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(71) Applicant: **Hokuriku Package Co., LTD.**
Fukui-shi, Fukui-ken (JP)

(72) Inventor: **Onishi, Susumu,**
Hokuriku Package Co., Ltd.
Fukui-shi, Fukui-ken (JP)

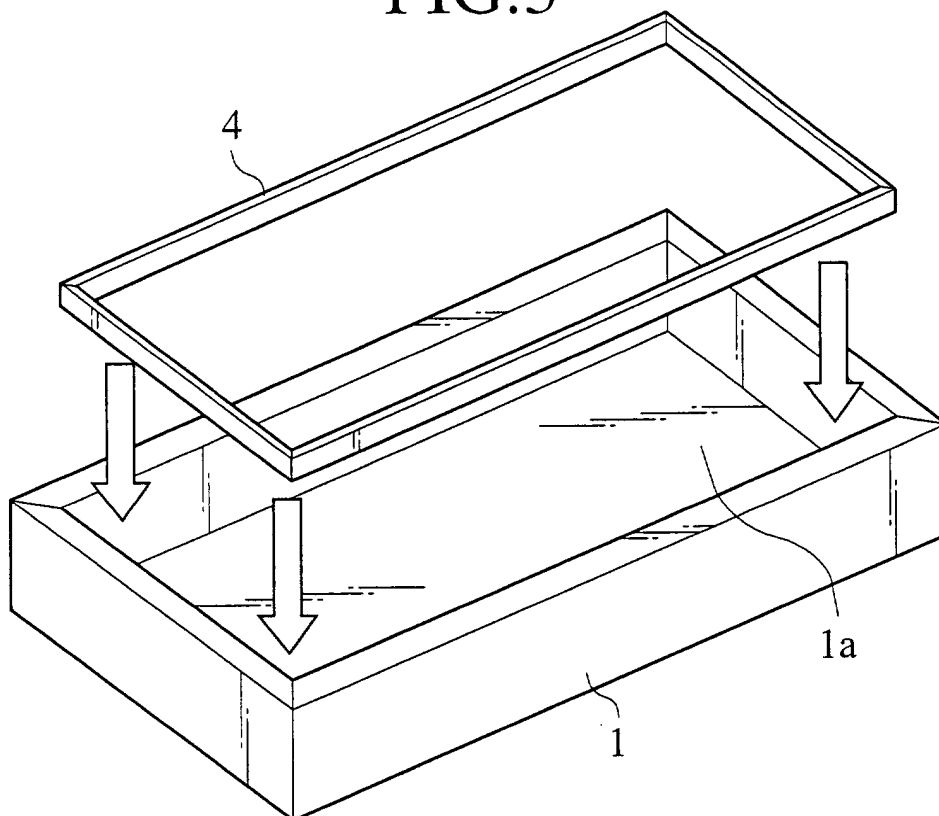
(74) Representative:
**Grünecker, Kinkeldey, Stockmair &
Schwanhäusser Anwaltssozietät**
Maximilianstrasse 58
80538 München (DE)

(54) **Heat insulating cardboard container and blank for constructing the same**

(57) A paper box is provided which includes an outer box (1), an inner box (3) and an upper lid (2). The outer box, inner box and the upper lid are doubly structured. The inner box is fitted into the outer box and the upper

lid is fitted onto the inner box. The paper for the boxes may be surface treated corrugated cardboard or made from paper materials that do not leak water without the surface treatment. The papers may be cut into a specified form and folded to form the box.

FIG.3



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to heat and cold retaining paper boxes made of corrugated cardboard and the like.

Prior art

[0002] Up to now, expanded or foamed polystyrene (styrene) has been used widely for boxes with heat and cold retaining properties. These boxes have been conveniently used for carrying frozen food, perishable food, hot food and the like. As styrene boxes are strong and also durable, styrene boxes of various size and forms have also been used widely for boxes that do not require heat and cold retaining properties.

[0003] Now recycling has become a necessity as one method for resolving environmental and resource problems that have attracted attention in recent years. For recycling styrene boxes, special equipment will be required which impose a heavy burden on small and medium-size enterprises that have manufactured the styrene boxes. The generation of dioxin when incinerating styrene imposes another big problem. Also storage and transportation of styrene boxes are costly as they are molded products that are bulky.

[0004] As described above, there are a variety of problems in styrene boxes.

SUMMARY OF THE INVENTION

[0005] The object of the present invention is to provide paper boxes which may be readily recycled and possess heat retaining and cold retaining qualities.

[0006] The box of the present invention is preferably constituted by an outer box, an inner box and an upper lid. Each box is preferably manufactured by folding a thick paper, such as corrugated cardboard.

[0007] It is preferable to have the above-mentioned outer box, inner box and the upper lid to be doubly structured, the inner box fitted into the outer box and the upper lid fitted onto the inner box. As the outer box, the inner box and also the upper lid are doubly structured, they are strong and the spaces formed between the components provide heat insulation.

[0008] In case the bottom of the outer box is single layered, it is preferable to provide a spacer between the outer box and the inner box when setting the inner box into the outer box.

[0009] Single or several layers of paper sheets formed to fit into the bottom of the box may also be placed in between the spacer and the inner box.

[0010] Although paper is the preferred material for the box of the present invention, there is no limitation to the

paper species used.

[0011] However as non-leakage of water is a feature of the box of the present invention, it is preferable to use surface treated paper. Of course paper materials may be used which do not leak water without surface treatment. The papers may be cut into a specified form and folded to form the box.

[0012] It is preferable that the box (in particular the inner box) of the present invention be structured so that, as in styrene boxes, no water leakage occurs. To this end, it is preferable to use materials that do not leak water or surface treated materials. Also it is preferable that the cut sheet of paper has the shape which, when folded, does not form a crevice from which water may leak. In more detail, it is preferable for the box to have corner pieces formed continuously between the sidewalls.

[0013] Other features of the present invention are as follows.

[0014] Firstly a thick paper for the boxes of this invention has a rectangular or square base plane or base plane section. On one pair of opposite sides on the base plane, there is a pair of the first outer side planes which are formed by a folding line. On the other pair of opposite sides of the base plane, there is a pair of the second outer side planes which are formed by a folding line. In between the first and second outer side planes, corner pieces 14 are provided by folding lines and these corner pieces are provided with central folding lines which preferably make a 45 degree angle with the outer side and corner side folding lines.

[0015] The thick paper for the paper box preferably has, on a pair of sides which face each other on the base plane, the first outer side plane, the first upper side plane and the first inner side plane which are formed continuously with folding lines and the first outer side plane, the first upper side plane, the first inner side plane are mutually connected by folding lines so as to construct a double layered structure box side part with space in between. It is desirable to have on the other sides which face each other in the base plane, a second outer side plane, a second upper side plane and a second inner side plane which are formed continuously with folding lines and the second outer plane, the second upper plane and the second inner plane be mutually connected via the folding line to form a double layered structure with space in between.

[0016] The other feature of this invention is a method of manufacturing paper boxes using the thick paper. The method preferably includes a step in which the pair of the first outer side planes are bent inwards, a step in which the corner side is folded into two by bending along the central folding line, a step in which a pair of the second outer side planes are bent inwards, and a step in which the folded corner side is bent towards the first outer side or the second outer side plane.

[0017] In the foregoing process, it is preferable to have a step where the pair of the first outer side planes, the first upper side planes and the first inner side planes

are bent inwards, respectively, so as to form a doubly structured box side with space in between, and a step where the pair of second outer side planes, the second upper side planes and the second inner side planes folded inwards, respectively, so as to form a doubly structured box side with space in between, and a step in which the corner pieces are folded inwards at the central folding line of the corner pieces.

[0018] Another feature of the present invention is a box manufactured by the foregoing process.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Fig. 1 is a perspective view of an embodiment of the present invention.

Fig. 2 is a exploded schematic view of the present invention with the outer box, the inner box and the lid separated.

Fig. 3 is a schematic view showing the spacer set on the bottom of the outer box.

Fig. 4 is a schematic view showing the paper pieces inserted into the bottom of the outer box.

Fig. 5 is a plan view of the thick paper such as corrugated paper that constitutes the outer box unfolded.

Fig. 6 is a schematic view illustrating the procedure for assembling the outer box.

Fig. 7 is a plan view of the thick paper that constitutes the upper lid unfolded.

Fig. 8 is a plan view of the thick paper that constitutes the inner box unfolded.

Fig. 9 is a schematic view illustrating the procedure for assembling the inner box.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] In the following, an embodiment of the present invention is described in detail with reference to the figures.

[0021] Fig. 1 shows an embodiment of the present invention. As shown in Fig. 1, the box has an outer box 1 and an upper lid 2.

[0022] An inner box 3 is set inside the outer box 1 as shown in Fig. 2. The outer box 1, the upper lid 2 and the inner box 3 may be made of corrugated cardboard. Fig. 2 shows the outer box 1, the upper lid 2 and the inner box in a separated state before assemblage. When the inner box is set inside the outer box 12, the upper edge

of the inner box 3 will protrude above the outer box 1. The upper lid 2 fits into this protrusion of the inner box 3.

[0023] Fig. 3 shows a spacer 4 that is set in between the outer box and the inner box 3. As shown in Fig. 3, the inner box 3 is inserted into the outer box 1 with the spacer 4 set on the bottom 1a of the outer box 1. Consequently, space will be formed between the bottom of the outer box 1 and the inner box 3 and flow of heat through the bottom 1a of the outer box will be suppressed by this space.

[0024] Fig. 4 shows a variation in which paper pieces 5 that fit into the bottom 1a of the outer box 1 are set in place of spacer 4 in between the outer box 1 and the inner box 3. In this case, the inner box 3 is inserted after the paper pieces 5 are set. Although the space between boxes 1 and 3 made by the paper pieces 5 will not be large, heat insulation will be sufficient. Also in this case, the strength of the bottom of the box will be reinforced.

[0025] The outer box 1, inner box 3 and the lid 2 may be made respectively, by folding a thick paper, as will be described in detail below. The thick paper may be a corrugated cardboard cut in a prescribed form.

[0026] Fig. 5 shows a thick paper for making the outer box.

[0027] As shown in Fig. 5, the thick paper for paper box 1 generally includes a rectangular or square base plane 6 having a first pair of opposite sides 6a facing each other along a first axis X and a second pair of opposite sides 6b facing each other along a second axis Y that is perpendicular to the first axis; pair of the first outer side planes 7 each of which is formed on each of the first pair of opposite sides 6a by a folding line; a pair of the second outer side planes 11 each of which is formed on each of the second pair of opposite sides 6b by a folding line; and corner pieces 14 provided in between the first and second outer side planes 7, 11 by folding lines 10g, 10h, the corner pieces 14 being provided with central folding lines 10i.

[0028] Specifically, the thick paper includes the first outer side plane 7, a first upper side plane 8 and a first inner side plane 9 which are formed continuously with folding lines on the first pair of sides 6a which face each other on the base plane 6, the first outer side plane, the first upper side plane, the first inner side plane being mutually connected by folding lines so as to construct a double layered structure box side with space in between; the second outer side plane 11, a second upper side plane 12 and a second inner side plane 13 which are formed continuously with folding lines on the other sides 6b which face each other in the base plane 6, the second outer plane, the second upper plane and the second inner plane being mutually connected via the folding line to form a double layered structure with space in between.

[0029] More specifically, the thick paper for the outer box 1 has a structure as follows.

[0030] As shown in Fig 5, on the long sides 6a of the rectangular base plane 6, the outer side plane 7, the up-

per side plane 8 and the inner side plane 9 are formed continuously demarcated by the folding lines 10a, 10b and 10c, respectively. Similarly on the short sides 6b of the base plane 6, the outer side plane 11, the upper side plane 12 and also the inner side plane 13 are formed demarcated by the folding lines 10d, 10e and 10f, respectively.

[0031] In between the outer side plane 7 and the other outer side plane 11, approximately square corner pieces 14 are formed continuously bounded by the folding lines 10g and 10h. A central folding line 10i is formed on these corner pieces 14 to fold the corner pieces 14 into two when forming the outer box. The corner pieces 14 therefore consist of two parts 14a and 14b. The folding line 10i makes an angle of 45 degrees with the folding lines 10g, 10h of the outer side planes 7, 11.

[0032] On both ends of the inner side plane 9, connecting pieces 15a, 15b are formed and on these connecting pieces 15a, 15b, slit grooves 16, 16 are cut in.

[0033] Figs. 6A and 6B show the process of forming the outer box 1 by folding the thick paper shown in Fig. 5 along the folding lines 10a~10i.

[0034] Firstly the outer side plane 7, the upper side plane 8 and the inner side plane 9 of the long sides 6a are folded along the folding lines 10a~10c to form the sides of the outer box. By providing the upper plane 8, space is formed between the outer side plane 7 and the inner side plane 9.

[0035] After the side planes of the long side are formed, the slit grooves 16, 16 of the connecting pieces 15a, 15a and also the slit grooves of the connecting pieces 15b, 15b on the opposite side are engaged so that the outer side part does not get out of shape. By this process, the side parts 7, 9 of the long sides will stand up perpendicular to the base plane 6.

[0036] As shown in Fig. 6B, the outer side plane 11, the upper side plane 12 and the inner side plane 13 of the short sides 6b are then folded along the folding lines 10d~10f to assemble the side part.

[0037] With this procedure, a double structured side part with space formed between the outer side plane 11 and the inner side plane 13 will be formed. The double structure between the outer side plane 7 and the inner side plane 9 and also the outer side plane 11 and the inner side plane 13 improves the strength and heat insulation of the outer box 1.

[0038] As shown in Fig. 6B, the corner piece 14 which forms the corner section of the outer side planes 7, 11 is folded towards inside the box along the folding lines 10g, 10h, 10i to form a triangle. The formed triangle is inserted between the outer side plane 11 and the inner side plane 13 of the short side 6b. The outer side plane 7 and the outer side plane 11 are mutually connected by this corner piece 14 with no gaps in between. Therefore leakage of water from the sides of the assembled box will not occur.

[0039] As shown in Fig. 5, on both sides of the distal end of the inner side plane 13, engaging pieces 17 are

formed. Also, engaging grooves 18 are formed at the boundary of the inner side plane 9 and the connecting piece 15. The engaging pieces 17 are plugged into engaging grooves 18 after the outer side plane 11, the upper side plane 12 and the inner side plane 13 are folded.

[0040] The outer box 1 is formed in this manner by folding a thick paper shown in Fig. 5. Although the outer box is assembled without use of fastenings or adhesives, it will not collapse.

[0041] Furthermore as shown in Fig. 5, a concave section 19 is formed at the center of the distal end of the inner side plane 13. Therefore the assembled outer box 1 may be readily disassembled (unfolded) by placing a finger into the concave section 19.

[0042] Fig. 7 shows the unfolded state of the thick paper which constitutes the upper lid 2. As can be seen from Fig. 7, the structure of the upper lid 2 is substantially the same as the outer box 1 with difference only in the height of the side part. Therefore the structure and the assembly of the upper lid 2 will be omitted (the assembly of the upper lid is the same as the outer box shown in Fig. 6).

[0043] Fig. 8 shows the unfolded state of the thick paper (such as corrugated cardboard) which constitutes the inner box 3.

[0044] As shown in Fig. 8, the thick paper for the inner box 3 generally includes a rectangular or square base plane 20 having a first pair of opposite sides 20a facing each other along a first axis X and a second pair of opposite sides 20b facing each other along a second axis Y that is perpendicular to the first axis; pair of the first outer side planes 21 each of which is formed on each of the first pair of opposite sides 20a by a folding line; a pair of the second outer side planes 24 each of which is formed on each of the second pair of opposite sides 20b by a folding line; and corner pieces 26 provided in between the first and second outer side planes by folding lines 10g, 10h, the corner pieces being provided with central folding lines 10i.

[0045] More specifically, the thick paper for the inner box 3 has a structure as follows.

[0046] As shown in Fig. 8, on the long sides 20a of the base plane 20 of the thick paper which constitutes the inner box 3, the inner side plane 21, the upper side plane 22 and the outer side plane 23 are formed continuously with folding lines 10a, b, c provided in between the side planes.

[0047] On the short sides 20b of the base plane 20, the inner side plane 24 and the outer side plane 25 are formed with folding lines 10d, 10f in between. At the boundary of the inner side planes 21, 24, approximately square shaped corner pieces 26 with folding lines 10i are formed by means of folding lines 10g, 10h. The folding line 10i makes an angle of 45 degrees with the folding lines 10g, 10h of the outer side planes 21, 24. Furthermore folding pieces 27, 27 are formed on both sides of the outer side plane 25.

[0048] Figs. 9A and 9B shows the assembly proce-

ture of the inner box 3 by folding the thick paper as described.

[0049] As shown in Fig. 9A, firstly the inner side planes 21 on the long sides are made to stand upright by folding at the folding lines 10a and next the inner side planes 24 on the short sides are also made to stand upright by folding at the folding lines 10d. In this process, the corner piece 26 in between the two inner side planes 21, 24 is folded on the folding lines 10g, 10h and also folded outwards at the middle folding line (the folding line in the middle of the corner piece) 10i to form a triangle.

[0050] Next, as shown in Fig. 9B, the outer side planes 25 on the short sides are folded outwards and the corner piece 26 (formed into a triangle) and the folding piece 27 are folded against the inner side planes 21 on the long sides standing upright.

[0051] Finally the outer side planes 23 on the long sides are folded outwards. Thus the inner box is assembled.

[0052] As mentioned above, corner pieces 26 are formed in between the side parts 21 on the long sides and the side parts 24 on the short sides. Therefore no gaps may be formed in between the inner side planes 21, 24 standing upright and there is thus no problem of water leakage.

[0053] As both side planes are not fixed, the side part of the inner box by itself will collapse but it will be stabilized when set inside the outer box.

[0054] As mentioned above, it is preferable for the box of the embodiment to be made of a combination of the outer box, inner box and the upper lid. However it is possible to use only the outer box. In this case, heat and cold retaining properties will be lost as the upper part is open but it is possible to use it for packaging articles and may be used in place of styrene boxes.

[0055] As explained above, the box of the present invention is manufactured simply by cutting and folding thick papers and as no fastenings or adhesives are used, they may be made easily and at low cost.

[0056] Also an unfolded box may be stored and transported as a sheet of paper. Therefore they conveniently will not take much space in storage and transportation and may be assembled easily for use.

[0057] Also as the sides of the box are double structured, they have high strength and will not be damaged when packed boxes are piled up on each other.

[0058] Moreover, although the box is made of paper, no gaps will be formed on the assembled box side walls and consequently water leakage will not occur. Therefore water leakage from the box may be prevented by use of waterproof thick paper or thick paper made waterproof by surface treatment.

[0059] Moreover, the box of the present invention is composed of an outer box and a removable inner box. Therefore in case the inner box is contaminated or damaged, only the inner box needs to be exchanged.

[0060] Also when the box is to be disposed, it can be

readily disassembled by placing a finger into the concave section 19 formed on the inner sidepiece.

[0061] The paper boxes of this embodiment are preferably used for carrying frozen food, perishable food, hot food and the like.

[0062] The thick papers having the shapes of Figs. 5, 7 and 8 may be prepared by cutting a large or wide sheet of thick paper such as the corrugated cardboard.

Claims

1. A heat and cold retaining paper box manufactured by folding a sheet of a thick paper having a predetermined shape; wherein

the paper box includes an outer box, an inner box, and an upper lid, the inner box being fitted inside the outer box and an upper edge of the inner box protrudes above the outer box 1;
a thick paper for the outer box comprises a rectangular or square base plane,
on a pair of sides of the base plane which face each other in the base plane, the first outer side plane, the first upper side plane and the first inner side plane are formed continuously with folding lines and the first outer side plane, the first upper side plane, the first inner side plane are mutually connected by folding lines so as to construct a double layered structure box side part with space in between, and
on the other sides of the base plane which face each other in the base plane, a second outer side plane, a second upper side plane and a second inner side plane are formed continuously with folding lines and the second outer plane, the second upper plane and the second inner plane are mutually connected via the folding line to form a double layered structure with space in between, and
in between the first and second outer side planes, corner pieces having substantially square shapes are continuously provided via folding lines
on both ends of the first inner side plane, connecting pieces are formed and on these connecting pieces, slit grooves are cut in;
the outer box is manufactured by folding the side planes and corner pieces and engaging slit grooves of the connecting pieces;
a thick paper for the inner box comprises a rectangular or square base plane,
on a pair of sides of the base plane which face each other in the base plane, the first outer side plane and the first inner side plane are formed continuously with folding lines and the first outer side plane and the first inner side plane are mutually connected by folding lines so as to

construct a double layered structure box side part with space in between, and on the other sides of the base plane which face each other in the base plane, a second outer side plane and a second inner side plane are formed continuously with folding lines and the second outer plane and the second inner plane are mutually connected via the folding line to form a double layered structure, and in between the first and second outer side planes, corner pieces having substantially square shapes are continuously provided via folding lines, and folding pieces (27) are formed on both sides of the second outer side planes; the corner piece (26) and the folding piece (27) are folded and placed between the first inner side planes (21) and the first outer side planes (23) when the box is manufactured; a thick paper for the upper lid comprises a rectangular or square base plane, on a pair of sides of the base plane which face each other in the base plane, the first outer side plane, the first upper side plane and the first inner side plane are formed continuously with folding lines and the first outer side plane, the first upper side plane, the first inner side plane are mutually connected by folding lines so as to construct a double layered structure box side part with space in between, and on the other sides of the base plane which face each other in the base plane, a second outer side plane, a second upper side plane and a second inner side plane are formed continuously with folding lines and the second outer plane, the second upper plane and the second inner plane are mutually connected via the folding line to form a double layered structure with space in between, and in between the first and second outer side planes, corner pieces having substantially square shapes are continuously provided via folding lines on both ends of the first inner side plane, connecting pieces are formed and on these connecting pieces, slit grooves are cut in; the upper lid is manufactured by folding the side planes and corner pieces and engaging slit grooves of the connecting pieces.

2. The heat and cold retaining paper box of claim 1, wherein a distal end of the second inner plane of the outer box and upper lid is formed with a concave section (19).
3. The heat and cold retaining paper box of claims 1 or 2, wherein both sides of distal end of the second inner plane of the outer box and upper lid is formed

with engaging pieces (17), and engaging grooves (18) with which the engaging pieces are adapted to engage are formed at the boundary of the first inner side plane (9) and the connecting piece (15).

4. The heat and cold retaining paper box of claims 1, 2 or 3, wherein the thick paper for the box is made of materials that do not leak water or surface treated materials.
5. The heat and cold retaining paper box of claims 1, 2, 3 or 4, wherein a spacer (4) or paper pieces (5) is set in between the outer box and the inner box, and the inner box is detachably fitted in the outer box.
6. A sheet of a thick paper having a predetermined shape, for manufacturing a paper box by folding the thick paper, wherein,

the sheet of paper has a rectangular or square base plane, on a pair of sides of the base plane which face each other in the base plane, the first outer side plane, the first upper side plane and the first inner side plane are formed continuously with folding lines and the first outer side plane, the first upper side plane, the first inner side plane are mutually connected by folding lines so as to construct a double layered structure box side part with space in between, and on the other sides of the base plane which face each other in the base plane, a second outer side plane, a second upper side plane and a second inner side plane are formed continuously with folding lines and the second outer plane, the second upper plane and the second inner plane are mutually connected via the folding line to form a double layered structure with space in between, and in between the first and second outer side planes, corner pieces having substantially square shapes are continuously provided, on both ends of the first inner side plane, connecting pieces are formed and on these connecting pieces, slit grooves are cut in; the box is manufactured by folding the side planes and corner pieces and engaging slit grooves of the connecting pieces.

7. A thick paper for paper box comprising:

a rectangular or square base plane (6, 20) having a first pair of opposite sides and a second pair of opposite sides; a pair of the first outer side planes (7, 21) each of which is formed on each of the first pair of opposite sides by a folding line;

a pair of the second outer side planes (11, 24) each of which is formed on each of the second pair of opposite sides by a folding line; corner pieces (14, 26) provided in between the first and second outer side planes by folding lines (10g, 10h), the corner pieces being provided with central folding lines (10i).

8. The thick paper of claim 7, comprising:

the first outer side plane (7), a first upper side plane (8) and a first inner side plane (9) which are formed continuously with folding lines on the first pair of sides which face each other on the base plane (6), the first outer side plane, the first upper side plane, the first inner side plane being mutually connected by folding lines so as to construct a double layered structure box side with space in between; the second outer side plane, a second upper side plane and a second inner side plane which are formed continuously with folding lines on the other sides which face each other in the base plane, the second outer plane, the second upper plane and the second inner plane being mutually connected via the folding line to form a double layered structure with space in between.

9. A method of manufacturing paper boxes using the thick paper of claim 7 or 8, comprising the steps of:

folding the pair of the first outer side planes and the pair of the second outer side planes relative to the base plane; folding the corner pieces into two along the central folding line; and folding the folded corner pieces towards the first outer side plane or the second outer side plane.

10. The method of claim 9, comprising the steps of:

folding the pair of the first outer side planes, the first upper side planes and the first inner side planes inwards relative to the base plane, so as to form a doubly structured box side with space in between; folding the pair of second outer side planes, the second upper side planes and the second inner side planes inwards, respectively, relative to the base plane so as to form a doubly structured box side with space in between; and folding the corner pieces inwards at the central folding line of the corner pieces.

11. A paper box manufactured by the method of claims 9 or 10.

12. A paper box comprising an outer box, an inner box, and an upper lid, wherein at least one of the outer box and the inner box is manufactured by folding a thick paper of claim 7.

FIG.1

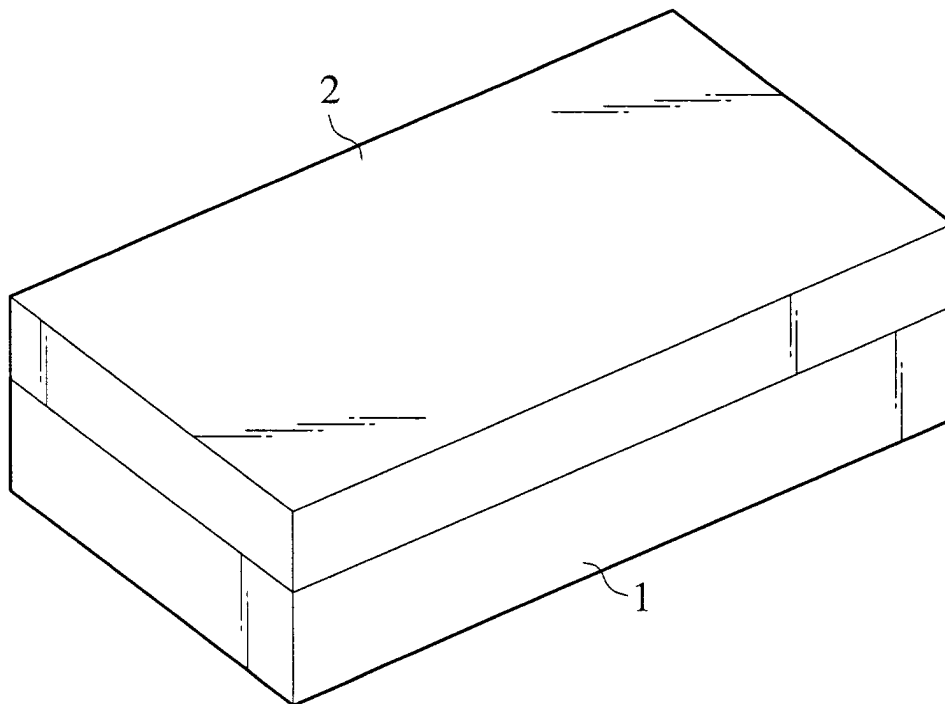


FIG.2

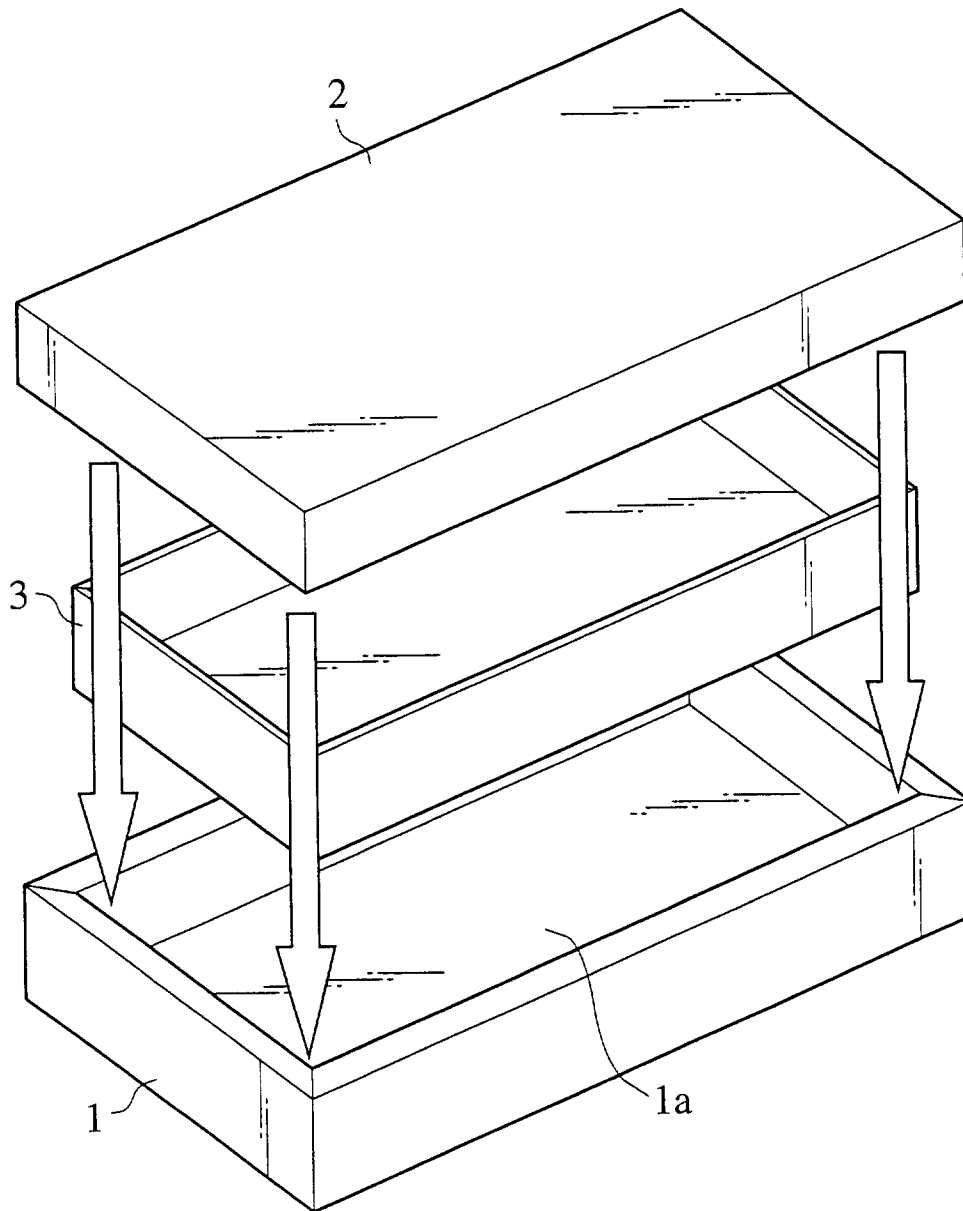


FIG.3

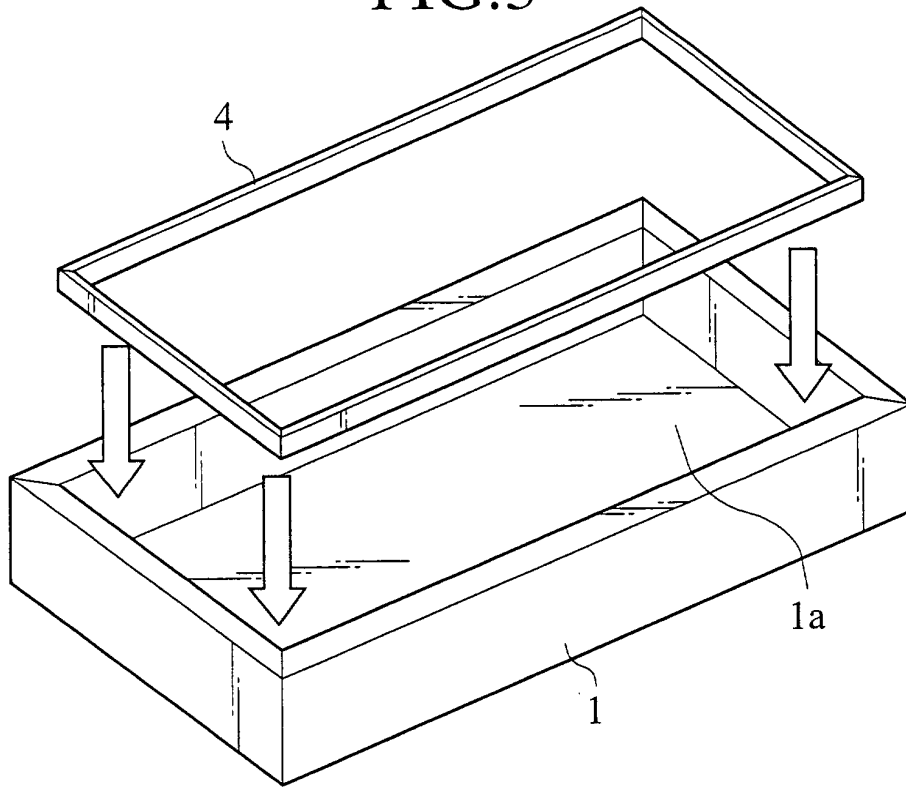


FIG.4

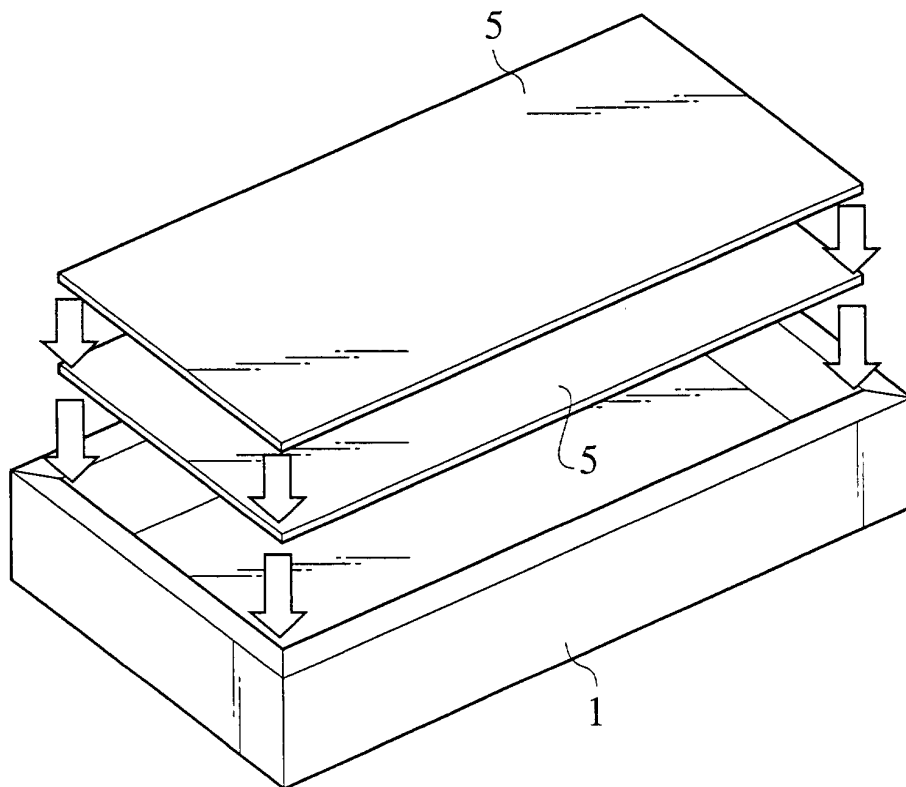


FIG.5

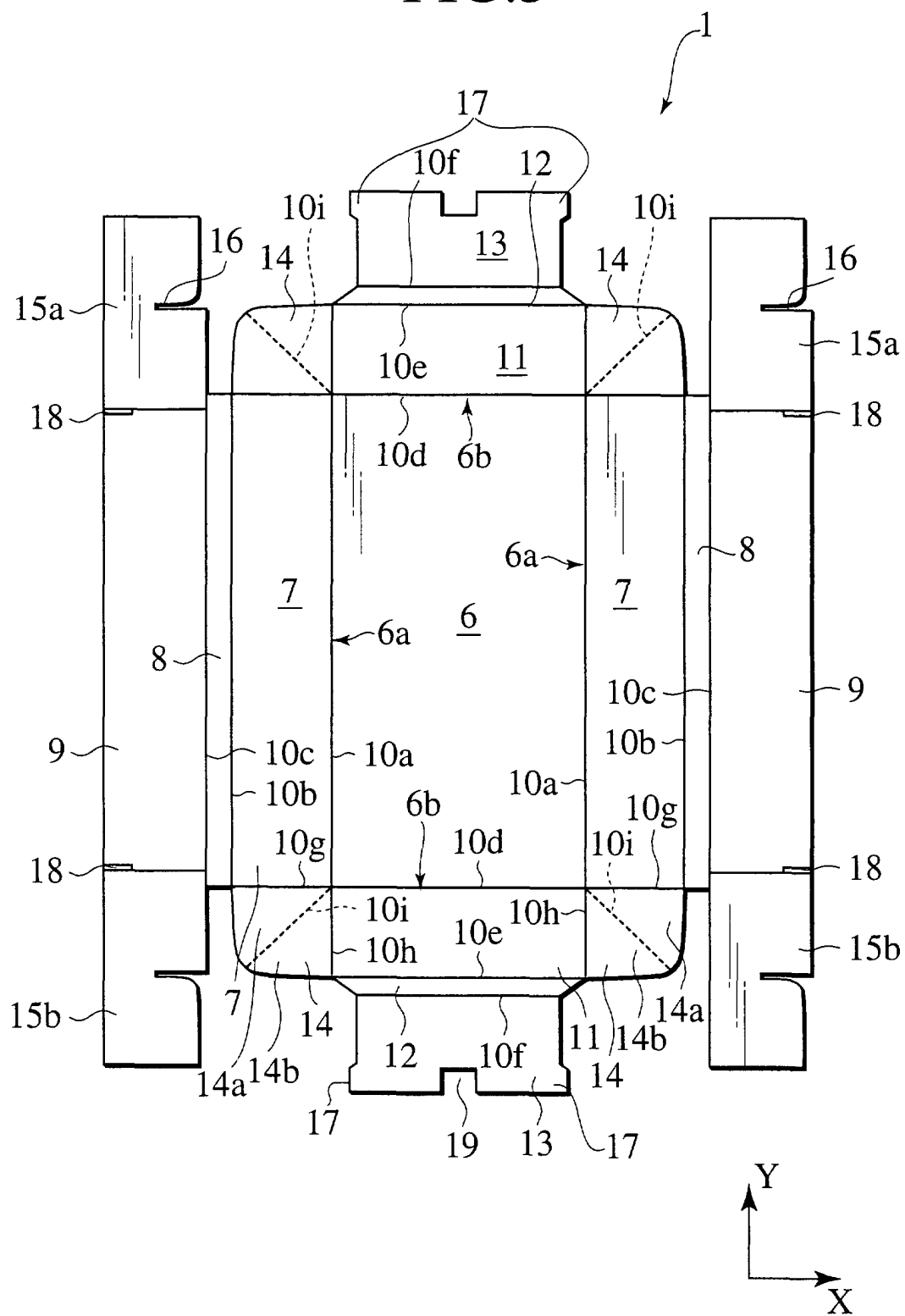


FIG.6A

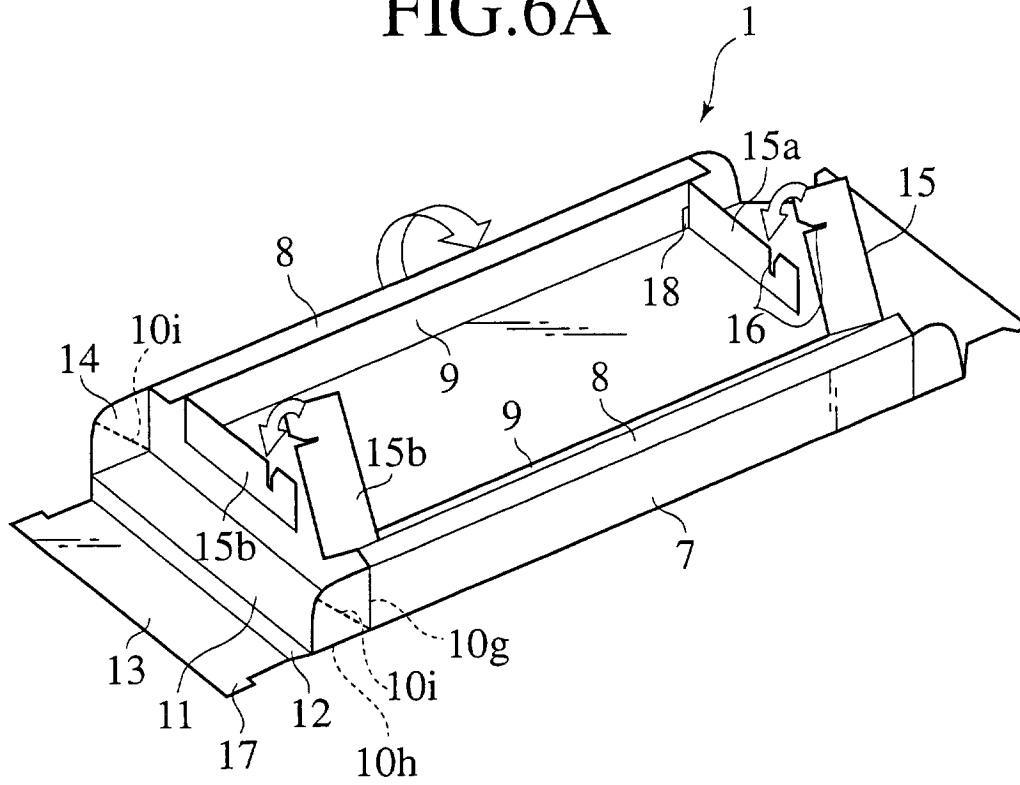


FIG.6B

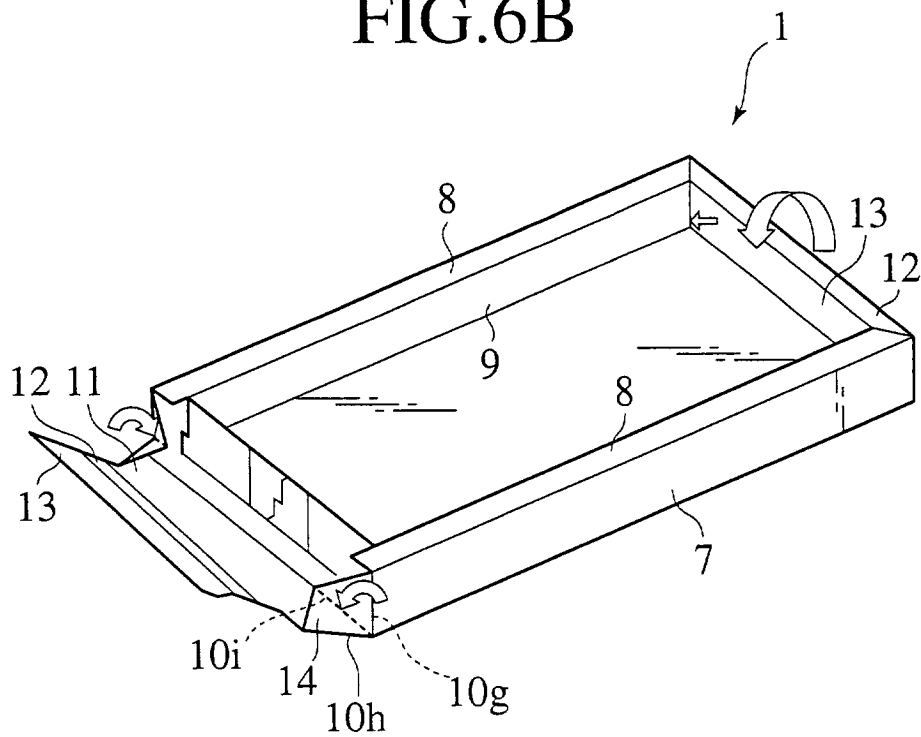


FIG.7

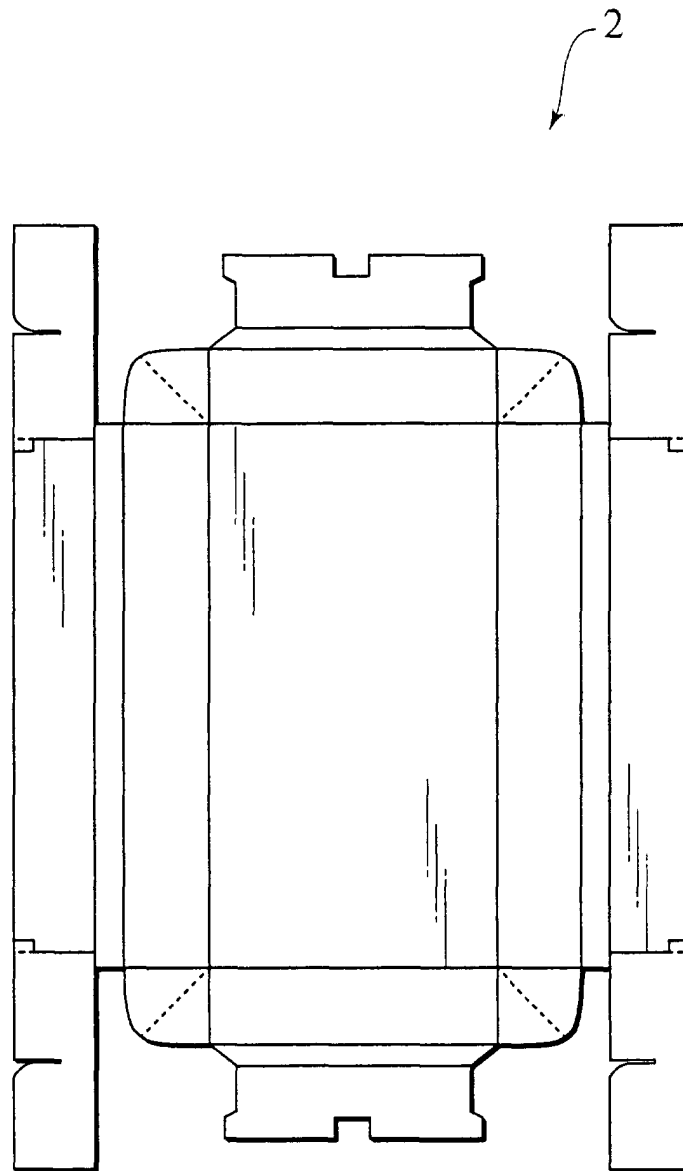


FIG.8

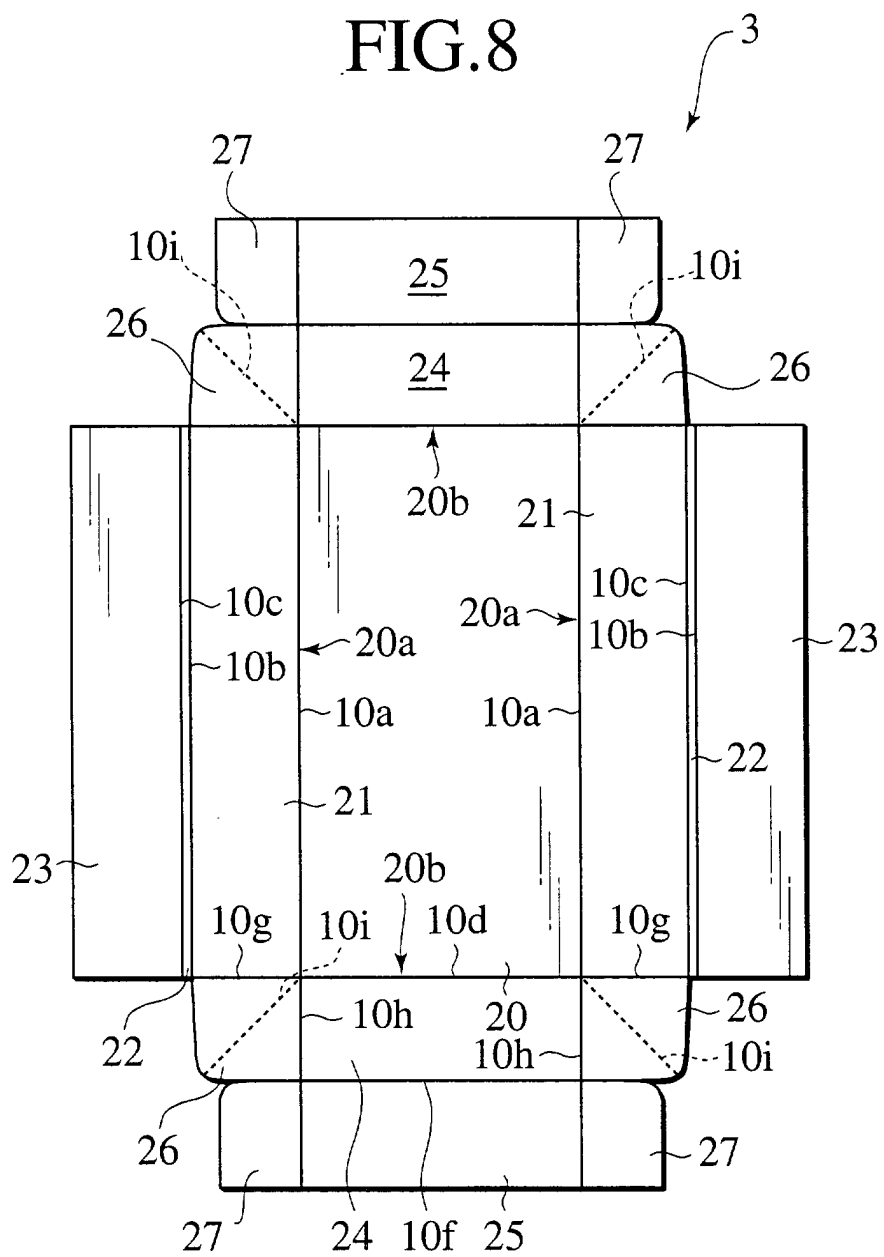


FIG.9A

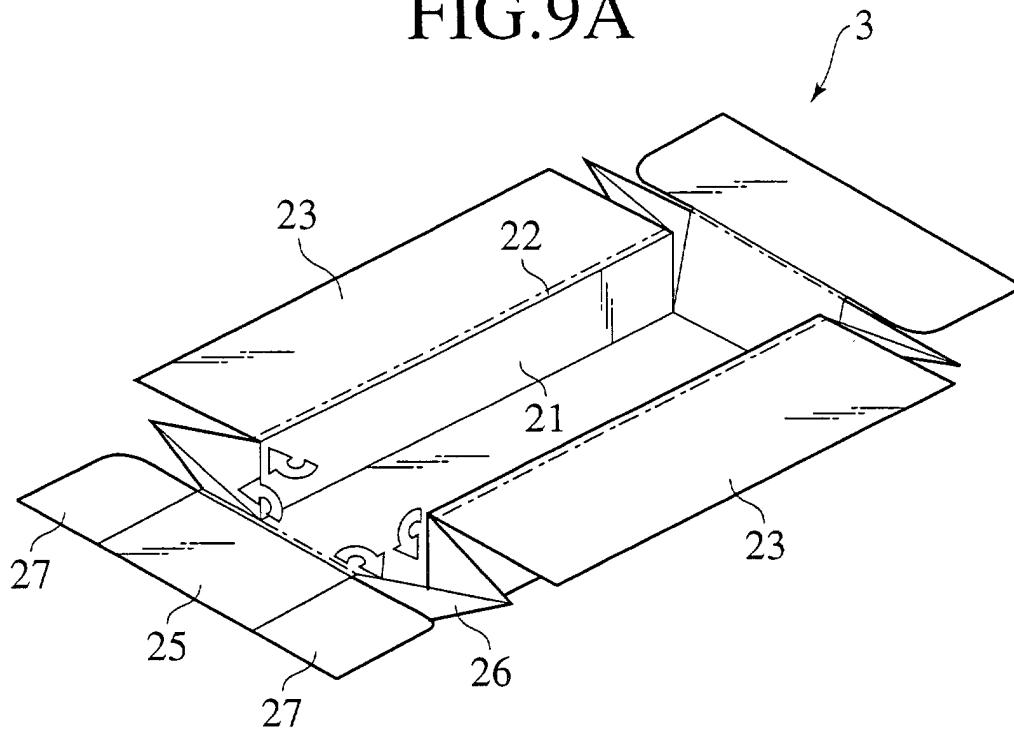
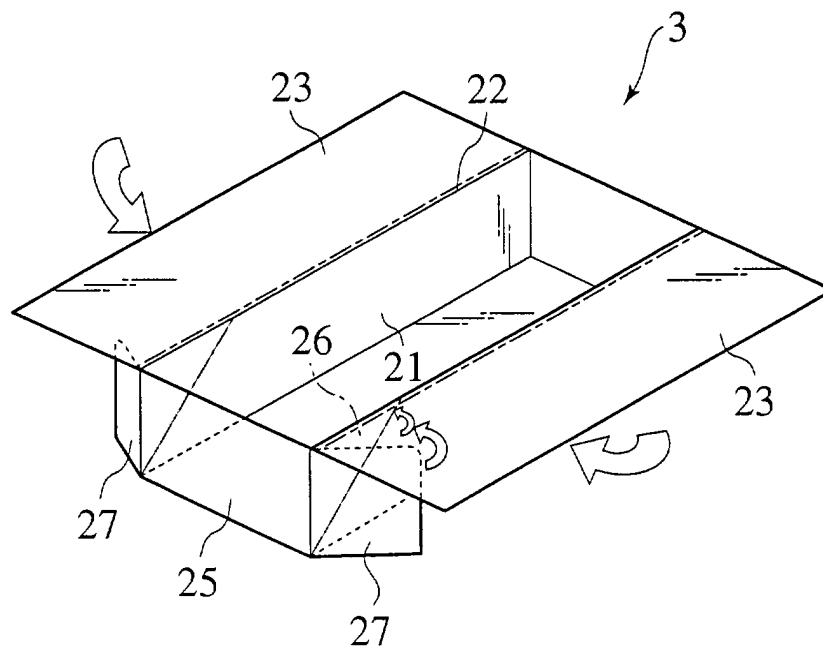


FIG.9B





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 8507

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 2 684 194 A (FRANKENSTEIN) 20 July 1954 (1954-07-20) * column 14, line 18 - line 37; claim 1; figures 1-3,25 *	1,6,7,9, 11,12	B65D81/38 B65D5/20
A	FR 1 215 899 A (LUROT) 21 April 1960 (1960-04-21) * claims; figures *	1,6,7,9, 11,12	
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