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

(11) EP 0 796 799 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.09.1997 Bulletin 1997/39

(51) Int Cl.[6]: **B65D 5/56**

(21) Application number: **97301795.7**

(22) Date of filing: **18.03.1997**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE

(30) Priority: **18.03.1996 GB 9605631**

(71) Applicant: **FIELD GROUP PUBLIC LIMITED COMPANY**
Old Amersham Buckinghamshire HP7 0DD (GB)

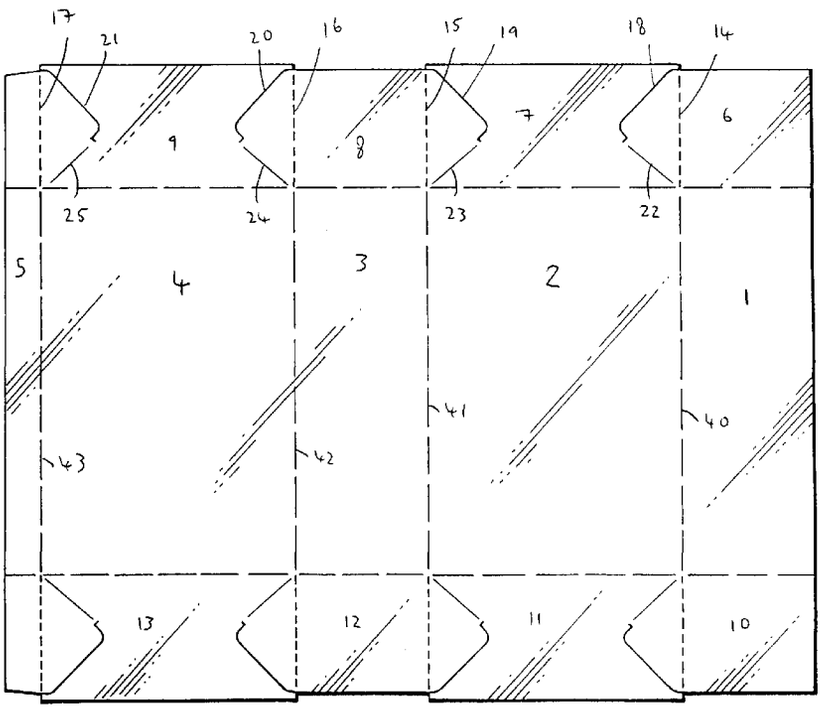
(72) Inventor: **Shilcock, John**
Thatcham Berkshire RG18 3EX (GB)

(74) Representative: **Leale, Robin George**
Frank B. Dehn & Co.,European Patent Attorneys,
179 Queen Victoria Street
London EC4V 4EL (GB)

(54) Lined articles having sealed corners and blank for forming such articles

(57) A blank for forming an article such as a carton is formed from a plural layer sheet material, one of whose layers can function as a liner. The liner is arranged to seal at the corners of the article, when the article is formed. To allow the blank to be folded, the liner is arranged to delaminate from the remainder of the material by means of cuts (14 to 17) which extend only through the liner layer but not the remainder of the material, and cuts (18 to 21) which extend through the remainder of the material but not the liner layer. The initial delamination can be controlled more accurately by offsetting the hinge lines (40 to 43) between body panels from the cuts (18 to 21) which define the end closure flaps. The delaminated liner is incorporated in the corner to seal it when the article is erected. The blank may be for forming a carton with all corners sealed. The material may be a laminate of cardboard, paperboard and the like and a layer of liner material, and the liner may be formed from a plastics film, such as polyethylene.

FIG.1.



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Description

This invention relates to articles, such as cartons, made of cardboard, paperboard or similar lightweight foldable sheet material and provided with a liner to seal at least some of the corners of the article.

It is often desired to seal the corners of articles such as cartons, as these are the regions which are most prone to leakage. Many types of lined carton are already known. There are cartons in which the contents are received in a separate paper or plastics bag inside the carton, but the provision of such a bag adds considerably to the cost of the carton and can cause problems during automatic erection and filling. Other types employ a flat paper or plastics liner which is applied to the carton blank, and which effectively forms an internal bag on erection; once again this is expensive and can cause problems during erection and filling. A further type uses a liner sheet arranged so as to form seals in the corner regions of the carton where sealing is required when the carton is erected and closed.

