

[54] **CARTON**

[57]

**ABSTRACT**

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Hillsborough, Calif. 94010

[22] Filed: **Oct. 4, 1972**

[21] Appl. No.: **298,767**

## Related U.S. Application Data

[63] Continuation-in-part of Ser. Nos. 231,204, March 2, 1972, Pat. No. 3,756,495, Ser. No. 192,720, Oct. 24, 1971, Ser. No. 154,784, June 21, 1971, Pat. No. 3,779,447, and Ser. No. 83,704, Oct. 26, 1970, Pat. No. 3,715,853.

[52] **U.S. Cl.**..... **229/31 R; 229/30**

[51] **Int. Cl.<sup>2</sup>**..... **B65D 5/24**

[58] **Field of Search** ..... 229/31 R, 31 FS, 30

[56]

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*Attorney, Agent, or Firm*—Diller, Brown, Ramik & Wight

A laminated or multi-layer wall carton or tray is provided which has a self-supporting outer layer or wall portion of paperboard which may be a laminated structure and may include a paperboard with a plastic, foil or a paper layer laminated thereto. The laminated layer of material may be adhered to the surface on one or on both sides of the paperboard, preferably before the tray or carton is die cut and formed. The carton includes a gusset fold and overlap at the corners for a leakproof construction and is concerned with the provision of a single gusset fold or a multiple gusset fold which may be heat sealed or glued in place.

A plastic liner is either thermo-vacuum formed as a preliminary operation or in place in the paperboard tray or carton in contact with the plastic or paper coating thereon and this plastic line may be so preformed into place as to be separable therefrom and to provide with the lid to which it is heat sealed a separable container. This container may be vacuumized so that the plastic bag attached to the lid shrinks about the product therein to provide for minimizing of oxygenation.

