Dec. 10, 1946. H. F. WATERS 2,412,546

METHOD OF PACKAGING

Original Filed July 5, 1940 3 Sheets-Sheet 1

Fig. 1.

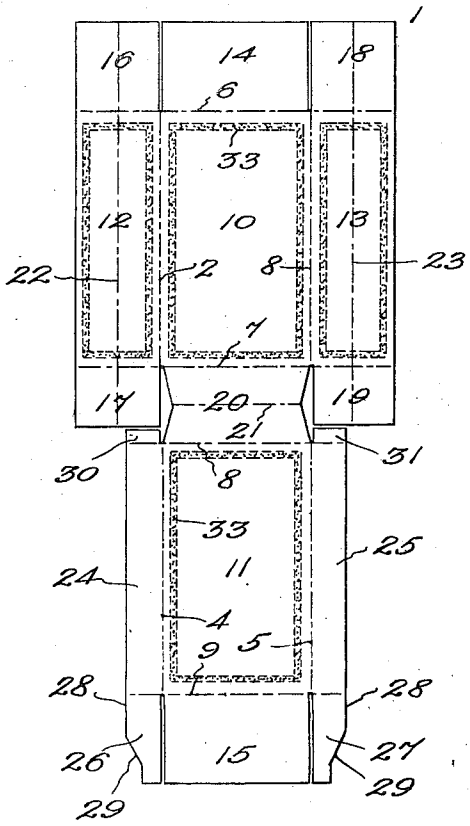


Fig. 2.

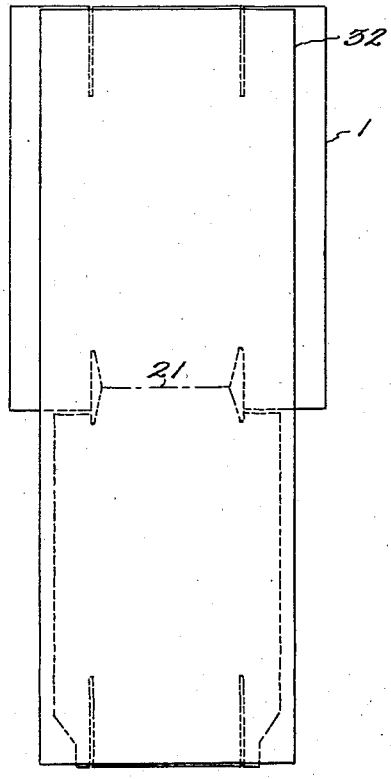


Fig. 3.

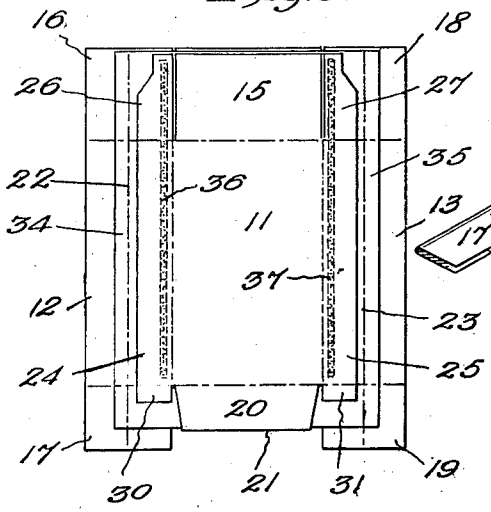
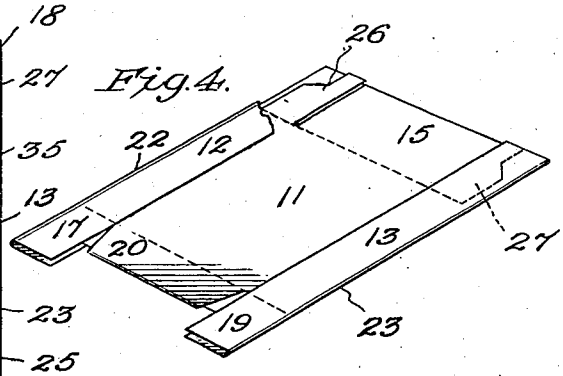


Fig. 4.



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Fig. 5.

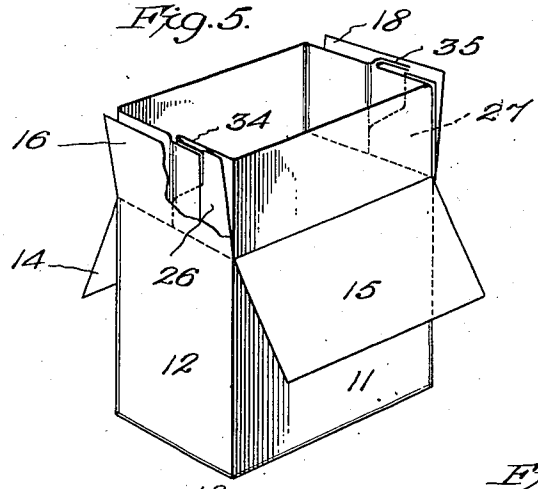


Fig. 6.

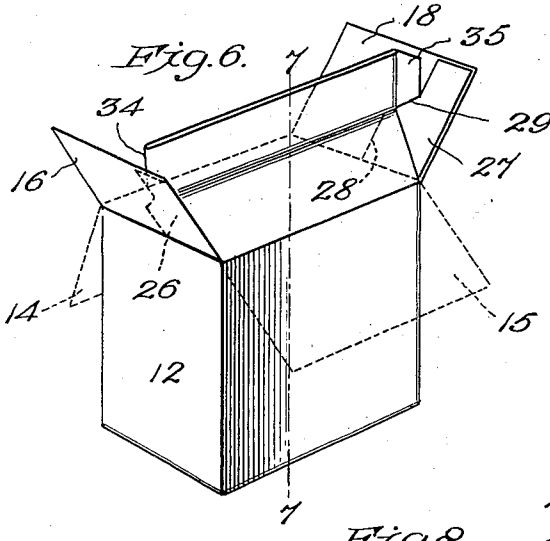


Fig. 7.

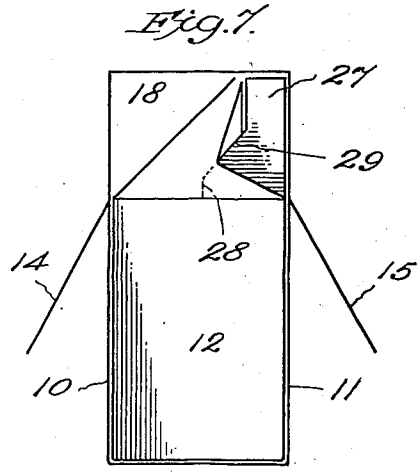
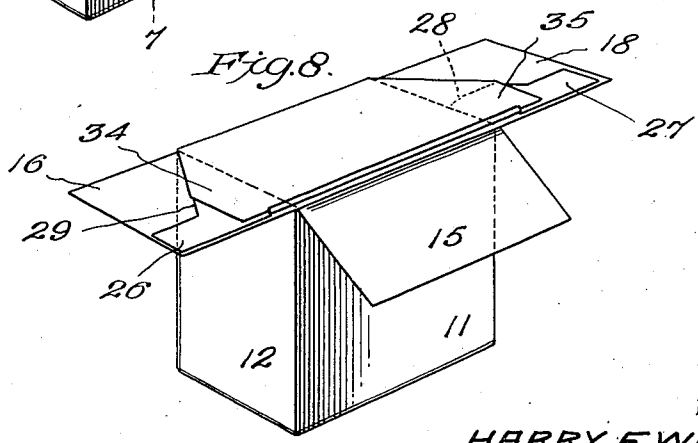


Fig. 8.



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Fig. 9.