The present invention is based on the recognition that a simple and economical form of lined carton can be provided by using a plural layer material, at least one of whose layers can function as a liner.

Viewed from a first aspect the present invention provides a blank made from a plural layer sheet material, one of whose layers can function as a liner, for making an internally lined article having a corner defined at the junction of at least three hinge lines between panels of the blank, the liner layer being intact all around the said junction, so as to seal the said corner, but arranged to delaminate sufficiently from the remainder of the material, during erection of the blank, to enable the said corner to be formed, the liner layer being formed with a linear cut arranged to assist it to delaminate as aforesaid.

The linear cut preferably extends at a substantially constant distance from the said junction.

In one form of the invention, the said panels of the blank are two hingedly interconnected wall panels and two closure flaps hingedly connected one to each said wall panel and to each other by way of said liner layer, the said cut being formed in the liner layer of one of said closure flaps so as to assist the liner layer to delaminate from said one closure flap when the other closure flap is folded in. Preferably, the said cut is aligned as a continuation of the distal edge of the said other closure flap.

Preferably, the said closure flaps are separated from each other by a cut which is slightly laterally offset from the hinge line between the said wall panels, in the direction of the said other closure flap.

Providing such an offset has the effect that when the said wall panels are first folded relative to each other, there is an initial delamination of the liner layer from the said one closure flap. This helps to make the remainder of the delamination during the folding of the blank more controllable and reliable.

Viewed from a second aspect the invention provides a blank made from a plural layer sheet material, one of whose layers can function as a liner, for making an internally lined article having a corner defined at the junction of at least three hinge lines between panels of the blank, wherein the liner layer is intact all around the said junction, so as to seal the said corner, but is arranged to delaminate sufficiently, during erection of the blank, to enable the said corner to be formed, the said liner layer extending across a dividing line between the edges of two of said panels which is substantially continuous with one of said hinge lines, but said dividing line being slightly offset from said continuity so as to cause the liner layer to delaminate from the edge region of one of said two panels when the blank is folded about said hinge line.

The blank may be for forming a rectangular carton with eight of said corners.

The said sheet material may be a laminate of cardboard, paperboard or the like and a layer of liner material. The liner layer may then be formed from a plastics film, more preferably a polyethylene film.

Alternatively, the sheet material could be formed wholly of cardboard, paperboard or the like, incorporating a delaminatable layer.

The scope of the invention also extends to articles made from blanks as set forth above.

A preferred embodiment of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:-

Figure 1 is a plan view of a blank for making a carton according to a preferred embodiment;
Figure 2 is an enlarged view of a part of the blank of Figure 1; and
Figures 3 to 5 illustrate steps in the closing process of such a carton.

Referring first to Figure 1, a blank for making a carton is shown. The carton is intended to have sealed corners in order for it to be sift-resistant, so that it can contain relatively coarse-grained material such as rice grains and the like. The blank is formed from a laminated sheet material comprising a layer of cardboard and a liner layer of polyethylene, with the liner on the side which forms the inside of the erected carton. However, a multilayer material, for example multi-ply board, may be used, as long as it comprises a layer which can serve as a liner and can delaminate from the remainder of the board. This layer can, for example, be formed from a layer of strong material which is weakly attached to the remainder of the board.

In the following description, references to the liner layer and the layer of cardboard should be construed as also meaning the layer of a multi-ply material functioning as a liner and the remainder of the multi-ply material, respectively.

The blank comprises a row of four body panels 1 to 4 with a gluing flap 5 at one end of the row, separated

by hinge lines 40 to 43. A front closure flap 7, a rear closure flap 9 and side closure flaps 6 and 8 are provided hingedly connected to the respective body panels. The front and rear closure flaps 7 and 9 are slightly longer than the side closure flaps 6 and 8, to facilitate machine erection. However, this is not necessary, and the invention can equally well be applied to a blank having all of the closure flaps the same length. Analogous closure flaps 10 to 13 are provided at the other end of the blank.

