Sept. 23, 1969 J. E. FOOTE 3,468,468

CONTAINER

Filed Aug. 14, 1967

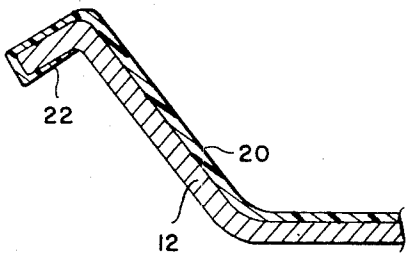


FIG. 2a

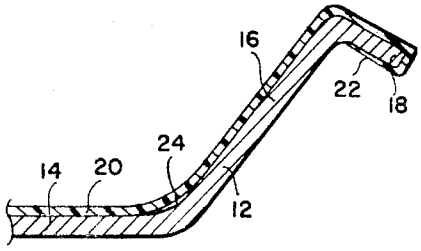


FIG. 2

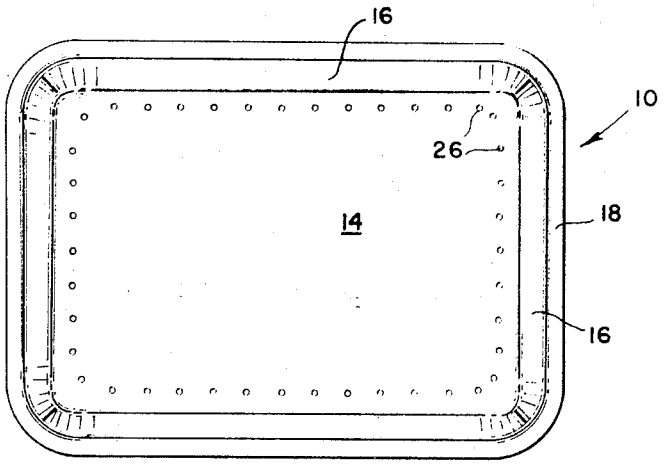


FIG. 1

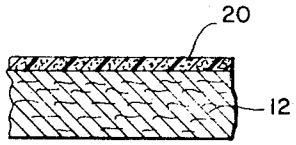


FIG. 3

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CONTAINER

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U.S. Cl. 229—14 7 Claims

ABSTRACT OF THE DISCLOSURE

The present disclosure relates to a plastic foam lined food tray formed by laminating a foam plastic liner to a molded pulp tray. The plastic lining is impervious to the penetration of liquid, but may be provided with apertures extending therethrough so that liquid exuded from the contained material can pass into the molded pulp tray if desired. An effective sealing is accomplished by wrapping the foamed liner around the lip of the tray and applying heat and pressure to the bottom side of the lip. By using a foamed liner, the material weight of the liner can be drastically reduced without inhibiting the thermoformability of the liner into the tray without the development of pinholes.

The present invention relates to a container and, more particularly, a foam plastic lined molded pulp food tray.

Containers made of molded pulp or paperboard are customarily used in most retail food markets today for packaging fresh meats, poultry, fish or other commodities from which some natural juices are likely to exude. These containers are usually in the form of a shallow generally rectangular or oval tray, and also generally embody a transparent plastic covering sheet which may be wrapped around the tray and heat-sealed around the bottom of the tray to form a package. Such containers present an attractive display while providing adequate protection during the sale and temperary storage of the packaged foodstuffs, particularly for naturally juicy fresh poultry and the like, from which some blood or water may exude. These packages have in general been highly successful.

In packaging fresh meats or poultry in paperboard or pulp trays, it is often desirable to have the tray pick up or absorb any exuded blood, free moisture or juice to keep the appearance of the package neat and to prevent such fluids from freely running around the inside of the sealed package during normal handling by customers or prospective purchasers. On the other hand, some consumers prefer food packaging trays which do not absorb the liquid since such absorption may have the effect under extreme conditions of causing the tray to become soggy and, when the package and contents become frozen, the tray may be difficult to remove from the product without prethawing.

In spite of the great success and desirability of the conventional pulp molded tray, many attempts have been made to provide other types of meat packaging trays to satisfy those purchasers who are adverse to the absorptive qualities of the molded pulp trays. Among the proposals suggested and attempted have been the provision of plastic trays, both foamed and unfoamed, the provision of non-absorptive inner layers in molded pulp containers, and the provision of plastic lined containers. While many of these previous attempts have been highly satisfactory from a product standpoint, they have not been widely adopted primarily because of the increased cost of producing such containers. This is particularly true in the case of the plastic food containers because the plastic raw material is more expensive than is molded pulp. In addition, the utilization of an impervious plastic liner for pulp or paperboard trays has in the past been generally procedurally expensive, both from the viewpoint of the laminating procedure and the cost of the liner raw material.

It is therefore an object of the present invention to obviate the deficiencies of the prior art, such as indicated above.

It is another object of the present invention to bond a lining to a paper product tray to provide a suitable container.

It is another object of the present invention to provide a molded pulp food tray having bonded to the interior surface thereof a lightweight and inexpensive plastic liner.

It is another object of the present invention to provide an inexpensive method and container, but wherein the container is extremely effective to provide frozen release of the contents.

It is another object of the present invention to provide a food container having a plastic lining which is impervious to the penetration of liquids.

It is another object of the present invention to provide a food container which has a plastic lining provided with apertures through which exuded liquid may penetrate.

It is another object of the present invention to provide a laminated product having the inherent strength and stiffness of a molded pulp article and the surface characteristics of a foamed plastic article.

It is another object of the present invention to provide new and improved paperboard or molded pulp containers and method of forming such containers.

It is another object of the present invention to provide new and improved food containers for packaging naturally wet or juicy food which containers are provided with means for trapping any excess freely flowable liquids drained from the packaged food.

It is another object of the present invention to provide new and improved food containers having integral means for absorbing excess fluids without dehydrating the food packaged therein.

Other objects and the nature and advantages of the instant invention will be apparent from the following detailed description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a plan view of a paper-product container embodying the present invention;

FIG. 2 is a vertical sectional view partly broken away of a container in accordance with FIG. 1;

FIG. 2*a* is a sectional view similar to FIG. 2 showing another embodiment; and

FIG. 3 is a detailed sectional view taken through the double thickness of the laminate product of FIG. 1.

In order to illustrate the principles of the invention as applied to a typically widely used article of commerce, the paper-product trays, preferably of molded pulp, embodying the invention shown in the drawings appear relatively shallow and generally rectangular in overall configuration, and it should be understood that this configuration may be varied as desired. The illustrated trays are particularly suitable for the packaging of fresh meat, poultry or fish for sale in retail food markets.

The container **10** shown in FIGS. 1–3 comprises a paper product tray **12** having a generally flat horizontal bottom wall **14** from the edges of which project an integral upwardly and outwardly extending inclined side wall **16** terminating in a generally outwardly, and preferably slightly downwardly, extending flange **18**. The tray is preferably formed of molded pulp which is inherently relatively strong and rigid. However, if desired the tray **12** could also be formed of folded porous paperboard.

A liner **20** of impervious plastic foam material is adhered to the inner surface of the tray **12** preferably by the utilization of a suitable adhesive which securely bonds

the plastic foam **20** to the upper and inner surface of the tray **12** to provide a highly attractive laminate.

The adhesive may be applied prior to effecting the lamination to either the foam plastic liner or to the molded pulp tray in a discontinuous pattern, or as a generally continuous layer to the foam plastic liner.

It is an important feature of the present invention that the liner **20** be formed of foamed plastic. The lamination is effected by a vacuum thermoforming procedure and it has been found that when using an unfoamed or crystalline film it is necessary to use a liner having a thickness of at least 5–6 mils, in order to avoid the development of undesirable pinholes in the liner film. Such pinholes disrupt the continuity of the film and render the product unsatisfactory and commercially unsaleable. On the other hand, the utilization of a 5–6 mil thick plastic film constitutes an excessive and unduly expensive waste of plastic and renders the resultant product too expensive to be properly competitive. By using a foamed sheet as the liner **20**, however, the material weight of a 10 mil film is approximately equivalent to the weight of a 1 mil crystalline film (when the foamed film constitutes the preferred 10% plastic and 90% cells).

The preferred parameters of foam liner thickness is between 5 and 20 mils. If the thickness lies substantially below 5 mils, the film becomes too difficult to handle and pinholes develop. On the other hand, if the thickness is greater than 20 mils, the total thickness of the laminate becomes greater than that which is commercially desirable. Furthermore, if it is substantially greater than 20 mils in thickness, the savings in plastic becomes increasingly diminished.

The percent-plastic parameters in the foam liner preferably lie between 5 and 50%. If the plastic content is substantially under 5%, the result is a porous foam which, although permissible in some instances, is not desired from a product viewpoint since a non-continuous film results. In addition, a porous foam liner complicates the laminating procedure. On the other hand, if the foam liner comprises more than 50% plastic, the result is a poorly foamed material and the savings in plastic becomes increasingly diminished.

In addition to the above defined parameter, it is also desirable, to effect maximum saving in plastic, that the plastic content of the foam liner, regardless of the thickness of the foam liner, be less than that necessary to provide a solid or crystalline plastic film having a thickness of 5 mils.

Any non-toxic thermoplastic material which is capable of being formed into thin film foam may be suitably used as the liner material. Included as such materials are the polyolefins, such as foamed polyethylene or foamed polypropylene, and other well-known plastics. However, the preferred material, primarily because of its ease of foamability and its low initial cost, is polystyrene.

As best seen in FIG. 2, the liner **20** overlies the interior of the tray **16** and wraps 180° around the flange **18** where it is adhered to the undersurface thereof at **22**. It is an aspect of the present invention that the liner **20** is strongly or tightly adhered to the undersurface of the flange **18** as shown at **22**. In addition, and as shown in FIG. 1, it is preferable that during the lamination sufficient force be applied to the film liner at the area **22** under the flange **18** to actually compress and densify the foam to insure its tight adhesion to the flange **18**; a result of this pressing is that the foam **20** at the area **22** becomes thinner than elsewhere.

The process of effecting the lamination preferably involves as a first step the application of a heat sensitive adhesive to one surface of the foamed polystyrene sheet. As a second step the foamed plastic sheet **20** is placed above the tray **12** and vacuum is drawn through the porous pulp tray **12** while simultaneously applying heat to the foamed plastic. This results in a vacuum thermoforming of the foam sheet into the pulp tray **12** and causes activation of the adhesive effecting adherence of the liner to the tray. As a third step the foamed liner is cut to the proper size, preferably approximately one-quarter inch beyond the perimeter of the tray, thereby providing a one-quarter inch extension which may be subsequently wrapped around the flange **18** and sealed at zone **22**. Preferably, the cutting of the foam is done with a hot knife or hot wire, although it may be carried out in any suitable manner such as with matched dies. As a fourth step, the one-quarter inch extension of the liner is crimped around the flange **18** and lightly adhered to the underside thereof at zone **22**. As a fifth step, the one-quarter inch extension is then strongly thermosealed at zone **22** to the underside of the flange **18** using heat and pressure.

Any adhesive which is non-toxic and which is capable of adhering the plastic liner to the pulp tray may be used, although heat-sensitive adhesives are preferred. Water base adhesives, such as polymer latex adhesives, are particularly suitable. Such adhesives are well known. Aqueous emulsions of polyvinyl acetate are the preferred adhesives.

As seen in FIG. 2, the liner **20** may be drawn into contact with the tray **12** in such a manner as to form an annular space **24** adjacent the periphery of the bottom wall **12** where it joins with the side wall **16**. In such a case, the foam plastic liner is tightly adhered to the inner surface of the pulp tray **12** everywhere except along the annular zone **24**. On the other hand, if a greater degree of vacuum is utilized and/or more heat is applied to the foam during the thermoforming, the liner will be drawn tightly against the tray **12** at all locations such as shown in FIG. 2*a*.

Forming the laminate with an annular space **24**, such as shown in FIG. 2, has the advantage of providing a zone for exuded liquids to flow into and be retained, and where, depending on the treatment of the pulp tray **12**, such liquid may be absorbed by the pulp tray **12** through capillary attraction. In such a case, however, it is necessary to provide apertures **26** through the liner **20** to provide egress of the liquid to the annular space **24** at the zone adjacent the periphery of the bottom wall **14**. Such holes **26** are preferably formed by puncturing the liner **20** immediately after laminating.

The following specific example, which is exemplary only, shows a method of forming a tray in accordance with the present invention:

A water base adhesive, Super Grip 160 (Stein Hall Co.), was applied to one side of a foamed polystyrene sheet having a thickness of 10 mils and a polystyrene content of 10%. The adhesive was applied by means of a nip-roll process and the application rate was approximately 1 pound per 1000 square feet of foam polystyrene film. The water carrier of the adhesive was then evaporated by air drying at room temperature.

A plurality of pulp molded trays having a thickness of about 1/16 of an inch were then placed on a vacuum table and the adhesive coated foamed polystyrene sheet was then placed thereover with the adhesive face down. Heat was applied for 5–6 seconds by radiant means, the sheet being heated to about 200–250° F., and vacuum was applied (e.g. 15–22 in. Hg) through the porous tray which caused the sheet to be drawn downwardly into the tray as shown in FIG. 2.

Cutting was then effected by utilizing hot knives at 350–450° F., constructed with standard steel roll cutting blades that were affixed to heater bars. Each tray with the adhering polystyrene was cut free from the sheet with ¼ inch of polystyrene foam film extending beyond the periphery of the tray.

The ¼ inch foam extension was then crimped to the underside of the flange **18** by utilizing a reciprocating die which turned the extension around the flange **18** and caused it to lightly adhere to the bottom thereof at zone **22** by the application of 5–15 p.s.i. To insure security of

this adhesion, it is preferred that a thermosealing step be carried out and in this case the film at zone 22 was pressed under heat (200–250° F.) and pressure (5–15 p.s.i.) against a heated die to obtain the desired degree of adhesion.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

What is claimed is:

1. In a container for the packaging of meat, fowl and other liquid exuding foods, said container comprising a bottom wall, a side wall extending upwardly and outwardly from the periphery of said bottom wall, and a flange extending generally outwardly from the upper edge portion of said side wall, the improvements wherein said container comprises a porous molded pulp base and a nonporous foamed plastic liner, said liner being wrapped 180° about said flange of said base and tightly adhered to the undersurface thereof, said liner being in relatively tight conforming relationship with said base and vacuum thermoformed thereagainst along the inner surface thereof and generally adhesively attached thereto, said foamed liner having a plastic content less than that necessary to provide a solid plastic film 5 mils thick.

2. A container in accordance with claim 1 wherein said foamed plastic liner is tightly adhesively adhered to the inner surface of said pulp base except at a zone adjacent the said periphery of said bottom wall at which said liner is spaced from said base.

3. A container in accordance with claim 2 wherein said liner is provided with apertures therethrough at said zone adjacent the said periphery of said bottom wall to provide egress of exuded fluid to the space between said base and said liner.

4. A container in accordance with claim 1 wherein the portion of said foamed plastic liner wrapped about said flange portion is thinner and has a greater density than the remainder of said foam plastic liner.

5. A container in accordance with claim 1 wherein said foamed plastic liner consists essentially of a polystyrene.

6. A container in accordance with claim 1 wherein said foamed plastic liner has a solids content of no greater than 50% and a thickness of at least 5 mils.

7. A container in accordance with claim 6 wherein said foamed plastic liner has a solids content between 5 and 50% and a thickness between 5 and 20 mils.

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U.S. Cl. X.R.

99—171, 174; 161—159; 229—2.5