United States Patent [19]

Cupo

[11] **3,871,571**

[45] **Mar. 18, 1975**

[54] **CARTON, CARTON BLANK AND METHOD OF ASSEMBLING THE CARTON**

[76] Inventor: **William J. Cupo,** 216 York St., Jersey City, N.J. 07302

[22] Filed: **Oct. 16, 1972**

[21] Appl. No.: **297,921**

[52] **U.S. Cl.** ..... **229/39 R**

[51] **Int. Cl.** **B65d 5/10**

[58] **Field of Search** ..... 229/37 R, 38, 39

[56] **References Cited**

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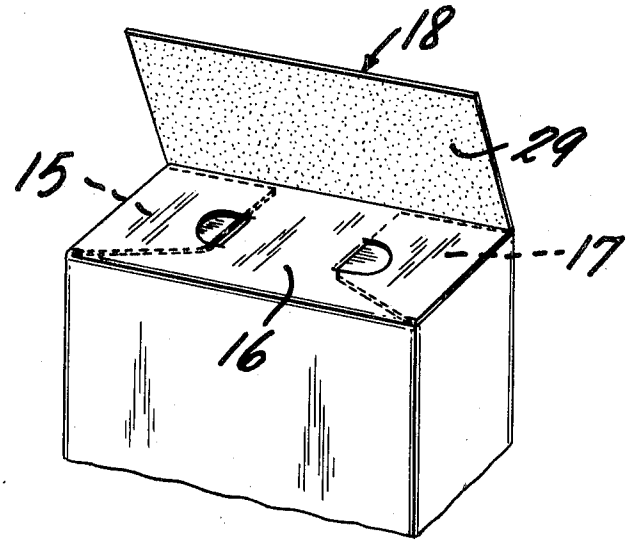
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Primary Examiner—William I. Price
Assistant Examiner—Bruce H. Bernstein
Attorney, Agent, or Firm—Brumbaugh, Graves, Donohue & Raymond

[57] **ABSTRACT**

A carton is described having four serially rectangular panels each with a respective flap at either end. The first and second flaps form innermost flaps and lie opposite one another across the mouth of the carton end. The third and fourth flaps are each situated between the first and second flaps and form intermediate and outermost end flaps, respectively. The first and second flaps each have side portions lying adjacent the hinge line of the third flap and the third panel which taper generally upwardly and inwardly in a generally straight line from the third flap when the first, second and third flaps are all substantially parallel to their respective panels. The third flap has two tabs cut in its surface which are generally in the form of half circles and which are adapted to underlie and hold an end portion of the first and second flaps when the first, second and third flaps lie generally perpendicular to their respective panels in their closed position.

