

[54] **METHOD OF MAKING SIDE SEAM SEALED CONTAINER**
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[73] Assignee: International Paper Company, New York, N.Y.
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[52] U.S. Cl. 93/94 PS, 83/668, 93/1 G, 93/52, 93/58 ST, 93/58.1
[51] Int. Cl. B31b 1/22, B31b 1/64, B31c 5/00
[58] Field of Search 93/1 G, 52, 58 ST, 58.1, 94, 93/94 PX; 83/668, 671, 917

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Primary Examiner—Wayne A. Morse, Jr.
Attorney—Charles B. Smith

[57] **ABSTRACT**

A container for packaging fluids is made from a scored folded blank of coated paperboard. The container is made resistant to leakage by preventing the uncoated edge of a side sealing panel from taking up fluid. This edge is protected by skiving a strip adjacent to the edge of the sealing panel, skiving a narrow region in the center of the skived face into a square-topped notch, scoring the center of the notch and folding the strip on the scoring so that the skived faces are in intimate contact with each other. If the skived strip becomes unfolded, it may be refolded by means of a rounded wedge. The container is then seam sealed.

1 Claims, 14 Drawing Figures

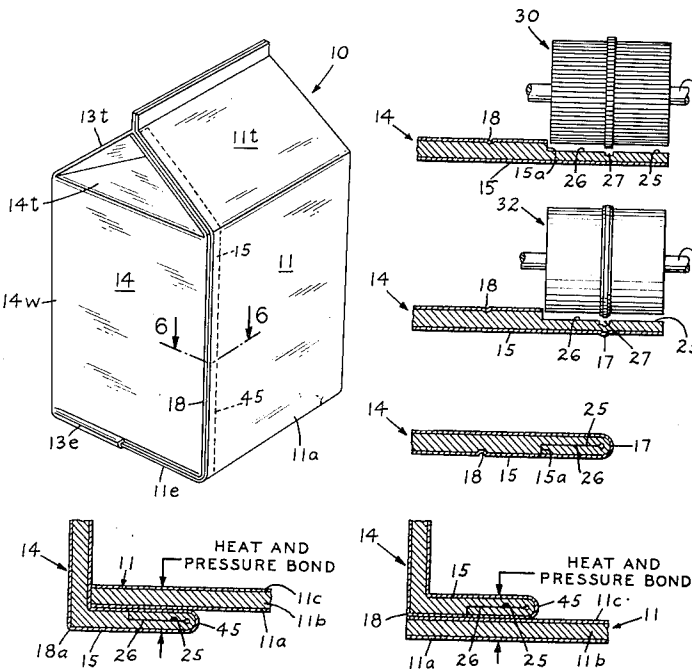


FIG. 1.

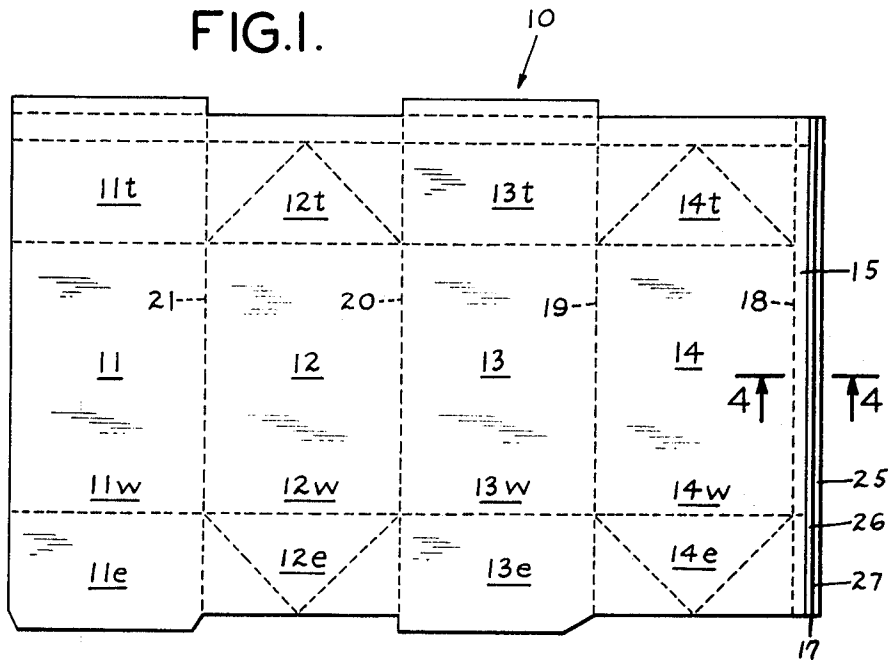


FIG. 2.

