United States Patent [19]

Bemiss

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[45] **Dec. 18, 1973**

[54] **BOILABLE BAKEABLE PACKAGE AND METHOD**

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[22] Filed: **June 21, 1971**

[21] Appl. No.: **154,784**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 83,704, Oct. 26, 1970, Pat. No. 3,715,853.

[52] **U.S. Cl.** ..... **229/14 B**, 206/46 R

[51] **Int. Cl.** **B65d 15/22**

[58] **Field of Search** ..... 229/14 B, 14 R; 206/46 R, 46 F

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Primary Examiner—Donald F. Norton
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[57] **ABSTRACT**

A laminated or multi-layer wall tray is provided which has a self-supporting outer layer or wall portion of paperboard which can be formed and handled as an independent self-supporting unit during manufacture of the laminated tray. A plastic liner is heat-vacuum formed into the paperboard tray or carton to provide a boilable, bakeable, liquid-tight, leakproof lining for the tray which in its entirety is of a boilable or bakeable character, and to provide a strengthened structure of the composite tray of the outer paperboard supporting structure and inner plastic film liner in supporting structure. Both the liner and the paperboard are preferably made of a thinness or caliper of a dimension less than can be normally employed in such structures when used alone. At the bottom the paperboard outer structure has certain formed indents around its bottom corner edge which provide resting portions or stops for nesting of the tapered trays to be handled as a stack, and also provide exit openings or vents for air from within the carton or tray at required positions to the outside during the thermo-vacuum forming of the liner. The method of fabricating or combining the components of such a tray comprises the steps of forming the outer paperboard structure or layer with the corners locked or secured together in self-supporting fashion to receive the plastic liner by thermo-vacuum forming process drawn inside of the self supported paperboard outer structure to correspond identically to the inner profile of the paperboard container thereby locking and if desired, adhering the molten plastic material to the inside paperboard structure. A laterally horizontally extending flange may be provided around the upper edge of either the paperboard or the plastic, or both.

