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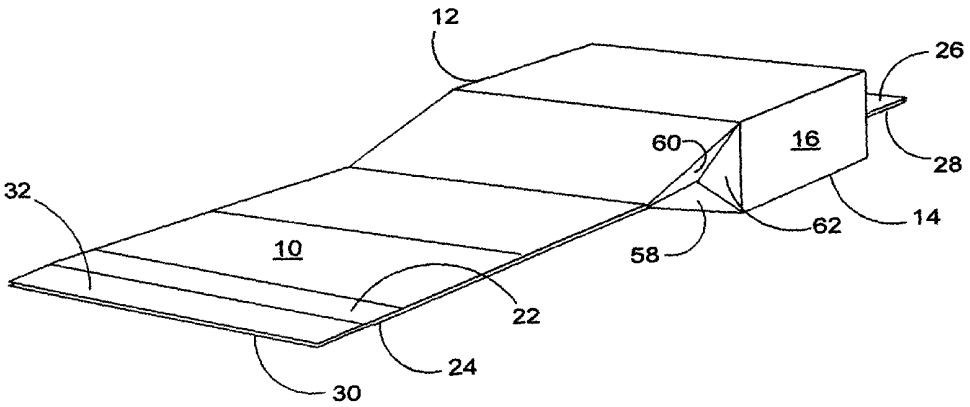

(57) Abstract: A carton, carton blank and method for packaging one or more articles for example, frozen or chilled foodstuffs comprising a top wall (10) and a base wall (14) interconnected by opposed side walls (12, 16) to define a tubular structure and end walls (18, 20, 22, 24), wherein at least one of the end walls is arranged so as to allow access to the interior of the carton and there further comprises a endless fold line (164) defining a first and second tabular section and an arrangement (50, 51, 52, 53, 54, 56) which is provided on one or more of said side walls whereby the corresponding one of the carton sections may be collapsed whilst the other carton section remaining substantially.

COLLAPSIBLE CARTON AND METHOD FOR COLLAPSING

Background of the Invention

The present invention relates to a carton, which is progressively collapsible in order to reduce the bulk of the carton as the articles or articles contained within are progressively removed. The invention also relates to a method of collapsing such a carton.

When one or more articles contained within a carton formed from paperboard or like foldable sheet material are purchased, it is often the case that such articles will not be removed from the carton all in one go. In the case of frozen or chilled foodstuffs, the carton will be removed from the refrigerator or freezer, a number of articles will then be removed for preparation or consumption, and the carton containing the remainder will be replaced back in the refrigerator or freezer. Refrigerators and freezers have a limited capacity and a part empty carton therefore normally represents wasted space.

In some instances, foodstuffs will spoil if they are not kept out of contact with air, and therefore, the large empty volume of a part empty but sealed carton may cause such spoilage.

US 3 366 308 to Phillips discloses a container for milk or similar liquid products which is collapsible in its entirety once the entire contents thereof have been removed.

US 1 751 755 to Paris discloses a box which is reducible in size by removing portions thereof, and then subsequently replacing an end portion which functions as a lid.

The present invention seeks to overcome or at least mitigate the problems of the prior art.

Summary of the Invention

One aspect of the present invention provides a carton for packaging one or more articles, for example, frozen or chilled foodstuffs, comprising a top wall and a base wall interconnected

by opposed side walls to define a tubular structure and a pair of opposed end walls. At least one of the end walls is arranged so as to allow access to the interior of the carton, and there further comprises an endless fold line defining first and second tubular sections and an arrangement which is provided on one or more of the side walls, whereby the corresponding one of the carton sections may be collapsed, whilst the other carton section remains substantially erected.

According to an optional feature of this aspect of the invention, the arrangement may comprise a first longitudinal fold line provided on the side wall, arranged so as to define two relatively foldable coplanar portions of the side wall and a pair of divergent fold lines defining a triangular portion of the respective side wall adjacent the endless fold line and interposed between the coplanar portions, the triangular portion being foldable inwardly to ease the transition between the collapsed carton section and the erected section.

Preferably, the pair of divergent fold lines may extend between the first longitudinal line and the endless fold line. More preferably, the end wall nearest the convergent ends of second and third fold lines may be arranged to permit access to the interior of the carton.

According to another optional feature of this aspect of the invention, a carton may be provided which is arranged so as to provide air-tight protection to the articles. Preferably, at least one end wall may be resealable such that the carton may remain airtight.

According to a further optional feature of this aspect of the invention there may further comprise upper and lower face contacting panels arranged perpendicular to the plane of the end wall that are adapted to be resealable.

According to a still further optional feature of this aspect of the invention the collapsed section may be foldable into face contacting relationship with the erected section so as to reduce the overall carton size.

According to a yet further optional feature of this aspect of the invention the carton may package a plurality of articles, the endless fold line being provided in register with the abutting edges of the articles.

According to a further optional feature of this aspect of the invention a further carton section defined by second endless fold line intermediate the arrangement and the end wall may be provided.

A second aspect of the present invention provides a carton for packaging one or more articles, for example, frozen or chilled foodstuffs, comprising a top wall and a bottom wall interconnected by opposed side walls to define a tubular structure and a pair of opposed end walls, wherein the top wall comprises an elongate tear panel defined by a pair of opposed frangible lines, wherein the tear panel is provided with a first fold line extending transversely across the tear panel to define a pair of tear portions that are capable of being folded inwardly to overlie the bottom wall after the or each article has been removed. Preferably, the tear panel may extend into one of the end walls.

According to an optional feature of the second aspect of the invention the carton may package a plurality of articles, and a plurality of transverse fold lines may be provided in register with the abutting edges of the articles.

A third aspect of the present invention provides a blank for erecting into a carton for packaging one or more articles, for example frozen or chilled foodstuffs, the blank comprising a top wall panel, a first side wall panel, a bottom wall panel, and a second side wall panel hingedly interconnected in series, and a plurality of end wall panels hingedly interconnected to the end edges of the top wall panel and bottom wall panel wherein, when erected to form a carton, at least one of the composite end walls formed from the end wall panels is arranged so as to allow access to the interior of the carton, and wherein there are further comprises an endless fold line defining first and second tubular sections and an arrangement which is provided on one or more of the side walls whereby the corresponding

one of the carton sections may be collapsed whilst the other carton section remains substantially erected.

According to an optional feature of the third aspect of the invention, that when erected to form a carton, the arrangement may comprise first longitudinal fold lines provided on the side wall, arranged so as to define two relatively foldable coplanar portions of the side wall and a pair of divergent fold lines defining a triangular portion of the respective side wall adjacent the endless fold line and interposed between the coplanar portions, the triangular portion being foldable inwardly to ease the transition between the collapsed carton section and the erected section.

Preferably, the pair of divergent fold lines may extend between the first longitudinal line and the endless fold line. More preferably, the end wall nearest the convergent ends of second and third fold lines may be arranged to permit access to the interior of the blank when erected to form a carton.

According to another optional feature of the third aspect of the invention, when erected to form a carton, the collapsed section of the blank may be foldable into face contacting relationship with the erected section so as to reduce the overall carton size.

According to a further optional feature of the third aspect of the invention, when erected to form a carton, the blank may package a plurality of articles, the endless fold line being provided in register with the abutting edges of the articles.

According to a yet further optional feature of the third aspect of the invention when erected to form a carton, a further section defined by a second endless fold line intermediate the arrangement and the end wall of the blank may be provided.