**8 Claims, 28 Drawing Figures**

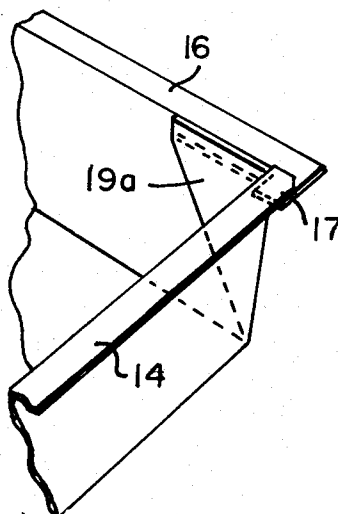


FIG. 1

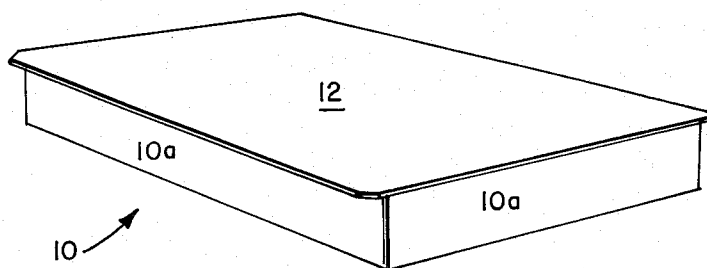


FIG. 2

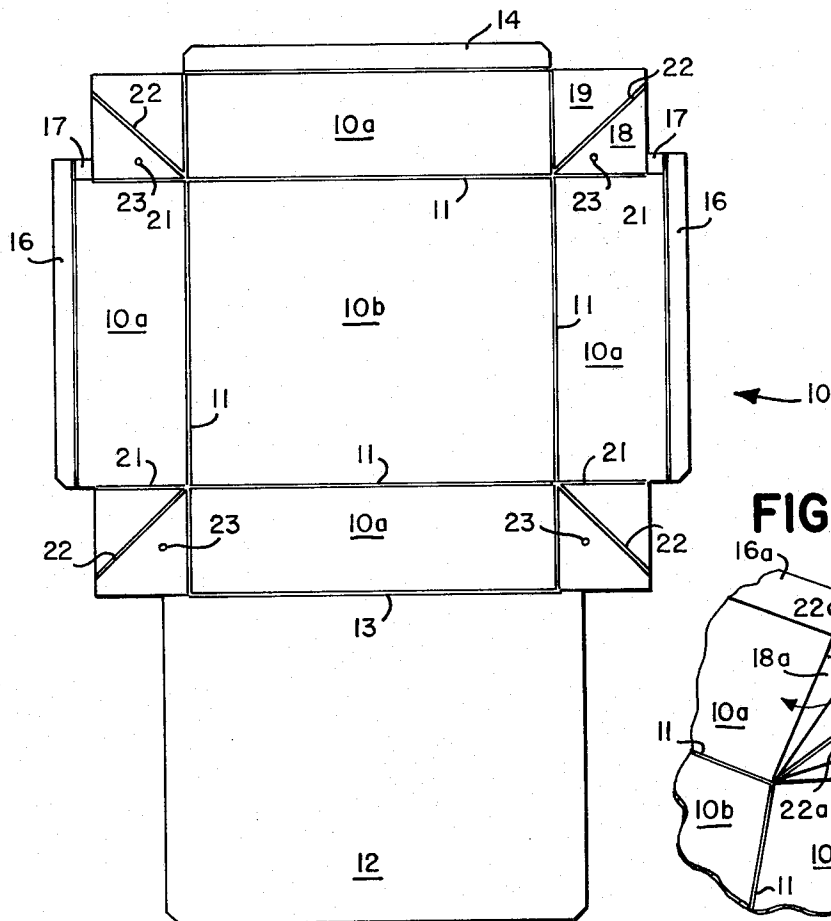


FIG. 5

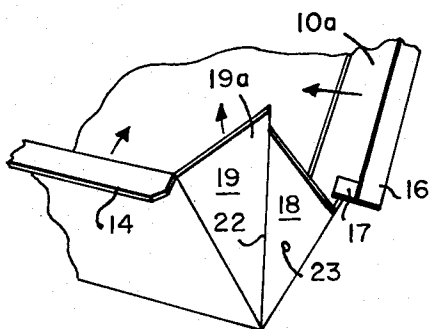
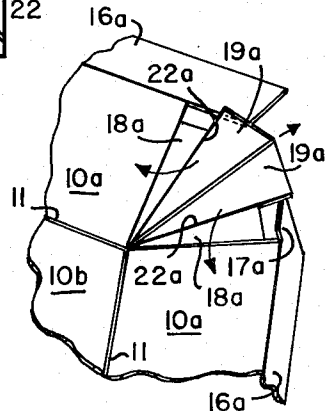


FIG. 3

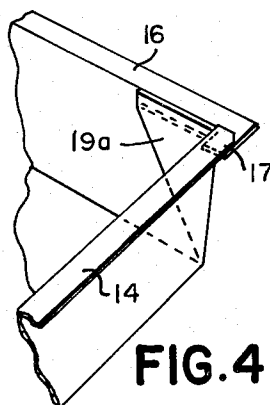


FIG. 4

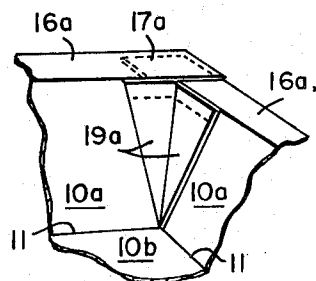
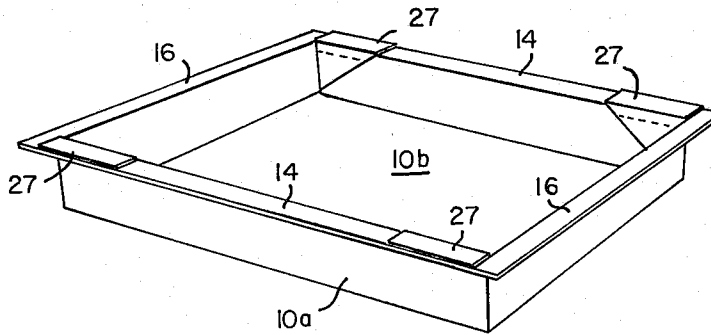
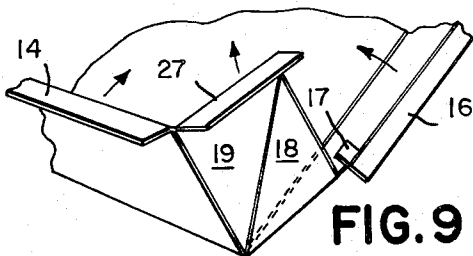
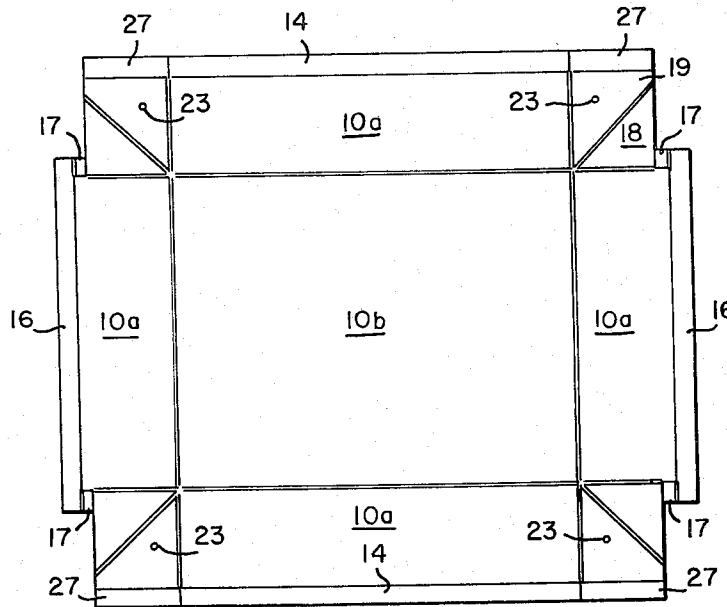