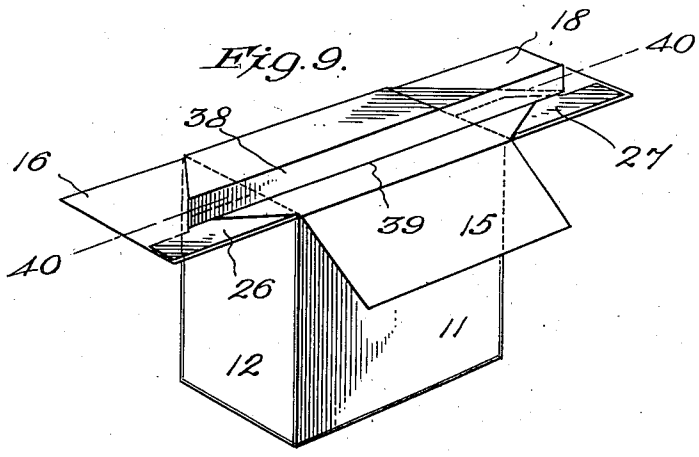
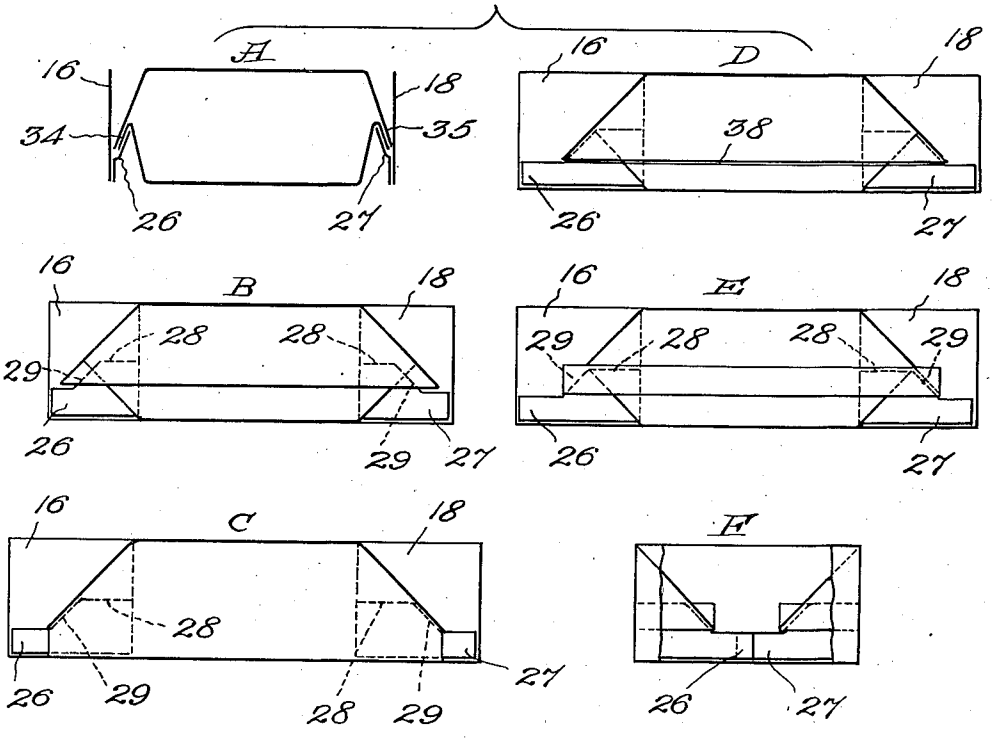


Fig. 10.



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UNITED STATES PATENT OFFICE

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METHOD OF PACKAGING

Harry F. Waters, New York, N. Y.

Original application July 5, 1940, Serial No. 343,926. Divided and this application December 6, 1941, Serial No. 421,920

4 Claims. (Cl. 93—49)

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This invention relates to a method of packaging and hermetically sealing commodities in containers of the type constituted of an outer carton having an inner fluid-tight liner therein.

This application is a division of my allowed application Serial No. 343,926, filed July 5, 1940, for Container and method of packaging therein, which has matured into Patent No. 2,316,919, April 20, 1943.

In my Patent No. 2,228,647 of January 14, 1941, I have disclosed a container particularly for packaging commodities in a hermetically sealed condition which comprises a flat folded carton having folding lines defining two pairs of opposed panels and an inner fluid-tight liner fastened so as to move with said pairs of opposed panels whereby when the carton is erected, it results in a rectangular-shaped and fluid-tight, lined container. In my said patent I have also disclosed a method of providing the top opening of the inner liner with a completely flat hermetic seal. This method included folding down the top portions of the liner into a substantially horizontal position and in the direction determined by the lateral fin or fins of the liner and thereafter applying heat and pressure to a transverse strip extending across the flattened mouth portions of the liner whereby a completely fluid-tight and permanently leakage-proof seal is obtained. The present invention relates to an improved method of bringing the upper terminal or mouth portions of the liner into the desired flattened face to face relationship preliminary to applying the top seal.

It is a feature of the present invention to provide a method of packaging involving displacement of the top mouth portions of the inner envelope in a fluid-tight container of the described character into a position wherein a completely flat seal may be applied thereto.

Other and further objects and advantages of the invention will become apparent from the following description taken in conjunction with accompanying drawings in which:

Fig. 1 illustrates a plan view of a carton blank employed in a preferred embodiment of the present invention;

Fig. 2 depicts a similar view of the carton blank shown in Fig. 1 having a liner attached thereto.

Fig. 3 shows the carton and the liner of Figs. 1 and 2 folded about a transverse medial line and having two parallel seals applied thereto;

Fig. 4 is a perspective view of the carton and liner during a later stage of its manufacture in

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which the end panels are adhesively secured to glue flaps of the front panel;

Fig. 5 illustrates a perspective view of the container embodying the invention in its erected or squared-up condition;

Figs. 6 depicts a similar view showing the mouth portions of the inner envelope partially brought together by displacing the top end flaps of the carton in opposite directions;

Fig. 7 shows a vertical sectional view taken on line 7—7 of Fig. 6;

Fig. 8 is a perspective view of the container with its end flaps brought into a substantially horizontal position and with the mouth portions of the liner brought into a flat face to face relationship in the plane bounded by the upper edges of the main body of the carton;

Fig. 9 illustrates a similar view of the container with the flattened mouth portions bent up, preliminary to applying a transverse top seal thereto; and

Fig. 10 is a group of diagrammatic views showing the top portions of the container during successive stages of the closing and sealing manipulations.

Broadly stated, according to the principles of my invention, I provide a container in flat folded form capable of being erected. This container comprises an outer carton having closing flaps at each end and an inner bag or envelope within said carton having extensions or fins in both sides thereof as I have disclosed in my copending application hereinbefore referred to and also in my copending applications Serial Numbers 338,709, filed June 4, 1940, now Patent 2,223,754 of Dec. 3, 1940, and 341,447, filed June 20, 1940. In order to provide a hermetic seal of the inner envelope it is critically important to carefully avoid intervening or doubled-up layers, reentrant folds and similar danger points of leakage in the sealing region. In my copending applications, I have not only carefully explained the conditions which are necessary for obtaining a completely and permanently fluid-tight seal, but I also have shown various ways of obtaining a seal of the desired character. Thus, I have disclosed that in the presence of lateral fins in the sealing-regions, it is necessary to fold down the terminal portions of the envelope into the direction in which the said lateral fins extend. This operation permits to bring the flattened mouth portions of the envelope, including the top portions of the lateral fins, into a single plane so that a completely flat transverse seal may be applied thereto. In the seam thus formed only two layers of material are

placed into a face to face relationship throughout the full extension of the sealing region.

I have now found that this displacement of the top portions of the envelope may be obtained in an extremely simple manner by incorporating suitable guide members or fingers into the top portions of the carton. For example, such guide members, or fingers, may be incorporated or secured to the top flaps of the carton adjoining the lateral fins of the envelope. Generally speaking, I prefer to employ guide fingers or members constituted of a piece of strong sheet material, such as a cardboard, which are connected to the top flaps of the end panels and engage the top portions of the lateral fins. Although this engagement or cooperation may be in the form of a rigid connection, I prefer such construction and arrangement of the guide fingers that they provide a channel into which the top portions of the lateral fins extend and are capable of sliding displacement therein. The guide fingers are preferably integrally formed with the other portions of the carton and, for example, may be constituted of integral extensions of the glue flaps of one of the panels. Of course, wide variations are possible in the arrangement and in the construction of the guide fingers. It is to be observed, however, that in all cases it is necessary to provide interlocking and restricted cooperation between a pair of flaps of the carton and the lateral fins of the envelope so that by displacing such flaps into opposite directions the engaged portions of the fins, and thereby the mouth portions of the container, are tensioned and are gradually brought into a flattened face to face position, as this will be explained more fully hereinafter.

Referring now more particularly to the drawings, a preferred embodiment of the invention will be described. Fig. 1 illustrates a carton blank 1 having longitudinal score lines 2, 3, 4 and 5 and transverse score lines 6, 7, 8 and 9 provided therein defining main panels 10 and 11 and end panels 12 and 13. Main panels 10 and 11 are provided with flaps 14 and 15 and end panels 12 and 13 are provided with flaps 16, 17 and 18, 19 respectively. 10 and 11 are connected by means of a bottom panel 20 which is provided with a transverse medial score line 21. In addition, medial score lines 22 and 23 are provided in end panels 12 and 13 respectively. Main panel 11 has glue flaps 24 and 25 connected to the lateral ends thereof which are adapted to be adhesively secured to the corresponding marginal portions of end panels 12 and 13 respectively. Glue flaps 24 and 25 have extension pieces or guide members 26 and 27 connected thereto. These extensions or guide members have the object of cooperating with the top terminal portions of the liner in order to fold the same into a predetermined plane, as it will be explained more fully hereinafter. This operation is essentially accomplished by longitudinal edge 28 of the extensions which slideably engages the upper portions of the liner and by folding edge 29 which is at an angle thereto and has the object of causing a folding displacement of said portions of the liner. It will be noted that this blank is similar to a carton and liner construction disclosed in my copending application Serial No. 255,030, filed February 7, 1939, and constitutes a further improvement thereover. Glue flaps 24 and 25 may be provided with short extension pieces 30 and 31 at their other end, the object of these extensions being to reinforce the lower portions of the carton, and may be omitted if desired.

The first step in preparing my novel container structure is adhesively securing a liner 32 to carton blank 1 by means of adhesive lines 33. As it will be noted in Fig. 2, this liner extends longitudinally from one end of the carton blank to the other end thereof and laterally at least beyond medial score lines 22 and 23 of end panels 12 and 13, respectively. This liner is of a fluid-tight and heat sealable character on at least the upper surface thereof which subsequently is going to form the inner surface of the liner. Thus, for example, the liner may be constituted of a fluid-tight and fusible material sold under the name of Pliofilm or may be constituted of vinyl resins, and the like. In most cases, however, I prefer to employ a flexible sheet of paper, or similar non-fusible material, having a layer or film of such heat-sealable material laminated or coated thereto. After the liner has been secured to the carton, carton and liner are simultaneously folded about fold line 21 to bring main panels 10 and 11 into a superposed registering position. In this condition of the carton and liner depicted in Fig. 3, main panel 10 and end panels 12 and 13 are at the bottom and have liner 32 folded about transverse medial line 21 above the same, and main panel 11 with glue flaps 24 and 25 are on top. It will be noted that two parallel marginal strips 34 and 35 of the liner protrude from underneath glue flaps 24 and 25. Heat and pressure may be applied to these two lateral marginal strips of the liner whereby the liner will be converted into a heat sealed and fluid-tight envelope or bag closed at the bottom, sealed at its two sides and open at the top. Hereafter, the two end panels 12 and 13 may be folded about their medial lines 22 and 23, respectively, and may be adhesively secured to glue flaps 24, 25 and extensions 26, 27 by means of adhesive lines 36 and 37. This operation results in the structure illustrated in Fig. 4 which shows a container in flat folded form adapted to be squared-up and to be filled at the top end thereof. It is worth noting that when folding the end panels about their medial lines 22 and 23, this operation will at the same time fold sealed marginal strips 34 and 35 about the same lines. Thus, the sealing regions will be placed beyond a fold line where they are protected by the fold against being separated by internal pressure possibly developing during the operation of the container and it is in this condition that the container is shipped and stored preliminary to its ultimate use.

When it is desired to use the container of the invention and to fill it with contents to be hermetically sealed therein, the folded and flat carton is squared-up or erected giving the structure shown in Fig. 5. In this erected position of the carton the original six-sided carton is converted into a four-sided box and the heat sealed lateral regions of the envelope 34 and 35 are converted into lateral fins denoted by the same reference characters in Fig. 5 and extending in the plane of end panels 12 and 13. Due to the fact that when adhesively securing glue flaps 24 and 25 to end panels 12 and 13 also a strip of extensions 26 and 27 has been adhesively secured by adhesive lines 36 and 37 to the corresponding and contacting portions of end panel top flaps 16 and 18, in the erected position of the container structure these extensions will protrude in between fins 34 and 35 and the corresponding end walls of the envelope. It is to be observed that this

protruding portion of the extensions is not adhered to the interspace of fins and envelope but is capable of slight relative displacement. In this erected position, the container is filled with the contents by any suitable filling device.

The provision of extensions 26 and 27 has the object of providing a certain cooperation between the displacement of top end flaps 16 and 18 with the top portions of the envelope protruding beyond the hinge lines of the main panels of the carton. When displacing these top flaps into opposite directions, the mouth portions of the envelope will be flattened into a face to face relationship in the plane defined by the upper hinge lines of the carton. This is accomplished by edges 28 of extensions 26 and 27 which extend into the interspace between the fins and the envelope proper and slideably engage the fins imparting a spreading displacement to the mouth portions of the envelope while edges 29 cause folding of these flattened portions into the plane bounded by the upper edges of the main body of the carton. This operation of extensions or guide members 26 and 27 will be best understood from Figs. 6 and 7 showing the carton and the liner in an intermediate condition in which top flaps 16 and 18 are already displaced from their vertical position shown in Fig. 5 but did not arrive as yet into their completely spread out or horizontal position shown in Fig. 8. As it will be observed in Fig. 6, longitudinal edges 26 of the guide members engage the upper portions of fins 34 and 35. Folding flaps 16 and 18 into opposite directions will stretch the mouth portions of the liner and bring the sides of the top or filling opening into a face to face relationship. At the same time folding edge 29 of the guide members which is at an appropriate angle to edges 28, for example at 45°, will engage a portion of the envelope across the fins and will gradually force the mouth portions of the envelope into a single plane to wit: into the plane bounded by the upper edges of the main body of the carton. Thus, displacement of the top end flaps will automatically displace the mouth portions of the liner or envelope into a single plane wherein a completely flat heat seal may be applied thereto. In this condition, the mouth portions of the envelope are completely flattened and brought into a single plane, including the lateral fins which originally were extending in a plane which was vertical to the plane bounded by the top edges of the container. This operation completely eliminates any intervening or doubled-up layers from the sealing region so that a positively leak-proof and permanently hermetic seal may be obtained. A completely flat and fluid-tight transverse top seal 38 may be applied to the envelope already in this condition of the container illustrated in Fig. 8. In most cases it is preferred, however, to bring the mouth portions into an upwardly directed position in which it is more readily accessible to a heat sealing device. This is accomplished by folding the flattened mouth portions of the envelope about a line 39, which is remote from center line 40 of the package, into an upwardly directed position in which it may be readily sealed by the application of heat and pressure to a transverse strip 38 thereof. Hereafter, the sealed portion thus obtained may be folded down flat and the top of the container may be closed by folding flaps 14 and 15 and flaps 16 and 18 thereabout.

To further facilitate the understanding of my novel guide members and to explain their operation in automatically bringing the mouth portions of the envelope into the preferred sealing position, reference may be had to Fig. 10 illustrating somewhat diagrammatically the top portions of the envelope and their cooperation with the top end flaps and guide members during the various stages of operation. Fig. 10A shows the top portion of the container when the carton is erected or squared-up. In this position, guide members 26 and 27 extend underneath fins 34 and 35. In this erected condition of the container, the envelope may be filled with the contents by means of any conventional filling device. After this has been accomplished, top end flaps 16 and 18 are gradually folded into opposite directions (Fig. 10B). Of course, this operation may be carried out manually but in most cases an automatic machine of suitable character is employed. In fact, since most modern conventional packaging and filling machines are equipped with devices for turning the flaps of the carton in a predetermined direction and in a certain sequence, this operation may be carried out by means of conventional machinery with little or no change in construction or adjustment. Continuing the displacement of top flaps 16 and 18, the condition shown in Fig. 10C is arrived at which corresponds to the showing of Fig. 8 and illustrates the mouth portions of the filled envelope completely flattened into a face to face position and in the plane defined by the top hinge lines of the carton. Application of a transverse top seal of completely flat character may be accomplished in this condition of the envelope, or if desired, the top mouth portions first may be folded upwards, as shown in Fig. 10D, and the transverse top seal 38 may be applied in this condition in which the region to be heat-sealed is more readily accessible to a heat sealing device. Hereafter, the heat sealed region may be folded down flat into the plane of the hinge lines of the carton (Fig. 10E) and then flaps 16 and 18 of the end panels and flaps 14 and 15 of the main panels may be closed thereabout. This will result in the top structure appearing in Fig. 10F in which the greater part of the top flaps has been broken away in order to make the appearance of the top portions of the envelope visible.

It will be noted that the present invention provides a novel container structure having means in the form of guide members or guide fingers incorporated therein. These guide members establish a cooperation between displacement of certain of the top flaps and of the mouth portions of the envelope and bring such portions into the desired and preferred face to face position which is necessary for obtaining a completely flat and permanently fluid-tight seal.

It is also to be observed that the advantages of the present invention are obtainable at practically no extra cost, because guide members 26 and 27 are formed integrally with portions of the carton blank and do not require any extra material.

Moreover, the invention teaches a novel method of packaging and a simplified procedure for bringing the top end portions of the envelope or liner into a face to face sealing position, such method capable of being carried out by means of existing packaging machinery with practically no change.

Although the present invention has been disclosed in connection with a preferred embodiment thereof, variations and modifications may be resorted to by those skilled in the art without departing from the principle of the present

invention. Thus, while I have explained and illustrated my invention in connection with a container in which the outer carton and the inner receptacle are formed by simultaneous manipulations and in which the envelope is constituted of an integral sheet folded along a transverse line, my invention is also applicable with equal or similar results to containers of the type in which an inner liner is folded along a longitudinal medial line or to containers of the type wherein a previously formed tubular liner is fastened to a carton having at least four panels. Likewise, while I have shown the guide members formed as extensions of glue flaps **24** and **25**, they may be provided in some other appropriate portion of the carton blank or even may be preformed separate pieces of suitable material, which are subsequently glued or stapled to a pair of oppositely positioned flaps. I consider all of these variations and modifications as within the true spirit and scope of the present invention as disclosed in the foregoing description and defined by the appended claims.

I claim:

1. The method of closing a carton having at least two pairs of opposed panels with closing flaps at the ends thereof and having a liner therein, said liner having longitudinal lateral fins and being closed at one end and having its open end projecting beyond the main body panels of said outer carton, and two opposed top flaps of said carton having slip-fit fin-engaging guide and folding members, which method comprises moving said fin-engaging top flaps with the engaged fins outwardly thereby stretching the mouth portion of said liner into flattened face-to-face relationship, then folding the flattened mouth in the plane bounded by the upper edges of the main body of the carton, thereafter sealing said flattened mouth portions and closing the flaps thereabout.

2. The method of closing a carton having at least two pairs of opposed panels with closing flaps at the ends thereof and having a liner therein, said liner having longitudinal lateral fins and being closed at one end and having its open end projecting beyond the main body panels of said outer carton, and two opposed top flaps of said carton having slip-fit fin-engaging and folding members, which method comprises moving said fin-engaging top flaps with the engaged fins outwardly thereby stretching the mouth portion of said liner into flattened face-to-face relationship, then folding over the constricted upper walls of the liner so that they lie parallel with the top edges of the carton, folding said constricted upper walls of the liner upwards about a a line spaced from the center line of the package, thereafter sealing said upwardly folded mouth portions and closing the flaps thereabout.

3. The method of closing a squared-up lined carton formed from a flat folded carton within which is secured an independent tubular liner heat fusible on its inner surface at least and being closed at one end, said liner having a pair of longitudinal lateral fins and having its open end projecting beyond the main body panels of said outer carton, two opposed top flaps of said carton having slip-fit fin-engaging guide and folding members, which method comprises moving said fin-engaging top flaps with the engaged fins outwardly thereby stretching the mouth portion of said liner into face-to-face relationship, then folding the flattened mouth in the plane bounded by the upper edges of the main body of the carton, thereafter heat-sealing said flattened mouth portions and closing the flaps thereabout.

4. The method of closing a squared-up lined carton formed from a flat folded carton having at least four parallel crease lines and closing flaps at the ends thereof within which is secured an independent liner heat fusible on its inner surface at least and being closed at one end, said liner having a pair of longitudinal lateral fins and having its open end projecting beyond the main body panels of said outer carton and two opposed top flaps of said carton having slip-fit fin-engaging guide and folding members, which method comprises moving said fin-engaging top flaps with the engaged fins outwardly thereby stretching the mouth portions of said liner into flattened face-to-face relationship, then folding the flattened mouth in the plane bounded by the upper edges of the main body of the carton, folding said flattened mouth portions of the liner into an upwardly directed heat-sealing position, thereafter heat-sealing said portions, folding back said heat-sealed portions and closing the flaps thereabout.

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