The closure flaps 6 and 7 are separated from one another by a cut 14 which extends through the layer of cardboard but not through the liner layer. Similar cuts 15 to 17 separate the closure flaps 7 to 9 and the gluing flap 5 from one another. These cuts are shown in the Figure by short-dashed lines.

Figure 2 shows an area of the blank in the region where the panels 1, 2, 6 and 7 meet, in greater detail. In this region, the hinge line 40 between the panels 1 and 2 ends, as does the cut 14 separating the layers of cardboard in closure flaps 6 and 7.

As can be seen, the hinge line 40 is slightly offset from the cut 14, so that they are parallel but not co-linear. The distance of the offset is around 0.5mm, although this can be varied according to requirements. It will also be seen that the end of the hinge line 40 and the end of the cut 14 are not coincident.

Further cuts 18 to 21 are provided which extend through the liner layer but not through the layer of cardboard. These cuts are shown in Figures 1 and 2 by solid lines. The cuts are aligned as continuations of the distal edges of the closure flaps, as can be clearly seen in Figure 2. It will be seen that in the region of the corners, where the end closure flaps and the body panels meet, the liner layer is not cut, but remains intact in order to effect sealing of the corner region.

To erect the carton the blank is first folded to form a tube, and the flap 5 is glued to the panel 1 to secure the blank in the form of a tubular body. During the step of forming the blank into a tube, the body panels fold around the hinge lines 40 to 43. As the end closure flaps are connected to the body panels, the end closure flaps also fold around imaginary extensions of the same lines, and since the liner layer is continuous in those regions, it also folds around the same imaginary lines.

However, because of the offset between the cut 14 and the hinge line 40 (and their equivalents at the other corners) the narrow strip of liner layer between the cut 14 and the imaginary extension of the hinge line 40 delaminates from the closure flap 7, which in due course assists in the further delamination of the liner layer, as described below.

It will be appreciated that the tubular body effectively comprises three separate tubes, a central one formed from body panels 1 to 4, and two end ones formed from the closure flaps 6 to 9 and 10 to 13. The body is sealingly contiguous, whereby leakage of a product stored within the carton can only occur at its ends.

The steps required to close one end of the body will now be described, with reference to closure flaps 6 to 9. Firstly, front closure flap 7 and rear closure flap 9 are folded outwardly away from each other along the hinge lines connecting them to body panels 2 and 4 respectively. As the front and rear closure flaps 7 and 9 are thus drawn away from the side closure flaps 6 and 8, the liner layer delaminates from the cardboard layer in regions 26 to 29 of flaps 7 and 9. These regions in which delamination takes place are triangular, and are eventually bounded by the side edges of the flaps 7 and 9, the cuts 18 to 21, and folds 22 to 25 which come about in the liner layer, shown in Figure 1 as thin solid lines.

As already described above, because of the offset between the hinge lines 40 etc and the cuts separating the closure flaps, such delamination has already been initiated at the side edges of the front and rear closure flaps. This allows the delamination to be achieved more accurately.

As the front and rear closure flaps 7 and 9 are folded further away from each other, the liner layer pulls the side closure flaps inwards, until the carton reaches the configuration shown in Figure 3, in which the front and rear closure flaps 7 and 9 extend outwardly perpendicular to the body panels 2 and 4, and the side closure flaps 6 and 8 extend inwardly perpendicular to the body panels 1 and 3. In the regions 26 to 29 the liner layer has delaminated from the cardboard, and these regions now consist of a layer of cardboard only. The liner layer 30 to 33 which was originally present in these regions has been folded through 180° about lines 22 to 25 respectively, and now overlies part of the liner layer on front and rear closure flaps 7 and 9.

