# United States Patent [19]

**Young**

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[54] **SEALS FOR DRUMHEAD CARTONS**


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

[51] **Int. Cl.** ..... **B65d 5/02,** B65d 5/12

[58] **Field of Search** ..... 229/37 R



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[57] **ABSTRACT**

This disclosure is directed to an improved method of construction of drumhead type cartons (i.e., parallelepiped cartons whose ends are sealed by independent, taut membranes). A portion of the glue flap in the manufacturer's joint is extended beyond the end edges and is provided with a special edge configuration (e.g., sawtooth or non-straight edge) to provide a transverse dam or dams at the region of the manufacturer's joint to which the membrane is tightly adhered. Absolute tightness at the joint maybe further enhanced by simultaneosuly cross-crushing and cross-sealing the membrane and underlying special edge portions by a specially configured sealing platen.


**4 Claims, 8 Drawing Figures**

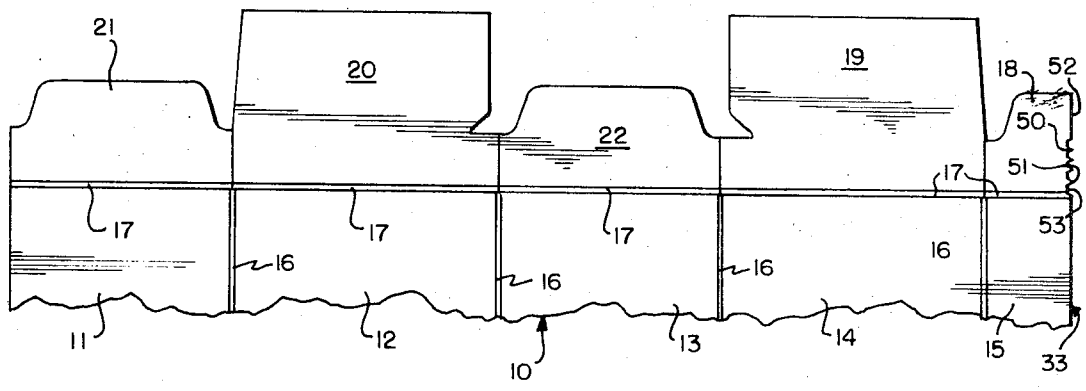
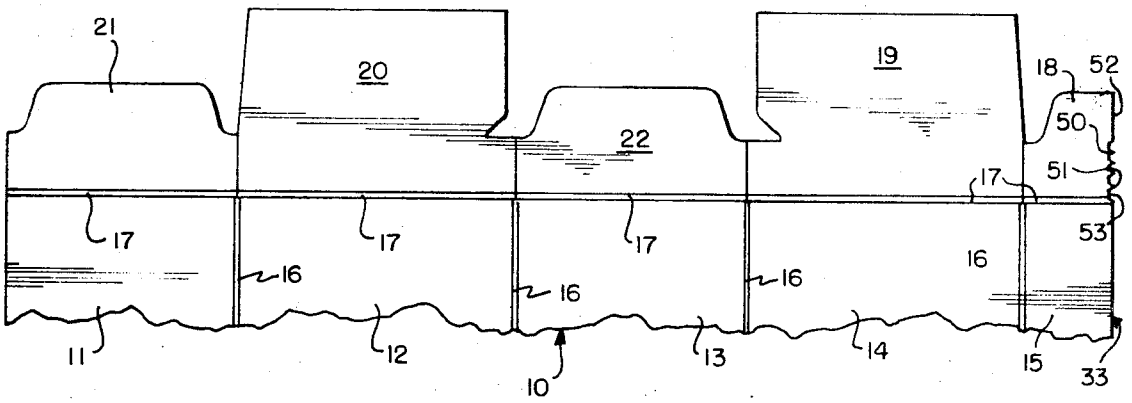