4 Claims, 8 Drawing Figures



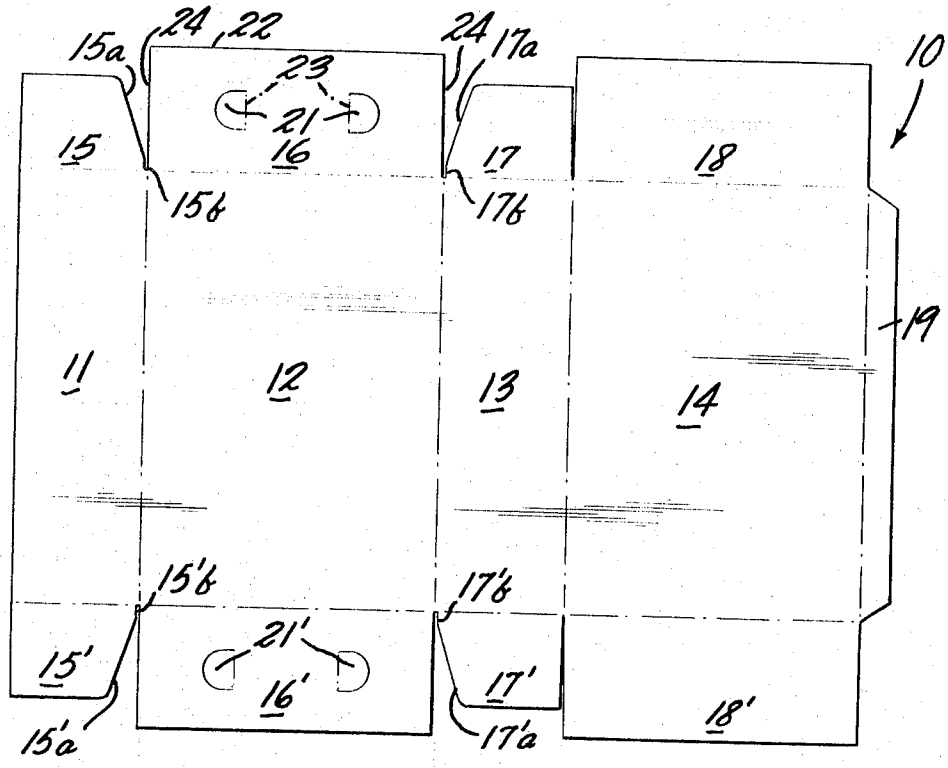

15a
24
22
24
17a
10
23
21
15
16
17
18
15b
17b
19
11
12
13
14
15'b
17'b
21'
15'
16'
17'
18'
15'a
17'a

FIG. 1

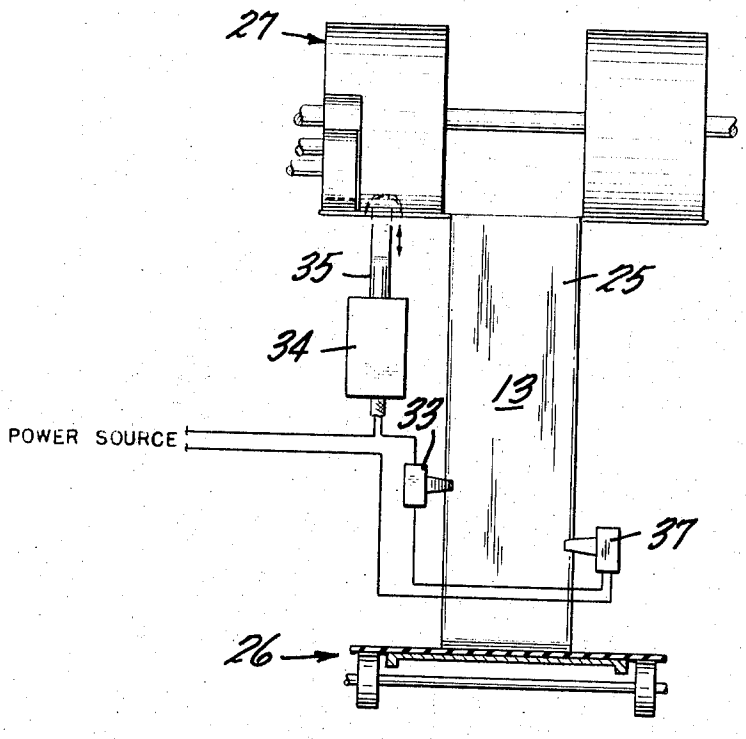
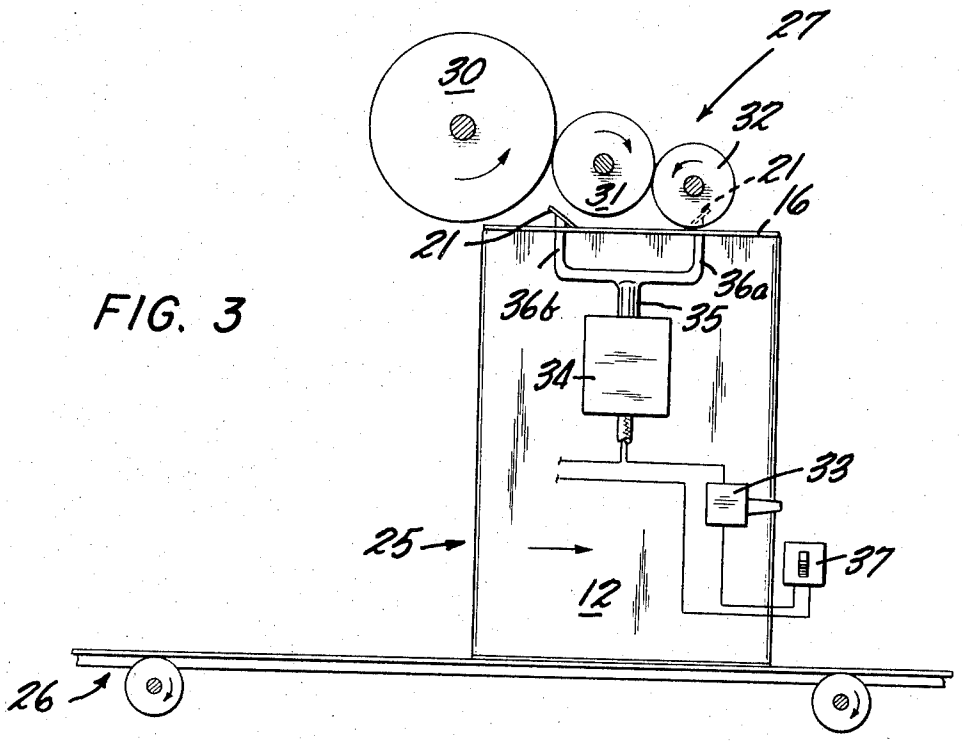