10 Claims, 13 Drawing Figures

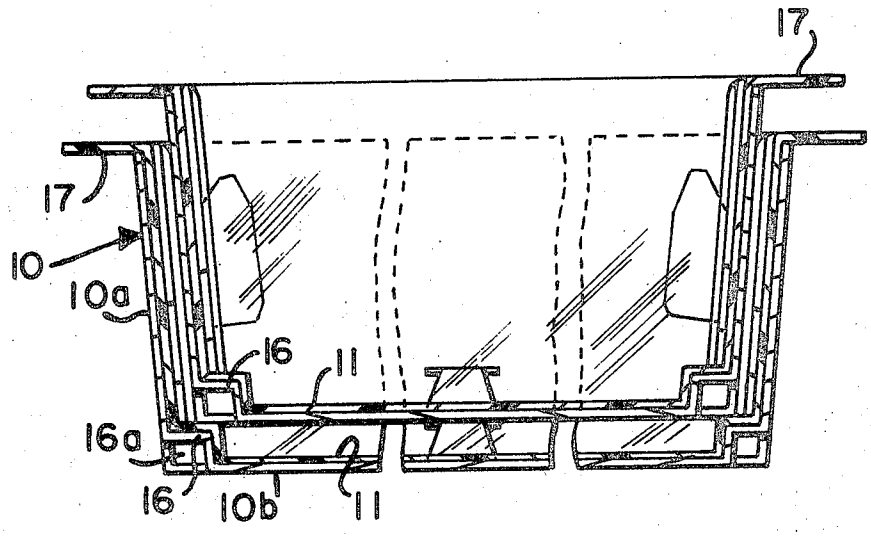


FIG. 1

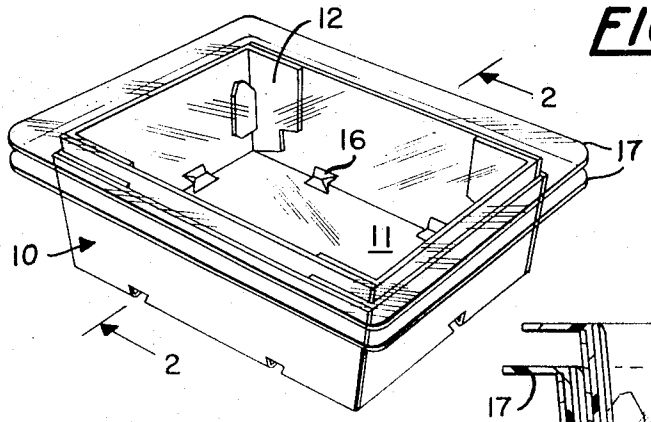


FIG. 2

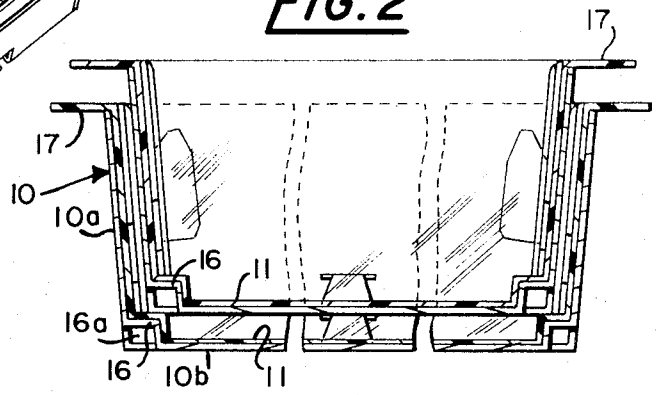
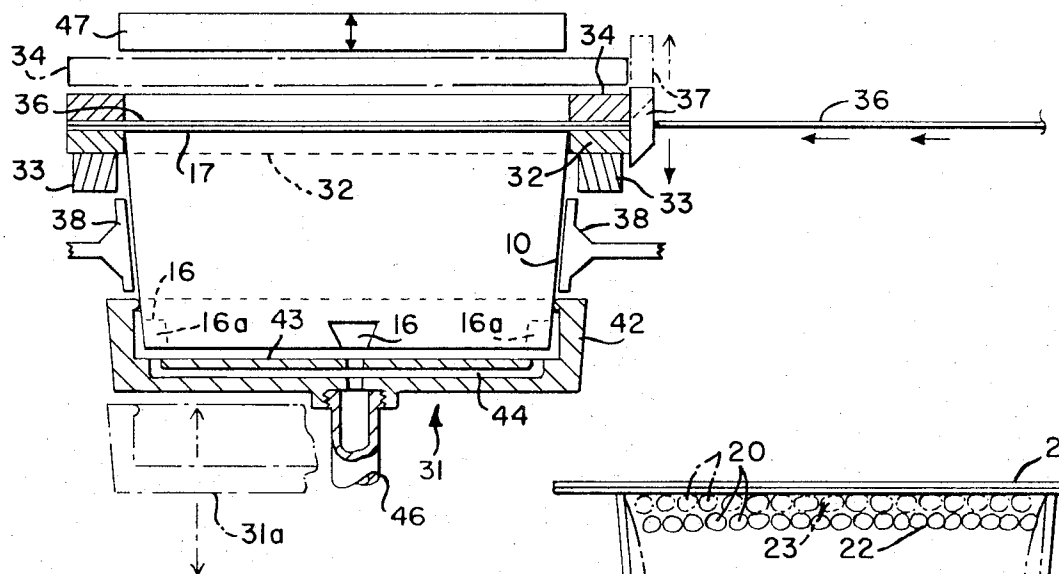


FIG. 4



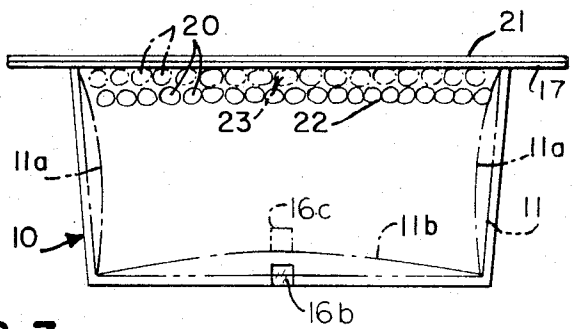


FIG. 3

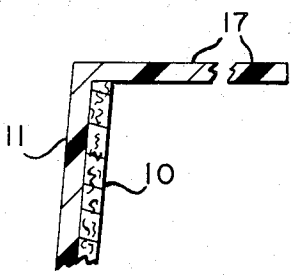


FIG. 2a

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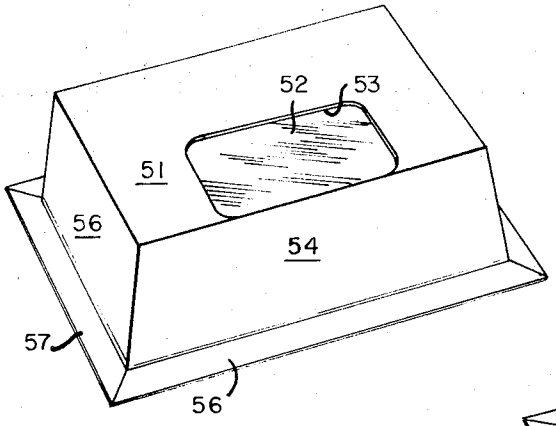
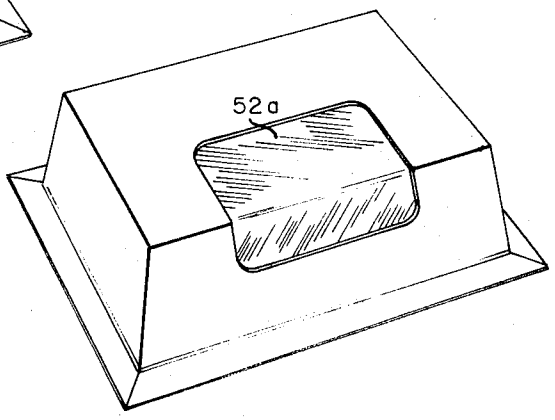


FIG.5

FIG.6



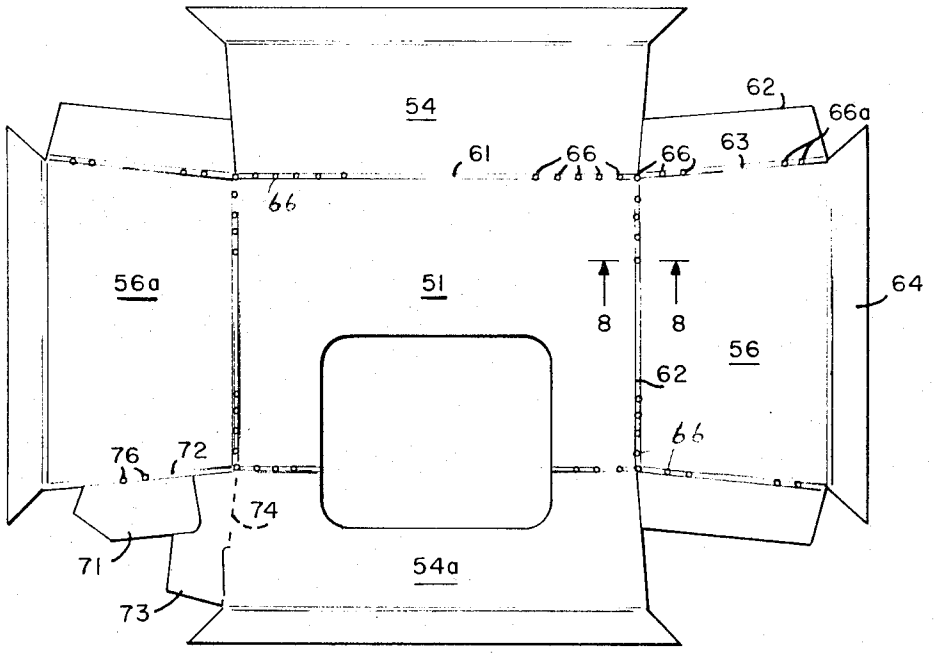


FIG.7

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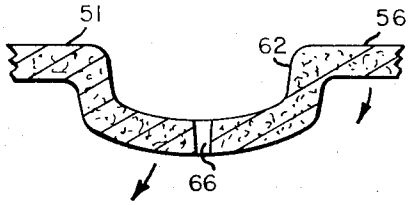


FIG. 8

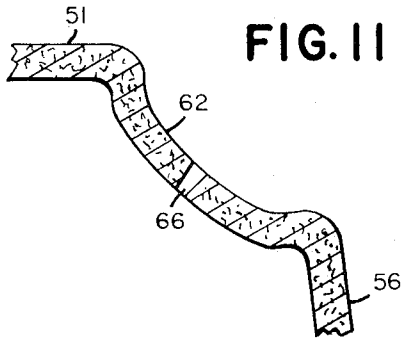


FIG. 11

FIG. 9

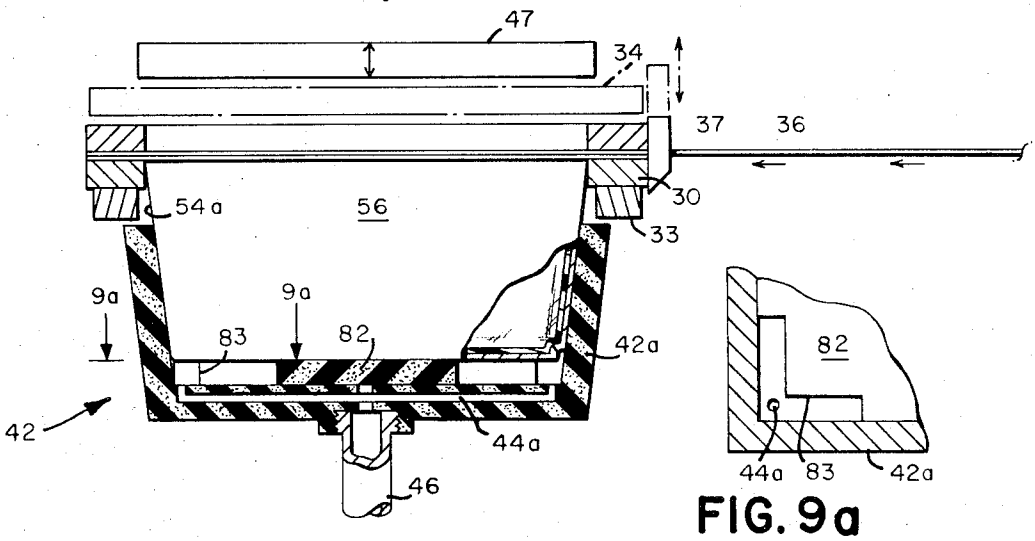


FIG. 9a

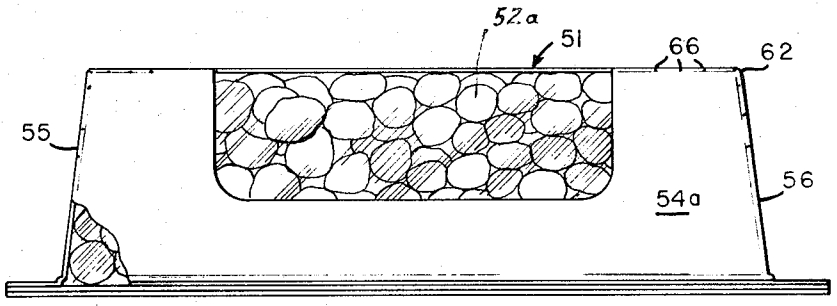


FIG. 10

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BOILABLE BAKEABLE PACKAGE AND METHOD

This application is a continuation-in-part of my copending Application Ser. No. 83,704 filed Oct. 26, 1970, now U.S. Pat. No. 3,715,853, for BOILABLE, BAKEABLE PACKAGE AND METHOD.

DESCRIPTION OF THE INVENTION

This invention relates to vacuum-thermoformed laminated packages such as tray or cartons, each package consisting of a fabricated paperboard outer layer which has its respective corners secured together in some conventional fashion, such as by a "Klik-Lok" construction, or similar construction, or by adhesive securing so that a self-supporting outer structure of paperboard is formed to be used in manufacture and for the application of any graphic art material desired in connection with the product container therein. The second lamina comprises an inner layer of film which is thermo-vacuum formed inside of the finished outer paperboard lamina. The finished tray or carton is filled with product and closed by a suitable lid or layer of film or coated paperboard. The product can be heated by boiling or baking to the desired temperature for use.

Packages somewhat similar to this have been known previously for packing margarine, for example, the "Tritello" package employed in Sweden under the "Flora" margarine label, wherein the manufacturing machine contains machine molds for trapping pre-cut paperboard within the mold and forming it in the shape of a tray, then the film or plastic is formed adhesively inside the paperboard to hold the paperboard together in finished form. With these prior structures it was necessary for the plastic to be in place and secured to the paperboard to make a self-supporting structure, the paperboard by itself being non self-supporting.

In accordance with the instant invention a competitive type package of improved character is provided with a lower cost basis.

It is an object of the invention, therefore, to provide a combination paperboard and film carton or tray of suitable character to be subjected to either boiling or baking.

Another object of the invention is to provide a package of the above character in which the tray can be constructed for nesting in a stack and be provided with nesting indexing means or stops, which also provide vents for the exhausting of air during the thermo-vacuum forming of the liner.

Still a further object of the invention is to provide a structure for a package of the above character wherein the package can be used with a seal flange, a trap flange, with outer flange and with a cover seal, either a separate cover or hinge type cover.

A further object of the invention is to provide a tray of a laminated construction wherein a thinner thickness of outer layer of paperboard and a thinner thickness of inner layer film can be used while still obtaining a structure which equals or exceeds the rigidity of a higher caliper or thickness of paperboard material.

A further object of the invention is to provide a combination laminated structure wherein an outer structure or layer of paperboard of self-supporting character and an inner structure or layer of film are provided wherein by subjecting the package to a vacuum at the time of sealing the closure, the inner layer can be formed to permit the exhausting of the air during the filling operation so that no head space remains.

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 nested trays or containers embodying the invention;

FIG. 2 is a transverse sectional view through FIG. 1; It will be understood that the thickness of the paperboard 10 and the film 11 has been exaggerated in FIG. 2 to enable clarity of the sectional view;

FIG. 2*a* is an enlarged view similar to FIG. 2 of a top corner of a tray;

FIG. 3 is a side view of a finished package which is closed by a lid under vacuum conditions so that the inner liner is drawn in, in the process of eliminating head space;

FIG. 4 is a sectional schematic view of a tray in the process of manufacture, the self-supporting outer paperboard structure being supported in a vacuum cup beneath the film for the inner layer;

FIGS. 5 through 11 illustrate a modified form of the invention;

FIG. 5 is a perspective view of one form of package having a window for inspection of the goods;

FIG. 6 is another form of structure wherein the window extends across the top and one side of the package;

FIG. 7 is a plan view of a tray blank for forming the package as shown in FIG. 5 and 6;

FIG. 8 is a fragmentary enlarged sectional view taken in the line indicated by the line 8—8 in FIG. 7;

FIG. 9 is schematic sectional view of tray in the process of manufacture, the self-supporting tray or paperboard structure being placed in a vacuum cup for installing the film for the inner layer;

FIG. 9*a* is a fragmentary sectional plan view taken as indicated by the line 9*a*—9*a* in FIG. 9;

FIG. 10 is an elevational view partly in section of the form of package being manufactured in FIG. 9;

FIG. 11 is an enlarged fragmentary sectional view of the right hand upper corner of the package shown in FIG. 10.

Referring to FIGS. 1 and 2, each of the trays comprises an outer paperboard structure 10 or lamina of upwardly diverging side walls 10*a* and a bottom 10*b*, and an inner layer of film 11 which is thermo-vacuum formed inside of the outer paperboard structure 10 and the divergent sidewalls provide for nesting of the structures. The film employed is preferably a high temperature film such as nylon, high density polyethylene, or the like. In practice, the thickness of the film will be from .006 to .010 mills, and the thickness of the paperboard will be from .009 to .020 mills. In thermovacuumforming a film into a recess the wall thickness is reduced as film is stretched and thinned, and an 0.008 inch thick film, for example, may be reduced to as little as 0.003 inch or 0.004 inch or mills.

As shown in FIGS. 1 and 2, the paperboard structure or lamina has its corner portions secured together by means of a conventional "Klik-Lok" or similar structure 12. Other conventional securing means such as by gluing, sealing, etc., can be employed at the corners. In any event, the outer paperboard structure is self-supporting and can be nested and stacked for subsequent use in completing the package.

In the matter of nesting, a series of angle-shaped indent portions 16 (FIGS. 1 and 2) are provided at spaced locations around the bottom edge of a carton to provide supporting steps or resting means for another carton as shown, for example, in FIG. 2 and these angle-shaped portions 16 are formed inwardly, provide side apertures 16*a* for emission of air during the vacuuming cycle and the processing operations as will be described. As shown there are six of the indents provided in each tray as a resting means and as an air emission means.

At the top the inner layer 11 extends outwardly in a flange 17 (FIG. 2*a*) to permit heat sealing of a coated paperboard lid to the flange or heat sealing of a similar plastic layer to the flange to form a weld. The flange 17 of the film is normally thinner than the paperboard lid to which it is heat sealed but for purposes of illustration in the drawings its thickness has been exaggerated.

Referring to FIG. 3, a carton is shown filled with a product 20 and has been closed by a paperboard lid 21 which is coated or film lined so as to be heat sealed to the flange 17. At the time of placing of this cover in place, the interior of the package is subjected to a vacuum operation so that the liner 11 is moved to a new position at 11*a* in certain portions, and 11*b* in others to force the product 20 from a level 22 upwardly toward the lid 21 at a level 23.

Referring to FIG. 4 the process of manufacture of the tray is illustrated schematically. The apparatus includes, for example, a rectangular conveyor frame 32 suitably mounted in elevated position so as to engage about a carton adjacent its top and locate it with its bottom resting in a vacuum cup 31. The conveyor frame 32 is shown above a pair of support rods 33, below a rectangular station clamp frame 34. At the station, there is a supply of film 36 fed across the top of the outer paperboard structure 10 and a suitable cut off knife 37 is provided to cut the desired length of film to be clamped by the rectangular clamp frame 34 aainst the rectangular support frame 32.

Suitable guides 38 may be provided at either side to ensure proper indexing of the carton with the vacuum cup 31 having a lower position indicated in dotted lines at 31*a* and an upper portion shown in full lines where its raised side flanges 42 engage the four walls of the paperboard structure 10. The bottom wall 43 of the cup 31 has suitable vacuum passages 44 leading to a vacuum fitting 46 by means of which vacuum can be applied to the space within the cup and through the vent openings 16a to the inside of the outer structure 10 of the carton or tray. At the same time an overhead electric heater 47 is energized and brought to active position to soften the film 36 so that it can be drawn inside of the carton to form the inner layer 11. When the struck-out portion 16 is formed with tapered side walls as seen in FIG. 4 the film drawn into this shape of opening will be effectively locked in place and can only be withdrawn with great difficulty. When the slot 16 is formed with straight side walls as shown in 16*b* in FIG. 3, a releasable interconnection or latch is provided by an indented film portion 16*c*.

If desired, the inner layer of film 11 may be secured adhesively to the outer paperboard structure 10 or the film may be heat sealed to this outer structure where a compatible coating exists on the paperboard.

While the above structure is schematic in nature, there are conventional vacuumizing arrangements manufactured which are capable of performing this operation in the manner described above or in another manner, for example, the U.S. Pat. to Bergstrom, No. 3,492,773.

The tray shown in FIGS. 5 – 8 is generally similar to the trays shown in FIGS. 1 and 2 and includes a top wall 51 having a window 52 formed of a plastic such as polyethylene covering an opening 53, and respective side walls 54 and 55 having flanges 56 and 57 at the edges thereof, all as previously described with the exception of the window construction. The modification shown in FIG. 6 differs only in that the window 52*a* extends around the corner of the package so that the contents can be seen both through the top and through a side of the tray.

The structure of the tray is illustrated more specifically in FIG. 7 wherein a plan view looking from the outside of the tray is shown, the top wall 51 being connected by blunt score lines 61 and 62, respectively, to the side panels 54 and 56. The side panels have respective glue flaps 62 hingedly connected thereto by blunt score lines 63 and having a flange forming outer tab or extension 64 also connected thereto by suitable score line.

Each of the score lines 61, 62 and 63 (FIG. 7) have adjacent the corner a series of perforations 66 which are formed in the blunt score. These punctures or holes 66 are small in character. In an actual tray they will be in the order of between 0.005 inch and 0.010 inch. The holes 66 are all grouped next to the corner and provide for access of the vacuum pressure to draw the film of plastic tightly into the package including the corner recesses of the package. In the score lines 63 between the respective glue flaps 60 and the walls 56 there is an additional set of perforations 66*a* close to the bottom of the hinge line for securing and performing the function of holding the plastic in place.

Referring to the bottom lefthand corner of FIG. 7 there is shown a lock-type carton corner including a locking tab 71 attached by a blunt score line 72 to the end wall 56*a* of the tray and cooperating with this tab 71 there is conventional form of flap 73 which is slit at 74 and its point of connection to the sidewall 54*a* so as to receive locking tab 71. This is a conventional form of construction and is commonly known in the market as a "Klik-Lok" corner lock.

While the cartons would not normally be built with three glue corners and one locking corner it is being illustrated in this fashion to show the different type of corners that can be associated with the tray. The score line 72 providing the hinge between the flap 71 and the body of the end panel 56*a* is provided with a pair of perforations 76 in the score line, all as will be described hereinafter.

FIG. 8 shows an enlarged score line, for example, the blunt score line 62 with its apertures 66 joining the top wall 51 to the end wall 56 provides a depressed score in which the apertures 66 are formed so that even when the walls are folded in the direction of the arrows to form the desired shape of the tray, the apertures 66 will still be in a position to pass gases without the likelihood of becoming obstructed by being forced against the wall.

In connection with the formation of the laminated structure of this type of carton it will be seen that the resilient, flexible vacuum cup 42 (FIG. 9) has its side walls extending up beyond the window 52a and the por-

tion of the window in the top panel is supported by means of a rubber pad 82 in the bottom which terminates short at its end portions and has its corners cut away to have communication with the vacuum passage 44a and with the adjacent vacuum admitting holes 66. The rubber pad 82 and the cup 42a may be of foam rubber impervious to a gas but still capable of giving an effective sealing action in pressing against the wall 54a of the tray or carton and the window 52a of the film.

Preferably where the film such as a plastic or nylon film, for example, is formed into the paperboard structure in a detachable way, the film liner or plastic part is secured by its flange portions to the paperboard top which bears printed material identifying the product. Where desirable, this top and liner assembly can be removed from the tray or paperboard structure with the food product therein for heating of the product. This is preferable from an ecology view point as the easy separation of the plastic part from the paperboard tray is desirable, and the plastic part could also be separated easily from the top after being heated.

In order to destroy the molecular orientation that will provide a plastic memory in certain plastic films the heating to enable vacuum forming of the film can be done either by a flame treatment as commonly employed for printing on polyethylene or by an electric corona discharge treatment employed for the same purpose.

While I have shown and described certain preferred forms of the invention, it is apparent that the invention is capable of variation and modification from the form shown so that the scope thereof should be limited only by the proper scope of the claims appended hereto.

I claim:

1. A tray or carton structure including an outer tray or part of paperboard having a bottom wall and four side walls, an inner tray or part comprising a thermo-vacuum formed layer of film conforming closely to the inside contour of said outer part of paperboard, said paperboard part and said film part individually lacking wall strength sufficient for handling as an individual container but together providing mutual reinforcing elements having a combined wall strength to provide for handling as a container for food or the like, and an interface between said film part and paperboard part being devoid of an adhesive the corners of the tray structure are formed by recessed blunt score lines facing outwardly and in which a series of apertures extend outwardly from each corner along said blunt score lines.

2. A tray structure as recited in claim 1, in which the series of apertures have a sufficiently small diameter of about 0.005 inch to 0.010 inch so as to preclude drawing of the film part into the openings.

3. A laminated container comprising an outer container, an inner liner of plastic material vacuum formed in situ within said outer container, a view opening in said outer container, a portion of said liner being in spanning relationship to said opening, and said liner portion being housed entirely interiorly of said outer container.

4. The laminated container as defined in claim 3 wherein said outer container has a bottom wall, and said view opening is in said bottom wall.

5. The laminated container as defined in claim 3 wherein said outer container has a body wall, and said view opening is in said body wall.

6. The laminated container as defined in claim 3 wherein said outer container has body and bottom walls, and said view opening is in said walls.

7. The laminated container as defined in claim 3 including a lid secured to said inner liner, and said liner and outer container being in releasable relationship whereby the liner with its lid secured thereto may be removed from said outer container.

8. A laminated container comprising an outer paperboard container blank folded to define an outer container, an inner liner of plastic material vacuum formed in situ within said outer container, said outer container having a flangeless terminal uppermost edge, and said liner having a peripheral flange projecting, radially beyond said terminal uppermost edge, said container including a view opening in said outer container, a portion of said liner being in spanning relationship to said opening, and said liner portion being housed entirely interiorly of said outer container.

9. A product package comprising an outer paperboard container blank folded along fold lines to define an outer container having body panels and a bottom panel, said body panel terminating in an uppermost flangeless edge, an inner liner of plastic material vacuum formed in situ within said outer container and being in releasable engagement therewith, a product in said liner, a lid heat sealed to a flange of said outer container whereby said liner, product and lid may be withdrawn as a unit from said outer container, said body panels being in upwardly divergent relationship to said bottom panel, inwardly indented portions of said body panels providing stop means for nesting of similar packages in the absence of lids and products and providing openings for communication with a source of vacuum, said stop means being struck out portions of said body and bottom panels, said liner having portions thereof extending into said openings, a view opening in at least one of said panels, a portion of said liner being in spanning relationship to said opening, and said liner portion being housed entirely interiorly of said outer container.

10. A laminated container comprising an outer paperboard container blank folded to define an outer container, an inner liner of plastic material vacuum formed in situ within said outer container, said outer container having a flangeless terminal uppermost edge, and said liner having a peripheral flange projecting, radially beyond said terminal uppermost edge, said container including a lid bonded to said flange, a product in said line, and said liner and outer container being in releasable relationship whereby said liner, product and lid can be withdrawn as a unit from said outer container.

* * * * *