FIG. 6

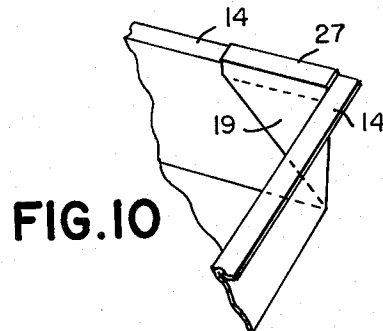
**FIG. 7**



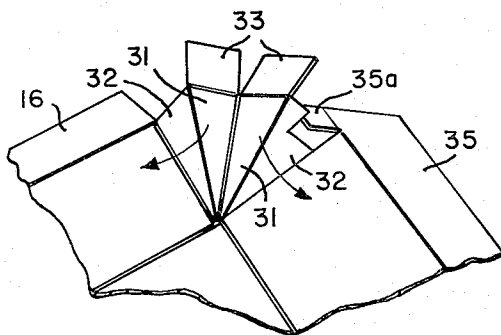
**FIG. 8**



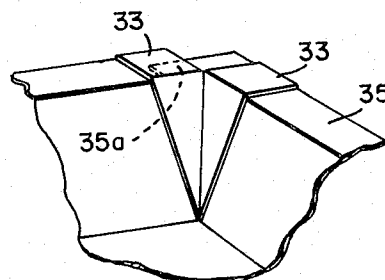
**FIG. 9**



**FIG. 10**



**FIG. 11**



**FIG. 12**

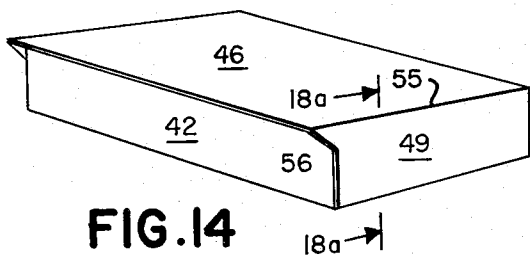


FIG. 14

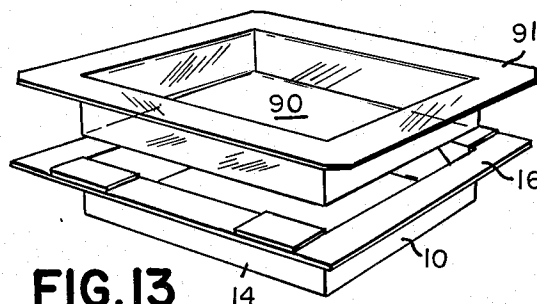


FIG. 13

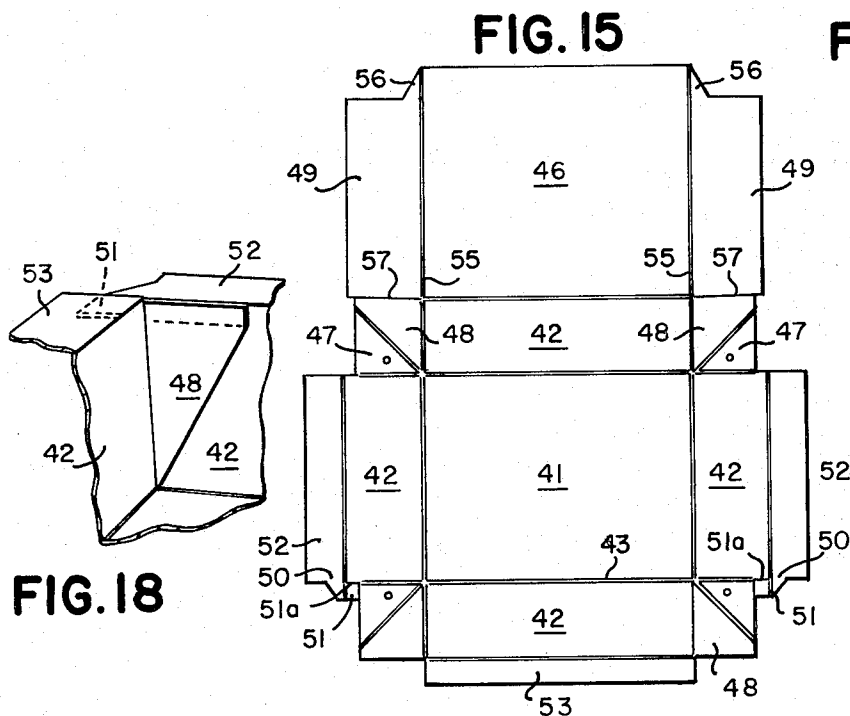


FIG. 15

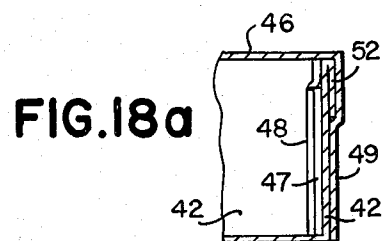


FIG. 18a

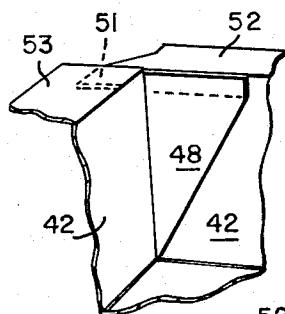


FIG. 18

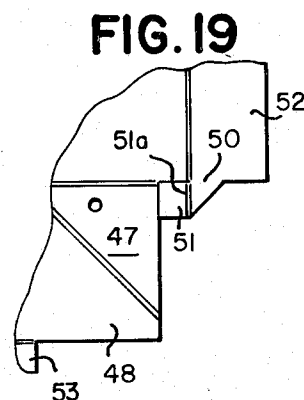


FIG. 19

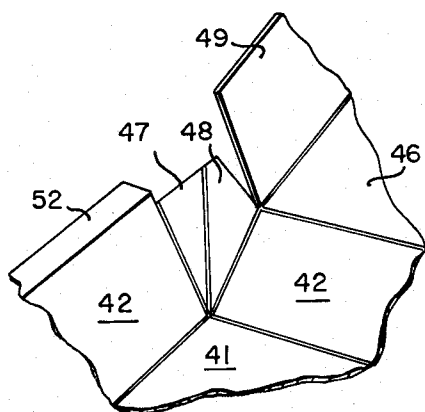


FIG. 17

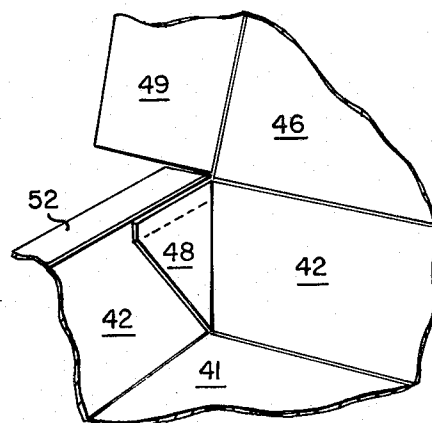
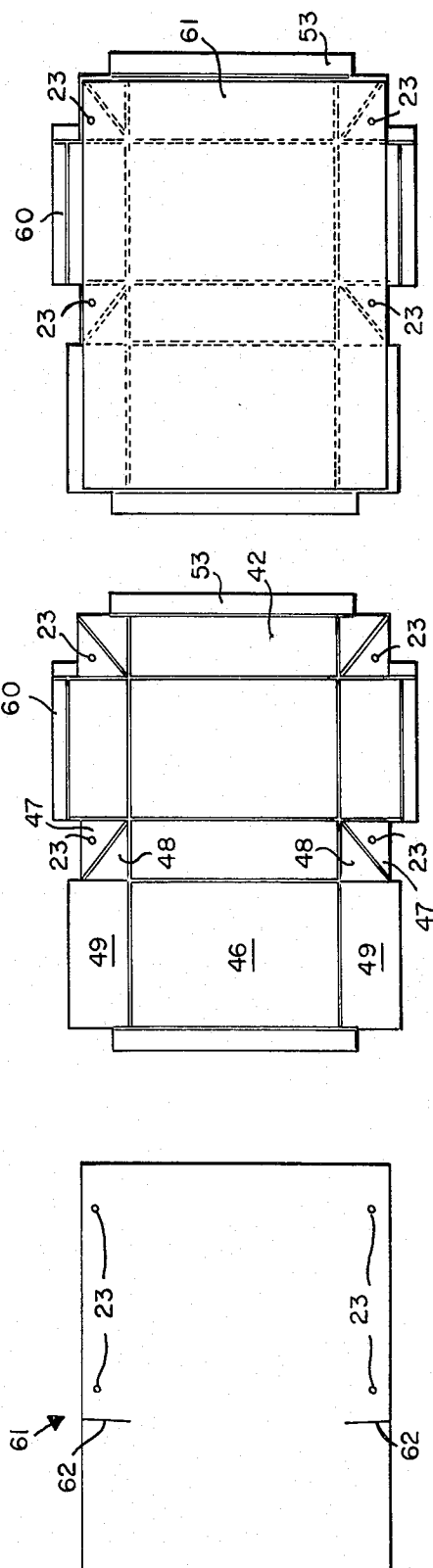
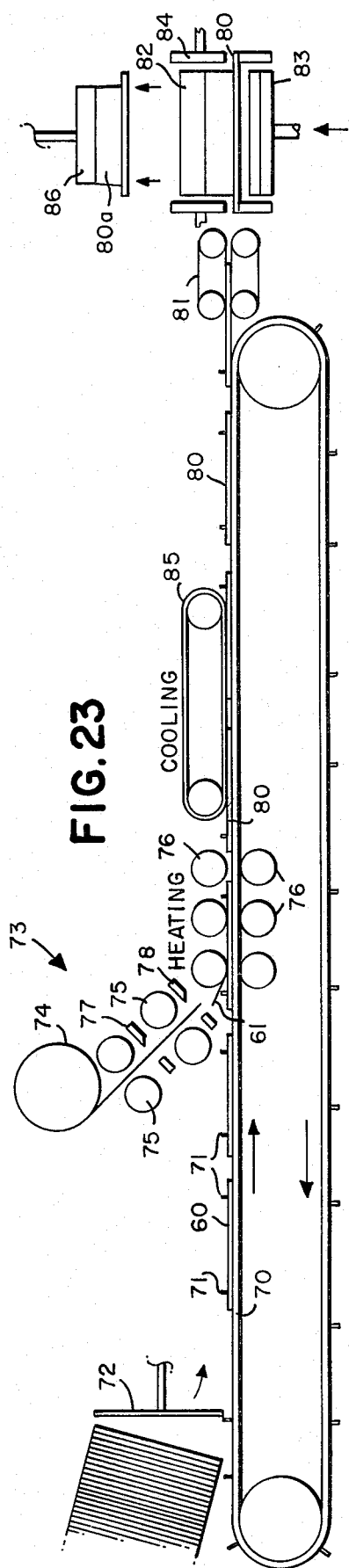
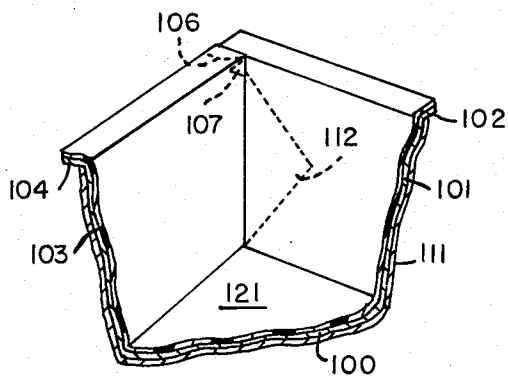
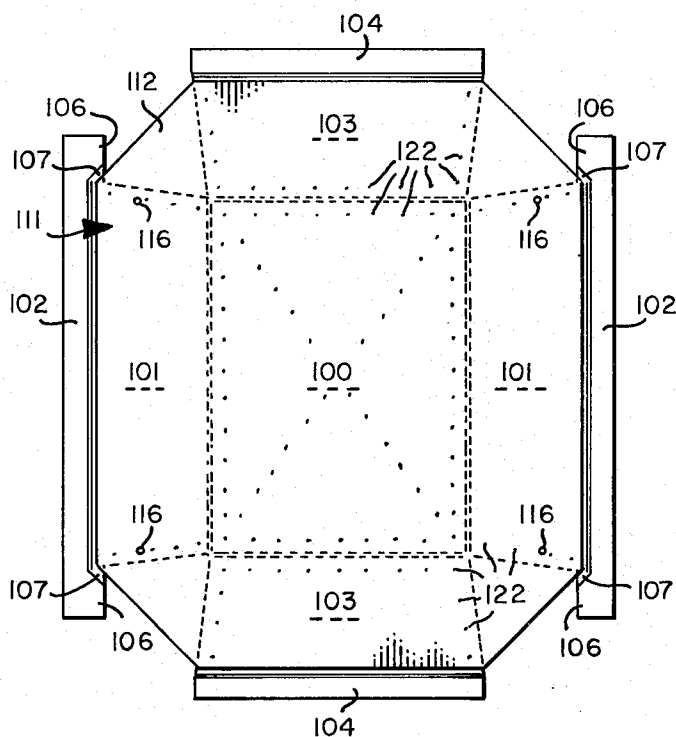


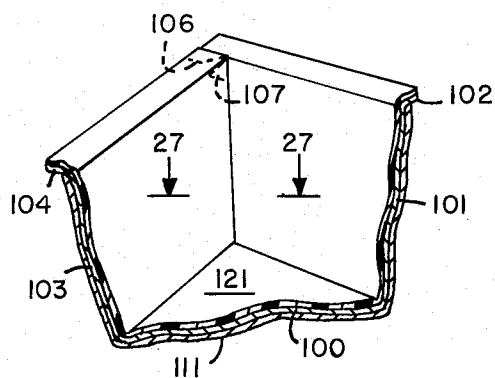
FIG. 16



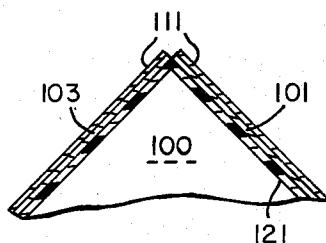
**FIG. 24**



**FIG. 25**



**FIG. 26**



**FIG. 27**

## CARTON

## DESCRIPTION OF THE INVENTION

This application is a continuation-in-part of my copending application Ser. No. 83,704 now U.S. Pat. Ser. No. 3715853 filed Oct. 26, 1970 for BOILABLE BAKEABLE PACKAGE AND METHOD, my copending application Ser. No. 154,784, filed June 21, 1971 now U.S. Pat. Ser. No. 3779477 for BOILABLE BAKEABLE PACKAGE AND METHOD, my application Ser. No. 192,720 filed Oct. 24, 1971 for BOILABLE BAKEABLE PACKAGE AND METHOD and my copending application Ser. No. 231,204 filed Mar. 2, 1972 for BOILABLE BAKEABLE PACKAGE AND METHOD now U.S. Pat. Ser. No. 3756495.

This invention relates to thermo-vacuum formed laminated packages such as trays or cartons of the straight sidewall type, each package consisting of a fabricated plastic coated or laminated paperboard outer layer which has its respective corners secured together by means of a gusset fold, either a single fold or a double fold with a sealing overlapping corner tab. The gusset fold and tab are glued or heat sealed in place against the adjacent wall of the tray or box or against an adjacent flange or edge portion or flap of the tray or box.

The structural features of the carton are such that it provides for effective sealing of the corners and open edges to substantially prevent leaks and cut-edge wicking and to substantially prevent desiccation or dehydration within the package during storage. Some of the corners provided may be subject to leakage of gases such as nitrogen, where it is not necessary for a tight seal as required in the case of such gases.

It is an object of the invention therefore to provide a combination of plastic, foil or paper coated paperboard lamina (and in some cases a film lamina) in a folding carton or tray of suitable character which can be used and subjected to either boiling, baking, or can be used for the storage of food products for subsequent sale and use.

Another object of the invention is to provide a package of the above character in which the tray or carton is constructed to hold liquids or liquid products and to prevent wicking thereof into the paperboard.

A further object of the invention is to provide a structure of the above character wherein there are no cut surfaces or edges of the paperboard structure exposed within the interior of the carton after sealing.

Still another object of the invention is to provide a thermoformed plastic inner layer in a carton for holding the food product, which inner layer is heat sealed to the lid or top of the carton and may be separated from the tray or bottom part of the carton without injury to the plastic so as to provide in effect a bag attached to a lid which can have graphics on it and display the necessary information needed to process the food contained in the plastic bag. This plastic bag may be subject to vacuumizing before sealing if desired.

Still another object of the invention is to provide for an improved process for covering a carton with a waxed paper layer having graphics and descriptive matter thereon, and for the resulting improved carton.

The above and other objects of the invention are attained as described in connection with certain preferred embodiments of the invention as illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of one form of the invention showing a closed carton;

FIG. 2 is a plan view of the carton blank employed in forming the carton of FIG. 1;

FIG. 3 is a perspective view illustrating the operation of the gusset fold and sealing tab and the placing of one of the gusset folds in position for heat sealing or laminating to the inner portion of the sidewall of the carton;

FIG. 4 is a perspective view of the corner shown in FIG. 3 after completion of the erection of the carton or package;

FIG. 5 is a perspective view of a double gusset corner fold in partially erected form;

FIG. 6 is a view of the structure shown in FIG. 5 in erected form;

FIG. 7 is a perspective view of an open top carton bottom or tray to which a plastic or plastic coated paperboard lid is adhered to complete the carton;

FIG. 8 is a plan view of a carton blank used in making the tray or carton bottom shown in FIG. 7;

FIG. 9 is a perspective view illustrating the method of erecting a corner of the carton shown in FIGS. 7 and 8;

FIG. 10 is an illustration of the corner shown in FIG. 9 in its erected condition;

FIG. 11 is a perspective view of a corner of a carton blank using a double gusset fold in the corner where flanges are attached at the top of the center portions of the fold for securing to the flanges attached with respect to the end of the side walls of the carton;

FIG. 12 is an erected view of the corner shown in FIG. 11;

FIG. 13 is a perspective view of a carton of the type shown in FIG. 7 with a preformed plastic liner being dropped in place therein.

FIG. 14 is a perspective view of a different type of carton having a single flange along one side of the lid;

FIG. 15 is a plan view of the blank of the carton illustrated in FIG. 14;

FIGS. 16 and 17, respectively, are perspective views of a corner of a carton at the hinged side of the lid being folded into place;

FIG. 18 is a perspective view of a corner of the carton of FIG. 15 adjacent the free edge of the lid;

FIG. 18a is a transverse sectional view taken in a plane indicated by the lines 18a—18a and FIG. 14 to show schematically the overlapping portions of the carton;

FIG. 19 is an enlargement of a part of FIG. 15;

FIG. 20 is a schematic side elevational view illustrating a method of coating a carton blank or laminating to it a layer of material such as waxed paper;

FIG. 21 is a plan view of the blank to be used with the wrapper of FIG. 20;

FIG. 22 is a plan view of the blank superposed in the wrapper; and

FIG. 23 is a schematic elevational view of a wrapper applying means.

FIG. 24 is a plan view of another form of blank with the wrapper superposed thereon and laminated thereto;

FIG. 25 is a perspective fragmentary view of the carton of FIG. 24 in erected form;

FIG. 26 is a fragmentary perspective view of one internal corner of a modified carton showing the liner therein;

FIG. 27 is a sectional view of a corner of the carton and is taken in the plane indicated by the line 27—27 in FIG. 26;

Referring to FIGS. 1 through 4 illustrating the first form of the invention, each tray may comprise an outer air-permeable paperboard structure or lamina 10 (FIGS. 1 & 2) of the type adapted to form a closed carton of rectangular construction with upright side walls and with a lid. This closed carton has three projecting flanges provided by flap extensions 14 and 16. The surfaces of the upright side walls 10a and a bottom wall 10b, may have a plastic coating on one or both sides or merely the inside surfaces if desired. For example, coatings such as polyethylene or the other plastics disclosed in said applications relating to higher temperatures of 350° F. and higher in the bakeable range. In the form shown in FIGS. 1 through 4 there is provided a polyethylene coating for example on both the inside and the outside of the board so as to enable lamination or heat sealing of respective portions of the inside and outer walls together as will later be described.

As seen in FIG. 2, each of the side walls 10a is joined to the bottom wall 10b by means of a score 11 and one of the side walls 10a has a lid 12 secured thereto by a score 13. The opposite wall 10a has a flap extension 14 secured thereto for registry with the edge of the lid 12.

The respective lefthand and right-hand side walls 10a in FIG. 2 have respective flap extensions 16 having a tab 17 formed at one end adjacent to a recessed or cut-away corner gusset fold structure including two triangular fold portions 18 and 19 joined to the respective side walls 10a by score lines 21 and having a diagonal score line 22 therein. The other gusset folds at the corners are similarly constructed and each one carries a registry aperture or indexing station 23 (referred to in greater detail hereinafter) to assist in the registry of a cover such as waxed paper bearing graphics. onto the blank before it is erected. For sake of clarity this covering layer has been omitted from the views of FIGS. 1 through 4.

As seen in FIG. 3 when the gusset fold formed about the score line 22 is broken inwardly, the triangular section 18 starts folding toward the adjacent side wall 10a and the gusset portion 19 starts overlapping of the gusset fold portion 18 at the same time that its side wall 10a is being lifted.

It will be noted that at the gusset fold portion 18 is less in height than the fold portion 19 so that when these fold portions are overlapping each other and also overlapping the righthand wall 10a the top strip 19a of the corner fold portion 19 will be in engagement, or can be placed in engagement with the inner part of the adjacent side wall 10a and they can be heat sealed together covering the cut portion of the inner gusset portion 18 and placing the aperture 23 on the inside so that it is protected from the contents of the carton.

In the erection of course the ear 17 overlaps the adjacent flange portion 14 as seen in FIG. 4 and can be heat sealed thereto as a part of the sealing operation to aid in strengthening and sealing the corner.

After the carton is erected and is filled, the lid 12 is bent around its score line 13, i.e., its connection to the adjacent side wall 10a of the carton, and will be placed in engagement with the side flap extensions 14 and 16 so as to be in position to be heat sealed thereto.

Referring to FIGS. 5 and 6 there is illustrated a carton construction wherein the bottom wall 10b is shown in fragmentary fashion and connected to fragmentary side walls 10a. The bottom wall and side wall being connected by a hinge joint provided by the score line 11. The two side walls 10a (FIG. 5) are connected by a

gusset fold construction with the two inner gusset portions 19a and two outer gusset portions 18a which are cutaway at the top as previously described in connection with gusset portions 18 and 19. In each instance the triangular gusset portions are connected to each other and to the adjacent side walls by hinged connections. One of the flap extensions 16a is extended to fill the corner and has a corner sealing tab 17a to underlie and be heat sealed to the outer flap extension 16a as seen in FIG. 6.

In erecting a carton the gusset portions 19a are broken inwardly to provide an outwardly forming bend along the gusset lines 22a so that each of the gusset portions 18a respectively, will be flat against the adjacent panels 10a and gusset portions 19a will be folded over them and the top portions of 19a above the gusset portions 18a will be in flush engagement with side walls 10a so as to be bonded thereto. Again in this style of structure both sizes of the paperboard may be plastic coated such as polyethylene coated. In this structure the cut ends of the gusset portions 18a will be covered when the gusset portions 13a and 19a are sealed to each other and to the adjacent side walls 10a. Also, the flap extensions 16a are overlapped and sealed by the ear or tab 17a overlying the corner joint and serving in its sealing function as previously described.

FIGS. 7-10 illustrated a form of the invention generally similar to that described above except there is no attached lid provided, so that all the corners are alike, and the side extensions 16 have tabs 17 at each end. Also, gusset portions 19 have sealing flap extensions 27 thereon so that when erected they will overlap the adjacent end side flap extension 16 and can be heat sealed thereto or glued thereto as the case may be. In this case also there are no open or cut ends on the inside of the carton and the paperboard is polyethylene coated both sides, if it is desired to heat seal the flap extensions 27 to the respective flap extensions 16.

FIGS. 11 and 12 illustrate a modified form of the invention wherein a double gusset fold is provided, with center folds 31-31 and side folds 32-32 with flap extensions 33 of the center folds 31. These flap extensions 33 may be heat sealed to the adjacent flap extensions 35 as the case may be. One of the flap extensions 35 is provided with an ear or tab 35a cutaway from the adjacent gusset portion 32 to form the corner seal.

With the above construction it will be noted the in the absence of a liner of polyethylene or the like, there will be leaking of gases such as nitrogen and the like but there will be an effective seal provided against the transfer of moisture so that there is a substantially constant moisture content within the package and there is substantially no loss of weight through desiccation. This enables the packer to fill close to the desired weight at the time of future sale and he is not required to put in excess weight of the product in order to meet the weight standard some 6 weeks to 2 months later.

FIGS. 14 through 19 illustrates another preferred modified form of the invention wherein a lid is employed and a projecting part of the carton is provided only on the edge along the free side of the lid.

The carton is shown in its closed condition in FIG. 14 and in plane as a carton blank as illustrated in FIG. 15. The carton has a bottom wall 41 joined by respective hinge lines or score lines 43 to side walls 42 having respective flaps 52 and 53. One wall 42 at the rear of the carton is hinged by a score line to the lid 46. All four of the side walls 42 are connected by gusset portions 47,

48 providing a single fold to be closed as shown in FIGS. 17 and 18 in the manner previously described.

In this case the gusset portion 48 is the longer and will lie over the gusset portion 47 and have its free end projecting above for heat sealing to the adjacent side wall 42 as seen in FIG. 16.

Each of the flap extensions 52 (FIGS. 15, 18 and 19) have corner locking ears or tabs 51 adapted to lie under and be heat sealed to the flap extensions 53 on the side wall 42 remote from the lid 46. These locking tabs 51 are cut free from the adjacent side wall 42 and the gusset portion 47 and have a fold line 51a between the tab 51 and the triangular extension 50 of the end wall 52. In this way the tab extension 52 in the erected position in the carton can be folded back flat against the outside of the adjacent wall 42 as seen most clearly in FIG. 18a. At its free edge the lid 46 has triangular tab extensions or flaps 56 hinged thereto by score lines 55 which extend also between side flaps 49 and lid 46. The gusset portions 48 are cut free at 57 from side flaps 49 and are adapted to be folded over in the finished condition of the carton as seen in FIG. 14. The side flaps 49 on the lid 46 are substantially the full depth of the side walls 42 so that they will overlap the tab extensions 52 and the side walls 42 and can be heat sealed or glued or otherwise bonded to the side walls.

FIGS. 20 and 21 illustrate a waxed paper or plastic film wrapper 61 and a carton blank 60 similar to the carton blank illustrated in FIG. 15. FIG. 22 shows a waxed paper wrapper 61 adhered by its wax to a carton blank 60 in position to cover the outside of the carton in erected position, the wrapper bearing the desired printed material desired thereon. The wrapper 61 is slit at 62 in alignment with the 2° cut between the side flaps 49 and the gusset portion 48 so as to not interfere with the erection of the carton. It will be seen that when the carton is erected the wrapper portions which are adhered to the gusset portions 47 and 48 will be caught in the gusset folds in each corner thereby insuring against any accidental detachment of the wrapper from the carton.

Referring to FIG. 23 there is shown in schematic side elevation a means for carrying out the method of the instant invention wherein a conveyor 70 has four aligning pins 71 at each carton receiving station. Each set of pins thereon being grouped to register with and pass through the apertures 23 of a carton blank 60 and a wrapper 61. The pins 71 will serve to keep both the carton blank 60 and the wrapper 61 in the proper aligned position after the pins 23 are engaged with their respective locating holes in the blank and the wrapper. As seen in FIG. 23, the carton blanks 60 are withdrawn from a stack by suitable feeding means 72 and placed in registry with a set of the pins 71. The conveyor then carries the carton blank underneath a wrapper feeding station 73 for the waxed wrapper which is fed from a supply roll 74 and passes through a series of feed rolls 75, a slitting knife 77, a cut off knife 78 and heating rollers 76 disposed both above and below the conveyor 70 and having suitable slots or apertures to receive the pins 71. The carton blanks and wrappers are fed through a cooling and pressure zone underneath an endless conveyor 85. The heating rollers 76 cause the wax on the paper wrapper to melt sufficiently to adhere to the paperboard carton blank. From the cooling and pressure zone, each carton assembly 80 is delivered by a transfer conveyor 81 to a conventional forming means including an upper form 82, a lower plunger 83,

of conventional construction and the carton assembly 80 is formed into the box shape of the carton by means including side formers 84 of conventional construction. The finished cartons 80a are discharged at the top and removed by a vacuum means 86.

Referring to FIG. 13 there is shown schematically one form of the invention in which the paperboard structure 10 having the usual side flanges 14-16 around its open upper end is lined with a preformed plastic liner 90 having a flange 91 formed thereon for heat sealing to the plastic coated flanges 14-16, if desired. This use of a preformed liner for heat sealing or non-heat sealing engagement within a paperboard erected carton structure can be employed with any of the various modifications disclosed in this application. Also, the liner 90 can be heat sealed to the plastic coated lid (not shown) so that it provides a come-apart pocket which, if desired may have air evacuated to reduce headspace.

After the heat sealing operation, the corners of the paperboard carton structure have overlapping portions provided by the overlapping structure such as the ears 17 and the adjacent flange portion 14 seen in FIG. 4 heat sealed together. This overlapping structure provides a smooth firm support during sealing of the plastic layer either to the flange or to the lid and insures a gastight seal.

The modified carton shown in plan in FIG. 24 includes a carton bottom 100 having a pair of opposite side walls 101 to which flap extensions 102 are connected by suitable score lines as previously described, and a second pair of side walls 103 having flap extensions of 104 hinged thereto. The side flap extensions 102 and 104 form flanges in the erected condition of the carton, and the extensions 102 have suitable ears 106 forming interconnecting means in the usual fashion and having the small triangular cut portion 107 which will be projected to form a stop. Heat sealed or laminated to the carton blank 100 after it is cut as a carton blank with all the respective hinge lines or score lines formed therein is a waxed paper label 111 which covers all the parts of the carton blank except the flap extensions 102 and 104. At the cutout corners of the blank between the side walls 101 and 103, at each corner the label provides a triangular connecting means 112 between portions of the label which are laminated to the side walls 101 and 103.

As seen with reference to FIG. 25, in the erected position of the carton the edges of the side walls 101 are adjacent to side walls 103 and come into abutting but not overlapping relation while the flap extensions 102 and 104 form flanges and have the overlapping ears or tabs 106 to provide an overlapping heat sealed connection as described in the other modifications. It is seen, therefore, in this particular carton structure that the carton is held in erected position as seen in FIG. 25 by the connection of the printed label 111 lamination to the carton structure or blank including the walls 100, 101 and 103 and the triangular connecting means 112 at each corner are folded in as seen in FIG. 25 to lie in flat abutting relation as a triangular extension of double thickness overlying the edge of the plastic coated side wall 101. Thereafter the inner layer 121 of plastic is shaped to the shape of the interior shape of the carton by thermo-vacuum forming and is bonded to and over the folded triangular portions 112 so that the waxed outer layer and the plastic inner layer reinforce the erected carton.

Referring to FIG. 24 it will be seen that the carton blank has a pattern of fine perforations 122 of special character. These perforations extend along beside each edge of the bottom wall panel or carton bottom 100 and which may also have an interior pattern. In the present case this interior pattern is shown as a cross shape with two diagonal lines from corner to corner. Also each of the side walls 101 and 103 have adjacent there end edges and adjacent their connections to the bottom wall or carton bottom 100 another series of these perforations which are employed in the thermovacuum forming of the layer 121 shown in FIG. 25 inside of the carton after it has been erected. It will be understood, of course, that these perforations 122 are formed in both the carton blank and the label 111.

Both the carton blank and the wrapper overlay laminated to it have indexing or registering holes 116 therein for use with the apparatus of FIG. 23.

FIG. 26 is a perspective view inside of one corner of a carton which is formed as described in connection with the blank comprising the reference numeral 100, 101, 102, etc., and the lamination of 129 on the inside. However, the outside is not laminated and carrier no wrapper and the sole method of support of the corners is the internal plastic layer 121 as seen more clearly in FIG. 27.

While I have shown and described certain preferred forms of the inventions, the invention is capable of being performed in various ways and by various means and should be limited only by the scope of the claims appended hereto.

I claim:

1. A carton corner construction comprising a bottom wall, a pair of side walls disposed normal to each other and to said bottom wall, a flange on each side wall normal thereto, one side wall and its flange having coincident edges, the other side wall and its flange having offset edges whereby a portion of said last-mentioned flange projects beyond the edge of said other side wall, a gusset hinged by first and second fold lines to said one and other side walls respectively, a third fold line dividing said gusset into a pair of gusset panels folded along said third fold line against one another and against one of said side walls, a flange hinged by a fourth fold line to one of said gusset panels, a tab projecting from said flange portion normal thereto and in the same plane

thereof, and said tab being in overlapped relationship to said one side wall flange.

2. The carton corner construction as defined in claim 1 wherein said tab is sandwiched between said one side wall flange and said gusset flange.

3. The carton corner construction as defined in claim 1 wherein said tab is formed by material robbed from the other of said gusset panels.

4. The carton corner construction as defined in claim 2 wherein said tab is formed by material robbed from the other of said gusset panels.

5. A carton corner construction comprising a bottom wall, a pair of side walls disposed normal to each other and to said bottom wall, a flange on each side wall normal thereto, one side wall and its flange having coincident edges, the other side wall and its flange having offset edges whereby a portion of said last-mentioned flange projects beyond the edge of said other side wall, a gusset hinged by first and second fold lines to said one and other side walls respectively, a third fold line medially of fourth and fifth fold lines dividing said gusset into first through fourth gusset panels folded along said first through fifth fold lines to bring two of said gusset panels against each other and against said one side wall and the remaining two of said gusset panels against each other and against said other side wall, a flange hinged by sixth and seventh fold lines to each of the centermost two of said four gusset panels, a tab projecting from said flange portion normal thereto and in the same plane thereof, one each of said centermost gusset panel flanges being folded about the respective sixth and seventh fold lines against said one and other side walls respectively, and said tab being in overlapped relationship to said one side wall flange.

6. The carton corner construction as defined in claim 5 wherein said tab is sandwiched between said one side wall flange and the associated centermost gusset panel flange.

7. The carton corner construction as defined in claim 5 wherein said tab is formed by material robbed from the gusset panel most closely adjacent said other side wall.

8. The carton corner construction as defined in claim 6 wherein said tab is formed by material robbed from the gusset panel most closely adjacent said other side wall.

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