27
35
25
34
13
33
POWER SOURCE
37
26

FIG. 2

FIG. 3


27
30
32
31
21
16
21
36a
36b
35
34
33
25
37
12
26

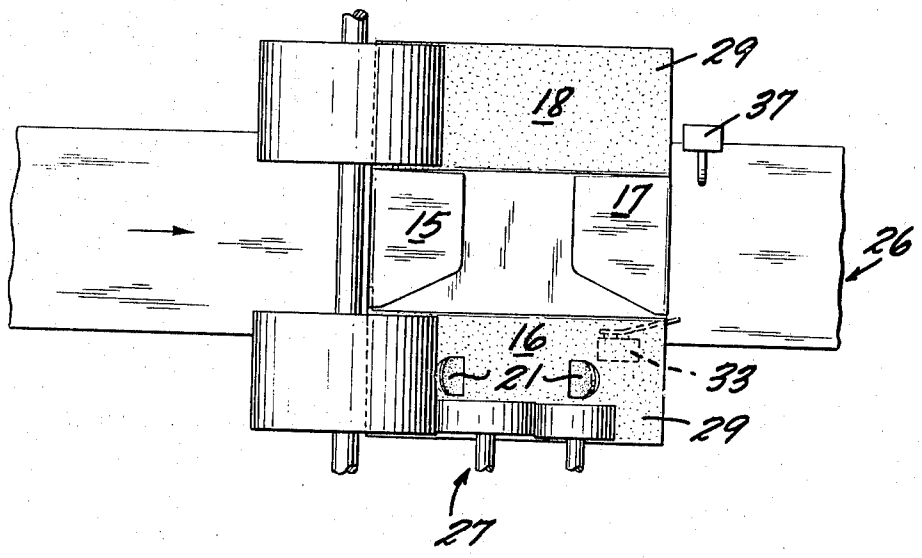
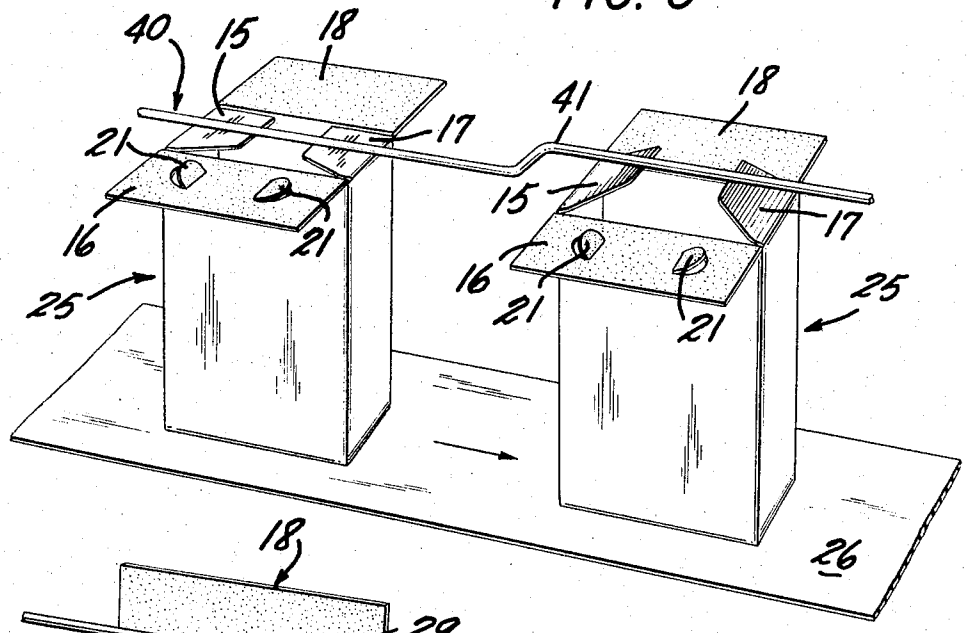