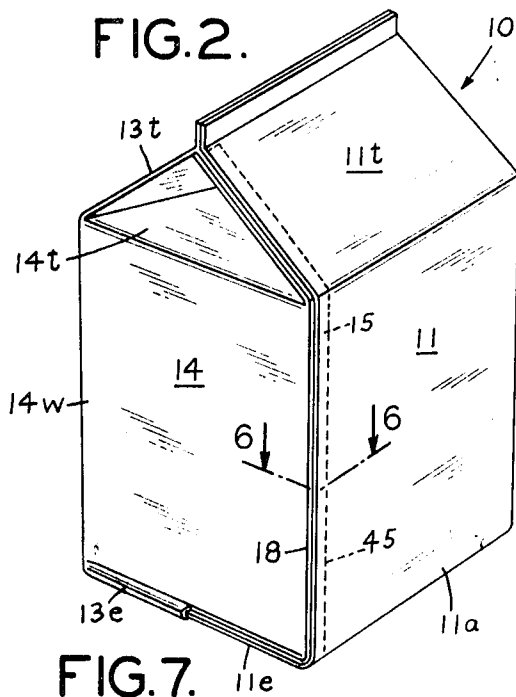


FIG. 3.

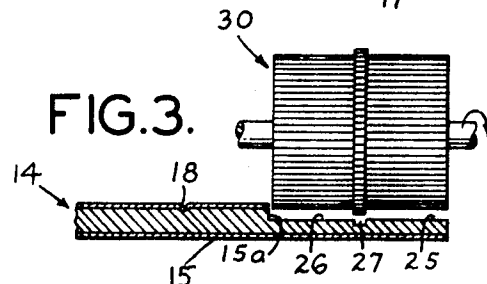


FIG. 4.

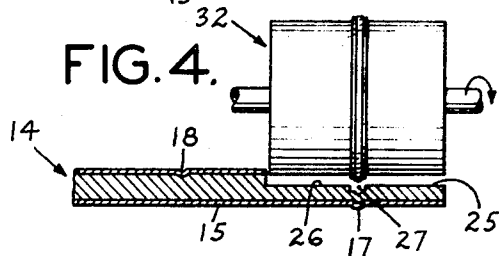


FIG. 5.

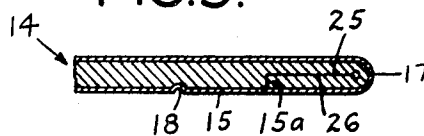


FIG. 6.

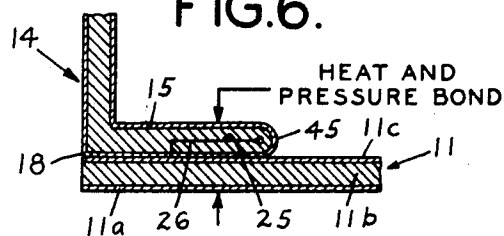


FIG. 7.

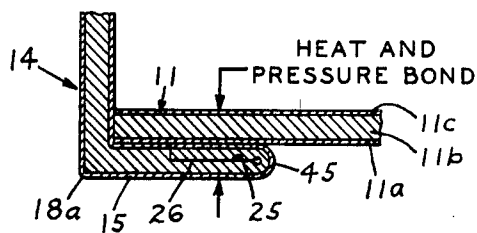


FIG. 8.

