United States Patent [19]

Rous

[11] **3,722,783**

[45] **Mar. 27, 1973**

[54] **CARTON**

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[73] Assignee: **Grand City Container Corporation**, North Bergen, N.J.

[22] Filed: **Mar. 27, 1972**

[21] Appl. No.: **238,634**

[52] **U.S. Cl.** .....**229/40**, 206/46 FR

[51] **Int. Cl.** **B65d 5/02**

[58] **Field of Search**.....229/40, 34 HW; 206/46 FR, 62 R

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Primary Examiner—Samuel B. Rothberg
Assistant Examiner—Stephen P. Garbe
Attorney—Harvey W. Mortimer et al.

[57] **ABSTRACT**

A carton for packaging an article is formed from a single piece blank and includes a bottom wall and two inner end flaps which are hingedly connected to the bottom wall and which are oblique with respect to the bottom wall. A pair of tabs are formed in the bottom wall of the carton. The tabs are hingedly connected to the bottom wall such that the axis of rotation of each tab is spaced inwardly from the axis of rotation of each inner end flap. In the preferred embodiment, the tab is normally positioned perpendicular to the bottom wall of the carton. In an alternate embodiment, the tab forms an angle with the bottom wall of the carton.

8 Claims, 12 Drawing Figures

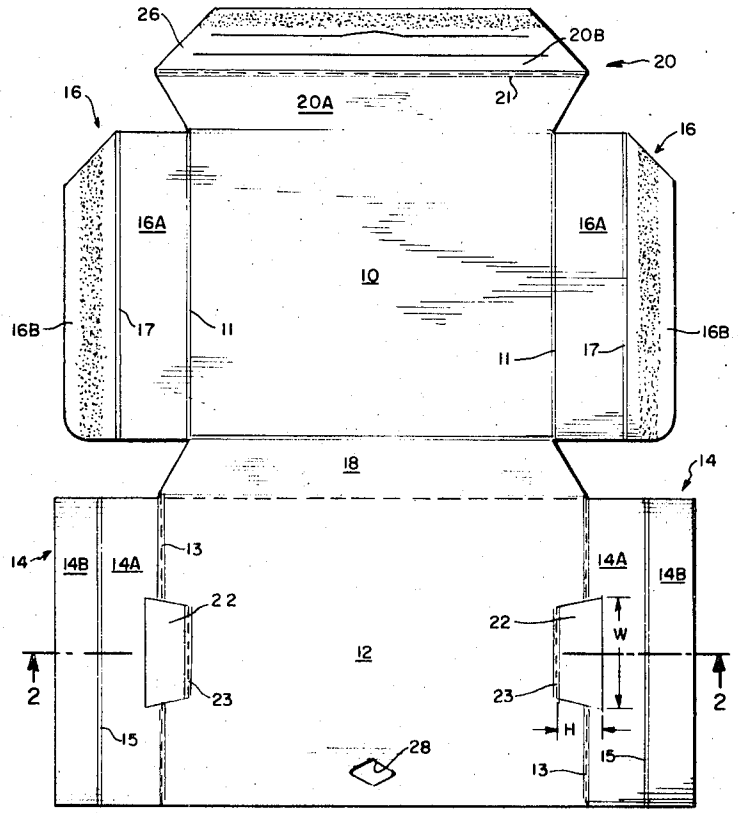


FIG. 1

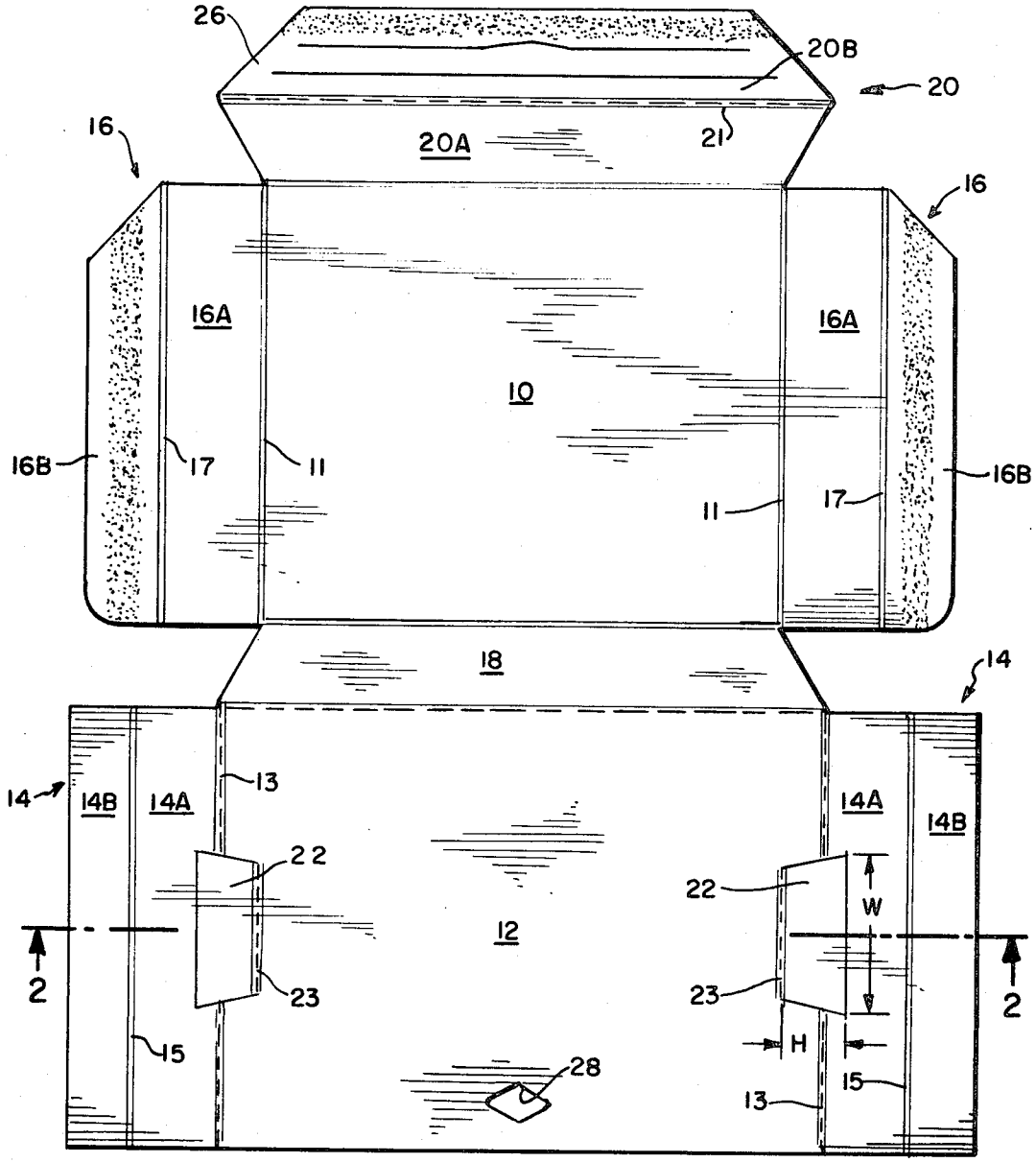


FIG. 2

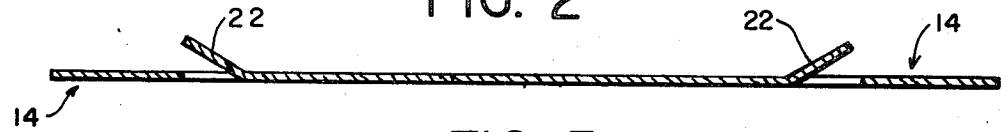


FIG. 3

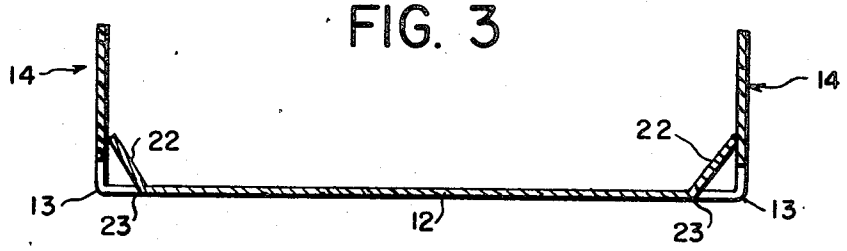


FIG. 4

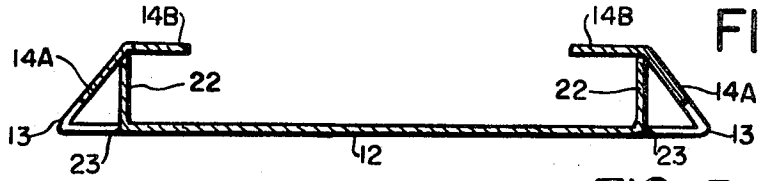


FIG. 5

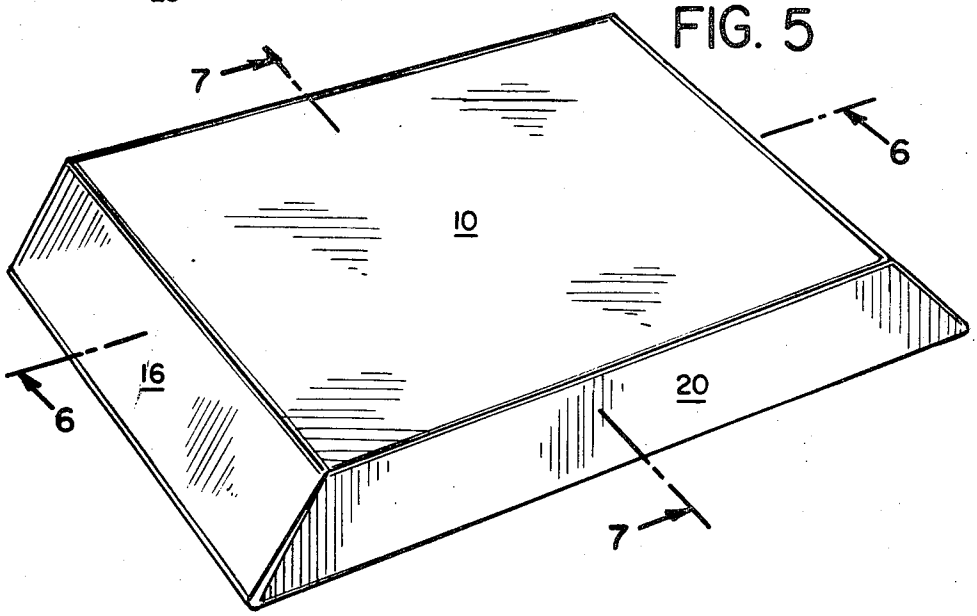


FIG. 6

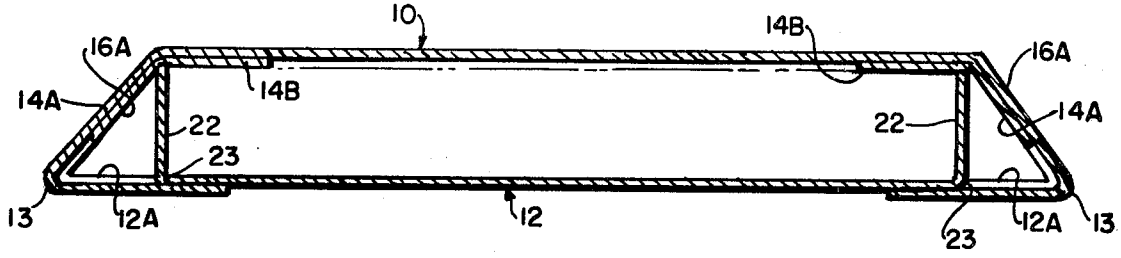


FIG. 7

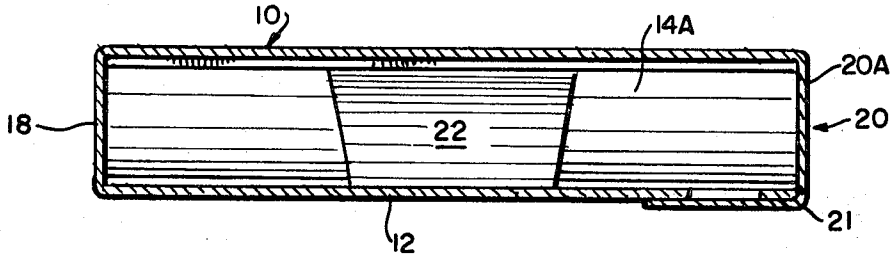


FIG. 8

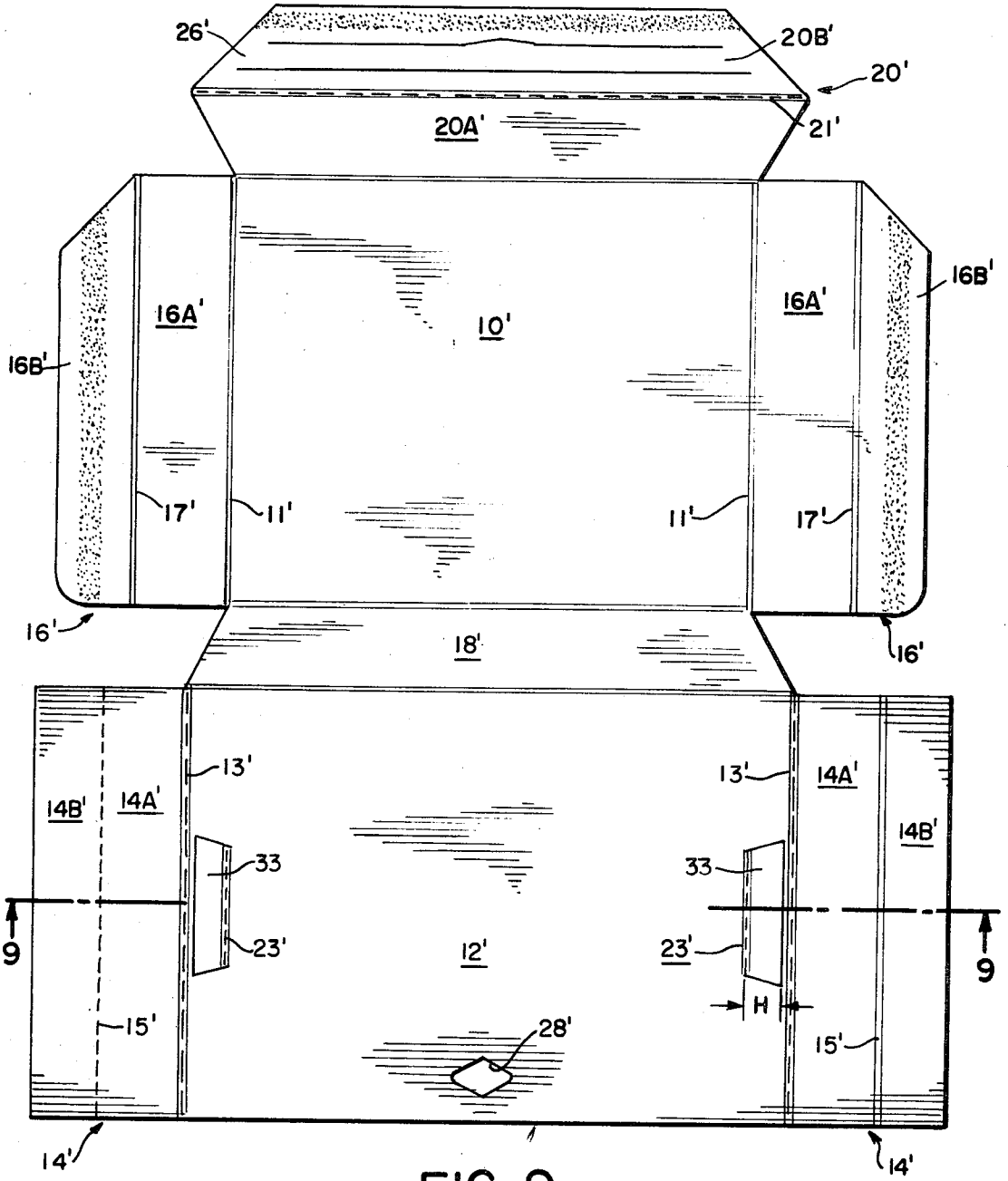

26'
20B'
20'
21'
20A'
16A'
16B'
10'
16A'
16B'
17'
11'
11'
17'
16'
18'
16'
14B'
14A'
13'
13'
14A'
14B'
33
33
9
23'
12'
23'
9
H
15'
28'
15'
14'
14'

FIG. 9

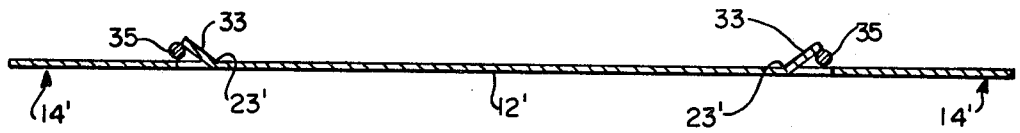

35
33
33
35
14'
23'
42'
23'
14'

FIG. 10

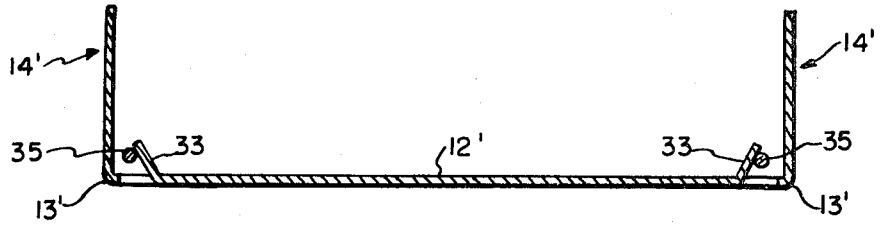


FIG. 11

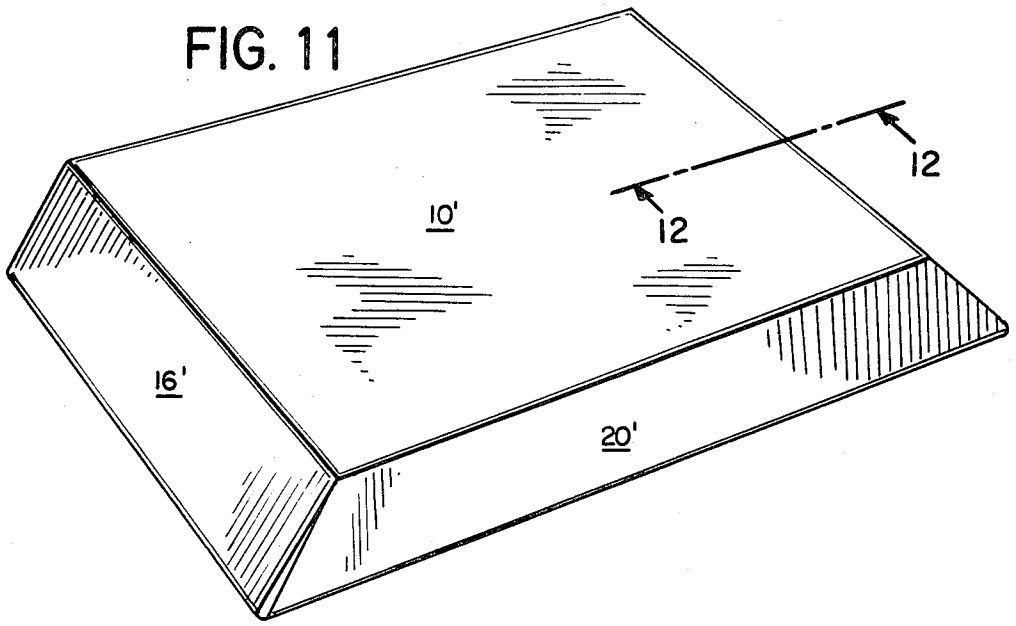
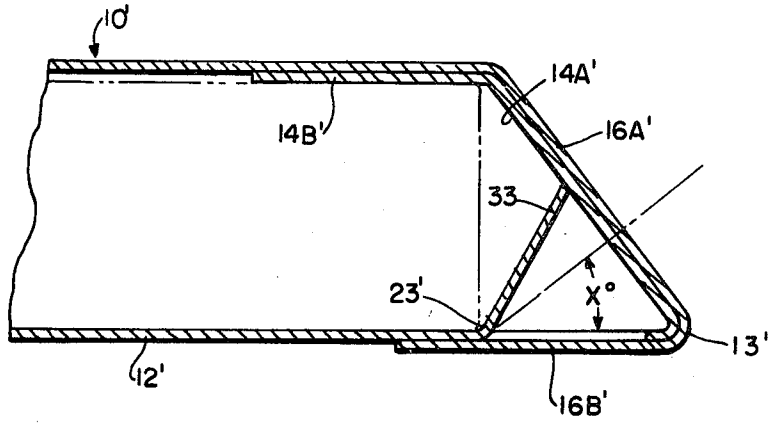


FIG. 12



CARTON

In the carton packaging industry, it is conventional to provide tubular bumpers about the periphery of the carton to protect the contents of the carton from injury during shipment. The hollow bumpers which are often constructed from the side flaps of the carton blanks, form air cells or cushions about the periphery of the article and protect the article against damage if the carton is dropped or bumped on its side.

However, the formation of tubular bumpers on a carton blank is often time consuming and expensive, since the carton blanks are either shipped to the ultimate user with the tubular bumpers already glued (thereby increasing shipping space and costs) or they are shipped in a substantially flat position and the tubular bumpers must be erected by the ultimate user, either manually (which is time consuming) or with expensive machinery. Further adding to the cost of erecting tubular bumpers on cartons, is the increased use of material in the construction of the carton since additional material must be used to form the tubular bumpers.

It is accordingly an object of this invention to provide a carton for packaging an article which is relatively easy and inexpensive to manufacture and erect, and which provides an air cushion about at least two sides of the article.

It is a further object of this invention to provide a carton for packaging an article which automatically positions the article centrally of the carton air cushion and which holds the article in that position.

It is a further object of this invention to provide a carton with an air cushion which is adapted for use with high-speed carton erecting and article inserting machinery.

The carton of the invention described herein consists of a top and bottom wall, the long dimension of the bottom wall being greater than the long dimension of the top wall; a pair of inner end flaps hingedly connected to the end edges of the bottom wall; a pair of outer end flaps hingedly connected to the end edges of the top wall and adapted to overlap the inner end flaps; a side wall, one edge of which is hingedly connected to the side edge of the bottom wall and the other edge of which is hingedly connected to the side edge of the top wall; and a side flap which is hingedly connected to the other side edge of the top wall. In the erected carton, the inner end flaps form an acute angle with the bottom wall of the carton.

A pair of tabs are formed from a cutout portion of the bottom wall. The tabs are cut out on three sides and are hingedly connected to the bottom wall of the carton. The pivot axis of each of the tabs is spaced inwardly from the pivot axis of the corresponding inner end flap of the carton.

In the preferred embodiment, each tab extends perpendicularly upwardly from the bottom wall of the carton. The pivot axes of the pair of tabs in the bottom wall of the carton are spaced a distance apart which is approximately equal to the length of the article to be packaged. Thus, when the tabs extend perpendicularly upwardly from the bottom wall of the carton, they engage the end edges of the article to be packaged and prevent it from shifting within the carton. The height of each tab can be equal to or less than the thickness of the article to be packaged. Also, for reasons explained below, the height of each tab must be greater than the distance between the pivot axis of the tab and the corresponding pivot axis of the nearest inner end flap.

In the alternate embodiment, each tab forms an angle with the bottom wall of the carton. Nevertheless, the lowermost portion of each tab engages the end edges of the article to be packaged and prevents it from slipping within the carton. The height of each tab in the alternate embodiment of this invention must be less than the thickness of the packaged article. Also, the height of each tab must be greater than the length of an imaginary line extending perpendicularly from the inner side flap of the carton to the pivot axis of the tab. If the tab were shorter than that line, it could slip down to a substantially horizontal position and it would no longer prevent the packaged article from sliding within the carton.

In both the preferred and alternate embodiments described above, a triangular bumper is formed on the ends of the carton which protect the packaged article from damage during shipment. Also, it is not necessary that the transverse dimension of the tabs extend the entire width of the packaged article. The triangular bumpers result in a great materials savings over the use of the more conventional rectangular bumpers since the hypotenuse of a triangle is shorter than the sum of its two adjacent sides. Another aspect of the materials saving feature of this invention is that the tabs are formed from a cutout portion of the bottom wall of the carton. (In the preferred embodiment, a portion of the inner side flap is also cut out to form the tab.)

Another feature of this invention is the ease with which these cartons can be erected and packaged, using high-speed machinery.

The preferred embodiment of the carton blank of this invention is loaded onto the article-inserting and carton-erecting machine in an essentially flat position. The cutout tabs are punched out and raised slightly so that they form a slight angle with the bottom wall of the carton. As the essentially flat carton blank is conveyed along the conveyor, conventional plows act on the inner end flaps of the carton and roll the end flaps upwardly so that the inwardly facing surfaces of the inner flaps engage the edges of the tab and progressively pivot the tabs upwardly into a substantially vertical position. During this process, the packaged article is inserted into the carton blank. The action of the plows on the inner side flaps cause the tabs to reach a vertical position and to properly position the packaged article in the carton and prevent it from slipping. It should be noted that no gluing operation is necessary to hold the tab in place. This is accomplished solely by the action of the inner end flaps.

An alternate embodiment of the carton blank of this invention is also placed on a conventional article-inserting and carton-erecting machine in a substantially flat position. The tabs of the alternate embodiment are punched out and raised to a certain angle described below. At this point, mechanical means such as metal bars are positioned beneath the raised tabs to hold them in their raised position. As the substantially flat carton blank proceeds along a conveyor, the inner end flaps of the carton are progressively raised by conventional plows. Since the height of the tab is greater than the distance between a line drawn perpendicularly from the inner end flaps to the pivot axis of the tabs

(when the carton is fully erected) and since the tab forms an angle with the bottom wall which is greater than the angle formed by the bottom wall and a line drawn perpendicularly from the inner end flap (when the carton is fully erected) to the tab pivot axis, the tab does not interfere with the progressive pivoting of the inner end flaps by the plows. In this embodiment, the tab may or may not be pivoted further upwardly by the pivoting action of the inner end flaps. Of course, when the inner end flap pivots sufficiently so that it contacts the end edge of the tab, it is no longer necessary for the mechanical means to hold up the tab, and it can be removed. Since the height of the tab is greater than the length of a line drawn perpendicularly from the inner end flap to the pivot axis of the tab, the tab cannot slide downwardly to a horizontal position. Accordingly, the packaged article is not permitted to slip or slide in the carton. It is only necessary that the lowermost portion of the tab be contacting the packaged article in order to prevent it from slipping or sliding.

Another feature of both embodiments of this invention is that outer end flaps which are hingedly connected to the top wall overlap the inner end flaps and provide a double thickness of protection for the more fragile end edges of the packaged article.

Another feature of this invention is that the inner and outer end flaps are oblique with respect to the bottom wall of the carton.

These and other objects and features of this invention will be more readily understood and appreciated by reference to the following descriptions and drawings, of which:

FIG. **1** is an enlarged plan view of a non-erected carton blank, showing the preferred embodiment of this invention;

FIG. **2** is a front view of a partially erected portion of the carton blank which is illustrated in FIG. **1**;

FIG. **3** is a front view of a partially erected portion of the carton blank which is illustrated in FIG. **1**;

FIG. **4** is a front view of a partially erected portion of the carton blank which is illustrated in FIG. **1**.

FIG. **5** is a perspective view of the erected carton which is illustrated unerected in FIG. **1**;

FIG. **6** is a cross-sectional view of the carton illustrated in FIG. **4**, taken along the lines **6—6**;

FIG. **7** is a cross-sectional view of the carton illustrated in FIG. **5** taken along the lines **7—7**;

FIG. **8** is an enlarged plan view of a non-erected carton blank showing an alternate embodiment of this invention;

FIG. **9** is a front view of a partially erected portion of the carton blank which is illustrated in FIG. **8**;

FIG. **10** is a front view of a partially erected portion of the carton blank which is illustrated in FIG. **8**,

FIG. **11** is a perspective view of the erected carton which is illustrated unerected in FIG. **8**; and

FIG. **12** is a cross-sectional view of a portion of the carton illustrated in FIG. **11**, taken along the lines **11—11**.

Referring now to FIG. **1**, the preferred embodiment of the carton of the invention described herein consists of a top wall **10** and a bottom wall **12**; a pair of inner end flaps **14** which are hingedly connected to the bottom wall end edges; a pair of outer end flaps **16** which are hingedly connected to the top wall **10** and which are adapted to overlap the inner end flaps **14**; a side wall **18**, the upper portion of which is hingedly connected to the top wall **10** and the lower portion of which is hingedly connected to the bottom wall **12**; and a side flap **20** which is hingedly connected to the other side edge of the top wall **10**.

Outer end flaps **16** are composed of an inner portion **16A** and an outer portion **16B** separated by a scoreline **17**. The outer end flaps are hingedly connected to the top wall along scorelines **11**. Likewise, inner end flaps **14** are composed of an inner portion **14A** and an outer portion **14B** divided by scoreline **15**. The inner end flap **14** is hingedly connected to the bottom wall **12** along scoreline **13**. Scoreline **13** may be partially perforated to facilitate bending of the end flap. Side flap **20** is composed of an inner portion **20A** and an outer portion **20B** which are separated by a partially perforated scoreline **21**.

Tabs **22** are formed partly in bottom wall **12** and partly in the inner end flap inner portion **14A**. The tabs **22** are completely cut out about three sides and are hingedly connected to the bottom wall of the carton along a partially perforated scoreline **23**. The partially perforated scorelines **23** and **13** are substantially parallel to one another. The tab **22** is centrally positioned in the bottom wall so that the transverse axis of the bottom wall **12** and the tab **22** coincide.

The height (marked H) of the tab **22** is approximately the same as the thickness of the article to be packaged, although the height of the tab can be less. However, the height of the tab must be greater than the distance between the pivot axes of the tab **22** and the inner end flap **14**; that is, the height of the tab must be greater than the distance between the score-lines **13** and **23**. It is also important that the distance between scorelines **13** and **23** be no greater than the thickness of the article to be packaged.

Strips of glue (indicated by speckled shading in the drawings) are applied to the outer end flaps' outer portion **16B** and to the side flap outer portion **20B**. A tearstrip **26** is also formed in the side flap outer portion **20B**. A recess **28** in the bottom wall of the carton permits a portion of the tearstrip to be pushed downwardly so that it is easier to grasp the other portion of the tearstrip and easily open the carton.

Referring now to FIG. **2**, in the process of inserting the article to be packaged into the carton and erecting the carton, the carton is first placed on a conveyor in a substantially flat position. As the flat carton blank proceeds along the conveyor, the tabs **22** are pushed upwardly so as to form a slight angle of approximately **10** degrees with the bottom wall of the carton. As the carton blank progresses further along the conveyor, conventional plows engage the inner end flaps **14** and rotate them upwardly about the scoreline **13**. As the inner end flaps are rotated upwardly, they engage the tabs **22** and rotate them upwardly.

Further rotation of the inner end flaps **14** causes further rotation of the tabs as illustrated in FIG. **3**. When the inner end flaps are in the substantially vertical position illustrated in FIG. **3**, the article to be packaged is inserted into the carton blank. Further rotation of tabs **22** causes the article to be correctly positioned in the carton between the two tabs.

The tabs 22 prevent the packaged article from slipping into the air cushion formed by the tab 22, the inner flap inner portion 14A, and the bottom wall portion 12A.

The inner flap outer portion 14B is then folded over to a substantially horizontal position so that it partially covers the packaged article, as illustrated in FIG. 4. The only step remaining for completely closing the carton is for the top wall of the carton to be folded over onto the partially erected portion illustrated in FIG. 4. The result is the completely erected carton illustrated in FIG. 5.

Referring now to FIG. 6, the top wall 10 of the carton directly engages the inner end flap outer portions 14B. The outer end flap inner portions 16A overlap the inner end flap inner portions 14A so as to form a double thickness of material. Also, the outer end flap outer portions 16B overlap the outer bottom wall portions 12A so as to provide a double thickness of material along the base of the triangular cushion. As best illustrated in FIGS. 6 and 7, the tabs 22 prevent the packaged article from slipping or sliding within the carton. The triangular bumpers formed by the inner and outer end flaps 14 and 16 provide an air cushion which protects the ends of the packaged article and also provides a double thickness of material around the air cushion to strengthen it.

As previously indicated, in the preferred embodiment, it is important that the height of the tabs be greater than the distance between the pivot axis of the tab and the pivot axis of the inner end flaps, that is, the distance between scorelines 23 and 13. If the height of the tab were less than the distance, the tab would be wholly within the bottom wall of the carton so that it would fall down to a horizontal position prior to the rotation of the inner end flap into engagement with the tab. It was also indicated above that it is necessary that the height of the tab not be greater than the thickness of the article to be packaged. Otherwise, the uppermost portion of the tab would interfere with the downward motion of the inner end flap outer portion 14B into engagement with the packaged article. It is also necessary that the distance between the scorelines 23 and 13 be less than the thickness of the packaged article. Otherwise, the tab would not extend to the inner end flap inner portion and it would fall downwardly to a horizontal position prior to the time that it was engaged by the inner end flap inner portion, as described above.

Referring now to FIG. 8, the carton blank of the alternate embodiment of this invention, is illustrated. The upper portion of the carton blank is exactly the same as the upper portion of the carton blank illustrated in FIG. 1. The lower portion of the carton blank illustrated in FIG. 8 is the same as the lower portion of the carton blank of the preferred embodiment with the exception that the height of the tabs in the alternate embodiment is less than the height of the tabs in the preferred embodiment. As illustrated in FIG. 8, the height (designated H') of the tabs 33, is less than the distance between the pivot axis of the tab and the pivot axis of the inner end flap. The elements illustrated in FIGS. 8–12 which are marked with primed numerals respond to the same description as the corresponding elements in the preferred embodiment designated by the corresponding unprimed numerals.

When the carton blank of the alternate embodiment of this invention is to be erected and an article is to be inserted into the carton, the carton blank is placed on an article-inserting and carton-erecting machine in a substantially flat position, as illustrated in FIG. 9. The tabs 33 are manually or mechanically raised upwardly as illustrated in FIG. 9, and are held in their raised position by an insert 35. The amount that each of the tabs 33 is raised is determined by the length of the inner end flap 14' and the angle which the inner end flap inner portion 14A' forms with the bottom wall of the carton, as explained in more detail below.

Referring now to FIG. 10, the mechanical insert 35 continues to hold each of the tabs 33 in a raised position as the inner end flaps inner portion 14A' are progressively rotated upwardly. If the tabs were not held in their raised position by mechanical inserts 35, they would fall downwardly to a substantially horizontal position and not prevent the packaged article from sliding within the carton.

In FIG. 12, a dotted line has been drawn which extends perpendicularly from the inner end flap inner portion 14A' to the pivot axis of the tab 33. The dotted line forms an angle X with the bottom wall of the carton. The angle at which the tab 33 must be held by the insert 35 must be greater than X°. Also, the height of the tab 33 must be greater than the length of the angled dotted line in FIG. 12. This is necessary so that the tab 33 does not fall downwardly to a substantially horizontal position, once the triangular bumper has been erected. It is also necessary that the tab be held at an angle greater than X° while the plows are rotating the inner end flaps from a substantially horizontal position to the triangular position illustrated in FIG. 12, so that the edge of the tab does not interfere with the rotation of the inner end flap.

The height or length of the tab 33 must be greater than the length of the dotted line, but it cannot be greater than the thickness of the packaged article so that it interferes with the folding over of the inner end flap outer portion across the top of the packaged article. The height of the tab 33 in FIG. 12 is between those two limits. Once the tab 33 is engaged by the inner end flap inner portion 14A', it is rotated progressively upwardly to a degree depending on the height of the tab. When the tab 33 is engaged by the inner flap inner portion, there is no further need for the mechanical inserts 35 which hold the tabs in a raised position.

The packaged article is held in position in the carton by the lowermost portion of the tab 33.

It should also be noted that in both embodiments the packaged article is held in position in the carton both at its top and at its bottom. The bottom of the packaged article is held in position by the tabs 22. The top of the packaged article is held in position by the angled pockets formed by panels 14A and 14B at score lines 15.

While embodiments of various aspects of the invention have been shown in the drawings, it is to be understood that this disclosure is for the purpose of illustration and that various changes in shape and proportion and arrangement of parts, as well as the substitution of equivalents for those herein shown and described, may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A carton for packaging an article comprising: a rectangularly shaped bottom wall and top wall, the length of said bottom wall being greater than the length of said top wall; a pair of first walls, each of said first walls being hingedly connected to a side of said bottom wall, the lines of connection between each said first wall and said bottom wall defining the axis of rotation of said first wall; a pair of tabs, each of said tabs being hingedly connected to said bottom wall, the line of connection between each said tab and said bottom wall defining the axis of rotation of said tab; the axis of rotation of each said tab being spaced inwardly with respect to said bottom wall from the axis of rotation of each said first wall; at least a portion of each said tab being formed from a cutout portion of said bottom wall; the height of each said tab being equal to or less than the height of the packaged article, the height of each said tab being greater than the distance between the axis of rotation of said tab and the axis of rotation of said first wall.

2. The carton recited in claim 1 wherein the distance between the axis of rotation of each said tab and the axis of rotation of each said first wall is less than the thickness of the article to be packaged.

3. A carton for packaging an article comprising: a rectangularly shaped bottom wall and top wall, the length of said bottom wall being greater than the length of said top wall; a pair of first walls, each of said first walls being hingedly connected to a side of said bottom wall, the lines of connection between each said first wall and said bottom wall defining the axis of rotation of said first wall; a pair of tabs, each of said tabs being hingedly connected to said bottom wall, the line of connection between each said tab and said bottom wall defining the axis of rotation of said tab; the axis of rotation of each said tab being spaced inwardly with respect to said bottom wall from the axis of rotation of each said first wall; at least a portion of each said tab being formed from a cutout portion of said bottom wall; the height of each said tab being equal to or less than the height of the packaged article, at least a portion of each said tab being formed by a cutout portion in each said first wall.

4. A carton for packaging an article comprising: a rectangularly shaped bottom wall and top wall, the length of said bottom wall being greater than the length of said top wall; a pair of first walls, each of said first walls being hingedly connected to a side of said bottom wall, the lines of connection between each said first wall and said bottom wall defining the axis of rotation of said first wall; a pair of tabs, each of said tabs being hingedly connected to said bottom wall, the line of connection between each said tab and said bottom wall defining the axis of rotation of said tab; the axis of rotation of each said tab being spaced inwardly with respect to said bottom wall from the axis of rotation of each said first wall; at least a portion of each said tab being formed from a cutout portion of said bottom wall; the height of each said tab being equal to or less than the height of the packaged article, the height of each said tab being greater than the length of a line extending perpendicularly from each said first wall to the axis of rotation of each said tab, each said first wall forming an acute angle with respect to said bottom wall.

5. A carton for packaging an article comprising: a rectangularly shaped bottom wall and top wall, the length of said bottom wall being greater than the length of said top wall; a pair of first walls, each of said first walls being hingedly connected to a side of said bottom wall, the lines of connection between each said first wall and said bottom wall defining the axis of rotation of said first wall; a pair of tabs, each of said tabs being hingedly connected to said bottom wall, the line of connection between each said tab and said bottom wall defining the axis of rotation of said tab; the axis of rotation of each said tab being spaced inwardly with respect to said bottom wall from the axis of rotation of each said first wall; at least a portion of each said tab being formed from a cutout portion of said bottom wall; the height of each said tab being equal to or less than the height of the packaged article, each said tab being positioned at a first angle with respect to said bottom wall, said angle being greater than a second angle, said second angle being defined by said bottom wall and a line extending perpendicularly from each said first wall to the axis of rotation of each said tab, each said first wall forming an acute angle with respect to said bottom wall.

6. A carton for packaging an article comprising: a rectangularly shaped bottom wall and top wall, the length of said bottom wall being greater than the length of said top wall; a pair of first walls, each of said first walls being hingedly connected to a side of said bottom wall, the lines of connection between each said first wall and said bottom wall defining the axis of rotation of said first wall; a pair of tabs, each of said tabs being hingedly connected to said bottom wall, the line of connection between each said tab and said bottom wall defining the axis of rotation of said tab; the axis of rotation of each said tab being spaced inwardly with respect to said bottom wall from the axis of rotation of each said first wall; the height of each said tab being equal to or less than the height of the packaged article; each said tab, at least a portion of each said first wall and the portion of said bottom wall between the axis of rotation of each said tab and each said first wall defining a triangular bumper for protecting the packaged article.

7. A carton for packaging an article comprising: a rectangularly shaped bottom wall and top wall, the length of said bottom wall being greater than the length of said top wall; a pair of first walls, each of said first walls being hingedly connected to a side of said bottom wall, the lines of connection between each said first wall and said bottom wall defining the axis of rotation of said first wall; a pair of tabs, each of said tabs being hingedly connected to said bottom wall, the line of connection between each said tab and said bottom wall defining the axis of rotation of said tab; the axis of rotation of each said tab being spaced inwardly with respect to said bottom wall from the axis of rotation of each said first wall; the height of each said tab being equal to or less than the height of the packaged article; each said tab, at least a portion of each said first wall and the portion of said bottom wall between the axis of rotation of each said tab and each said first wall defining a triangular bumper for protecting the packaged article, at least a portion of each said tab being formed by a cutout portion in each said first wall and the distance between the axis of rotation of each said tab and the

axis of rotation of each said first wall being less than the thickness of the article to be packaged.

8. The carton recited in claim 7 wherein the entirety of each said tab is formed from a cutout portion of said bottom wall and wherein the height of each said tab is greater than the length of a line extending perpendicularly from each said first wall to the axis of rotation of each said tab, each said first wall forming an acute angle with respect to said bottom wall.

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