29
18
37
17
15
26
16
21
33
29
27

FIG. 4

FIG. 5



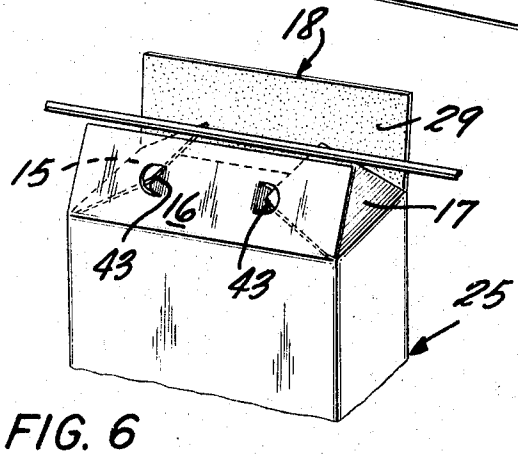


FIG. 6

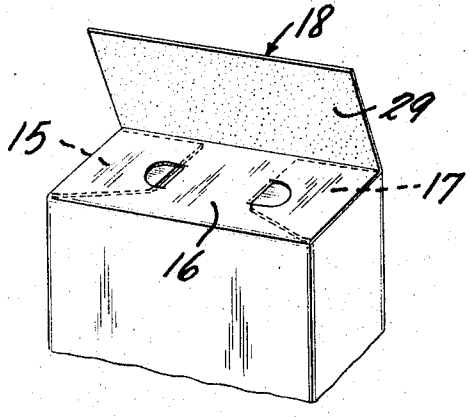


FIG. 7

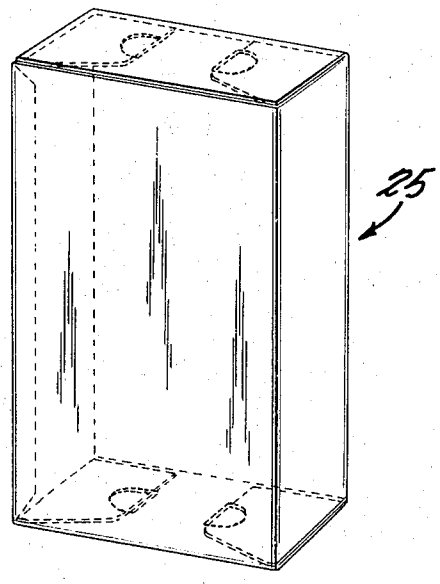


FIG. 8

CARTON, CARTON BLANK AND METHOD OF ASSEMBLING THE CARTON

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is a carton having four serially connected rectangular panels with flaps at the end of the panels having interlocking means thereon, a planar carton blank adapted to form the carton and a method for forming the carton.

2. Description of the Prior Art

Representative examples of prior art cartons having end flaps with interlocking means thereon are disclosed in U.S. Pat. Nos. 3,074,613; 466,792; 1,968,082; 1,288,895; 2,151,733; 2,053,857; and 2,337,039; French Pat. No. 1,063,100 and German Pat. No. 1,068,174.

SUMMARY OF THE INVENTION

The present invention includes a carton which is more easily assembled by machine, having four serially connected rectangular panels each with a respective panel along the length of the panel end. In such cartons it is customary for the first and second end flaps, which lie opposite one another across the opening of the carton end, to form end flaps after they have been rotated downwardly so that they lie perpendicular to their respective panels. The remaining two end flaps, i.e. the third and fourth flaps, also lie on opposite sides of the carton mouth and form the outer flaps. The first and second flaps in the carton of the present invention have sides adjacent the hinge line of the third flap and panel which are each generally upwardly and inwardly tapered from the third flap when the first, second and third flaps are in an upstanding position substantially coplanar with their respective panels. The third flap has tab means cut in its surface which are adapted to underlie and hold a portion of the first and second flaps after the first, second and third flaps have been rotated inwardly and lie generally perpendicular to their respective panels. In the finally assembled carton the first and second flaps are the innermost end flaps, the third flap forms an intermediate end flap overlying the first and second flaps and the fourth end flap forms the outermost end flap, overlying the third flap.