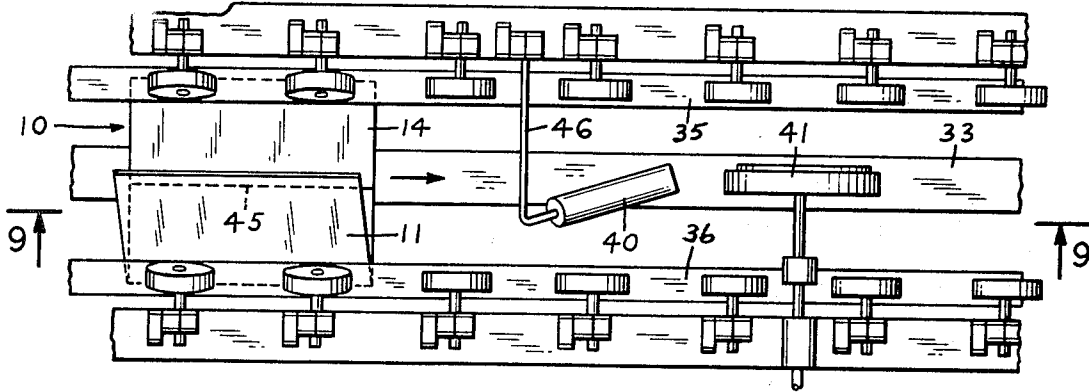


FIG. 9.

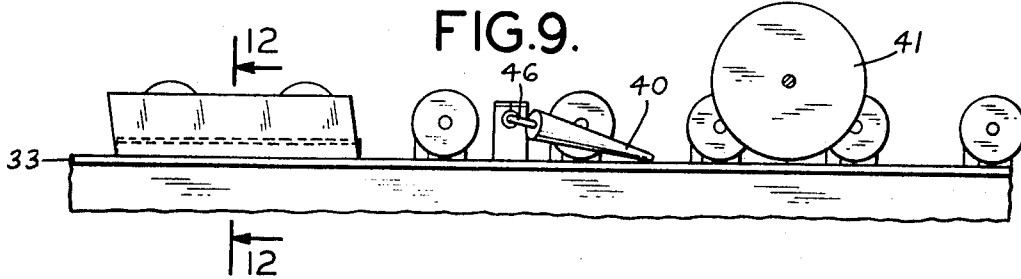


FIG. 10.

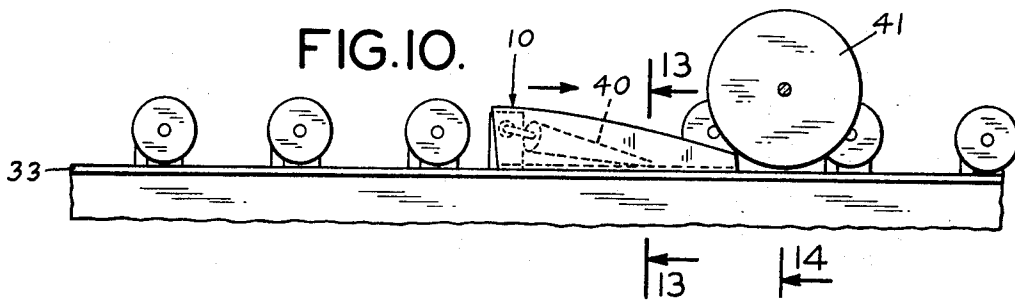


FIG. 11.

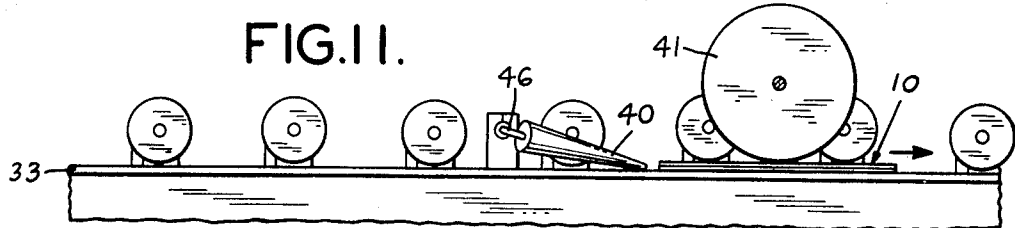


FIG. 12.

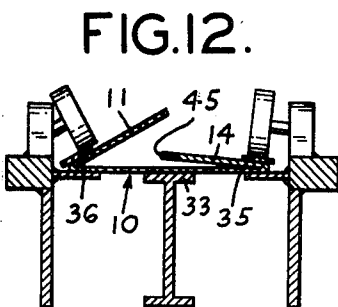


FIG. 13.