The front closure flap 7 is then folded inwardly along the hinge connecting it to body panel 2, so as to overlie side closure flaps 6 and 8. As the front closure flap 7 is folded inwardly, the liner layers 32 and 33 are trapped between it and the side closure flaps 6 and 8 in such a way that the liner layers are sealingly incorporated in each corner. The result of this folding step is shown in Figure 4.

The rear closure flap 9 is then folded to overlie front closure flap 7, trapping the liner layers 30 and 31 therebetween and sealingly incorporating them in the corners of the carton. The rear closure flap 9 is glued down to complete the closure of the end of the carton, as shown in Figure 5.

An analogous folding method is used on flaps 10 to 13 to close the other end of the carton.

The effect of this closure sequence is that the liner layer becomes incorporated in the folds at each corner of the carton, where escape of the contents of the carton would otherwise be most likely to occur.

The resulting carton has a layer of liner sealingly incorporated at each of its corners, and thus has improved sift-resistant qualities. In addition to providing a layer of liner which extends right across the small gap which would otherwise exist at some of the corner regions of a carton formed by folding a flat blank, the

length of the path which a particle must follow to escape from the package is substantially increased. The use of a laminated material removes the need to affix a separate liner sheet to the blank, and thus reduces the number of steps involved in the manufacture of the carton.

The material forming the liner layer can be chosen to have properties appropriate to the contents of the carton. For example, in certain applications, it will be desirable for the liner to exhibit waterproof properties. Further, as discussed above, a multi-ply material may be used, with one layer acting as a liner, and the remainder of the material forming the body of the carton. The layers of the multi-ply material may be chosen to perform different functions as necessary.

Although the invention has been described in the context of a blank for forming a rectangular carton, it can equally be applied to blanks for forming other forms of cartons (for example with a hexagonal or octagonal cross-section), trays and the like. In particular, it can be used on blanks used for forming articles having non-cubical corners, for example dished trays. In this case, if the feature of offsetting the cut and the fold line is to be used, then the cut separating the end flaps, corresponding to cut 14 in the blank of Figures 1 to 5, would be offset from the natural fold line between the end flaps.

Claims

1. A blank made from a plural layer sheet material, one of whose layers can function as a liner, for making an internally lined article having a corner defined at the junction of at least three hinge lines between panels of the blank, wherein the liner layer is intact all around the said junction, so as to seal the said corner, but is arranged to delaminate sufficiently, during erection of the blank, to enable the said corner to be formed, the liner layer being formed with a linear cut (18) arranged to assist it to delaminate as aforesaid.

2. A blank as claimed in claim 1, wherein the said cut extends at a substantially constant distance from the said junction.

3. A blank as claimed in claim 1 or 2, wherein the said panels of the blank are two hingedly interconnected wall panels (1,2) and two closure flaps (6,7) hingedly connected one to each said wall panel and to each other by way of said liner layer, the said cut (18) being formed in the liner layer of one of said closure flaps (7) so as to assist the liner layer to delaminate from said one closure flap when the other closure flap (6) is folded in.

4. A blank as claimed in claim 3, wherein the said cut (18) is aligned as a continuation of the distal edge of the said other closure flap (6).

5. A blank as claimed in claim 3 or 4, wherein the said closure flaps (6,7) are separated from each other by a cut (14) which is slightly laterally offset from the hinge line (40) between the said wall panels (1,2), in the direction of the said other closure flap (6).

6. A blank made from a plural layer sheet material, one of whose layers can function as a liner, for making an internally lined article having a corner defined at the junction of at least three hinge lines between panels of the blank, wherein the liner layer is intact all around the said junction, so as to seal the said corner, but is arranged to delaminate sufficiently, during erection of the blank, to enable the said corner to be formed, the said liner layer extending across a dividing line (14) between the edges of two of said panels (6,7) which is substantially continuous with one of said hinge lines (40), but said dividing line being slightly offset from said continuity so as to cause the liner layer to delaminate from the edge region of one of said two panels when the blank is folded about said hinge line.

7. A blank as claimed in claim 6, wherein the said hinge line (40) is between two wall panels (1,2) of the blank and the said dividing line (14) is between two closure flaps (6,7) thereof, hinged to said wall panels.