The invention also comprises the planar carton blank which can be used in forming the carton, and the method of assembling the carton. The method comprises applying glue to portions of the inner surfaces of the third and fourth flaps after the respective panels have been joined together into a tubular body, positioning of the first, second and third flaps after the glue has been applied so that all are inwardly inclined over the carton mouth and at an angle to a line drawn perpendicular to their respective panels so that the tab means in the third flap is in position to engage the underside of a portion of the first and second flaps, and inward rotation of the first three flaps until all are substantially perpendicular to their respective panels and the tab means in the third flap in under a portion of the first and second flaps thereby holding the glued inner surface of the third flap securely to the outer surface of the first and second flaps. Finally, the rotation of the fourth, and outermost, flap inwardly until it is perpendicular to its respective panel brings it into gluing contact with portions of the outer surface of the third flap.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be further understood by reference to the drawings wherein:

FIG. **1** is a view showing the planar carton blank which can be used to form the carton of the present invention;

FIG. **2** is an end view showing the partially formed carton, and the apparatus which may be used to seal one end of the carton;

FIG. **3** is view similar to that of FIG. **2** from the side;

FIG. **4** is a plan view similar to the views of FIGS. **2** and **3**;

FIGS. **5** and **6** are views showing apparatus which can be used in closing the carton of the present invention after glue has been applied to portions thereof;

FIG. **7** is a view showing the carton when the inner and intermediate flaps have been rotated into position; and

FIG. **8** shows the carton of the present invention after the closing operation has been completed.

DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

The planar carton blank **10** of the present invention is shown in FIG. **1**, and it comprises four serially connected rectangular panels **11**, **12**, **13** and **14** which are connected to one another by hinge lines as shown in dot-dash in FIG. **1**. Hereinafter, panels **11** and **13** will be referred to as first and second panels while panels **12** and **14** will be referred to as third and fourth panels, respectively. Attached to each panel **11–14** are carton end flaps **15–18** respectively. In a preferred embodiment they are at both ends of the blank **10** so that they will form both ends of the carton to be assembled therefrom. The flaps **15** and **17** are the first and second flaps for the carton whereas flaps **16** and **18** are the third and fourth flaps, respectively. The third and fourth flaps **16** and **18** alternate with the first and second flaps **15** and **17** along one marginal edge of the planar carton blank **10.**

Attached to one end of the panel **14** of the carton blank is a narrow sealing panel **19** which is used when each of the panel members **11–14** are bent to a **90°** angle to one another along the respective hinge lines to form a carton body having unsealed end flaps **15–18** at either end. This type of general arrangement of panels and flaps is well-known in the art. If desired, the planar blank **10** could be formed with the panels **11–14** and their respective flaps **15–18** being placed in a different sequential order in the planar blank **10.** The sealing panel **19** would then be placed on one of the panels **11–14** lying adjacent one end of the blank **10.** Such modifications in the order of the panels **11–14** are well within the skill of those in the art.

The first and second flap members **15** and **17** have side portions **15***a* and **17***a*, respectively, lying adjacent the hinge line between the third flap **16** and the third panel **12** which are generally straight and upwardly and inwardly tapered from the third flap **16** when all three flaps **15–17** are in a position which is substantially coplanar with their respective panels **11–13** when the flap **19** has been glued to the panel **11.** The inward and upward taper of the first and second flaps **15** and **17** allows an at least partial inward rotation of the third flap **16** so that tab means on that flap can make sealing contact with the first and second flaps **15** and **17** as de-

scribed below. In order to provide a greater degree of sealing at the edges of the first and second flaps **15** and **17**, shoulders **15***b* and **17***b*, which are approximately 5/32 of an inch in height in a preferred embodiment of the invention, are provided in each flap. Corresponding parts and members **15'–18'**, **21'**, **15'***a*, **15'***b*, **17'***a* and **17'***b* are shown at the other end of the carton.

Two tabs **21** preferably in the form of half-circles are provided approximately midway between the hinge line joining the third flap **16** and the third panel **12** and the outer edge **22** of the third flap **16.** As shown in FIG. **1,** each of the tabs **21** is connected to the third flap **16** by a hinge line **23,** substantially perpendicular to the hinge line of the flap **16,** which lies approximately one-third of the way across the length of panel **16** from the end **24** of the panel **16** neareast the circular edge of the tab. The distance of the hinge line **23** from the edge **24** of flap **16** will generally be about equal to the length of the flap **15** to permit proper mating of the two in closing the carton end. The same is true for the location of the other tab **21** with respect to flap **17.**

To assemble the carton of the present invention, the carton blank shown in FIG. **1** is formed into a tube with each panel **11–14** perpendicular to its adjacent panels, and then joining sealing flap **19** to a marginal portion of the first panel **11.** The flaps **15–18** are then in the position and each is in the plane of its respective panel.

In order then to seal the end flaps, glue is first applied to portions of the third and fourth flaps **16** and **18,** respectively, the opposite end of the carton having been closed by suitable means, preferably means similar to that herein described. Apparatus for this operation is shown in FIGS. **2** through **4.** The partially formed carton **25** is placed on a conveyor apparatus **26** so that it is passed under a glue roller assembly **27.** The third and fourth flaps are substantially horizontal to allow them to come into contact with the undersurface of the glue roller assembly **27.** This is best shown in FIG. **4.** At this point, the first and second flaps **15** and **17** are in the folded configuration shown in FIG. **4.**

The roller assembly **27** comprises three rollers **30, 31** and **32.** Roller **30** applies the glue to surfaces **29.** Roller **32** is mounted so that its surface is about 1/32 inch above the upper surfaces **29** of the flaps **16** and **18** when the latter are substantially horizontal as shown. The roller **31** is mounted somewhat higher than the roller **32** so that it does not touch the flaps, and the roller **30** is mounted so that it touches the surface **29** of the flaps **16** and **18** when they are substantially horizontal.

As the carton **25** travels along the conveyor belt it also contacts the switch **33** to activate the solenoid **34** thereby pushing attached piston **35** and the arms **36***a* and **36***b* upwardly so that the arms punch the tab means **21** upwardly, enabling them to later underlie a portion of first and second flaps **15** and **17.** The under surface of roller **32** provides a support to hold the flap **16** against upward movement of the plungers or pistons **36***a* and **36***b*. As the carton **25** moves a short distance further it touches a deactivation switch **37** which retracts the piston **35** to its normal rest position thereby pulling the arm **36***a* and **36***b* out of the holes formed by the moving of the tabs **21** out of the plane of the flap **16.**

The location of the wires which carry the electric current to the switches **33** and **37** and solenoid **34** is of course schematic and is such as to permit movement of the carton **25.** Moreover, the location of the switch **37** is such as to permit clearance of the pistions **36***a* and **36***b* in retracting from the holes in flap **16.** If desired, the circuitry may be so designed that the switch **33** and solenoid **34** cause upward movement of the pistons for a time sufficient to raise the flaps **21** and also downward movement of the pistons in time to afford clearance of the flaps **16,** without the need for providing the switch **37.** In this way the switch **37** may be dispensed with.

After the inner surface **29** of the flaps **16** and **18** has been coated with glue, and the tabs **21** have been lifted so that they protrude from the surface of the flap **16,** the carton **25** is advanced to means which perform the remaining operations of carton end closing or respectively. In FIG. **5** a guide bar **40** has a raised portion **41** which allows the innermost flaps **15** and **17** to rise to a position where they lie at an acute angle to the horizontal through natural reaction of the cardboard. In this position they are adapted to mate with the now inwardly protruding tabs **21** in the third flap **16.** Conventional means (not shown) are used to rotate the third flap **16** so that it is also inclined inwardly towards the open end of the carton thereby allowing the inwardly protruding tab means **21** to make contact with an end portion **43** of the flaps **15** and **17** as shown in FIG. **6.** The further continued rotation inwardly of flap **16** by means of an appropriately dimensioned guide bar will rotate the flap **16** inwardly and carry the tab **21** along the edge portion **43** of the flaps **15** and **17** thereby forcing all three flaps downwardly and inwardly until they are substantially perpendicular to their respective panels. The position is shown in FIG. **7.** At this point, the glue which has been applied to the interior surface **29** of the flap **16** securely bonds it to the outer surface of the innermost flaps **15** and **17.** The rotation of the outermost flap **18** downwardly and inwardly is then begun and is continued until its inner surface **29,** which is coated with glue, is securely attached to the upper surface of the intermediate flap **16.** The construction shown on the top of FIG. **8** is thereby formed.