A fourth aspect of the present invention provides a blank for erecting into a carton for packaging one or more articles, for example frozen or chilled foodstuffs, the blank comprising a top wall panel, a first side wall panel, a bottom wall panel, and a second side

wall panel hingedly interconnected in series, and a plurality of end wall panels hingedly interconnected to the end edges of the top wall panel and bottom wall panel wherein the top wall panel comprises an elongate tear panel defined by a pair of opposed frangible lines, wherein the tear panel is provided with a first fold line extending transversely across the tear panel to define a pair of tear portions that are capable of being folded inwardly to overlie the bottom wall after the or each article has been removed. Preferably, the tear panel may extend into one of the end walls.

According to an optional feature of the fourth aspect of the invention when erected to form a carton, the blank may package a plurality of articles, a plurality of transverse fold lines may be provided in register with the abutting edges of the articles.

A fifth aspect of the present invention provides a method of reducing the bulk of a carton having a top wall and a bottom wall interconnected by opposed side walls to define a tubular structure and a pair of opposed end walls comprising the steps of: applying an inward force along a portion of the length of the side wall such that the side wall folds inwardly along a first longitudinal fold line provided intermediate the upper and lower edges of the side wall, applying a force to a section of the top and bottom walls of the carton defined by an endless fold line so as to collapse said section, a collapsing fold line arrangement being provided so as to permit one section of the carton to remain erected, and the top and bottom walls of another section to be in a collapsed condition.

Preferably, the method may comprise the additional steps of opening one end closure structure of the carton to remove a proportion of the contents of the carton prior to collapsing a section of the carton, and resealing the end closure structure once the bulk has been reduced.

Optionally, the method may comprise the additional step of folding the collapsed section of the carton into face contacting relationship with the erected portion.

A sixth aspect of the present invention provides a method of reducing the bulk of a carton for packaging one or more articles having a top wall and a bottom wall interconnected by side

walls to define a tubular structure and a pair of opposed end walls, wherein the top wall comprises an elongate tear panel defined by a pair of opposed frangible lines, and wherein the tear panel is provided with a first fold line extending transversely across the tear panel to define a pair of tear portions comprising the steps of: tearing the panel, and folding the torn panel inwardly inside the carton so one of the portions overlies the bottom wall after the or each article has been removed.

Brief Description of the Drawings

Exemplary embodiments of the present invention are now described, by way of example only, with reference to the accompanying drawings in which:

FIGURE 1 illustrates a blank according to a first embodiment of the invention;

FIGURE 2 is a perspective view of an erected carton formed from the blank of Figure 1;

FIGURE 3 is a perspective view of the carton of Figure 1 in a partially collapsed condition;

FIGURE 4 is a perspective view of the partially collapsed carton of Figure 3 in which the collapsed section has been folded over;

FIGURE 5 illustrates a blank according to a second embodiment of the invention;

FIGURE 6 is a perspective view of a carton formed from the blank of Figure 5;

FIGURE 7 is a perspective view of the carton of Figure 6 in which a panel has been torn back to allow access to the contents of the carton; and

FIGURE 8 is a perspective view of the carton of Figure 7 in which the torn back panel has been placed inside the carton once some of the contents thereof have been removed.

Detailed Description of the Preferred Embodiments

Turning to the first embodiment as illustrated in Figures 1 to 4, there is shown a carton for packaging one or more articles for example, frozen or chilled foodstuffs formed from one or more blanks 100 made from paperboard or other foldable sheet material. The carton comprises a top wall 10 and a base wall 14 interconnected by opposed side walls 12, 16 to define a tubular structure and end walls 18, 20, 22, 24, wherein at least one of the end walls is arranged so as to allow access to the interior of the carton and there further comprises an endless fold line 164 defining a first and second tabular section and an arrangement 50, 51, 52, 53, 54, 56 is provided on one or more of said side walls whereby the corresponding one of the carton section may be collapsed whilst the other carton section remaining substantially erected.

Referring in particular to Figure 1, there is shown a blank 100 comprising a top wall panel 10, first side wall panel 12, a bottom wall panel 14 and a second side wall panel 16 hingedly interconnected in series along fold lines 110, 112, 114 respectively. A securing flap 48 which is hingedly attached to second side wall panel 16 along fold line 116 is also provided in this embodiment.

Upper end wall panels 18 and 22 are, in this embodiment, hingedly connected to the end edge of top wall panel 10 along fold lines 118 and 122 respectively. Preferably, hingedly connected thereto along fold lines 126 and 132 are upper end glue panels 26 and 32 respectively. Likewise, in this embodiment, lower end wall panels 20 and 24 are hingedly interconnected to base wall panel 14 along fold lines 120 and 124 respectively, and hingedly connected thereto are lower end securing panels 28 and 30 respectively.

In this embodiment, gusset panel arrangements 34, 36, 38, 40 are hingedly interconnected to the end edges of side wall panels 12 and 14 along fold lines 134, 136, and 138, 140 respectively. Each arrangement is substantially identical, therefore only gusset panel arrangement 34 is discussed in more depth. In addition to being hingedly interconnected to first side wall panel 12 along fold line 134, gusset panel arrangement 34 is further

interconnected to upper end wall panel 18 along fold line 146, and lower end wall panel 20 along fold line 142. The arrangement preferably comprises three triangular panels 42, 44, 46 hingedly interconnected along fold lines 144 and 145 which converge from the corners 11 and 15 of top wall panel 10 and base wall panel 14 respectively to the mid point 35 of the free edge of the arrangement 34.

Tubular segments are provided in the carton. In this embodiment, these are defined by fold lines 160, 162 and 164 extend transversely across top wall panel 10, first side wall panel 12, bottom wall panel 14 and second side panel 16 and are used to aid the progressive collapsing of the carton as described below. In alternative embodiments, the number of these fold lines may be changed according to the particular requirements of the carton. If the carton is intended to hold articles of regular size, it is preferable that the fold lines 160, 162, 164 are provided in register with the abutting edges of the articles in order to optimise the possible bulk reduction when articles are removed. Adjacent each fold line 160, 162, 164 on the first and second side wall panels 12, 16, are provided side collapsing arrangements 50, 51, 52, 53, 54, 56, two side collapsing arrangements preferably being provided for each fold line 160, 162, 164. Each side collapsing arrangement is substantially identical, therefore only arrangement 56 is discussed in more detail.

Arrangement 56 is preferably divided into a triangular portion 62, and two trapezoidal portions 58, 60. The triangular portion 62 is defined by an extension of fold line 164 and fold lines 161 and 163. Fold lines 161 and 163 intersect with fold line 158 which preferably runs substantially parallel to fold lines 114 and 116, and interconnects trapezoidal portions 58 and 60. Fold lines 161 and 163 are arranged with their intersection nearest the end of the carton which is to be opened by the user. For ease of construction, central fold line 158 may extend into triangular panel 62 and intersect with fold line 164, as can be seen in collapsing arrangement 52, for example. In any case, the fold line 158 preferably extends from the end of the carton intended to be opened (in this embodiment the end having gusset structures 38 and 40 attached thereto) to the most distant collapsing arrangement therefrom (in this embodiment, collapsing arrangements 54 and 56) to ease the folding operation, but this does

not affect the functioning of the intermediate side collapsing arrangements (in this embodiment, side collapsing arrangements 50, 51, 52, 53).