FIG. 1



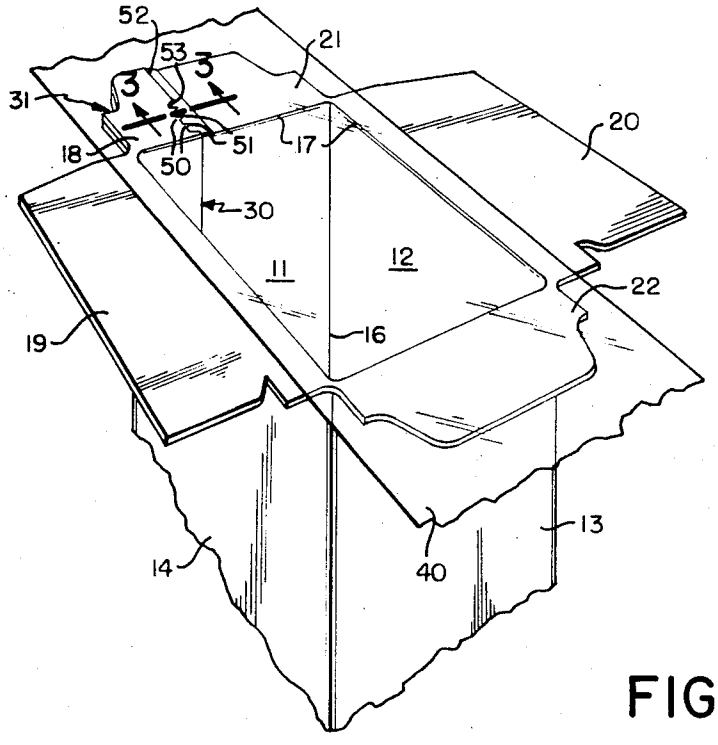
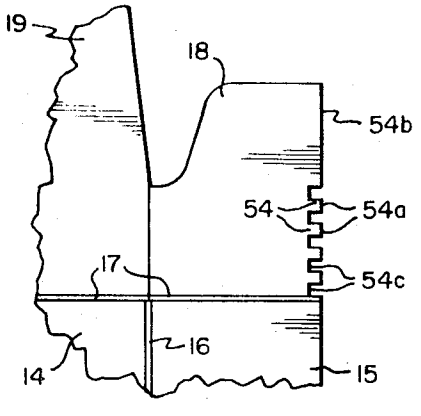




FIG. 2

FIG. 3



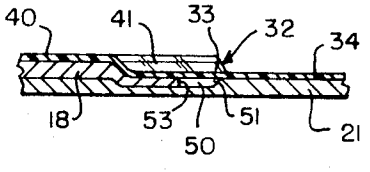
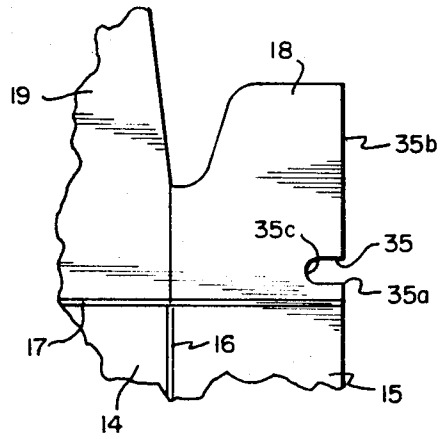




FIG. 4

FIG. 5



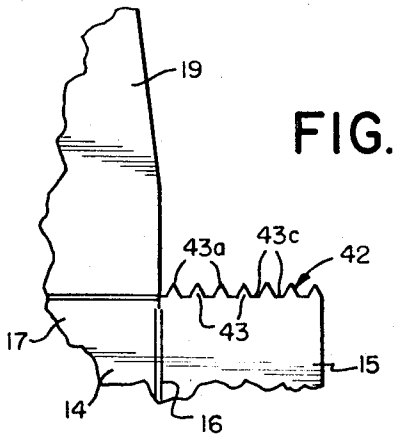




FIG. 6

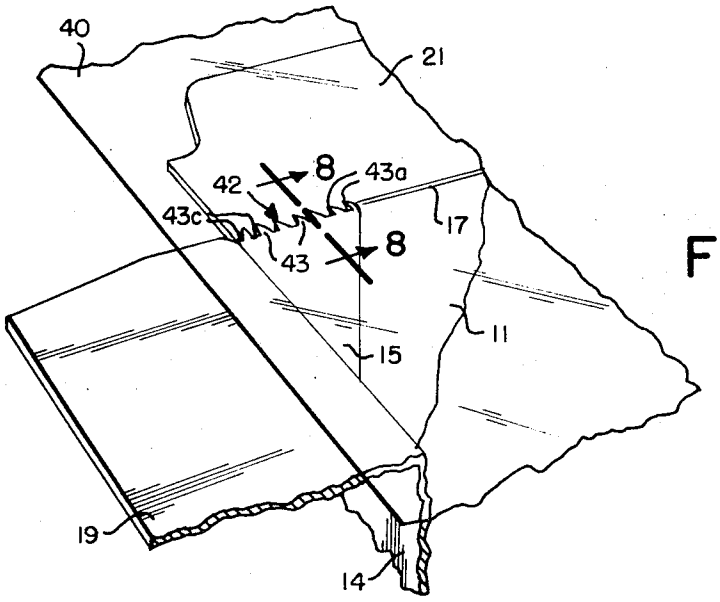



FIG. 7

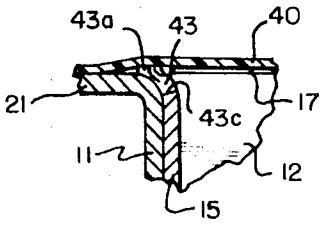



FIG. 8

# SEALS FOR DRUMHEAD CARTONS

## BACKGROUND OF THE INVENTION

Many airtight, siftproof, and moistureproof paperboard carton constructions for liquid and pulverulent materials are formed from parallelepiped cartons and have their opposite ends sealed by "safety shield" members or "drumhead" membranes adhered to the carton end flaps and side flaps (dust flaps). Presently, in commercially useful drumhead cartons, the membrane materials and/or the inner surfaces of the flaps to which the membranes are adhered are thermoplastic. For example, a resin, wax or other material which may be easily heat sealed may be coated on the membrane of flaps. The strength of these drumhead cartons is often custom tailored to meet packaging requirements by the choice of laminated materials used to construct the blanks. Moreover, with the development of improved coated and laminated paperboard materials and improved thermoplastic films, the tightness and imperviousness of membrane sealed cartons of the aforementioned type have been greatly imprvoed, and these cartons have continued to find ever increasing acceptance and widespread use in diverse packaging applications.

It is to a further improvement in the airtightness or siftproofness of the attachment of the drumhead to the end carton flaps that the present invention is directed. More specifically, where the carton to be sealed includes a manufacturer's joint extending into or terminating immediately adjacent the dust flaps, it is often possible for the applied membrane to stretch over the right angular step or shoulder defined at the straight edge of the manufacturer's joint (indeed, the likelihood of such an occurrence is increased as a function of thhe increase in caliper of the carton blank). The stretching of the membrane over the shoulder tends to form a small gap or channel of triangular cross-section which, of course, establishes communication between the outside and inside of the carton and prevents an end sealed carton from being hermetically or otherwise completely tightly sealed. A proposed solution to this problem has included the line scoring of the membrane and end flap transversely of the manufacturer's joint in order to eliminate the channel at the site of the line score. While the score did not eliminate the channel, its purpose was to cut off communication between the inside of the carton and the carton exterior by collapsing portions of the channel. Additionally, prior to the cross scoring step, in some instances a supplemental quantity of hot melt sealing material has been used to establish a fillet at the site of the crushing. It is to this specific problem area of drumhead carton formation i.e., leakage at the manufacturer's joint, and more specifically to the elimination of the need for supplementary sealing material that the present invention is directed.

## SUMMARY OF THE INVENTION

In accordance with the principles of the present invention a new and improved dam or a series of dams is formed in situ at the edge of the manufacturer's joint by interrupting the normal straight edge through the provision of a sawtooth edge or the like. This will enable the overlaid membrane when cross-scored to be sealed across the normal flap edge line rather than merely against the raw straight edge along the flap edge. In other words the channel that tends to form will be completely intersected by a membrane seal rather than being merely collapsed or squeezed down adjacent the straight flap edge.



For a better understanding of the present invention and its attendant advantages, reference should be made to the following detailed description taken in conjunction with the accompanying drawings.

## DESCRIPTION OF DRAWINGS

FIG. **1** is a fragmentary plan elevational view of a drumhead carton blank embodying the interrupted or non-straight edge principle of the invention.

FIG. **2** is a fragmentary perspective view of a carton erected from the blank of FIG. **1**, with its end flaps outfolded and the sealing membrane adhered thereto;

FIG. **3** is enlarged fragmentary cross-sectional view of the improved seal of the invention taken along line **3—3** of FIG. **2**.

FIGS. **4–6** are enlarged fragmentary plan elevationed views of alternative interrupted edge configurations embodying the principles of the invention.

FIG. **7** is a fragmentary perspective view of a carton embodying the glue flap configuration of FIG. **6**; and

FIG. **8** is a fragmentary cross-sectional view taken along line **8—8** of FIG. **7**, showing the improved seal of the invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. **1** a typical drumhead carton blank **10** (of which only one end is shown, it being understood that the opposite end is a mirror image of the illustrated end) includes a first side wall **11**, a rear wall **12**, a second side wall **13**, a front wall **14**, and a glue flap **15**, consecutively articulated along parallel vertical creases **16**. The glue flap **15** extends for the entire depth of the carton and above the upper carton edge **17** as a glue flap segment **18**. Front and rear carton closing flaps **19** and **20** are articulated to the front and rear walls at the carton edges **17**, as shown, and dust flaps **21** and **22** are similarly articulated to the carton side walls at the edges **17** thereof. As indicated in FIG. **2**, the manufacturer's joint **30** is established when forming flat folded tubes by adhering the glue flap **15** to the first side wall **11** and by adhering the glue flap segment **18** to the dust flap **21**, which flaps together form a compound dust flap **31** having a step **32** (see FIG. **3**) therein. The step is defined by the end edges **33** of the glue flap segment **18** and the upper surface **34** of the dust flap **21**. Ordinarily when the segment **18** has a straight edge, a straight channel tends to form along the step after the membrane **40** is attached.

In accordance with the invention, the step **32** is interrupted or otherwise made non-linear by the provision of interruptions in the form of sawtooth-like projections **50** formed at the vertical edge of the segment **18**. The crests **51** of the projections **50** are in line with normal straight edge portions **52** of the segment **18**, while the troughs **53** between the projections lie inwardly of the straight edge portions. Alternatively the interruptions ( with crests and troughts ) may be in the form of square wave perforations **54** (FIG. **4**), a single slot **35** (FIG. **5**), or any other configuration which accomodates the entry of sealing membrane material **40** across the channel that tends to form at the edge of segment **18** in carton formation. The cartons of the invention are completed as follows. After the carton tubes are squared and placed on a carrier of a packaging ma-

chine, they are advanced continuously along a horizontal path for outfolding the flaps **19–22** and application and sealing of the membrane **40.** With continued advance of the cartons, the sealing membrane **40** is applied and then is sealed, in tape form, to a group of cartons simultaneously by a group of heated sealing shoes which move along the path with the cartons and which are lowered into pressured engagement with the outfolded flaps and upper ends of the cartons. An exemplary sealing mechanism is disclosed in more detail in Lense U.S. application Ser. No. 835,008, filed June 20, 1969 and entitled "Packaging Machine With Continuous Motion Sealer." After the membrane is heat sealed to the flaps, the carton flaps **19–21** are infolded to complete the carton.

As shown in said application the lower or sealing surfaces of each sealing shoe are especially contoured and define the circumscribing sealing zones while a relieved area of the shoe receives and presses against the step **32** at the glue flap segment **18** overlying the dust flap **21,** while the other embossing-sealing surfaces of the shoe tend to press against the exposed surfaces of the dust flap **21,** and the flaps **19,20,22.** In accordance with the invention a so-called peninsula or finger (dike pin) of the shoe extends into the relieved area of the shoe and serves to cross-crush and to cross-score the flue flap segment **18,** at the interruptions **50** in the step **32** thereby forcing membrane **40** into the troughs **53** to form a dam **41** extending transversely of the step **32.**

As will be understood, this constuction creates a barrier of one or more dams along the manufacturer's joint and forms a new and improved drumhead seal which is superior to those heretofore obtainable. Moreover, the use of an interrupted edge configuration reduces resistance to and facilitates the crushing effect of the "dike pins" of the sealing platens presently used on drumhead carton machines.

In some applications it may be desirable to eliminate the segment **18,** as shown in the arrangement of FIG. **6,** In accordance with the principles of the invention, improved end sealing of the carton may be effected in this case by providing the horizontal end edges **42** of the glue flap **15** rather than side edges of the glue flap segments **18** with interruptions **43** similar in shape to those shown in FIGS. **1–5.** The crests **43***a* project slightly beyond the intended carton edges defined by scores **17** while the troughs **43***c* are generally colinear with the scores **17** as shown in FIG. **6.**

The carton of FIG. **7** is initially glued and erected in the same manner as the carton of FIG. **2** until membrane sealing. However, when the membrane **40** is applied to the outfolded flaps **19–22** and sealed thereto by the heated platen of the packaging machine, the crests **43***a* will be crushed and spread beneath the membrane to effect a strong bond therewith. Moreover, the endmost distorted crest will tend to dam the shoulder formed between the glue flap **15** and the carton wall **11.** After the membrane is heat sealed to the flaps, the carton flaps **19–22** are infolded to complete the carton.

As is well known to the art, extra tightness of the seal of the membrane **40** to the carton corners may be effected by expanding the corner areas or surfaces by crushing, controllably tearing or otherwise re-forming the same.

It should be understood that the specific drumhead closures herein illustrated and described are intended to be representative only as certain changes may be made therein without departing from the clear teachings of the disclosure. Accordingly, reference should be made to the following appended claims in determining the full scope of the invention.

I claim:

**1.** In a parallelepiped carton having consecutively articulated first side, front, second side, and rear walls with said rear wall adhered to said first side wall by a glue flap articulated to said rear wall; said carton having first, front, second, and rear closing flaps articulated to each of said first side, front, second side and rear walls, respectively, and a glue flap segment having an outer edge lying along a generally straight line articulated to said glue flap; said glue flap segment being adhered to said first flap and defining therewith a composite flap having a discrete shoulder therein, and improved drumhead closure characterised in that characterized a. the side edge of said glud flap segment includes at least one interruption having a trough glue inwardly of said generally straight line;

b. a heat sealable membrane tightly adhered about the periphery of the end of said carton at the edges thereof to said glue flap segment, the exposed portion of said first flap not underlying the glue flap segment, said front flap, said second flap, and said rear flap;

c. said membrane being adhered by circumscribing heat seals;

d. a portion of said membrane being crushed into the trough of said segment and intersecting said generally straight line;

e. whereby the end of said parallelpiped carton is sealed in an airtight and siftproof fashion.

**2.** The carton of claim **1,** in which said interruptions are in the form of sawtooth shaped projections.

**3.** In a parallelepiped carton having consecutively articulated first side, front, second side, and rear walls with said rear wall adhered to said first side wall by a glue flap articulated to said rear wall; said carton having first, front, second, and rear closing flaps articulated to each of said first side, front, second side and rear walls, respectively, and a glue flap segment; said glue flap being adhered to said first wall, an improved drumhead closure characterized in that

a. said glue flap segment terminating at the upper and lower edges of said first wall;

b. said glue flap end edges including a series of interruptions, whereby said glue flap end edges are crushable during subsequent membrane application;

c. a membrane sealed to said first, second, front and rear flaps and to the interrupted end edges of said glue flap;

d. whereby the end of said parallelpiped carton is sealed in an airtight and siftproof fashion.

**4.** The carton of claim **3,** in which said interruptions are in the form of sawtooth shaped projections.

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