United States Patent [19]

Wandel

[11] **3,910,485**

[45] **Oct. 7, 1975**

[54] **SHIPPING AND STORAGE CARTON**

[76] Inventor: **Kurt Wandel,** R.D. No. 1, Downingtown, Pa. 19335

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[52] **U.S. Cl.** ..... **229/37 R;** 229/14 R; 229/16 R

[51] **Int. Cl.**[2] **B65D 5/02**

[58] **Field of Search** ..... 229/37 R, 35 R, DIG. 5, 229/23 R, 16 A, 16 R, 16 D, 34 R, 35, 17 R, 229/14 R, 14 BA, 14 C, 14 H; 41 R, 41 B; 161/114; 156/271

[56] **References Cited**

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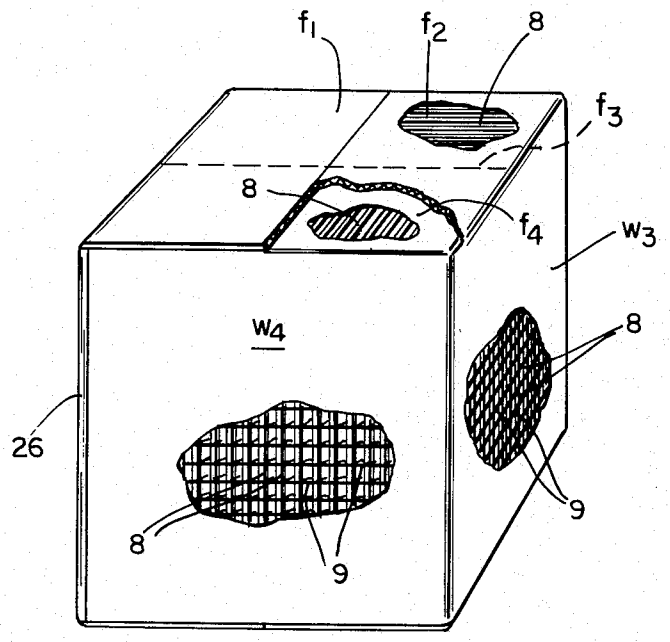
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Primary Examiner—Leonard D. Christian
Attorney, Agent, or Firm—Edward J. Sites

[57] **ABSTRACT**

A cardboard shipping carton whose bottom and vertical walls are formed by light weight structure which minimizes bulging due to the items in the carton.

8 Claims, 7 Drawing Figures



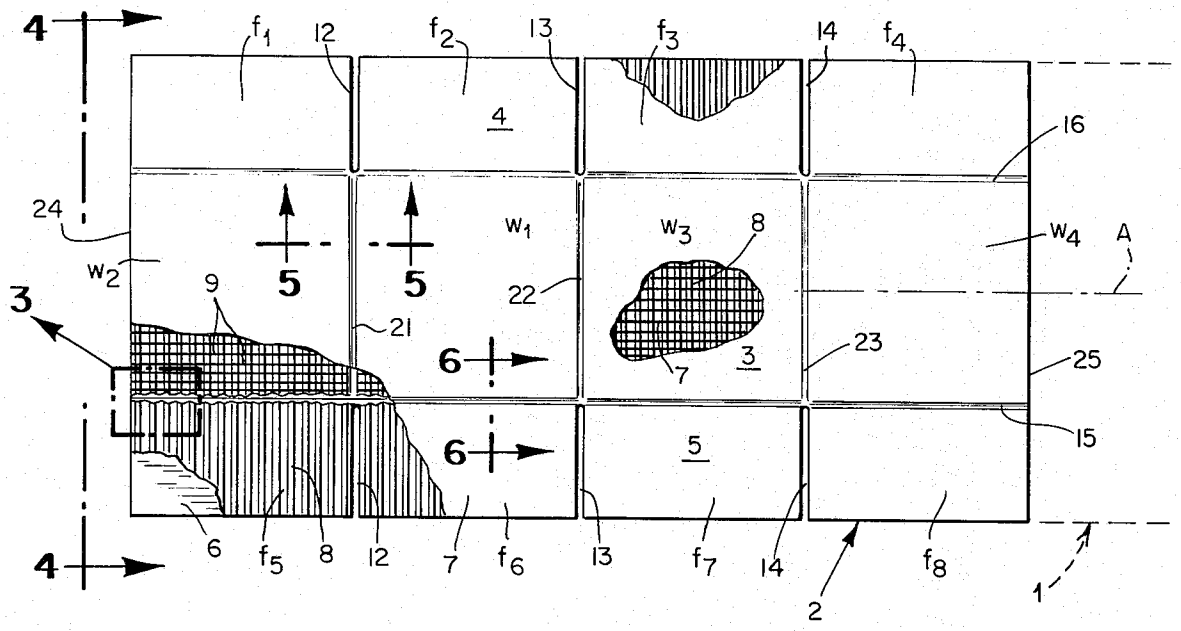


Fig. 1

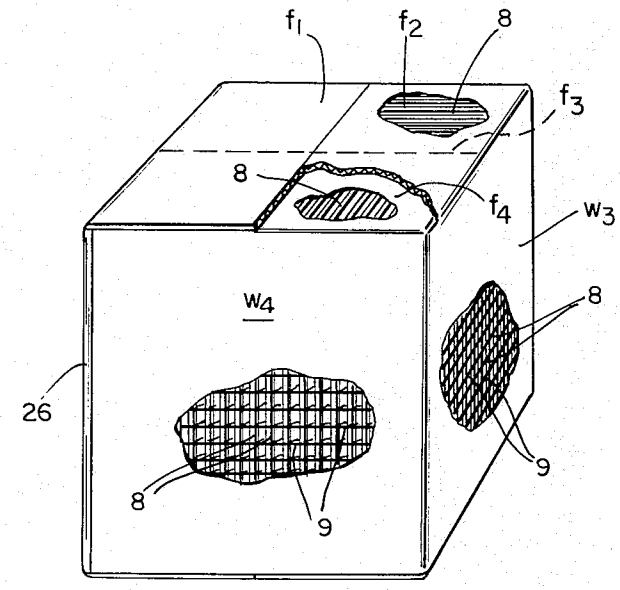


Fig. 2

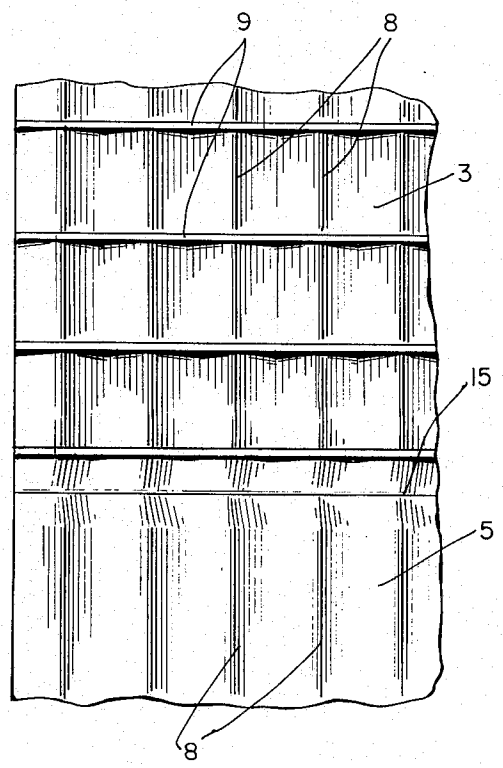


Fig. 3

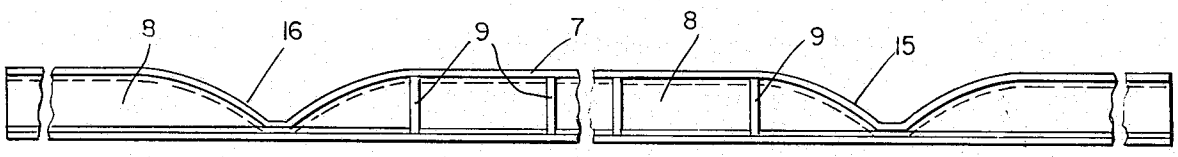


Fig. 4

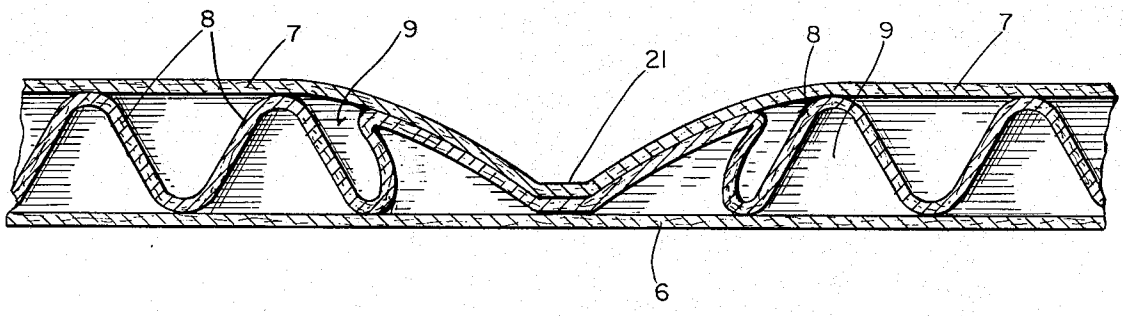


Fig. 5

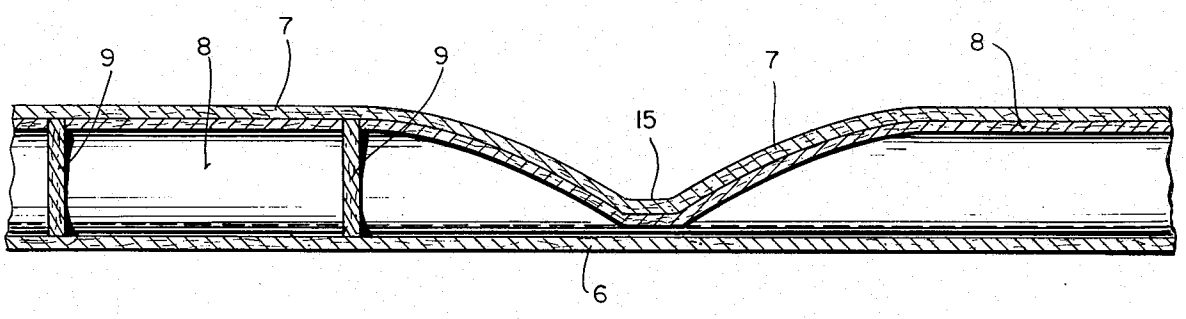


Fig. 6

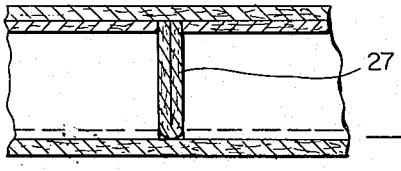


Fig. 7

SHIPPING AND STORAGE CARTON

This invention relates in general to packaging materials and in particular it relates to improvements in the structure of storage or shipping cartons to provide an economical, lightweight carton having high resistance to bulging of its vertical walls and bottom.

The invention finds a special utility in cartons for the shipping of items the nature of which is to generate bulging forces on the walls, for example cartons for shipping grapefruit, oranges and the like.

The invention contemplates forming each wall of the carton by two facing webs with an intermediate web comprised of groups of planar sections arranged at cross-angles so as to provide dual axes or anti-bulging strength and forming the bottom of the carton by flaps which are extensions of the facing webs and only one of the intermediate groups, the flaps when folded down setting up the planar sections at cross angles and so obtaining the anti-bulding strength.

Such a carton having anti-bulging strength, economy and lightness in weight is achieved by forming a blank comprised of facing webs having both planar groups in the area for the carton walls but with one of the groups omitted in the adjacent area for the flaps. The omission of the material in the flap area results in substantial savings and commensurate economy and lightness in weight. For example, in a substantially cubical carton the savings in material is about ⅓.

A preferred form of the invention will be described below in connection with the following drawings wherein:

FIG. 1 is a planar view, partially in section, of a blank constructed in accordance with the invention;

FIG. 2 is a perspective view of a carton folded from the blank of FIG. 1;

FIG. 3 is an enlarged planar view taken on the section 3 of FIG. 1;

FIG. 4 is an enlarged elevational view taken on the line 4—4 of FIG. 1;

FIG. 5 is an enlarged elevational view taken on the line 5—5 of FIG. 1;

FIG. 6 is an enlarged elevational view taken on the line 6—6 of FIG. 1; and

FIG. 7 is a fragmentary view illustrating an alternative form of a planar strip.

There are many known methods for forming cellular-type structures having cross-planar members which can be modified for producing the blank structure of the invention. For example, the techniques for making a honeycomb and the techniques illustrated in the Wandel U.S. Pat. Nos. 3,589,964 and 3,542,636. The techniques shown in the Wandel U.S. Pat. No. 3,589,964 are especially suitable for modification to produce the blank of the invention and for descriptive purposes reference may be had to that patent. The Wandel U.S. Pat. No. 3,589,964 contemplates the forming of a sub-member which comprises a facing web and a corregated web adhesively secured thereto. The corregations of the sub-member are provided with slits which extend in spaced rows at right angles to the corregations. Subsequently, reinforcing strips are secured in the rows of slits or slots. Preferably, the slits extend completely through the corregations but stop short of penetrating the facing web. Lastly, a second facing web is adhesively secured to the corrugations and strips. The foregoing structure is formed on automatic machinery which continuously discharges a formed member. As the formed member moves out of the machine, it is cut into desired lengths. Normally the corrugations run at right angles to the path of movement of the member through the machine and the strips run parallel through the axes.

With the above in mind, a formed member indicated by the dotted lines 1 in FIG. 1 moves out of the machine along the axis A. A blank structure which has been severed from the member 1 is indicated at 2.

The blank 2 has a rectangular shaped wall section 3 and rectangular shaped flap sections 4 and 5. As will be explained later, the wall section 3 is for use in being folded to form the vertical walls of the carton and the flap sections 4 and 5 are for folding into the top and the bottom of the carton.

The blank 2 includes flat facing webs 6 and 7 and an intermediate web which, in the wall section 3, comprises the corrugations 8 extending at right angles to the axis A and reinforcing strips 9 extending parallel the axis A and which, in flap sections 4 and 5, comprises the corrugations.

In using the process of the Wandel U.S Pat. No. 3,589,964 for the construction of the formed member 1, the slits are cut in the corrugations only in a defined area (wall section 3) and the strips are fed to the slits in this area.

Thus, the board comes out of the machine with the wall section 3 and the flap sections 4 and 5 integral. The wall section comprises the flat parallel webs 6 and 7 and the intermediate web which is made up of the groups of corrugations 8 and the groups of strips 9. The groups are oriented at right angles and both have substantially flat planar sections and which are interconnected to each other and extend between and are interconnected to the facing webs 6 and 7. The flap sections are each comprised of the extensions of the facing webs and the intermediate section is comprised of extensions of the corrugations. There are no strips in the flap sections.

It is to be noted in passing that for purposes of the present invention, it is especially desireable that the corrugations or V-sections be formed so that the opposite surfaces forming the V have planar, or substantially planar, characteristics. This enhances the anti-bulging strength feature.

After the blank has been formed as above indicated, the flap sections 4 and 5 are cut or pierced to form pairs of slits or slots such as the pairs 12, 13 and 14. This forms the outboard sections into flaps f_1, f_2, f_3 and f_4 for folding into the top and flaps f_5, f_6, f_7 and f_8 for folding into the bottom of the box. The joinder areas between the wall section 3 and the flap sections 4 and 5 are rolled or depressed as at 15 and 16 to reduce the spacing between the webs 6 and 7, such as indicated in FIG. 6. This deforms the top web 7 and the corregations 8 and also any strips within the area. The slits and the deformation facilitates folding the flaps to form the top and the bottom of the carton.

The areas in the wall section 3 between the pairs of slits are also rolled or depressed to reduce the spacing between the facing webs as indicated at 21, 22 and 23. The effect of the foregoing is to deform both the corrugations 8 and the strips 9 within the depressed areas. A typical example of such deformation is illustrated in FIG. 5. The depressed areas 21, 22 and 23 divide the wall section 3 into sections w_1, w_2, w_3 and w_4, which will form the vertical walls of the carton.

In the usual course of events, the blanks as above described are formed continuously and are stacked into packs for shipment to the user. Then by either manual or automatic means, the user folds each blank into a box. This is done by folding along the depressed areas **21, 22** and **23** until the edges **24** and **25** abut one another and then a conventional facing or securing strip **26** (FIG. **2**) is applied over the abutting edges to lock the same together. The sections w_1, w_2, w_3 and w_4 form the vertical walls of the carton.

With reference to FIG. **2**, it will be noted on the side walls, for example the walls w_4 and w_3, the corrugations **8** run vertically, while the strips **9** run horizontally. The corrugations resist bulging or bending of the wall about a horizontal axis parallel to the wall while the strips resist bulging or bending about a vertical axis parallel to the wall.

When the flaps f_1, f_2, f_3 and f_4 are folded down to form the top of the box, the corregations in the flaps f_1 and f_2 run in the same direction, whereas the corrugations in the flaps f_3 and f_4 run at right angles to these corrugations. The same effect is achieved when the flaps f_5, f_6, f_7 and f_8 are folded to form the bottom of the box. Inasmuch as the overlapping flaps are adhesively secured together, the orientation of the corrugations makes for resistance against bending along two axes oriented at right angles to each other and therefore provides the anti-bulging effect. This is especially important in the bottom.

While in the foregoing description, the blank was formed with a wall section and two flap sections on either side thereof, it will be understood that blanks can be formed by omitting one of the flap sections so that the wall section is for forming the vertical walls of the box and the flap section is used to form the bottom of the box. In such cases, an independent cover is provided.

Before closing, reference is made to FIG. **7** which shows an alternative form of strip. In this case, the strip instead of being a single planar member, such as the strip **9**, it is comprised of a member bent back on itself as noted at **27**. This permits use of thinner original material yet attains the desired structural strength.

I claim:

1. A blank structure for use in being folded into a rectangular parallelepiped type carton having four walls and a bottom comprising:

a rectangular wall section for use in being folded to form the four walls of the carton and a rectangular shaped flap section integral with the wall section and disposed on one side thereof for use in being folded to form the bottom of the carton;

the wall section being comprised of a pair of flat, parallel facing webs and an intermediate web between the facing webs and having means to facilitate folding of the section to form the walls of the carton;

the intermediate web being comprised of first and second groups of members having substantially planar sections interconnected with each other and extending between and interconnected to the facing webs and the planar sections of one group being angularly oriented to the planar sections of the other group, the facing webs and the groups providing means to resist bending of the wall section respectively along a first axis parallel to the plane of the wall section and along a second axis also parallel to the plane of the wall section and oriented at an angle to the first axis; and

the flap section being comprised of extensions of the facing webs and an extension of one of said groups therebetween and the other of said groups being confined within the area of the wall section and the flap section having slits dividing the section into four flaps and also having means to facilitate folding of the flaps to form the bottom of the carton.

2. A blank structure for use in being folded into a rectangular parallelepiped type carton having four walls and a top and a bottom comprising:

a rectangular shaped wall section for use in being folded to form the four walls of the carton and rectangular shaped flap sections integral with the wall section and respectively disposed on opposite sides thereof for use in being folded to form, respectively, the top and the bottom of the carton;

the wall section being comprised of a pair of flat, parallel facing webs and an intermediate web between the facing webs and having means to facilitate folding of the section to form the walls of the carton;

the intermediate web being comprised of first and second groups of members having substantially planar sections interconnected with each other and extending between and interconnected to the facing webs and the planar sections of one group being angularly oriented to the planar sections of the other group, the facing webs and the groups providing means to resist bending of the wall section respectively along a first axis parallel to the plane of the wall section and along a second axis also parallel to the plane of the wall section and oriented at an angle to the first axis; and

each flap section being comprised of extensions of the facing webs and an extension of one of said groups therebetween and the other of said groups being confined within the area of the wall section and each flap section having slits dividing the section into four flaps and also having means to facilitate folding of the flaps to form the carton.

3. A blank structure in accordance with claim **2** wherein said slits are formed as co-planar pairs respectively in said flap sections and wherein first said means includes, in the wall section between the respective pairs of slits, a reduction in the spacing between the facing webs with the planar members within said reduced spacing being deformed, and wherein said second means includes, in the joinder area between the wall section and each flap section, a reduction in the spacing between the facing webs with the planar members within the reduced spacing being deformed.

4. A carton formed from the blank of claim **3.**

5. A blank structure for use in being folded into a rectangular parallelepiped type carton having four walls and a top and a bottom comprising:

a rectangular shaped wall section for use in being folded to form the four walls of the carton and rectangular shaped flap sections integral with the wall section and respectively disposed on opposite sides thereof for use in being folded to form respectively the top and the bottom of the carton;

the wall section being comprised of a pair of flat, parallel facing webs and an intermediate web extending between and joined to the facing webs and having means to facilitate folding of the section to form the walls of the carton;

the intermediate web comprising a corrugated web including substantially planar sections extending between and interconnected to the facing webs, a plu-

rality of rows of aligned slots in the corrugations, the slots extending transversely to the axes of the corrugations and a plurality of planar strips disposed in the slots and extending transversely to the axes of the corrugations the corrugations providing a means to resist bending along an axis parallel to the plane of the wall section and the strips providing a means to resist bending along a second axis parallel to the plane of the wall section and oriented at an angle to the first axis; and

each flap section being comprised of extensions of said facing webs and an extension of said corregated web, the strips being confined within the area of the wall section and each flap section having slits dividing the section into four flaps and also having means to facilitate folding of the flaps to form the bottom of the carton.

6. A blank structure for use in being folded into a rectangular parallelepiped type carton having four walls and at least a bottom comprising:

a rectangular shaped wall section for use in being folded to form the four walls of the carton and a rectangular shaped flap section integral with the wall section and disposed on one side thereof for use in being folded to form the bottom of the carton;

the wall section being comprised of a pair of flat, parallel facing webs and an intermediate web extending between and joined to the facing webs and having means to facilitate folding of the sections to form the walls of the carton;

the intermediate web comprising a corrugated web including substantially planar sections extending between and interconnected to the facing webs, a plurality of rows of aligned slots in the corrugations, the slots extending transversely to the axes of the corregations and a plurality of planar strips disposed in slots and extending transversely to the axes of the corrugations, the corrugations providing a means to resist bending along an axis parallel to the plane of the wall section and the strips providing a means to resist bending along an axis parallel the plane of the wall section and oriented at an axis to the first axis; and

the flap section being comprised of extensions of said facing webs and an extension of said corrugated web, the strips being confined within the area of the wall section and having slits dividing the section into four flaps and also having means to facilitate folding of the flaps to form the bottom of the carton.

7. A carton formed from the blank of claim **6.**

8. A blank structure in accordance with claim **5** wherein the means to facilitate folding of the wall section to form the walls of the carton is defined by spaced, parallel lines of reduction in the spacing between the facing webs with one facing web deformed toward the opposite facing web along underlying valleys formed by said corrugation and with the planar strips crushed along the lines of reduction.

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