Turning to the construction of the erected carton as illustrated in Figure 2, it is envisaged that the carton of the present invention can be formed by a series of sequential folding and gluing operations which can be performed in a straight line machine so that the carton is not required to be rotated or inverted to complete its construction. The folding process is not limited to that described below and be altered according to particular manufacturing requirements.

In this embodiment, glue is applied along one face of securing flap 48, and the blank is folded along fold lines 110, 112, 114, 116, such that flap 48 is secured in face contacting relationship with a portion of top wall panel 10 so as to form a open ended tubular carton with fold lines 160, 162 and 164 endlessly encircling the carton. In other classes of embodiment, alternative securing means known in the art, such as mechanical locking means, may be provided. The contents of the carton may be loaded from either, or both, open ends of the carton, or be placed on the blank prior to it being formed into a tube.

Upper and lower end closure panels 18 and 20, and gusset panels 44 are preferably folded out of alignment with their respective top, bottom and side panels 10, 14, 12, 16, with fold lines 144 and 145 allowing gusset panels 44 to be tucked inside the upper and lower end closure panels 18 and 20. Upper and lower end securing panels 26 and 28 are simultaneously folded in the opposite direction, and are secured in face contacting relationship as seen in Figure 2 to form composite panels using glue or other suitable means known in the art. In the embodiment, a similar operation is also carried out on the end closure panels at the opposite end of the carton, such that the carton is substantially airtight. The composite panels 22, 24 and 26, 28 may optionally be secured in face contacting relationship with either the upper or lower end closure panels 18, 20 or 22, 24. This is particularly advantageous if applied to the end of the carton not intended to be opened so as to discourage the user from attempting to do so. It is envisaged that suitable alternative end closure panel arrangements may be provided within the scope of the invention, however it is preferred that such arrangements are resealable.

Referring now in particular to Figure 3, in order to gain access to the interior of the carton panels 30 and 32 are separated such that a proportion, or all of the contents of the carton may be removed. In order to reduce the bulk (i.e. the overall volume taken up by the carton) of the carton in instances when some of the contents remain, the centre fold line 158 of second side panel 16, and the corresponding fold line on first side wall panel 12 are pushed inwardly, thus facilitating the pressing of a section of top wall panel 10 and bottom wall panel 14 into substantially face contacting relationship as far along the carton as the remaining contents will allow. Endless fold lines 160, 162, 164 ease the pressing action. The converging nature of fold lines 161 and 163 allow the triangular portion 62 to hinge inwardly along fold line 164, providing a neat, and easy to form transition between the collapsed and erected portions of the carton. Panels 30, 32 are then preferably re-adhered to provide a substantially airtight seal.

It can be seen from Figure 3 that the overall bulk of the carton is now significantly reduced. To reduce the overall dimensions of the carton, the collapsed portion may be folded about one of the endless fold lines, fold line 162, for example, such that the collapsed portion overlies the remaining erected portion as shown in Figure 4. To gain access to the interior of the carton again, the above method is reversed.

Turning now to the second embodiment of the present invention as illustrated in Figures 5 to 8, but referring particularly to Figure 5 which shows a blank 200 for forming the carton of the second embodiment of the invention. In this embodiment, the blank comprises a side wall panel 216, a bottom wall panel 214, a second side wall panel 212, a top wall panel 210, and a securing flap 248 hingedly interconnected in series along fold lines 314, 312, 310 and 348 respectively. End wall panels 220, 224 and 218, 222 are preferably hingedly interconnected to bottom wall panel 214 and top wall panel 210 along fold lines 320, 324 and 318, 322 respectively. End wall flaps 236, 238 and 234, 240 are optionally provided which are hingedly interconnected to first side wall panel 216 and second side wall panel 212 along fold lines 336, 338 and 334, 340 respectively.

There further comprises an elongate tear panel 251. In this embodiment, the tear panel is defined by opposed frangible lines 364, 368, and may comprise a series of tear portions 250, 252, 254, 256, 258, 260 is formed in top wall panel 210 and preferably end wall panel 222. The portions are hingedly interconnected along fold lines 322, 352, 354, 356, 358 respectively. Portion 260 is further hingedly interconnected to top wall panel along fold line 360. The frangible lines 364 and 368, in this embodiment, extend from the free edge of end wall panel 222 to the intersection with fold line 360. It is preferred that the frangible lines 364, 368 converge towards the free edge of end wall panel 222 to improve their tear initiation characteristics. It is envisaged that the number of tear portions may be increased or decreased in accordance with the requirements of a particular embodiment of the invention.

As in the first embodiment, it is envisaged that the carton can be formed by a series of sequential folding and gluing operations which can be performed in a straight line machine so the carton is not required to be rotated or inverted to complete its construction. The folding process is not limited to that described below and can be altered according to particular manufacturing requirements.

In this embodiment, glue is applied to one face of securing flap 248, and side, top and base wall panels 216, 214, 212, 210 are folded along fold lines 314, 312, 310, 348 such that an open ended tubular carton is formed. Securing flap 248 is secured in face contacting relationship with first side wall panel 216 thereby forming a composite side wall. The contents of the carton may be loaded from one or both open ends of the carton, or may have been placed within the blank prior to the above described folding operation. Glue is then applied as necessary to end wall panels and flaps 218, 220, 224, 224 and 234, 236, 238, 240 so as to preferably form a substantially sealed container as the respective panels are placed in face contacting relationship. It should however be ensured that end wall panel 222 is secured outwardly of end wall panel 224, and that glue is not applied to the face of tear portion 250 contacting end wall panel 224 which would otherwise compromise the subsequent tearing operation. The blank is now fully erected into the carton illustrated in Figure 6. In other classes of embodiment, alternative securing means and/or end closure panel arrangements known in the art may be employed.

In order to gain access to the contents of the carton, the user preferably tears back the tear panel of the carton as far as is required along frangible lines 364 and 368. It can be seen in Figure 7 that tear portions 250, 252 and 254 have been torn back as far as fold line 354. A proportion of the contents of the carton may now be removed. If some of the carton contents remain, and the carton is to be stored away, for example in a refrigerator, then the user may fold the torn portions 250, 252, 254 downwardly such that portions 250 and 252 substantially overlie bottom wall panel 214, and portion 254 is out of alignment therewith, as shown in Figure 8.

In a preferred embodiment, the length of the tear portions is substantially identical to the depth of the carton, in order that angle between the torn off portion 254 and portion 252 shown in Figure 8 is substantially 90°, and the end edge of portion 250 engages with fold line 324 in the erected carton so as to hold the torn off portions in place. As the contents of the carton are removed, the tear portions may be torn back further and the process repeated to reduce the bulk of the carton further. If the carton is intended to hold articles of regular size, it is preferable that the fold lines 352, 354, 356, 358, 360 are provided in register with the abutting edges of the articles in order to optimise the possible bulk reduction when articles are removed.

In an alternative embodiment of the carton (not shown), the frangible lines 364, 368 are disposed along fold lines 310 and 348 such that when the access portions are folded downwardly, the side edges thereof contact the side wall panels 212 and 216, therefore minimising the ingress of air and other contaminants to the contents of the carton, thus reducing the risk of spoiling the foodstuffs and extending their shelf-life.

It will be recognised that, as used herein, the terms "top", "bottom", "side", "end", "lower" and "upper" with respect to the panels of the carton are relative terms, and that the carton may be reoriented as necessary or as desired. It will be further recognised that rather than the side wall or top wall being formed from a glued composite of panels, the carton blank may be rearranged whereby some other wall such as a bottom wall is formed from the glued

composite of panels. Any reference to hinged connection should not be construed as necessarily referring to a single fold line only: indeed it is envisaged that hinged connection can be formed from one or more of one of the following, a score line, a frangible line or a fold line, without departing from the scope of invention.

The invention and its preferred embodiments relate to a carton or a sleeve which is shaped to provide satisfactory rigidity to hold items such as frozen or chilled foodstuffs. The shape of the blank minimises the amount of paperboard required for the carton. It is anticipated the invention can be modified without departing from the scope of the invention: for example, side and end panels can be increased in height or width to provide a carton to receive one or more articles of different shapes and/or sizes. Furthermore, the collapsing and tearing structures can be applied to other known carton types, for example fully enclosed cartons or wraparound cartons for enclosing other article types, without departing from the scope of the invention.

CLAIMS

1. A carton for packaging one or more articles, for example, frozen or chilled foodstuffs, comprising a top wall and a base wall interconnected by opposed side walls to define a tubular structure and a pair of opposed end walls, wherein at least one of the end walls is arranged so as to allow access to the interior of the carton, and there further comprises an endless fold line defining first and second tubular sections and an arrangement which is provided on one or more of said side walls, whereby the corresponding one of the carton sections may be collapsed, whilst the other carton section remains substantially erected.

2. A carton according to claim 1, wherein the arrangement comprises a first longitudinal fold line provided on the side wall, arranged so as to define two relatively foldable coplanar portions of the side wall and a pair of divergent fold lines defining a triangular portion of the respective side wall adjacent the endless fold line and interposed between the coplanar portions, the triangular portion being foldable inwardly to ease the transition between the collapsed carton section and the erected section.

3. A carton according to claim 2, wherein the pair of divergent fold lines extend between the first longitudinal line and the endless fold line.

4. A carton according to claim 3, wherein the end wall nearest the convergent ends of second and third fold lines is arranged to permit access to the interior of the carton.

5. A carton according to any preceding claim, arranged so as to provide air-tight protection to the articles.

6. A carton according to claim 5, wherein at least one end wall is resealable such that the carton may remain airtight.

7. A carton according to claim 5 or claim 6, wherein there further comprises upper and lower face contacting panels arranged perpendicular to the plane of the end wall that are adapted to be resealable.

8. A carton according to any preceding claim, wherein the collapsed section is foldable into face contacting relationship with the erected section so as to reduce the overall carton size.

9. A carton according to any preceding claim, wherein the carton packages a plurality of articles, the endless fold line being provided in register with the abutting edges of the articles.

10. A carton according to any preceding claim wherein a further carton section being defined by second endless fold line intermediate the arrangement and the end wall is provided.

11. A carton for packaging one or more articles, for example, frozen or chilled foodstuffs, comprising a top wall and a bottom wall interconnected by opposed side walls to define a tubular structure and a pair of opposed end walls, wherein the top wall comprises an elongate tear panel defined by a pair of opposed frangible lines, wherein the tear panel is provided with a first fold line extending transversely across the tear panel to define a pair of tear portions that are capable of being folded inwardly to overlie the bottom wall after the or each article has been removed.

12. A carton according to claim 11, wherein the tear panel extends into one of the end walls.

13. A carton according to claim 11 or claim 12, wherein the carton packages a plurality of articles, and wherein a plurality of transverse fold lines are provided in register with the abutting edges of the articles.

14. A blank for erecting into a carton for packaging one or more articles, for example frozen or chilled foodstuffs, the blank comprising a top wall panel, a first side wall panel, a bottom wall panel, and a second side wall panel hingedly interconnected in series, and a plurality of end wall panels hingedly interconnected to the end edges of the top wall panel and bottom wall panel wherein, when erected to form a carton, at least one of the composite end walls formed from the end wall panels is arranged so as to allow access to the interior of the carton, and wherein there further comprises an endless fold line defining first and second tubular sections and an arrangement which is provided on one or more of said side walls whereby the corresponding one of the carton sections may be collapsed whilst the other carton section remains substantially erected.

15. A blank according to claim 14, wherein, when erected to form a carton, the arrangement comprises first longitudinal fold lines provided on the side wall, arranged so as to define two relatively foldable coplanar portions of the side wall and a pair of divergent fold lines defining a triangular portion of the respective side wall adjacent the endless fold line and interposed between the coplanar portions, the triangular portion being foldable inwardly to ease the transition between the collapsed carton section and the erected section.

16. A blank according to claim 15, wherein the pair of divergent fold lines extend between the first longitudinal line and the endless fold line.

17. A blank according to claim 15, wherein the end wall nearest the convergent ends of second and third fold lines is arranged to permit access to the interior of the blank when erected to form a carton.

18. A blank according to any one of claims 14 to 17, wherein, when erected to form a carton, the collapsed section is foldable into face contacting relationship with the erected section so as to reduce the overall carton size.

19. A blank according to any one of claims 14 to 18, wherein when erected to form a carton, the blank packages a plurality of articles, the endless fold line being provided in register with the abutting edges of the articles.

20. A blank according to any one of claims 14 to 19 wherein, when erected to form a carton, a further section defined by a second endless fold line intermediate the arrangement and the end wall is provided.

21. A blank for erecting into a carton for packaging one or more articles, for example frozen or chilled foodstuffs, the blank comprising a top wall panel, a first side wall panel, a bottom wall panel, and a second side wall panel hingedly interconnected in series, and a plurality of end wall panels hingedly interconnected to the end edges of the top wall panel and bottom wall panel wherein the top wall panel comprises an elongate tear panel defined by a pair of opposed frangible lines, wherein the tear panel is provided with a first fold line extending transversely across the tear panel to define a pair of tear portions that are capable of being folded inwardly to overlie the bottom wall after the or each article has been removed.

22. A blank according to claim 21, wherein the tear panel extends into one of the end walls.

23. A blank according to claim 21 or claim 22, wherein when erected to form a carton, the blank packages a plurality of articles, and wherein a plurality of transverse fold lines are provided in register with the abutting edges of the articles.

24. A method of reducing the bulk of a carton having a top wall and a bottom wall interconnected by opposed side walls to define a tubular structure and a pair of opposed end walls comprising the steps of: applying an inward force along a portion of the length of the side wall such that the side wall folds inwardly along a first longitudinal fold line provided intermediate the upper and lower edges of the side wall, applying a force to a section of the top and bottom walls of the carton defined by

an endless fold line so as to collapse said section, a collapsing fold line arrangement being provided so as to permit one section of the carton to remain erected, and the top and bottom walls of another section to be in a collapsed condition.

25. A method according to claim 24, comprising the additional steps of opening one end closure structure of the carton to remove a proportion of the contents of the carton prior to collapsing a section of the carton, and resealing the end closure structure once the bulk has been reduced.

26. A method according to claim 24 or claim 25, comprising the additional step of folding the collapsed section of the carton into face contacting relationship with the erected portion.

27. A method of reducing the bulk of a carton for packaging one or more articles having a top wall and a bottom wall interconnected by side walls to define a tubular structure and a pair of opposed end walls, wherein the top wall comprises an elongate tear panel defined by a pair of opposed frangible lines, and wherein the tear panel is provided with a first fold line extending transversely across the tear panel to define a pair of tear portions comprising the steps of: tearing the panel, and folding the torn panel inwardly inside the carton so one of the portions overlies the bottom wall after the or each article has been removed.

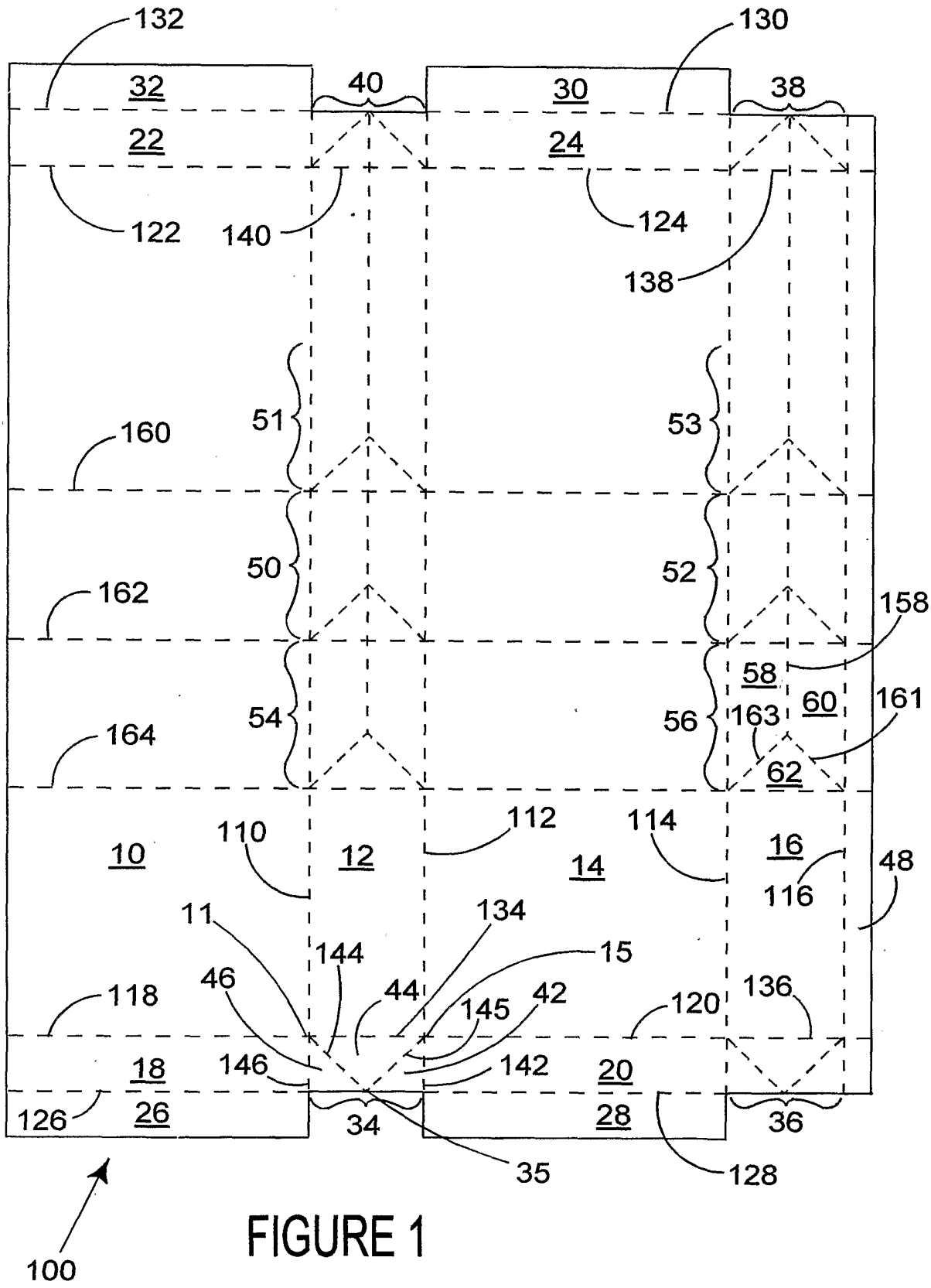
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FIGURE 1

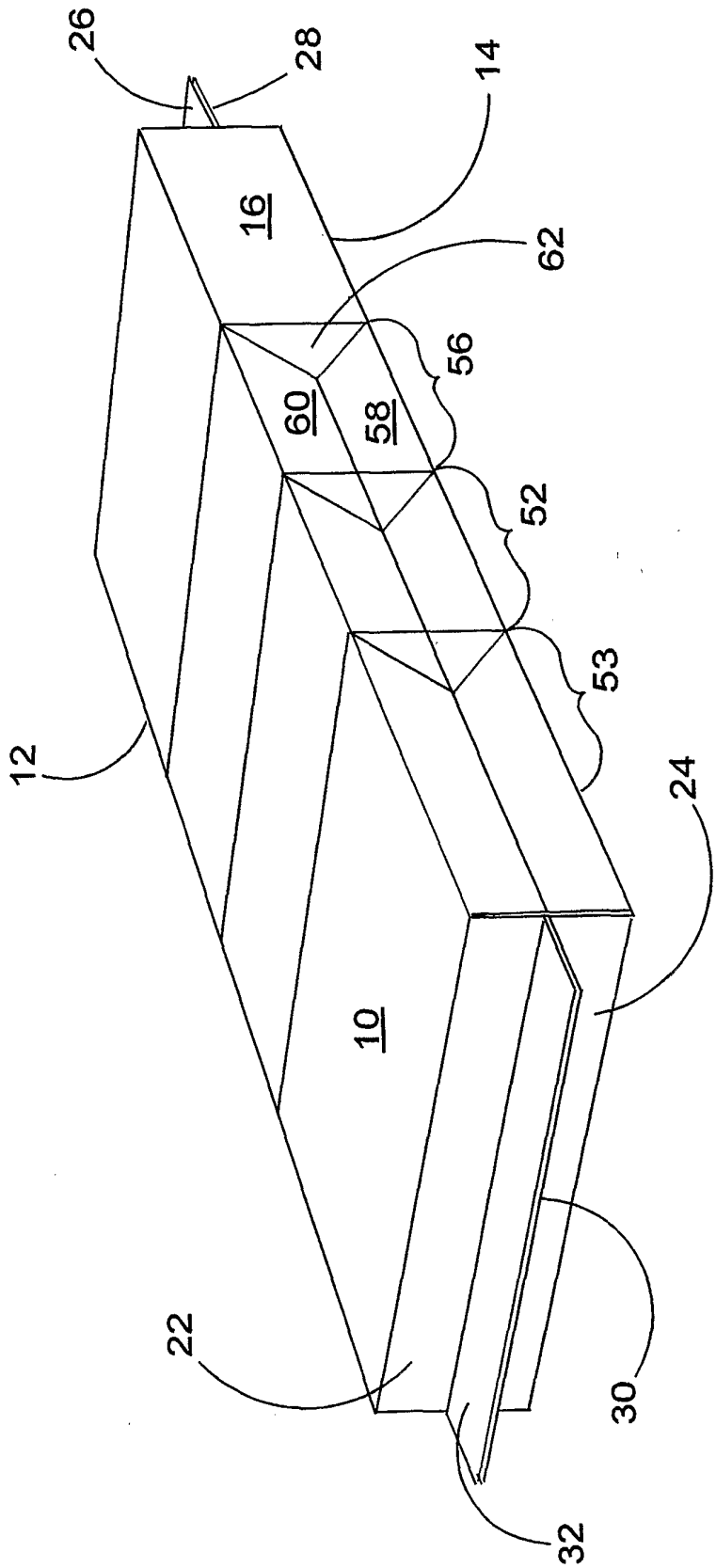

FIGURE 2

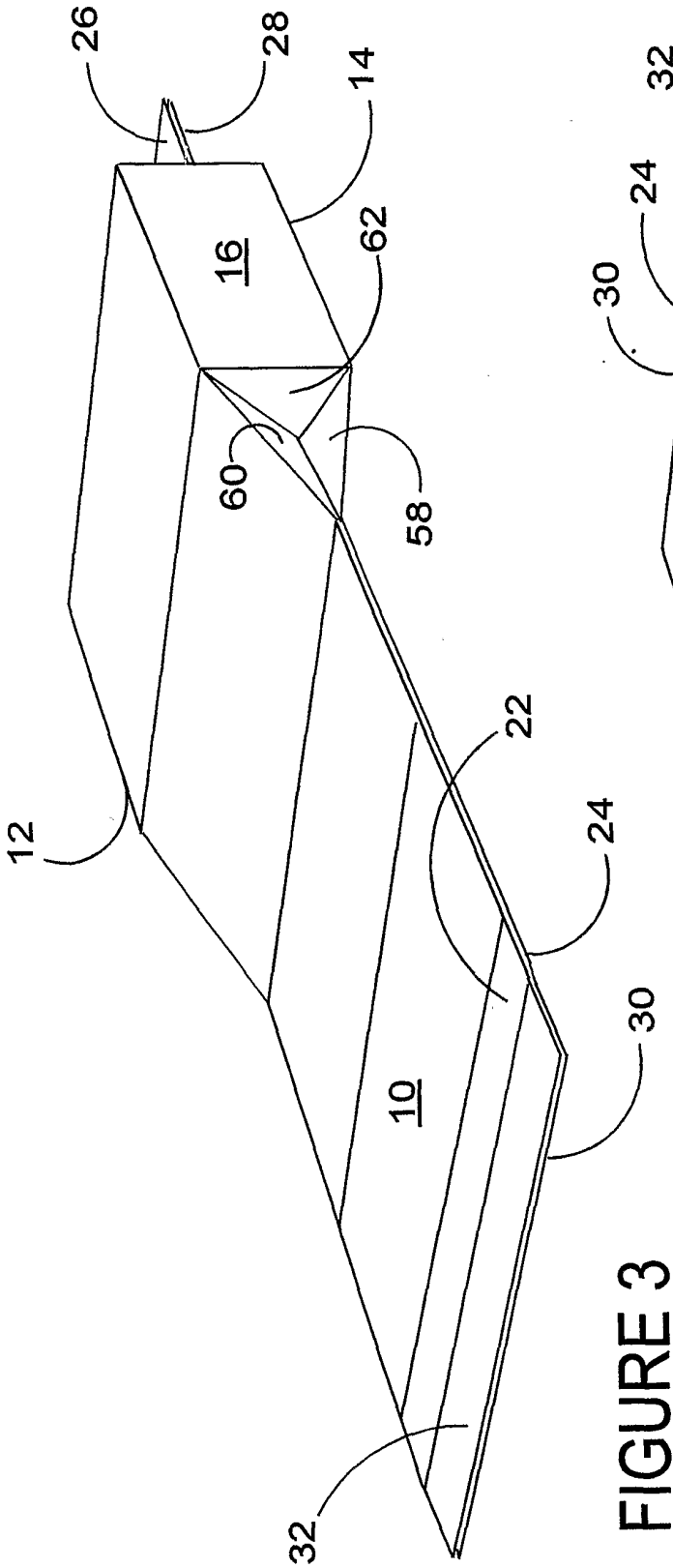

FIGURE 3

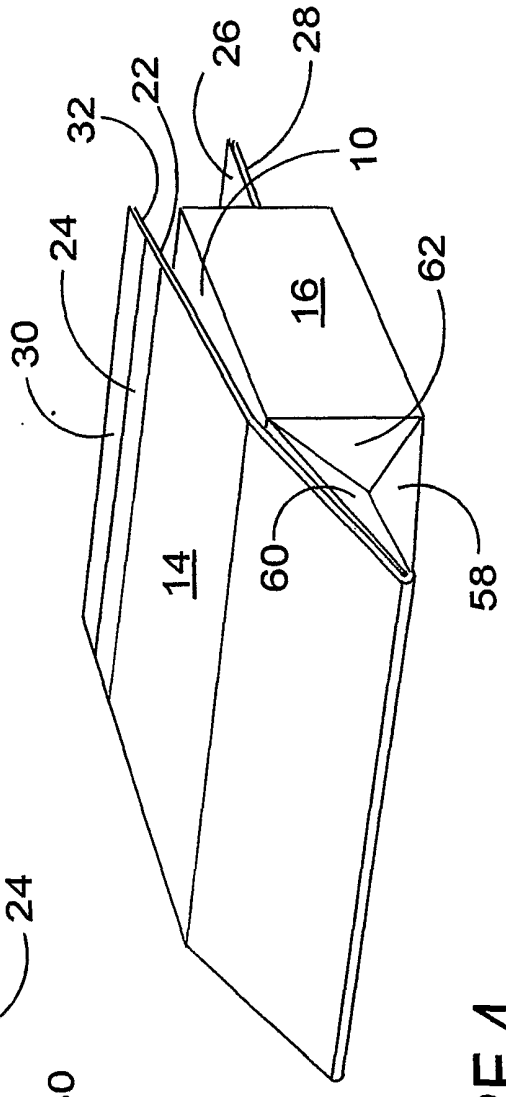

FIGURE 4

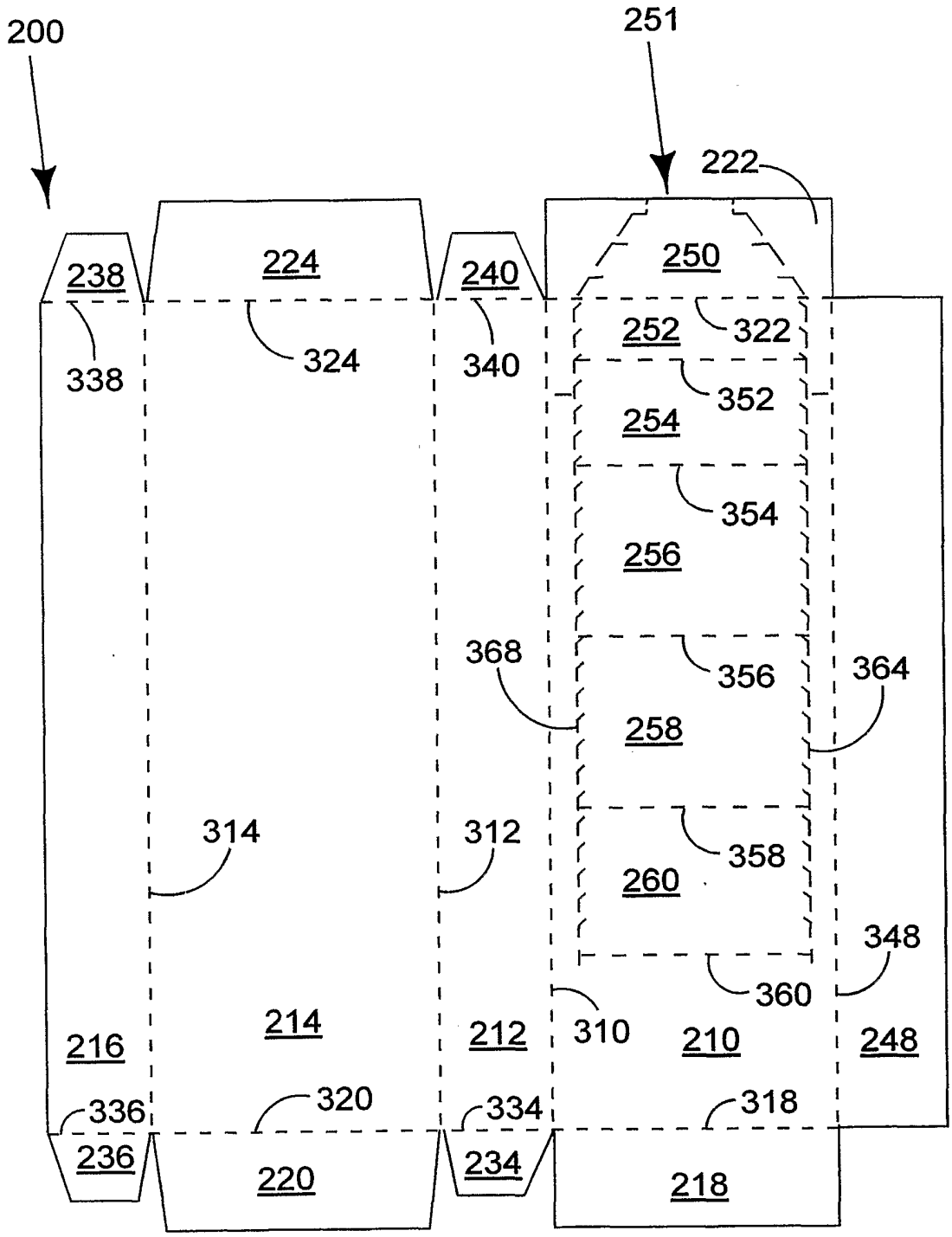
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FIGURE 5

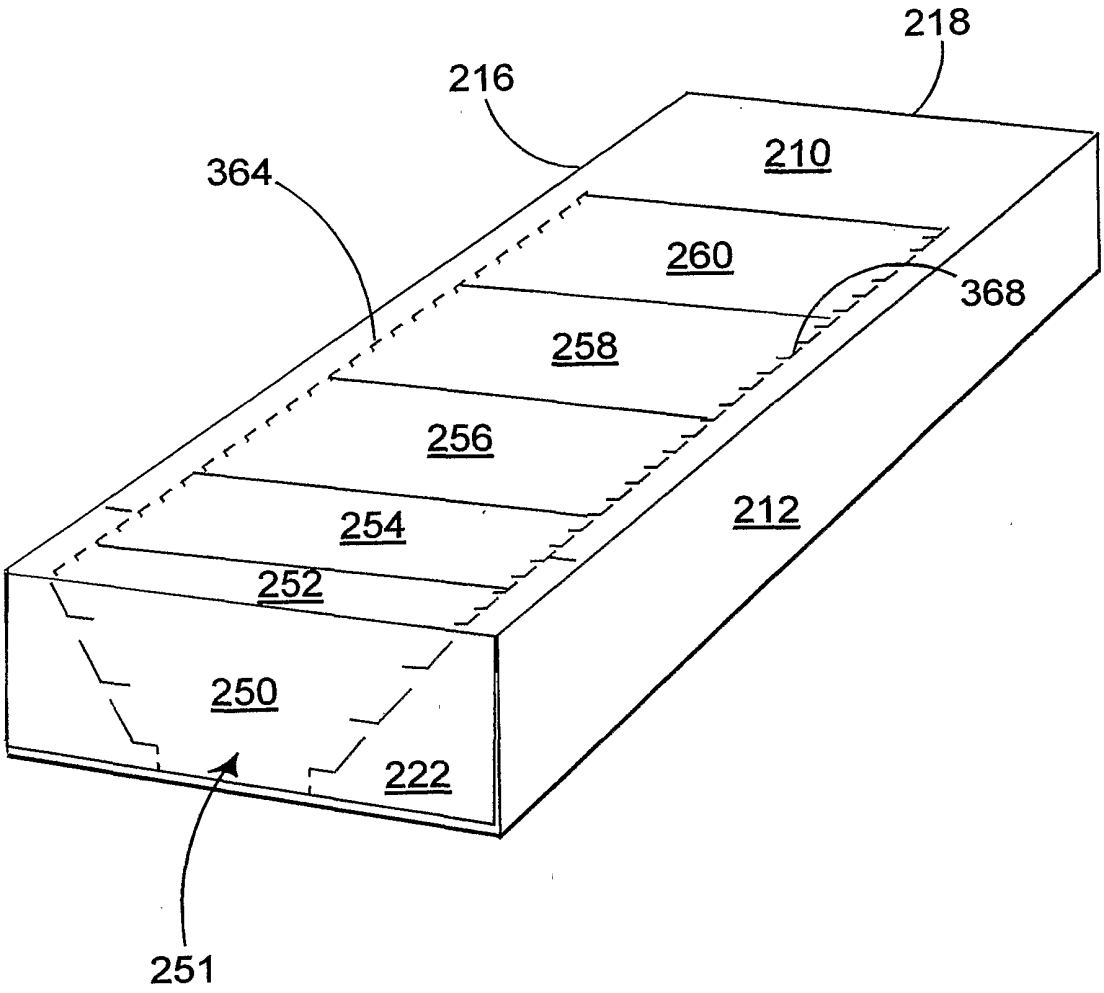

FIGURE 6

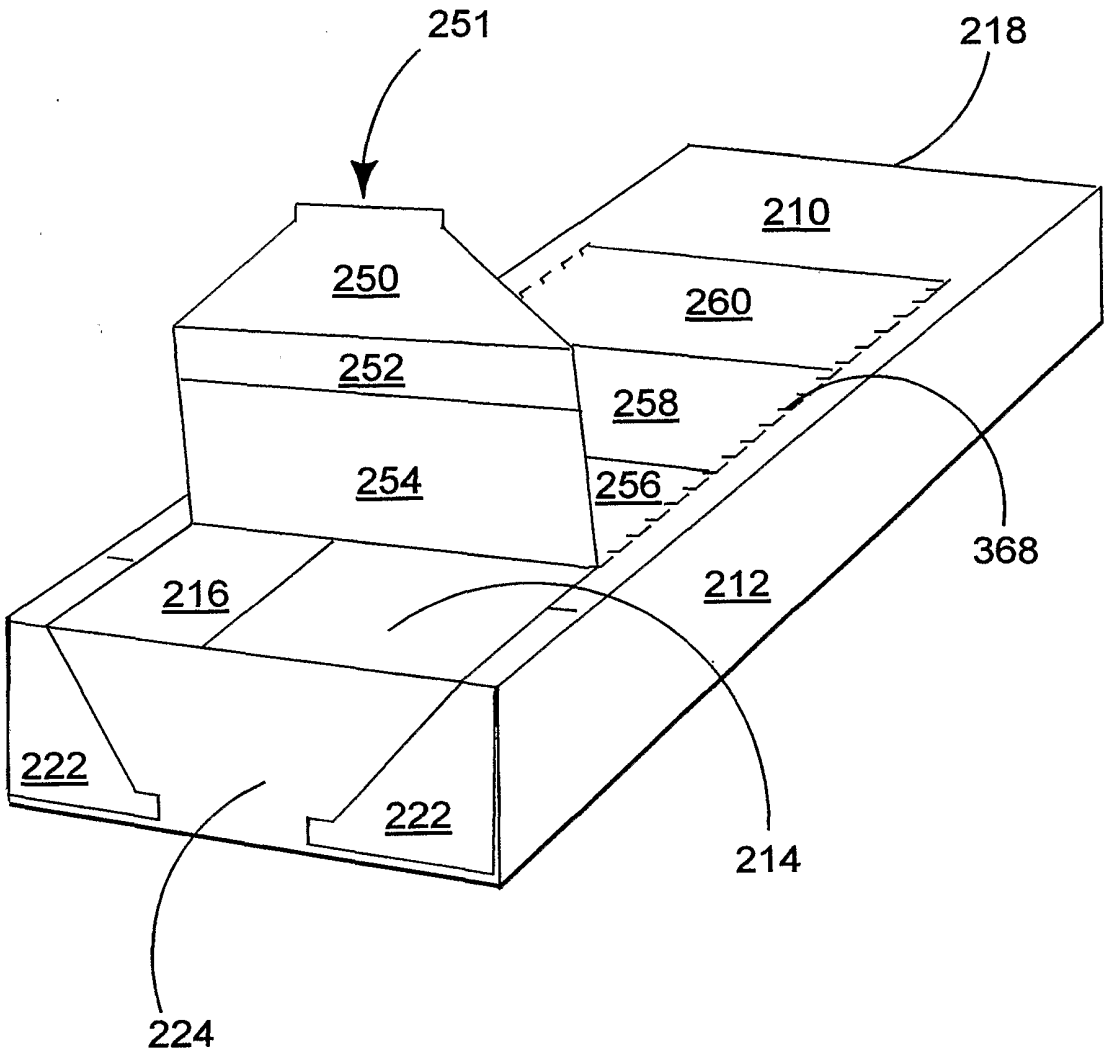

FIGURE 7

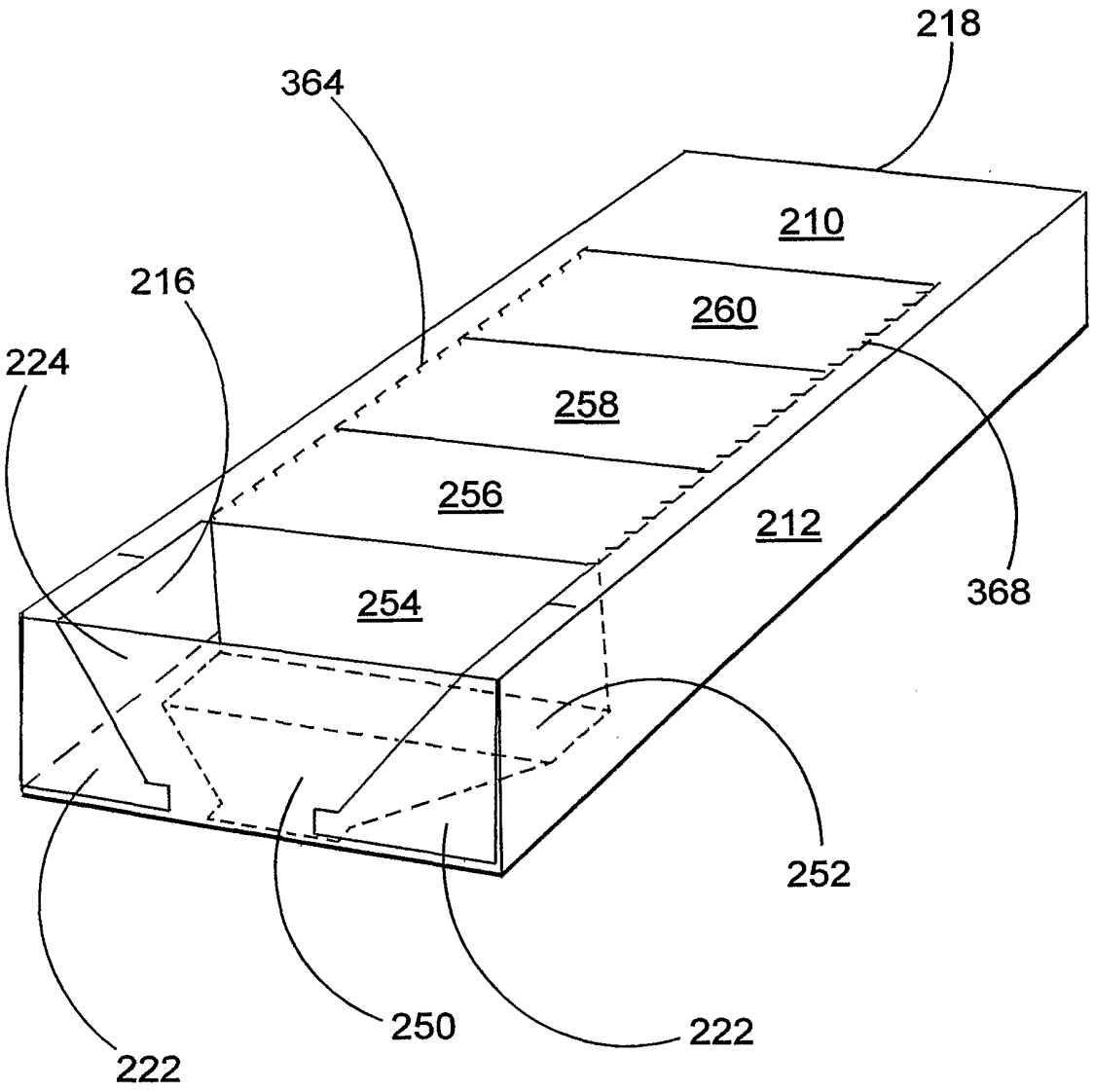

FIGURE 8

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 00/18471

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D5/355 B65D5/54

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 250 266 A (ALBATEX S L) 3 June 1992 (1992-06-03) claims; figures ---	1-3,8, 14-16, 18,24-26
A	EP 0 897 873 A (MALZ HERMANN) 24 February 1999 (1999-02-24) column 5, paragraph 24 - paragraph 26; figures 12-15 ---	1-4, 14-17, 24,25
A	US 3 366 308 A (PHILLIPS FLOYD L JR) 30 January 1968 (1968-01-30) cited in the application claims; figures --- -/--	1-3, 14-16, 24,25

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 November 2000	14. 03. 2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Serrano Galarraga,J

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 00/18471

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	NL 112 055 C (WÖRNER) 15 June 1965 (1965-06-15) claims; figures -----	1-4,8, 14-18, 24-26

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 00/18471

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-10,14-20,24-26

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10,14-20,24-26

   Container with an end wall arranged to allow access to the contents, whereby sections of the container may be collapsed upon partial removal of its contents.

2. Claims: 11-13,21-23,27

   Container with a tear panel defined in its top wall to allow access to the contents, whereby sections of the tear panel can be inwardly folded upon partial removal of its contents.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 00/18471

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2250266 A	03-06-1992	NONE	
EP 0897873 A	24-02-1999	DE 29714644 U	09-10-1997
US 3366308 A	30-01-1968	NONE	
NL 112055 C		NONE	