It will be observed particularly from FIG. **7** that in the assembled carton, the first and second flaps **15** and **17** substantially completely overlie the respective tabs **21,** and the first and second flaps do not extend above the top surface of the third flap **16** through the openings formed by the tabs **21.**

FIG. **8** shows a preferred embodiment of the invention in which both ends of the carton **25** have the tab and flap arrangement of the present invention. If desired, only one end need be provided with such a construction, the other end being closed in a conventional manner.

Upon reading the specification and claims a person in the art will undoubtedly become aware of modifications that can be made merely by the exercise of ordinary skill in the art. Hence, the foregoing is intended to be merely illustrative of a number of preferred embodiments of the invention and is not to be construed as limiting. The scope of protection desired is set forth in the appended claims.

I claim:

1. In a carton having four serially connected rectangular panels and four flaps at one end of the carton with each flap being hinged to a panel along the length of the panel end, a first of said flaps being joined to the first of said panels, a second of said flaps being joined to a second of said panels spaced from said first flap by

third and fourth flaps which are joined to third and fourth panels, respectively, said first and second flaps being bent inwardly perpendicular to their respective panels to form inner flaps for the carton end, said third flap lying generally over both the first and second flaps perpendicular to its respective panel and glued to said first and second flaps, and said fourth flap overlying at least a portion of said said third flap to form an outer flap for the carton and perpendicular to its respective panel and being glued to said third flap, wherein the improvement comprises said first and second flaps having a side lying adjacent the hinge line of the third flap and the third panel which tapers generally upwardly and inwardly from said third flap when the first, second and third flaps are in a position which is substantially coplanar with their respective panels, and tab means cut in the surface of the third flap which underlie and hold a portion of said first and second flaps, said tab means comprising two spaced tabs joined to the panel by respective hinge lines which are substantially perpendicular to the hinge lines of said third panel, said tab means underlying that portion of the first and second flaps lying adjacent the edge of the flap which is opposite the hinge line of the first and second flaps with their respective panels, said first and second flaps substantially completely overlying said respective tabs, and said first and second flaps not extending above the top surface of said third flap.

2. A carton as claimed in claim **1**, wherein the distance from the tab hinge lines to the adjacent edge of the third flap which is perpendicular to the hinge line of the third flap is about the same as the length of the respective first and second flaps thereby to provide support for said first and second flaps.

3. In a carton blank having four serially connected rectangular panels and four flaps at one end of the carton with each flap being hinged to a panel along the length of the panel end, a first of said flaps being joined to the first of said panels, a second of said flaps being joined to a second of said panels spaced from said first flap by third and fourth flaps which are joined to third and fourth panels, respectively, said first and second flaps being adapted to be bent inwardly perpendicular to their respective panels to form inner flaps for the carton end, said third flap being adapted to generally lie over both the first and second flaps when said third flap is bent inwardly to lie perpendicular to its respective panel, and said fourth flap being adapted to overlie at least a portion of said third flap to form an outer flap for the carton when it is bent inwardly perpendicular to its respective panel, wherein the improvement comprises said first and second flaps having a side lying adjacent the hinge line of the third flap and the third panel which tapers generally upwardly and inwardly from said third flap when the first, second and third flaps are in a position which is substantially coplanar with their respective panels, and tab means cut in the surface of the third flap which are adapted to underlie and hold a portion of said first and second flaps after the first, second and third flaps have been rotated inwardly and lie generally perpendicular to their respective panels, wherein the tab means comprise two spaced tabs joined to the panel by respective hinge lines which are substantially perpendicular to the hinge line of said third panel, said tab means being adapted to underly that portion of the first and second flaps lying adjacent the edge of the flap which is opposite the hinge line of the first and second flaps with their respective panels, said first and second flaps being adapted to substantially completely overlie said respective tabs, and said first and second flaps not extending above the top surface of said third flap.

4. A carton blank as claimed in claim **3** wherein the distance from the tab hinge lines to the adjacent edge of the third flap which is perpendicular to the hinge line of the third flap, is about the same as the length of the respective first and second flaps thereby to provide support of said first and second flaps.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,871,571

DATED : March 18, 1975

INVENTOR(S) : William J. Cupo

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1, line 60, "in" should read --is--;

Col. 2, penultimate line, change "that" (first occurrence) to --the--;

Col. 3, line 16, "neareast" should read --nearest--;

Col. 4, lines 14 and 15 "respectively" should read --assembly--;

Col. 5, line 8, "said said" should read --said--.

Signed and sealed this 1st day of July 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks