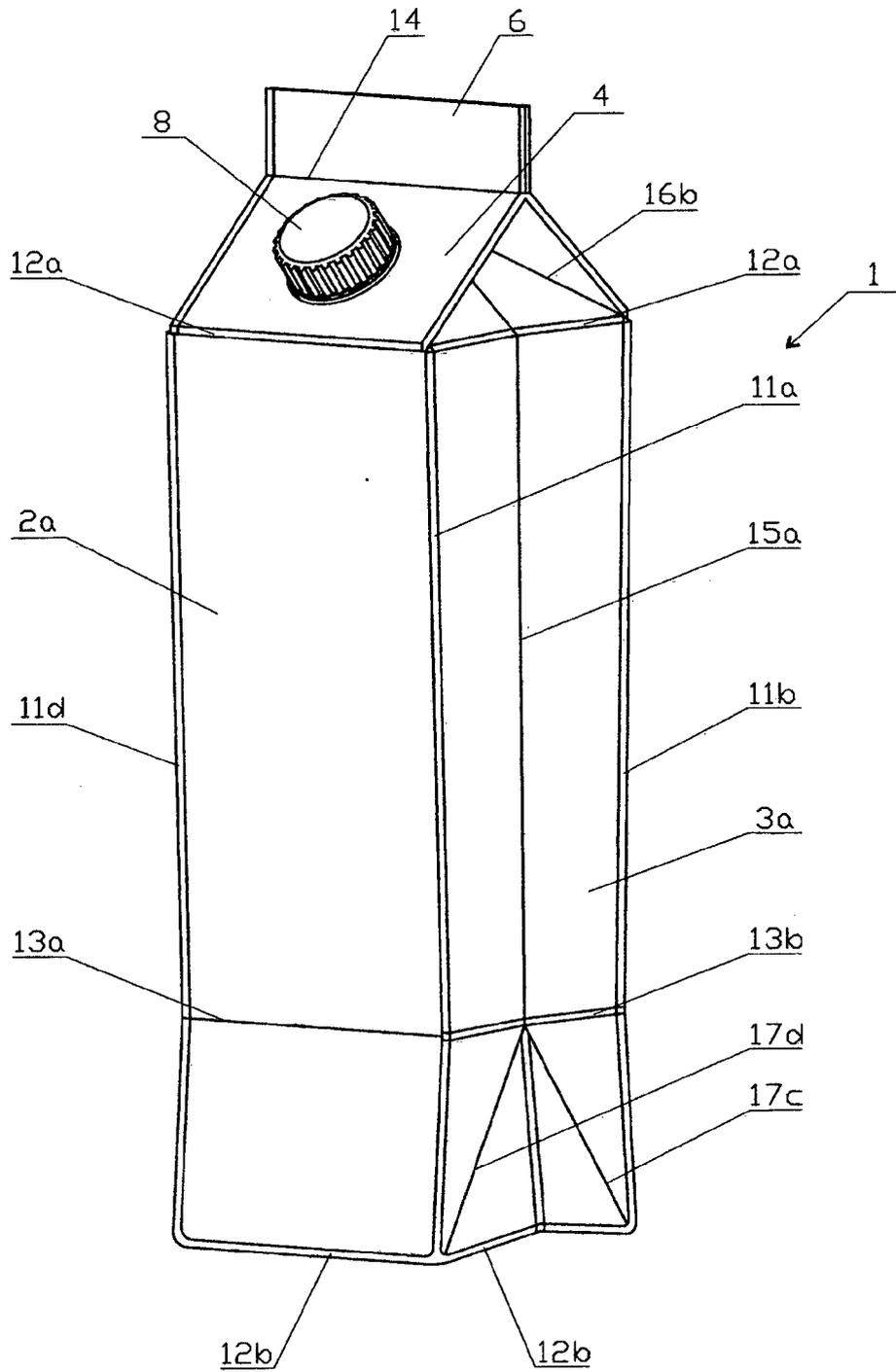


Fig. 3

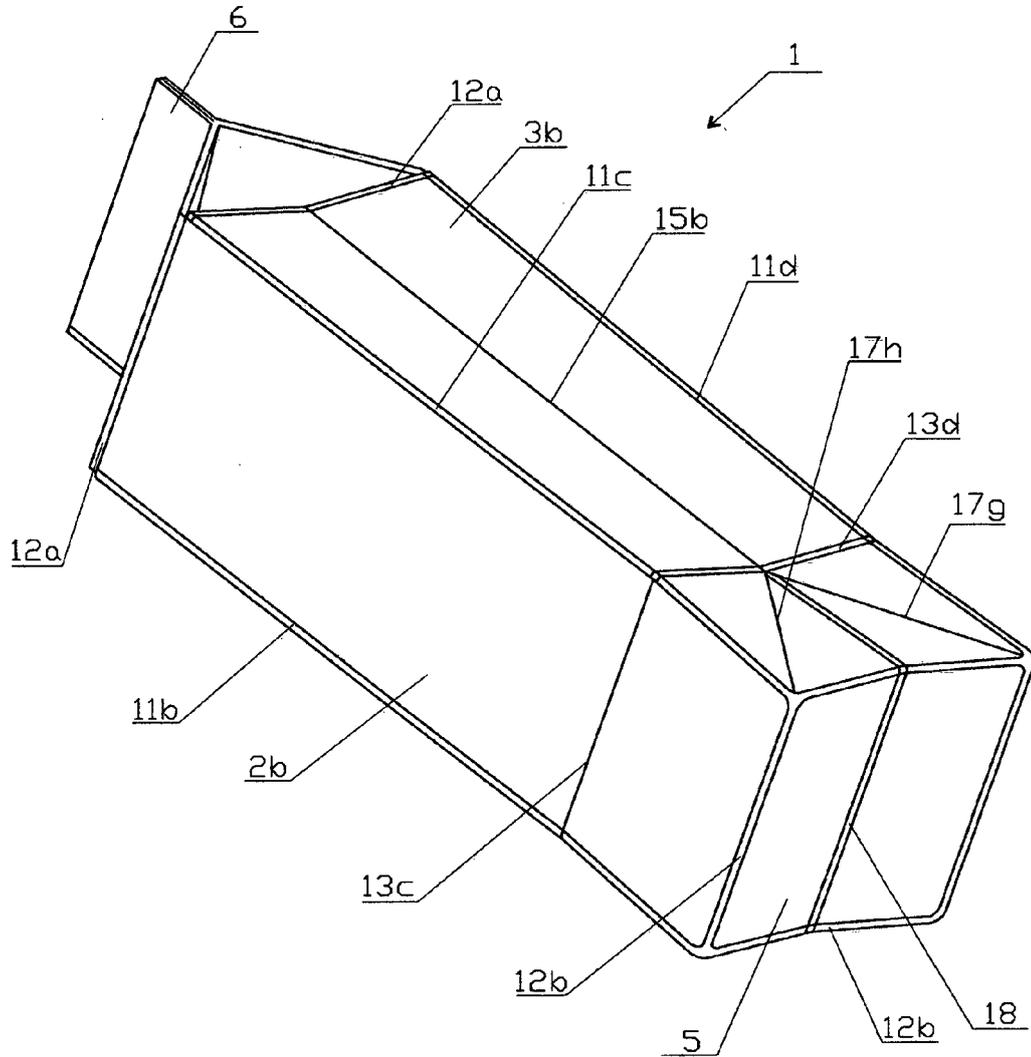


Fig. 4

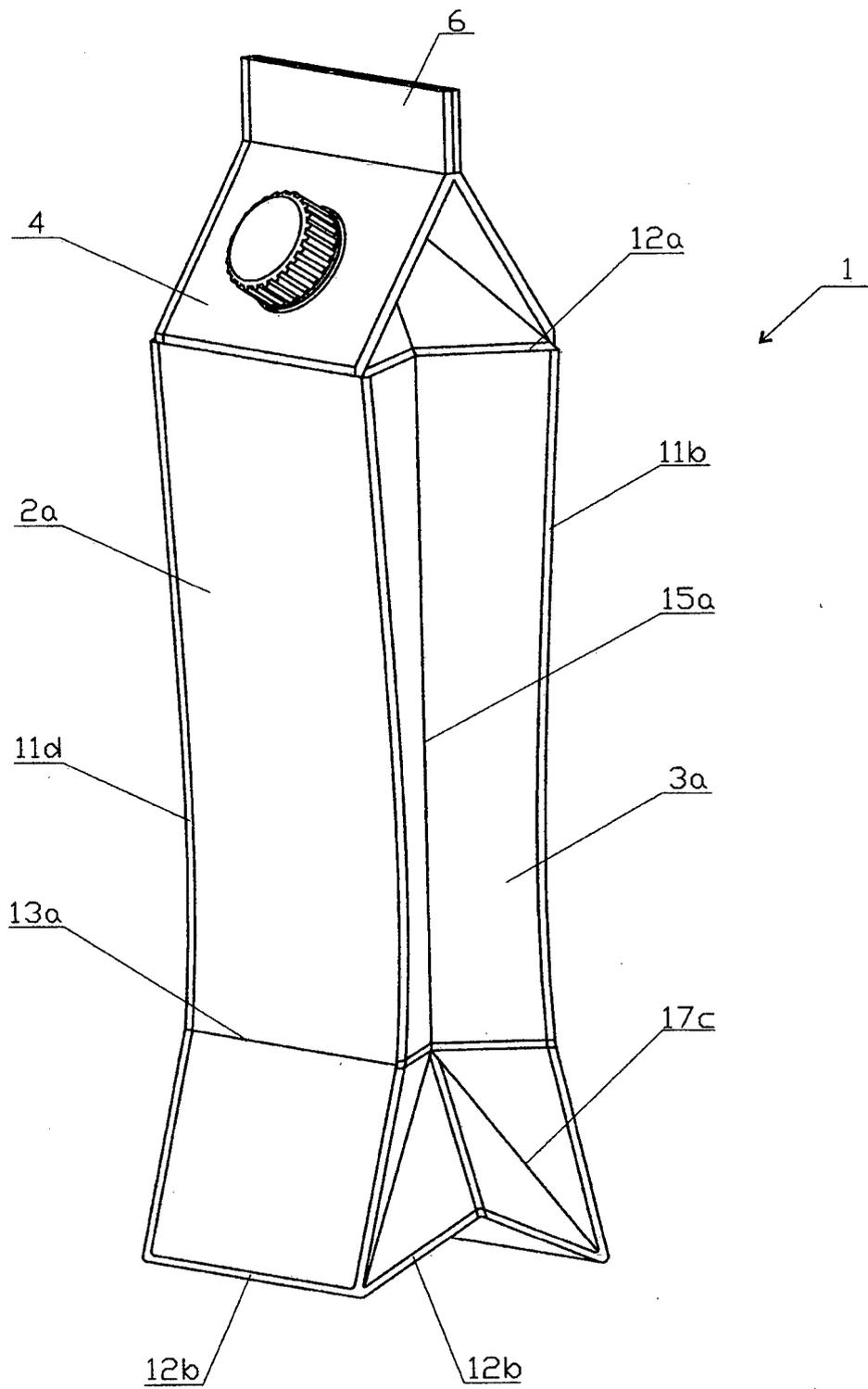


Fig. 5

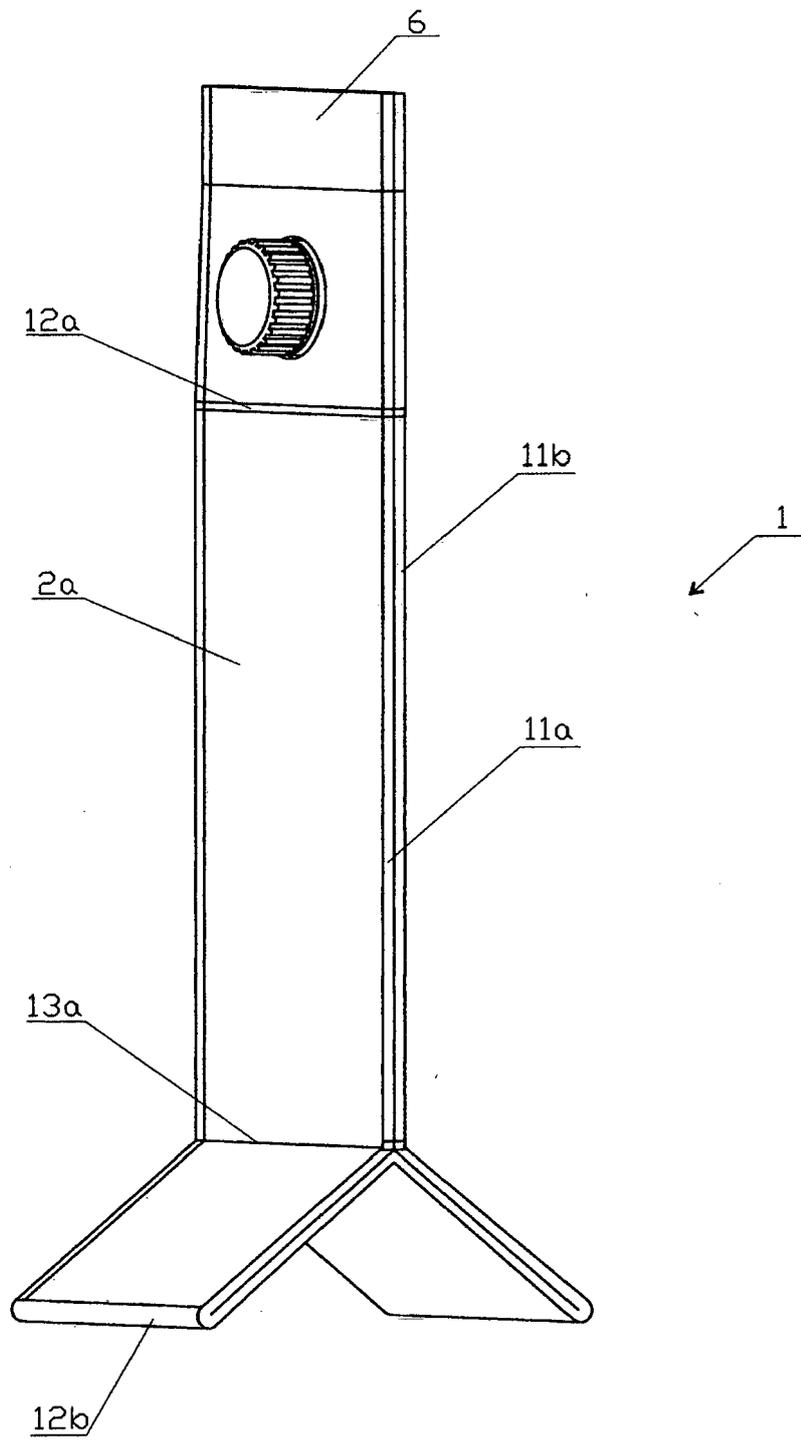


Fig. 6

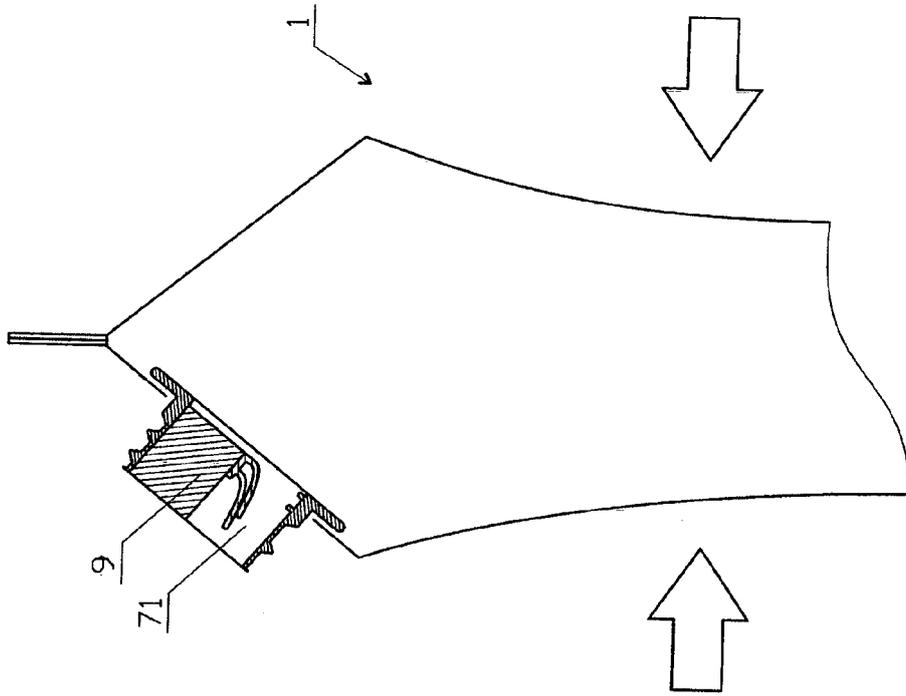


Fig. 8

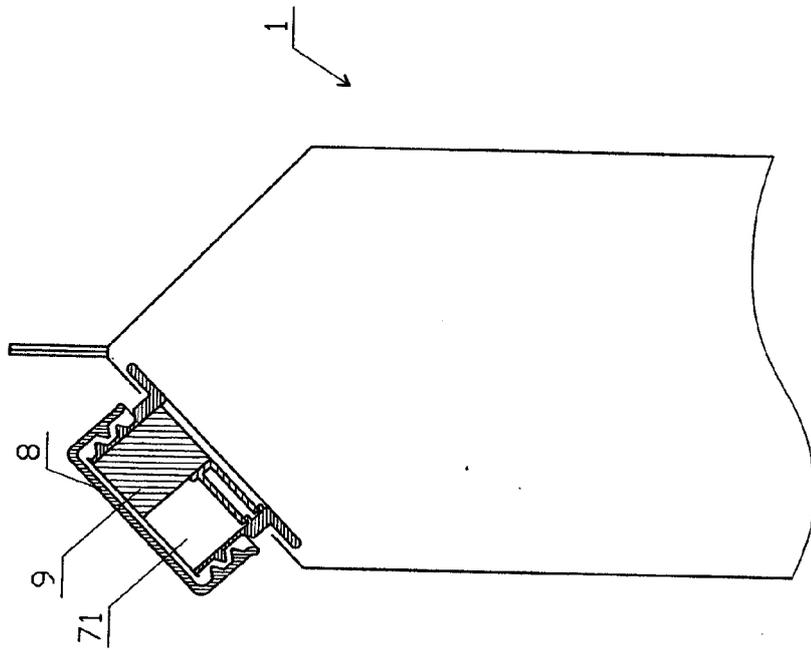


Fig. 7

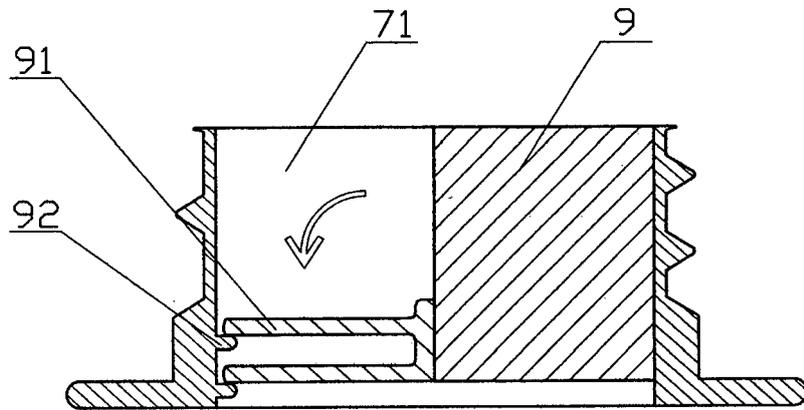


Fig. 9

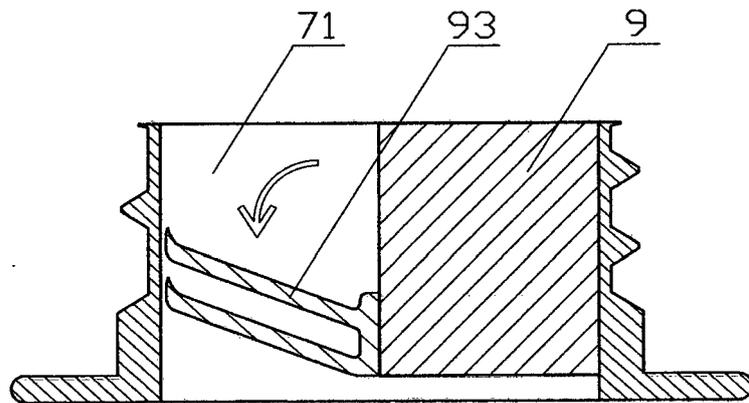


Fig. 10

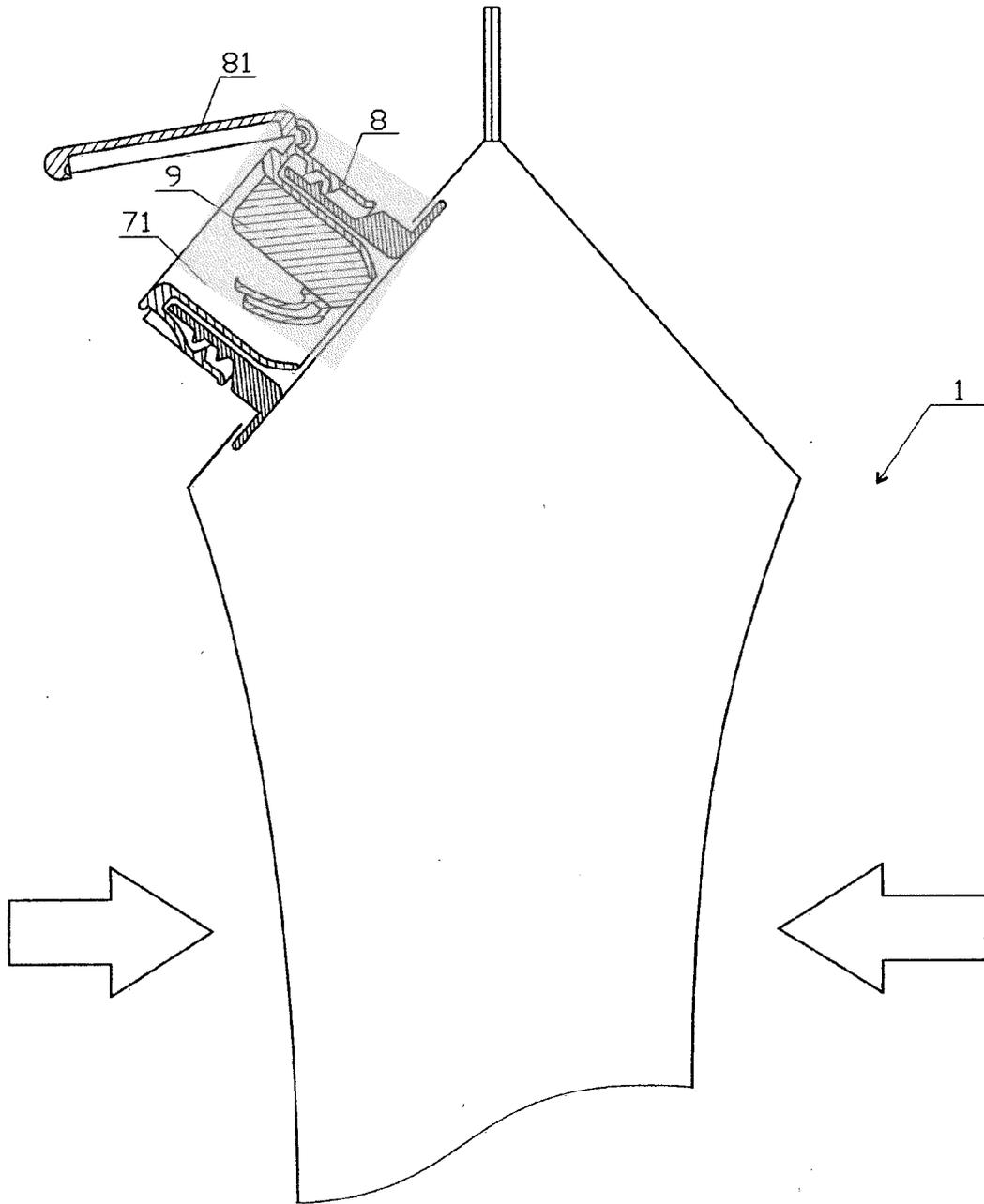


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 14 46 0052

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2010/133329 A1 (DICKIE ROBERT G [CA]) 3 June 2010 (2010-06-03) * abstract; figures 1-10 * -----	1-11	INV. B65D5/06 B65D47/20
A	GB 2 452 727 A (ECONIX LTD [GB]) 18 March 2009 (2009-03-18) * abstract; figures 1-3, 11 * -----	1-11	
A	EP 0 524 854 A1 (OREAL [FR]) 27 January 1993 (1993-01-27) * abstract; figures 1,2 * -----	6-11	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
Place of search		Date of completion of the search	Examiner
Munich		30 January 2015	Visentin, Mauro
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 46 0052

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-01-2015

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010133329 A1	03-06-2010	CA 2686610 A1	01-06-2010
		US 2010133329 A1	03-06-2010

GB 2452727 A	18-03-2009	NONE	

EP 0524854 A1	27-01-1993	CA 2073834 A1	26-01-1993
		DE 69202833 D1	13-07-1995
		DE 69202833 T2	14-03-1996
		EP 0524854 A1	27-01-1993
		ES 2073256 T3	01-08-1995
		FR 2679620 A1	29-01-1993
		JP H05246452 A	24-09-1993
		US 5271432 A	21-12-1993

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 3366308 A [0005] [0011] [0014]
- WO 2005102848 A [0014]
- US 4094458 A [0015]
- PL 198329 [0016]
- US 6578740 B [0018]