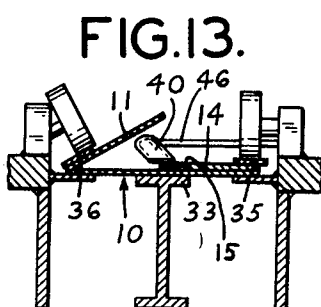
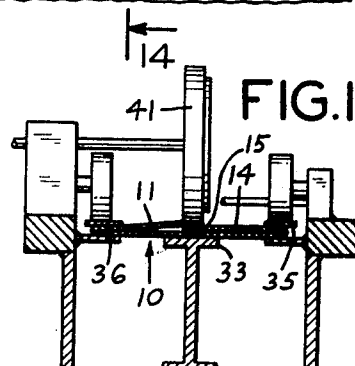


FIG. 14.



METHOD OF MAKING SIDE SEAM SEALED CONTAINER

BACKGROUND OF THE INVENTION

The packaging in paperboard containers of fluids such as soft drink syrups raises problems of leakage both into and out of the container. The containers are made of coated paperboard, scored and folded to the desired shape. The usual coating material is polyethylene. The blanks for the containers are cut from the paperboard and thus have unsealed edges. If the "fifth" or sealing panel is on the inside, the contained fluid wicks into the raw edge, weakening the container so that it may rupture under stress. If the sealing panel is on the outside, unwanted foreign material may leak into the container by wicking.

Efforts have been made in the past to inhibit and hopefully to stop this leakage with mixed results. The uncoated edges have been coated with sealing material. The coating on one face and the paperboard have been removed in a strip and the remaining coating folded over. The edge portions of the container material have been skived and folded together with intervening adhesive. Feather edge or tapered skiving has also been used.

SUMMARY OF THE INVENTION

Containers of the kind contemplated are made from blanks of paperboard coated with a substantially impervious layer or film of a plastic material such as polyethylene or another plastic having suitable qualities. Many containers of this kind are of rectangular section, usually square. For making such a container the blank is scored to define four side wall panels and a relatively narrow side sealing panel sometimes called the "fifth" panel. The blank is further scored to divide each panel into top, body, and bottom or end sections.

The present invention is an improvement in that described in "Method of Making Side Seam Sealed Container", Ser. No. 628,709 filed Apr. 5, 1967 by Henry J. Haas and Leon W. LaBombard, now U.S. Pat. No. 3,495,507, issued Feb. 17, 1970. As more fully disclosed in that application, the container blank is prepared for assembly by skiving a strip on the sealing or fifth panel to a depth equal to half the thickness of the blank. A line is then scored down the middle of this strip on its unskived face dividing it into two parallel, half-width strip portions. The skived strip is then folded on the scored line so that the skived faces are in contact. Even though no adhesive is needed in the fold, it is important that the fold line be ironed to reduce the spring-back tendency and thus keep the fold from unfolding through the heat activation period.

This method has proved successful in many applications, but it has been found that the step of ironing the fold is sometimes not effective and allows raw edges of the blank to remain exposed. Further, the region of the fold tends to form a ridge from the paperboard that bunches up on the inside of the fold. This ridge places a strain on the plastic coating which sometimes splits and thus opens up a raw edge.

The present invention eliminates the need for ironing and insures that the skived half-width strip portions remain in intimate contact during the rest of the processing and that the folded over portion of the blank is flat.

In order to better solve the noted problems of making coated paperboard containers, it is proposed in accordance with this invention, in the step of skiving a strip on the sealing or fifth panel to a depth equal to half the thickness of the blank, to skive a narrow region in the center of the skived face into a square-topped notch symmetrical with respect to the center of the skived face. A line may then be scored down the middle of this notch on its skived face dividing the strip into two parallel, half-width strip portions. The skived strip is then folded on its centerline (the scored line, if provided) so that the skived faces are in contact. Since the skived strip is half thickness and the strip portions flanking the centerline are equal in width, the edge of the strip when folded fits tightly against the shoulder of the strip formed by skiving, and the folded portion is of the same thickness as the main panel.

Skiving the notch in the region where the strip is to be folded relieves the fold of pressure to unfold. Because of this notch, no adhesive is needed in the fold on the skived surface and the fold line need not be ironed. Because the scoring (if provided) is done on the skived face of the notch, the paperboard deformed by the scoring serves further to insure that the fold stays folded and flat. It has been found that scoring the skived face of the notch is not necessary if the notch is skived deep enough and if the outer coating of the container is sufficiently flexible.