8. A blank as claimed in any preceding claim, which is for forming a rectangular carton with eight of said corners.

9. A blank as claimed in any preceding claim, wherein the said sheet material is a laminate of cardboard, paperboard or the like and a layer of liner material.

10. A blank as claimed in any preceding claim, wherein said liner is formed from a plastics film.

11. A blank as claimed in claim 10, wherein said plastics film is a polyethylene film.

12. An article formed from a blank as claimed in any preceding claim.

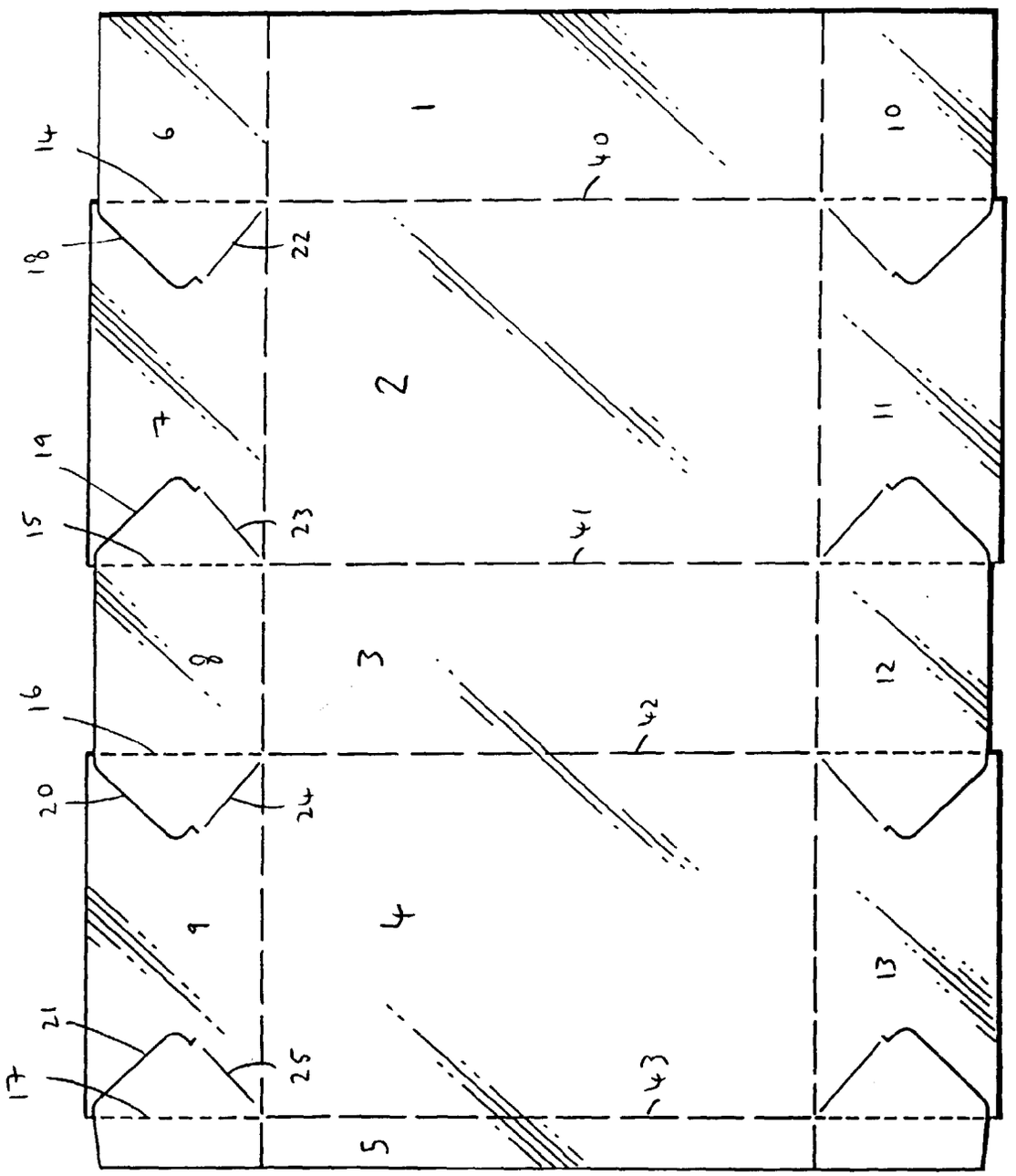

FIG. 1.

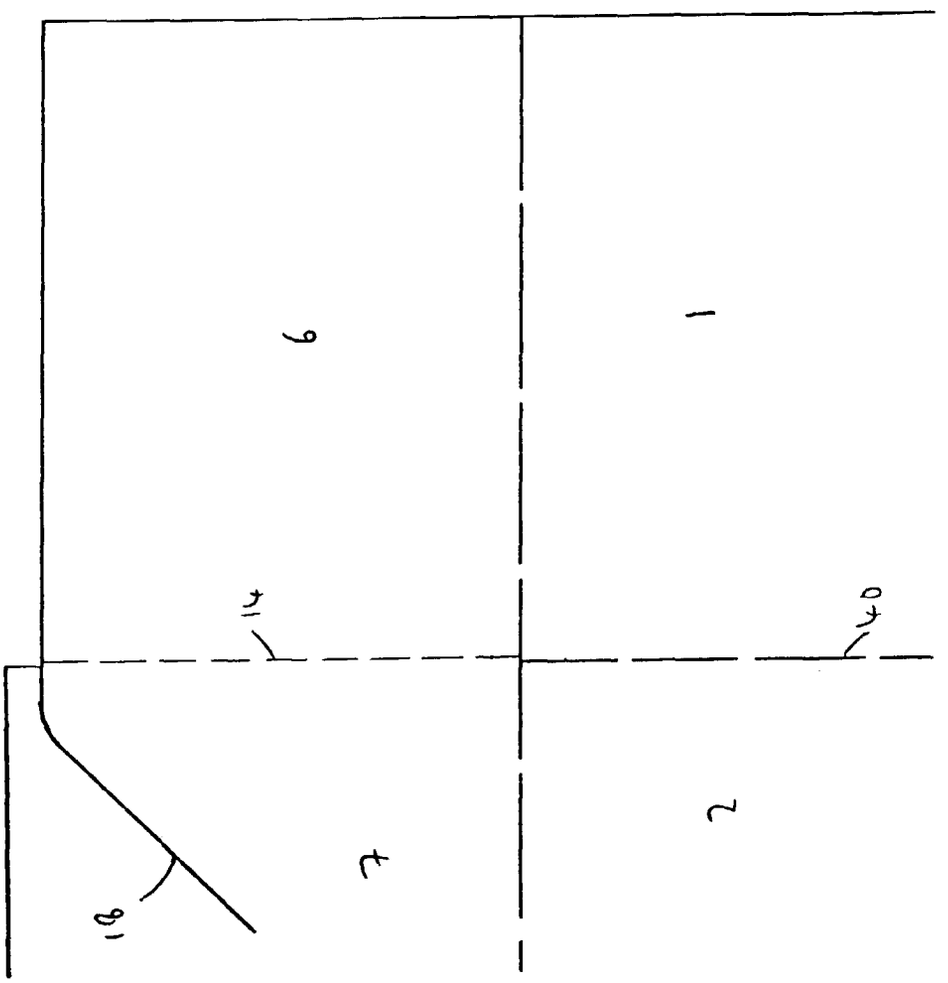

FIG. 2.

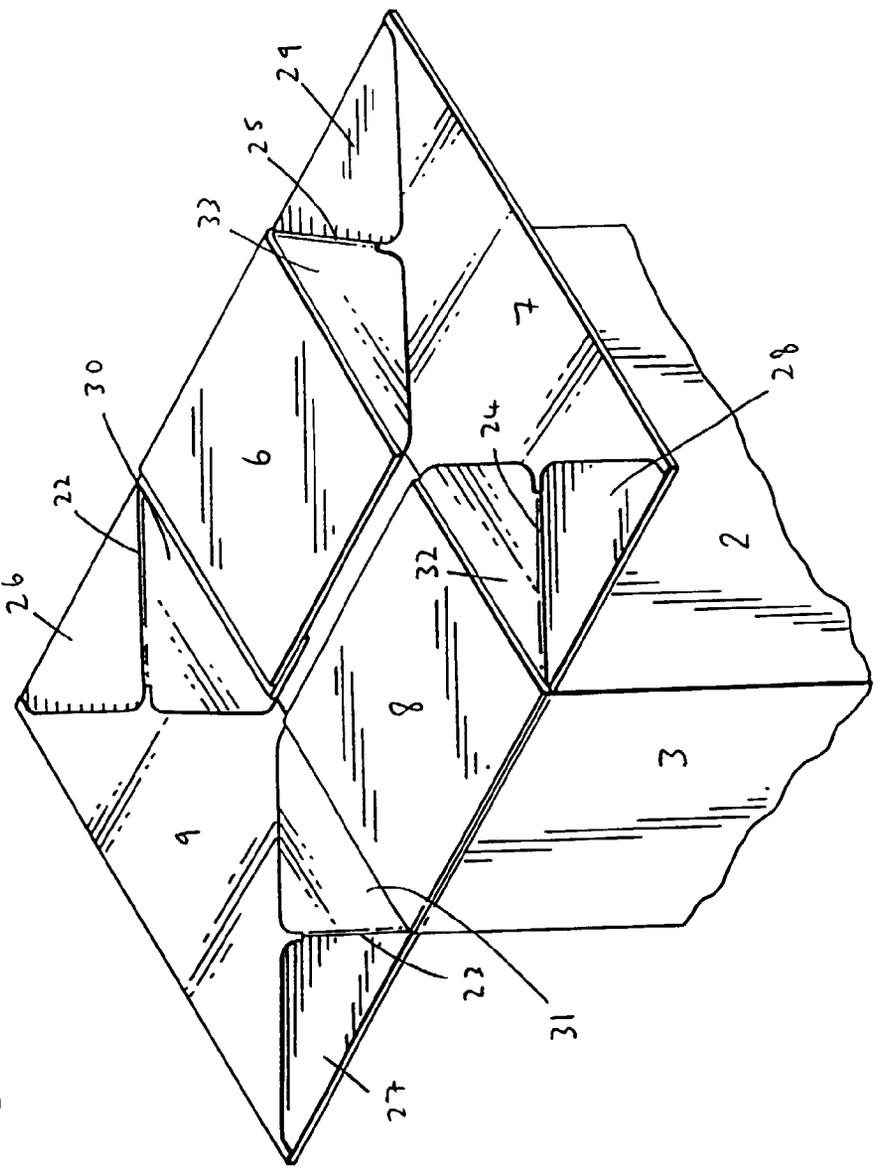

FIG. 3.

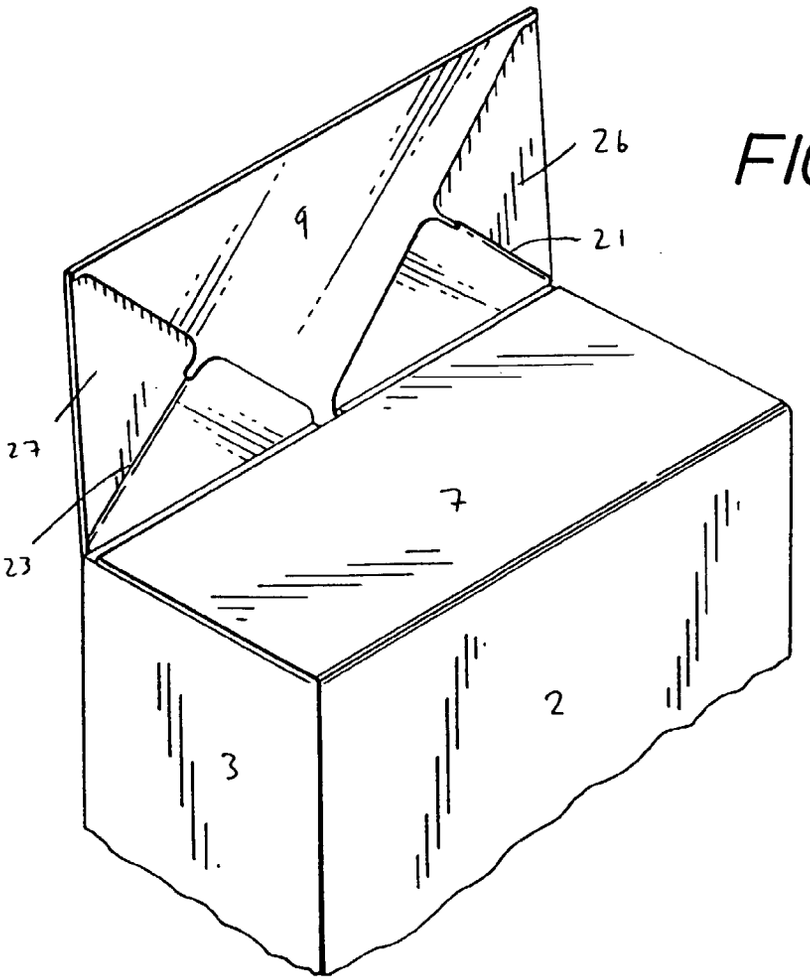

FIG. 4.

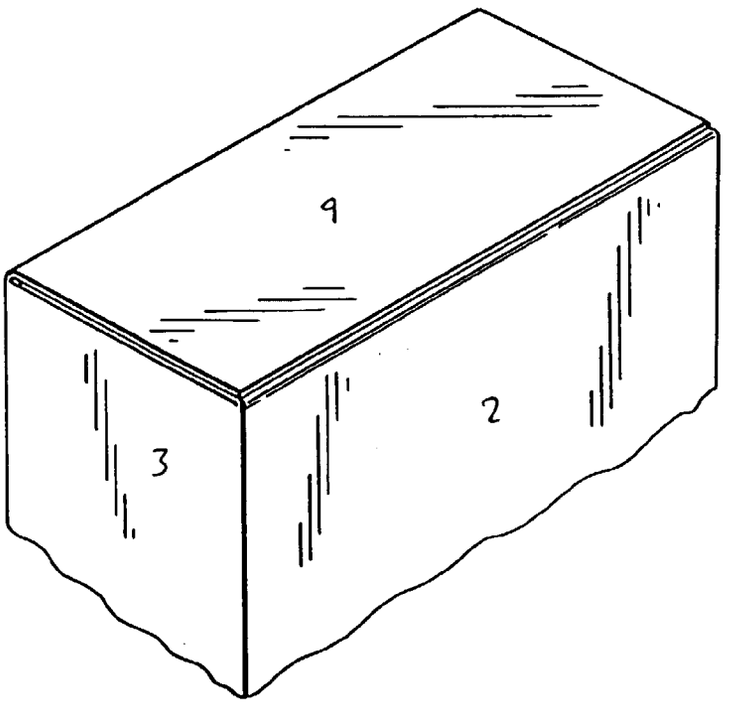

FIG. 5.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 30 1795

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.6)
X Y	GB 1 378 742 A (BOXFOLDIA LTD) 27 December 1974 * page 3, left-hand column, line 59 - page 4, right-hand column, line 71 * * figures 1-7 * ---	1-3,5-9, 12 10,11	B65D5/56
X A	US 3 261 536 A (BIXLER, K. D.) 19 July 1966 * column 2, line 31 - column 5, line 13 * * figures 1-8 * * column 5 * ---	1-3,12 4	
Y	US 3 877 630 A (SILVER STANLEY M) 15 April 1975 * column 2, line 59 - column 3, line 13 * * figures 1A-1D * -----	10,11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 June 1997	Wennborg, J

CATEGORY OF CITED DOCUMENTS

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