United States Patent

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[72] Inventor **John S. Troth**
Greenville, Delaware

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[73] Assignee **Potlatch Forests, Inc.**
Chicago, Illinois
a corporation of Delaware. by mesne assignments to The Finn Industries Division

[54] **CUSHIONED FOLDING CARTON**
4 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **229/38,** 229/14; 206/46
[51] **Int. Cl.** **B65d 5/08,** B65d 5/56, B65d 25/14
[50] **Field of Search** ..... 229/14C, 14H; 206/46(Fiem), 51D

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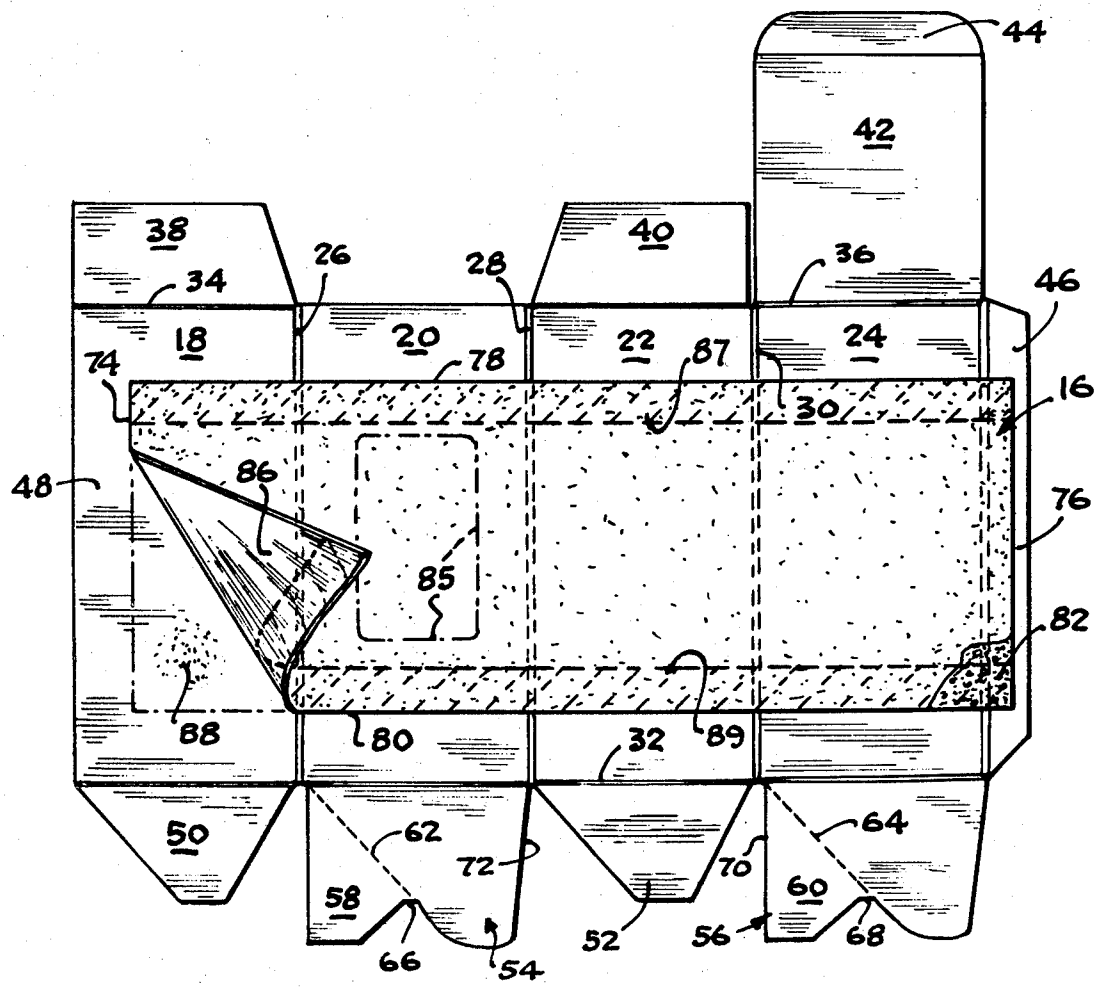
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Primary Examiner—Davis T. Moorhead
Attorney—Dominik, Knechtel & Godula

ABSTRACT: A flat-foldable carton with a foamed elastomeric resin sheet on the inside surface to provide cushioning for an article deposited within the formed carton, and to also provide a frictional surface against rotation and lateral displacement of the carton. The resin sheet is substantially of uniform thickness, but is relatively thin. The sheet is preferably disposed along less than the total side wall area of the carton while still providing effective contact with the deposited article. The resin sheet is bonded to the inside surface of a carton blank in an improved way by providing the resin sheet with a laminated paper backing.



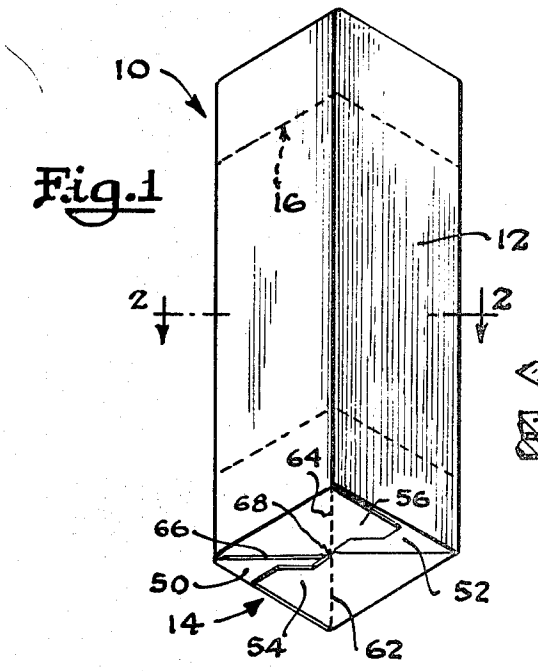


Fig.1

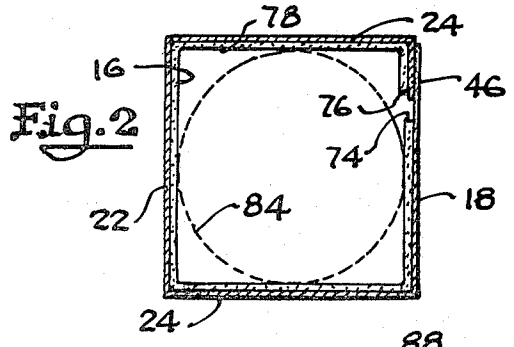


Fig.2

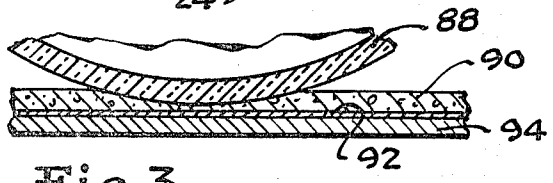


Fig.3

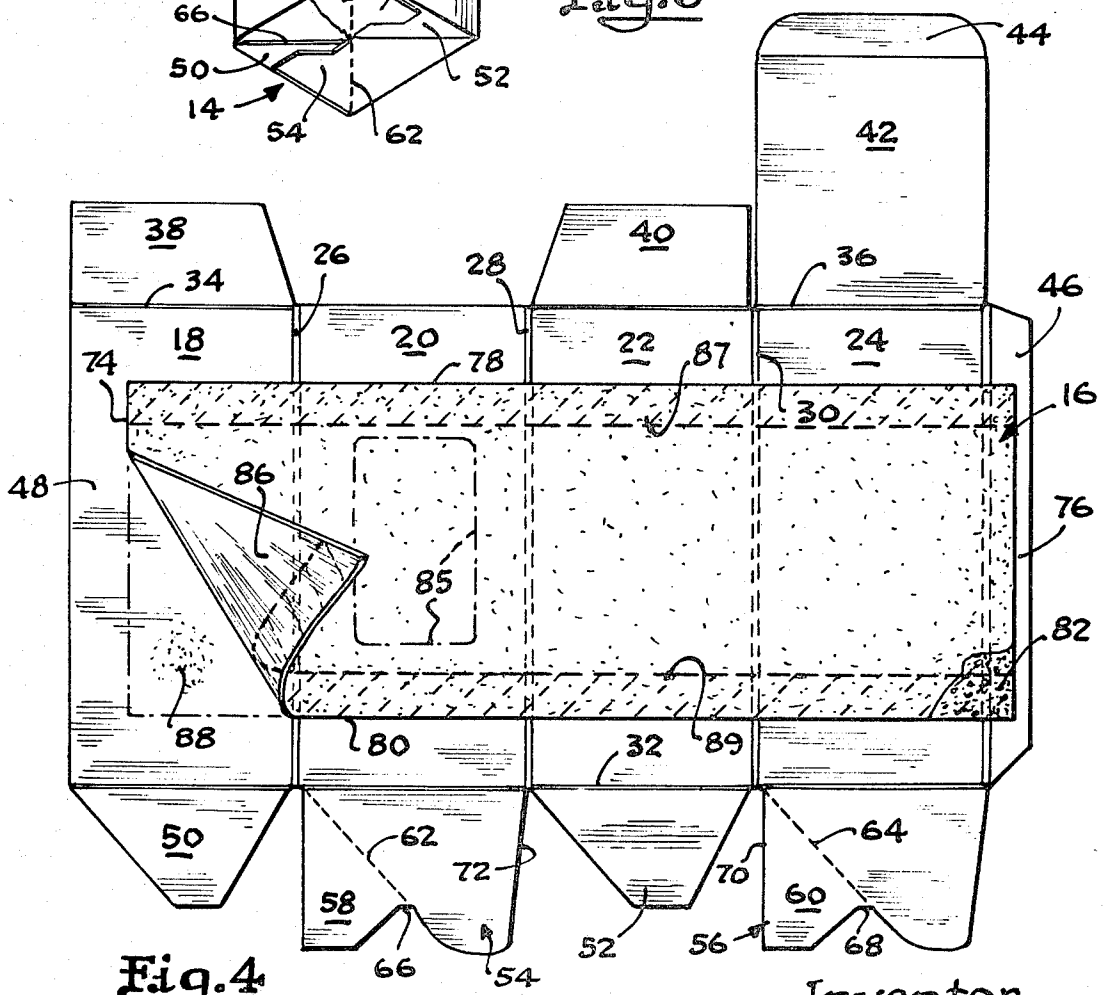


Fig.4

Inventor
John S. Troth
By Dominik, Stein & Kuechtel
Attorneys

CUSHIONED FOLDING CARTON

This invention relates to cartons for packaging articles, in particular, to cartons intended for packaging articles which are to be cushioned within the package.

The packaging art has long provided cushioning means for certain types of articles, such as bottles. Such means have principally taken the form of a fluted paper board cylinder which is placed within the carton, or which is first mounted around an article and then deposited in the carton. It is recognized that such cylinders lead to significant cost increases when considering the large production runs of cartons. It is also recognized that such fluted cylinders do no solve all the problems which may arise in a particular cushioning project. Such cylinders provide fairly effective cushioning against transverse shocks but do not contribute in any way towards resisting lateral displacement of an article in the carton. Such a displacement is in a direction between the top and bottom of the carton, or along the lateral or side walls of the carton.

Certain cushioning problems may include considerations of cushioning the top and bottom of an article within the carton, and the fluted cylinders are not adequate for such purposes. Fillers such as batting have also been used to provide cushioning to the effective contact area of an article, but such means also may lead to disadvantages of cost, as well as requiring more cumbersome methods in completing assembly of the package.

Accordingly, it is one object of the present invention to provide an improved cushioning for the interior of cartons in which an article is not only cushioned against transverse shocks, but which additionally is restrained against moderate tendencies of rotation and lateral displacement.

Still another object of the invention is an improved cushioning for a carton which additionally provides an effective frictional surface to resist rotation of an article, and to likewise resist lateral displacement of the article.

Yet another object of the invention is an effective cushioning means of the type indicated which allows substantial savings in paper board to be realized. A feature of the object is to provide less costly materials than paper board while still enjoying the desired cushioning advantages, as well as still other advantages.

Still another object of the invention is the provision of a foamed polyurethane sheet which is bonded to the inside surfaces of the lateral walls of the carton, but which sheet may have an area less than the total area of the inside of the lateral walls. A feature of this object is to realize economies in the size of the foamed sheet which is bonded, while still attaining an effective contact area for cushioning and for frictional contact with the article.

A further object of the invention is a cushioned carton of the foregoing type in which a foamed polyurethane sheet is preformed and then bonded to the inside lateral walls of the carton, as a unitary sheet or as a plurality of strips, in an economical and improved way to realize still further advantages in the formed cushioned carton.

A still further object of the invention is to attain improvements and advantages which flow from the combination of a uniformly thin foamed polyurethane sheet which is bonded to a supporting and more or less stiff paper board of a carton. In particular, such object is concerned with the supporting walls of the carton cooperating with the foamed polyurethane sheet to enhance the frictional properties of said sheet.

Other objects of the invention will become apparent and will occur to practitioners in considering the following disclosure.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description, taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of a carton in which the cushioning means are indicated in dotted line, said carton being an embodiment constructed in accordance with the present invention;

FIG. 2 is a sectional view on a slightly enlarged scale taken through a plane which is parallel to the top and bottom of the carton of FIG. 1;

FIG. 3 is a sectional view on a still further enlarged scale and through a plane similar to that of FIG. 2, but showing only a fragmentary portion, including an article within the carton; and

FIG. 4 is a plan view of a blank of sheet material, with the cushioning means, from which the carton is formed.

The use of the same reference numerals will indicate a reference to the same parts in the several views of the drawings.

Referring now to the drawings, in FIG. 1 there is shown a formed carton **10** having continuous side walls indicated at **12**, and a self locking bottom indicated generally at **14**. The cushioning means within the carton are shown by dotted line at **16**. The particular construction of certain features of the carton, such as the top and bottom closures, are not essential to an understanding or to the practices of the invention, and reference will be made to such features only to better understand the context or environment of the invention.

Reference is now made to the blank material of FIG. 4 which shows the inside surfaces of the blank, and which will form the interior of the formed carton of FIG. 1. The blank is a single sheet of material in generally rectangular form. It includes four mutually paired lateral or side walls **18**, **20**, **22**, and **24**. The lateral walls are separated from one another by creases or score marks **26**, **28**, and **30**. The foregoing vertical score marks are disposed at a normal relation to horizontal score marks or creases such as **32** at the bottom of the blank, and **34** and **36** at the top of the blank. It will be seen that the vertical creases such as **30** are wider or are of greater size than the horizontal creases such as **32**. The reason for this difference will be later apparent.

Three top closure flaps are shown along the top edge of the blank, and they include side flaps **38** and **40** extending, respectively, from side walls **18** and **22**; and a closing flap **42** extending from side wall **24**. Flap **42** will overlap side flaps **38** and **40** when the top closure is formed, and lip **44** may then be tucked in between the top of side wall **20** and the fronts of the side flaps in the usual way. A glue flap **46** extends from the terminating side edge of one remote or terminating side wall **24**. The side not shown of the glue flap **46** is provided with an adhesive, and such side may then be placed in face to face engagement with the side portion **48** at the remote edge of the other remote or terminating side wall **18** to form continuous sides **12** of the carton.

Each side wall has a bottom closure flap extending from the bottom edge defined by the horizontal score line **32**. Bottom closure flaps **50** and **52** have similar configuration in the shape of truncated pyramids. These flaps extend from side walls **18** and **22** which confront each other or are parallel to each other in the formed carton. Bottom closure flaps **54** and **56** have similar configurations, and each flap may be viewed as having a tab portion such as **58** and **60**, which tab portions are demarcated from the remaining portions of the flaps by a scored or perforated line **62** and **64**. The scored lines **62** and **64** are disposed as diagonals which extend from the corner of the flaps to the ends of connecting straight edges **66** and **68** between the two portions of the flaps **54** and **56**.

When the glue flap **46** is bonded to the inside portion **48** of side wall **18**, the carton will be folded flat. In that position, the inside of tab portion **60** will be bonded to the outside of flap **52** so that edge **70** is generally alined with score line **32**. The inside of tab portion **58** will be likewise bonded to the outside of flap **50**. In the fully flattened position, the outside surfaces or faces of tab portions **58** and **60** will be in face to face contact. By applying force to the remote side edges of the folded carton, it will be erected or opened, as shown in FIG. 1. When the carton is so opened, the outside of the remaining portion of flap **54** will be moved against the inside of flap **52** so that edge **72** of flap **54** becomes generally alined with horizontal score line **32**. Accordingly, the bottom closure flaps are self-

forming to assume the position shown in FIG. 1 when the carton is opened.

The cushioning means 16 is shown bonded to the inside surfaces of the lateral walls 18—24. Such means are foamed elastomeric sheets of substantially uniform thickness, which additionally present a frictional surface to be engaged by the article deposited in the carton. The sheet is shown herein as being elongated with opposite side edges 74 and 76 being normal to the longitudinal axis of the sheet, and opposite top and bottom edges 78 and 80 being parallel to said longitudinal axis. A foamed polyurethane sheet has superior elastomeric properties, and its face, which is exposed to the interior of the carton, presents a frictional surface as a result of the aggregate of small pores of varying size, a portion whereof is diagrammatically indicated at 82. Such a frictional surface tends to resist the rotation of an article deposited within the carton, and also tends to resist the lateral displacement of the article, that is, in a direction from the top to the bottom of the carton. The foamed polyurethane sheet is therefore seen to possess particularly desirable properties of an elastomer for cushioning against transverse shocks and of a frictional body to counter any rotational or lateral movements of an article within the container.

It is seen that the foamed sheet is a unitary material. When the sheet is bonded to the inside of the side walls, the opposite sides 74 and 76 terminate short of the adjoining edges of, respectively, side wall 18 and glue flap 46. A clearance is thus provided for the overlap of the glue flap with a remote side wall. The unitary or integral formed polyurethane sheet therefore provides a substantially continuous cushioned and frictional surface in the opened carton. This is also seen in the plan view of FIG. 2 where the continuity of the cushioned surface is interrupted only by the small gap between adjoining edges 74 and 76 of the foamed sheet. The gap may be very small or essentially nonexisting if the edges 74 and 76 abut. The continuous sheet provides an effective contact area for deposited articles of various shapes, such as the cylindrical article indicated in phantom at 84 in FIG. 2. The foamed sheet may be modified as by providing a cutout in the sheet which may be registered with a like cutout in a lateral wall such registered cutouts indicated in phantom at 85 in FIG. 4. The cutouts are covered with a transparent plastic film to provide a window in a carton.

It is an advantage of the invention that the effective contact area of the foamed sheet is obtained without requiring such sheet to cover the entire inside area of the lateral walls. The total area of the foamed sheet is less than the total area of the lateral walls as shown by top edge 78 terminating short of the top edge of the lateral walls as marked by score lines 34, 36; and the bottom edge 80 terminating short of the bottom edge of the lateral walls, as marked by score line 32. It has been found that such a limited area of the foamed sheet, relative to the area of the lateral walls, provides an effective contact area for cushioning and for frictional contact for a wide variety of articles deposited in the carton. The reduced area of the foamed sheet results in an added economic attraction of the invention.

The foamed polyurethane sheet is applied to the lateral walls of the blank in an improved way by employing conventional window machines, such as the Stoude Gladiator type window machine. Rolls of the foamed sheet may be fed into the window machine, and such sheets are then bonded to the carton blank with conventional paper board adhesives.

To utilize the full advantage of the window machine for such applications, it has been found to be a marked advantage tp provide the cushioning material as a laminar structure in which paper backing, such as Kraft paper, is laminated to and is coextensive the foamed polyurethane sheet. The paper backing is laminated to the foamed sheet by means of bonding agents which are known to operate with foamed polyurethane resins. Rolls of the foamed polyurethane sheets with the paper backing may than be delivered to the window machine where sheets of desired length are cut before passing through the adhesive applicator of the window machine. Glue or adhesive is rolled onto the paper backing at room temperature, and the strip or sheet is applied by contacting the paper backing with the inside surface of the blank, which preferably is uncoated paper board. The provision of the paper backing leads to a further advantage in that the paper functions in the nature of a blotter along its marginal edges to soak up glue or adhesive so that undesirable spreading of the adhesive beyond the marginal edge of the foamed sheet is substantially eliminated.

The paper backing is indicated at 86 in the turned-back corner of the laminar structure in FIG. 4. The glue or adhesive is indicated at 88. The paper backing allows the laminar structure to be successfully applied by the window machine in the manner described. The reasons for the successful operation of the method include the provision of a paper to board bonding situs which allows conventional bonding and rapid bonding. Without the paper backing, the adhesive cure time in the window machine would generally be too short to effect a direct bonding of the foamed sheet to the board. Another reason for the successful operation of the method is the added body imparted to the foamed sheet by the paper backing. This is required to allow the window machine to effectively handle the laminar roll for cutting, adhesive application, and board application. The method also permits inspection of the laminar rolls and the carton blanks before the application of the strips or sheets to the board. Any defective laminar material or misalinement may be observed and corrected before a substantial number of carton blanks are spoiled.

A foamed polyurethane sheet bonded to the carton blank does not require any scoring or the like to facilitate erection or opening of the carton, or folding thereof. The foamed sheet is flexible and elastomeric and, therefore, accommodates easily to folding of the carton. The foamed sheet does, however, present a certain amount of bulk volume. An accommodation is made to these features by providing wider vertical creases or score lines 26—30. The conventional horizontal score lines 32, 34, and 36 have a width about two times the thickness of the board which is used, but the foregoing vertical score lines are provided with a width about three times the thickness of the board which is used. Such a one-fold increase in the crease is sufficient to allow efficient folding of the foamed sheet.

The thickness of the foamed polyurethane sheet may be somewhat varied to meet different cushioning problems for different articles. It is preferred, however, to keep the sheet fairly thin so that the method of application in the window machine is not adversely affected, and so that more board material is not required for articles of a given dimension. It has been found that the foamed polyurethane sheet or the laminar structure, may be substantially as thick as the board, or it may have a preferred maximum thickness about two to three times the thickness of the board.

Efficient frictional action is obtained from the rough surface of the foamed sheet, especially as enhanced by the combination of the relatively thin foamed sheet and the relatively stiff supporting board of the carton. It is believed that when the board supports the relatively thin foamed sheet, or laminar, the frictional resistance to rotational and lateral displacement is improved. The relatively stiff board imparts body to the sheet so that both the board and the rough surface of the polyurethane sheet contribute to attaining effective frictional resistance. This is indicated in the view of FIG. 3 where the arcuate section 88 represents a portion of a continuous wall of a bottle. A portion of the foamed polyurethane sheet is shown at 90, the laminated paper backing is shown at 92, and a portion of the paper board carton is shown at 94. The wall of the bottle has depressed the sheet so that the stiffness of the board gives support to the compressed area of polyurethane resin between the bottle and the board.

Foamed polyurethane sheets which are useful for this invention may be made by skills well known in that art. A foamed sheet which is successfully used is a fine-pore, flexible polyester, polyurethane foam supplied by the Scott Paper Company under the trade designation of Scott Standard

Foam. Such foams are available in thickness of about one-sixteenth inch, and even thinner. Although the polyurethane foamed sheet has marked advantages, other foamed elastomeric resin sheets may be used such as polystyrene, polyethylene, vinyl chlorides and the like. Also, foamed natural and synthetic rubber may be employed.

The resistance to rotational movement or displacement is particularly desirable to assure orientation of an article in the carton. For example, it may be desirable to allow a user to withdraw an article from the carton with the label disposed towards the user. Lateral displacement could lead to objectionable dislodging of the top or bottom closures of the carton. Orientation is also desirable for cartons having windows such as the one indicated in phantom at **85**. A bottle will be deposited so a label on the bottle can be oriented with respect to such a window.

While a unitary foamed elastomeric sheet is used to advantage, a plurality of foamed strips may be used such as shown in phantom lines at **87** and **89** in FIG. **4**. Such spaced strips lead to even further savings of the foamed sheet while still providing effective contact area for cushioning and for frictional contact. Two or more of such strips are parallel to one another and have long axes which are normal to the long axis of the lateral walls.

One of the additional advantages of the cushioned carton is that it can be manufactured more economically than a carton with a fluted cylinder wrapper. The more economical production is due to reduction of paper board material per given article or bottle size. The complete elimination of the fluted board cylinder, or other cushioning board or filler, leads to great savings in production runs. The cost of forming and applying the cushioned laminar of this invention does not set off the substantial savings realized in reducing the board requirements.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter language, might be said to fall therebetween.

I claim:

1. A flat-foldable carton of paper board material having four lateral walls mutually paired with upright vertical score lines:

a glue flap extending from a terminating side of one remote lateral wall, the outside surfaces of said walls adapted to form the exterior of the formed carton and the inside surfaces of said walls adapted to form the interior of said carton, said lateral walls having top and bottom horizontal score lines and closure flaps at their opposite ends to form the top and bottom closures of said carton;

cushioning and friction means within said carton including a prefoamed polyurethane elastomeric sheet having a frictional surface and having a substantially uniform thickness, said prefoamed polyurethane sheet being present as a part of a laminar structure, said structure comprising a laminated paper backing coextensive with said prefoamed sheet and bonded thereto by a polyurethane adhesive material, and said paper backing of the laminar structure being directly bonded to the inside surfaces of said lateral walls by conventional paper board adhesives, said laminar structure having an elongated axis parallel to the top and bottom horizontal score lines, opposite top and bottom edges parallel to said elongated axis, and opposite side edges normal to said top and bottom edges and parallel to a short axis of the laminar structure, said top and bottom edges terminating short of their respective horizontal score lines to obtain a laminar structure having a total area less than a total area of the lateral side walls, a side edge of said laminar structure terminating short of said glue flap, a side portion of the laminar structure joining the remote edge of the other remote lateral wall, the opposite side edge of the laminar structure terminating short of said side portion, the outside of said glue flap adapted to be placed in face to face contact with the inside of said side portion, a paper board adhesive between said contacted faces, said face to face contact further adjoining opposite side edges of the laminar structure; whereby

said thin elastomeric sheet presents a substantially continuous cushioning and frictional surface which is interrupted only by said adjoining edges.

2. A flat-foldable carton of stiff paper board material having four lateral walls mutually paired with upright vertical score lines:

a glue flap extending from a terminating side of one remote lateral wall, top and bottom horizontal score lines and closure flaps at the opposite ends of said lateral walls to form top and bottom closures;

cushioning and friction means within said carton including a relatively thin elastomeric sheet having a substantially uniform thickness, which sheet is bonded to the inside surfaces of said walls, one side edge of said elastomeric sheet terminating short of said glue flap and the opposite side edge of said elastomeric sheet terminating short of the oppositely remote lateral wall edge, said elastomeric sheet having a thickness no greater than about three times the thickness of the lateral carton walls; and

said elastomeric sheet being prefoamed and bonded to the lateral carton walls so that the erected carton provides a substantially continuous cushion within the carton for deposited articles, which elastomeric sheet further tends to resist rotational displacement of the deposited articles by the stiff paper board material of the carton walls providing a support for said cushion and imparting rigidity to said cushion to enhance frictional engagement.

3. A flat-foldable carton as in claim **2**, wherein said elastomeric sheet is a part of a laminar structure which includes a paper backing laminated to and coextensive with said sheet, said paper backing being bonded to said foamed sheet and being further bonded to said foamed sheet and being further bonded to the inside surfaces of the stiff paper board material of said carton lateral walls.

4. A flat-foldable carton as in claim **2** wherein said foamed elastomeric sheet is polyurethane.