The side seam panel, which is bounded on its inner edge by a scored line between it and the adjacent body panel, is folded on this line to fit against a mating panel. The direction of the folding is such that the folded over portion of the skived strip may make contact with the mating panel. Thus if the fifth panel is on the inside the folding is in one direction, and if on the outside, in the other direction, and it is skived and scored accordingly.

The container is then folded from the prepared blank. A rounded Teflon wedge installed near the sealing station refolds the occasional skived strip that becomes unfolded.

The sealing seam is wider than the folded over skived strip by enough to obtain a bond beyond this strip. This part of the sealing seam may be as wide as or somewhat wider than the folded strip. The sealing may be accomplished by the application of heat and pressure to the mating portions of the folded blank. The top and bottom portions of the container are formed on their scored lines and suitably sealed.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of this invention will be understood more fully and clearly from the ensuing description of illustrative embodiments thereof taken in connection with the appended drawings in which:

FIG. 1 shows a container blank on which the location of the scored lines and of the skived and scored portions is indicated;

FIG. 2 is a perspective view of the erected container;

FIG. 3 is a cross-sectional view of the container showing the skived but still unskived portion and the skiving cutter in spaced relation away from the blank;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 1 showing the skived notch having been scored and the scoring wheel in spaced relation away from the blank;

FIG. 5 is a sectional view similar to FIG. 4 but with half of the skived portion folded along the scored line onto the other half;

FIG. 6 is a sectional view taken along line 6—6 of FIG. 2 showing a side seam assembled with the sealing or fifth panel inside the adjoining body panel;

FIG. 7 is a sectional view similar to FIG. 6 but with the sealing panel outside the adjoining body panel;

FIG. 8 is a plan view showing a partially folded container being advanced toward a seam folding station;

FIG. 9 is a sectional view taken along the line 9—9 of FIG. 8;

FIG. 10 is a view similar to FIG. 9 but shows the folded skived portion of a container located underneath a wedge;

FIG. 11 is a view similar to FIG. 9 but shows the container located underneath the seam sealing wheel;

FIG. 12 is a sectional view taken along line 12—12 of FIG. 9, showing a partially folded container located on the pressure belt;

FIG. 13 is a sectional view taken along line 13—13 of FIG. 10, showing the folded skived portion of the container located underneath the wedge; and

FIG. 14 is a sectional view taken generally along line 14—14 of FIG. 11, showing the folded container located underneath the seam sealing wheel.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

As seen in FIG. 1, the blank 10 comprises four body panels 11, 12, 13 and 14, and a side seam panel 15. The panel 15 has

a strip skived over the portion of its width as indicated by strip portions 25 and 26 and a notch 27 skived over a narrow region of its width with a line 17 scored in the center of the skived notch 27, as is more fully shown in FIG. 4. The side wall portions of the blank are denoted as 11w, 12w, 13w and 14w. The portions of the top and bottom or end of the container are denoted as 11t, 12t, 13t and 14t and 11e, 12e, 13e and 14e, respectively. The location of some of the necessary scored lines is indicated by dotted lines 18, 19, 20 and 21.

FIG. 2 shows the assembled container 10 in perspective. The side seam panel 15 is on the inside and its edge is indicated by the dotted line 45. The other reference characters correspond to those of FIG. 1.

A sectional view of a portion of the unfinished container blank 10 shown in FIG. 3 indicates where the side seam panel 15 has been reduced up to the depth of the shoulder 15a by skiving. The skiving, which is accomplished by the abrasive action on the paperboard of a skiving cutter 30, illustrated in spaced relation away from skived surfaces 25, 26 and 27, removes material down to essentially half the thickness of the blank 10. In practice, the notch 27 may be approximately 0.030 inch wide and 0.007 inch deep.

As shown in FIG. 4, a line 17 is scored down the middle of the skived notch 27 on its skived side and parallel to the scored line 18 at the intersection of the panels 14 and 15. The scoring is accomplished by a scoring wheel 32, which is illustrated in spaced relation away from the skived and scored surfaces 25, 26 and 27. Scoring of the line 17 may be omitted, particularly in cases where the coated paperboard is highly flexible.

In the view of FIG. 5 the panel 15 is bent on the scored line 17 so that the skived strip portion 25 lies in intimate contact with the skived strip portion 26. The edge of the strip portion 25 fits snugly against the shoulder 15a of the full thickness portion of the fifth panel 15. Because of the skived notch 27, the scored line 17 and a good fit, no adhesive and no ironing are needed in this fold.

A corner joint between the side seam panel 15 and the side wall panel 11 is shown in FIG. 6. The side wall or body panel 14 is shown as bent on the scored line 18. This represents a corner with the fifth panel 15 inside the container. In FIG. 6 the layers of the coated paperboard are denoted. The plastic coatings 11a and 11c are on opposite faces of the paperboard 11b. This applies to the whole blank 10 and not only to what is disclosed of panel 11.

In FIG. 7 the fifth panel 15 is represented as outside the first panel 11. In order that this may be done, a scored line 18a may be made on the side of the blank 10 opposite the line 18 as it is shown in FIGS. 3, 4 and 5.

The joint is bonded by the application of heat and pressure thereto by conventional means for sealing containers of this kind. It will be noted on the joints of both FIGS. 6 and 7 that the folded strip of the panel 15 is between 15 and the panel 11 to which it is sealed. It will be further noted that the bonding includes a portion of the panel 15 that has not been skived and is therefore of the full thickness of the blank 10. In FIG. 7 the edge of the panel 11 rests tightly against the side of the panel 14; thus a strong leakproof joint is afforded.

FIGS. 8 and 9 show the partially folded container 10 resting on the pressure belt 33 in progress on movable conveyor belts 35 and 36 towards a rounded wedge 40 mounted on shaft 46

and the seam sealing wheel 41. Wedge 40 is preferably made from or coated with a low friction plastic material such as Teflon (a fluorinated ethylene-propylene resin). The container 10 progresses by means of the movable conveyor belts 35 and 36 in the direction indicated by the arrow. In FIG. 10, the rounded Teflon wedge 40 mounted on shaft 46 presses down on the outside of the skived strip and pushes the skived strip portions 25 and 26 into intimate contact with each other and the edge of the strip portion 25 snugly against shoulder 15a of the full thickness portion of the panel 15. As shown in FIG. 11, the container 10 is folded flat and moves to the seam sealing wheel 41, where the joint is bonded by the application of heat and pressure thereto by conventional means for sealing containers of this kind.

In FIG. 12, the partially folded container 10 is shown resting on the pressure belt 33 and lying between the movable conveyor belts 35 and 36.

In FIG. 13, the partially folded container 10 is shown between the pressure belt 33 and the rounded Teflon wedge 40. The longitudinal axis of the rounded Teflon wedge 40 makes a small angle, in practice about 30°, with the axis of the pressure belt 33. The rounded Teflon wedge 40 is thus directed to force the edge of the skived strip portion 25 against the shoulder 15a of the panel 15 and to insure that no raw edge remains exposed.

As shown in FIG. 14, the folded container 10 then moves between the seam sealing wheel 41 and the pressure belt 33. The skived strip portions 25 and 26 are in intimate contact with each other and the edge of strip portion 25 lies snugly against the shoulder 15a of the panel 15.

What is claimed is:

1. The method of sealing the side seam of a container formed from a blank of foldable, fibrous sheet material coated with a plastic layer on each face, and having a plurality of scored lines dividing said blank into five contiguous panels including first, second, third and fourth side wall panels and a side seam panel, which comprises

skiving a strip on one surface of said side seam panel along the free edge of said side seam panel to a substantially uniform depth equal substantially to one-half of the panel's thickness thereby to provide skived surfaces parallel to the unskived surface of said side seam panel and a shoulder parallel to said free edge of said side seam panel,

skiving a narrow region in the center of the skived face of said strip into a square-topped notch symmetrical with respect to said center of said skived face, said notch having sides parallel to said free edge of said side seam panel, folding the skived strip upon itself with said skived surfaces of the strip portions in intimate contact, said folding being along the centerline of said strip to insure abutment of said free edge of said strip against said shoulder,

and applying heat and pressure to seal the unskived surface of the folded strip and an adjacent strip of said side seam panel to a surface of said first side wall panel,

said container being moved from a station at which said folding step is performed to a later station at which said sealing step is performed and in which said container is being so moved is passed beneath a refolding element which presses down said strip if the latter becomes unfolded.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,654,842 Dated April 11, 1972

Inventor(s) William E. Schwenk

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

Col. 4, line 53 - "is" should be -- in --.

Signed and sealed this 22nd day of August 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents