TWO-COMPARTMENT SEMI-RIGID TRANSPARENT PACKAGE

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ABSTRACT

A multi-compartment package is formed by filling the cup-like cavities of a two-part container with the separate parts being semi-rigid and thermoformed from flexible plastic sheet material. One part of the container is thermoformed from a flat sheet so as to have a flat sheet or flange portion and a plurality of contiguous cup-like container cavities lying wholly within the margins of the flat sheet portion. Side walls of contiguous cavities are integrally joined in a relatively small generally tangential juncture area which is generally vertical with respect to the horizontal flat sheet portion. The second part of the container serves as a closure for the first and is formed of flexible plastic sheet material having shallow plug-like embossments thermoformed therein for plug-like or stopper-like registering engagement in the open ends of the cavities in the first part and with the surrounding flat sheet portions sealed flat-wise against the flat sheet or flange portion of the first part.

9 Claims, 4 Drawing Figures
TWO-COMPARTMENT SEMI-RIGID TRANSPARENT PACKAGE

This invention relates, generally, to innovations and improvements in multi-compartment semi-rigid packages using semi-rigid containers thermoformed from flexible plastic sheet material. More particularly, the invention pertains to such packages wherein the containers therefor are economically formed in two parts by using known thermoforming techniques and equipment, with maximum efficiency and economy in the quantity or weight of plastic sheet utilized being obtained in part by reason of certain structural features which impart rigidity and in part by the contents of the packages.

The containers utilized in making the package of the present invention are formed in two parts. One part is thermoformed from a sheet of flexible plastic material so as to have two or more bubble-like or cup-like cavities formed therein with the side wall of each bubble or cavity being integrally contiguous with that of at least one other bubble or cavity and integrally connected thereto in a relatively small generally tangential juncture area as a result of the thermoforming process. The cavities lie wholly within the margins of the remainder of the flat sheet portion. The integral interconnection between contiguous cavities or bubbles is at least in part adjacent to the closed bottoms of these bubbles or cavities whereby the bubbles or cavities are integrally joined together adjacent their closed ends so as to resist twisting or flexing forces tending to separate the cavities.

The second part of each container of the present invention can be regarded as a closure plate or cover member for the multiple cavities. In its preferred form this cover plate or member has thermoformed plug-like embossments which fit like stoppers or plugs into the open ends of the bubbles or cavities. The balance of the closure sheet or plate is available for flat surface-to-surface sealing engagement with the flange or flat portion of the container part that has the bubbles or cavities therein.

The object of the invention, generally stated, is the provision of packages and containers of the type described characterized by the following important advantages:

A. The multiplicity of bubble-like or cup-like cavities allows the packaging of maximum weight or volume of product without resorting to an unacceptable package depth.

B. The multiplicity of cavities increases the display surface of the contents.

C. The multiplicity of cavities allows the unitary packaging of different materials or products in the multiple compartments or cavities, and if desired they may have different sizes and shapes.

D. The tangential integral interconnection of the side walls of contiguous cavities is adjacent to the closed ends thereof thereby contributing a substantial degree of rigidity against twisting or flexing which rigidity is augmented by the flange like portions of the plastic sheet surrounding the cavities or bubbles.

E. The embossed shallow or plug-like formations in the closure sheet matingly engage and close or stopper the open ends of the multi-cavities and thereby contribute added strength.

F. The tangential integral interconnection between contiguous plug-like formations in the closure part projects or wedges into a recess provided therefor in the part having the bubbles or cavities and aligned with the tangential juncture area or center connection between contiguous cavities or cups.

Certain other objects of the invention will in part be obvious, and will in part appear hereinafter.

For a more complete understanding of the nature and scope of the invention reference may now be had to the following detailed description thereof taken in connection with the accompanying drawings, wherein:

FIG. 1 is a top perspective view of a filled package forming and illustrating one embodiment of the invention;

FIG. 2 is a longitudinal sectional view on enlarged scale taken on line 2—2 of FIG. 1 with the contents of the package shown in elevation;

FIG. 3 is a transverse sectional view on enlarged scale taken on line 3—3 of FIG. 1; and,

FIG. 4 is an exploded perspective view showing the two parts comprising the container for the package shown in FIGS. 1—3 with these parts inverted.

Referring to the drawings, a completed (i.e., filled and sealed) package is indicated generally at 5 in FIG. 1 having the cylindrical cup-like pockets or cavities 6 and 7 and a generally flat sheet or flange-like portion 8.

The pockets or cavities 6 and 7 may be filled with any desired product. However, the package 5 is especially useful for the self-service merchandising of stacked and sliced food products such as luncheon meats (e.g., bologna, summer sausage, ham) cheese, etc.

The container of the package 5 is comprised of two thermoformed parts as best shown in FIG. 4. One of these parts is indicated generally at 10 and includes the pockets or cavities of 6 and 7. The other part is indicated generally at 11 and constitutes a cover or closure for the first part 10.

Generally it will be desired to vacuumize and hermetically seal the package 5 in order to preserve the perishable food contents in excellent condition with prolonged shelf life. Various plastics may be used that lend themselves to thermoforming techniques and which are formulated so as to provide adequate resistance to transmission of air, oxygen and moisture. Since it will usually be necessary or desirable to refrigerate, or even freeze, many packaged items the plastic materials used should have adequate impact strength at low temperatures.

Plastic materials are commercially available which are formulated to have the foregoing desired properties and include polyvinyl, cellulose acetate, nylon, polycarbonate, high impact polystyrene, high impact polypropylene, high density polyethylene, and acrylate resins.

These various plastic materials may be laminated or coated with saran to increase their oxygen impermeability or otherwise improve or modify their physical properties.

The container parts or elements 10 and 11 are thermoformed on a mass production basis from desired plastic sheet materials on commercially available thermoforming equipment. In equipment of this type heated flat plastic sheets are thermoformed by means...
of vacuum and/or blow molding techniques permitting the repetitive production of the parts with adequate accuracy so that any randomly selected multiple-cavity part 10 will mate with any randomly selected cover or closure part 11.

Reference may now be had to the drawings for a detailed description of each of the container parts or components 10 and 11. Considering first the multiple-cavity container part 10, it will be noted that this is a one-piece part consisting of the multiple cavities 6 and 7 formed within the margins of the flat sheet or flange portion 12. The portion 12 is part of the original sheet material from which the part 10 was formed, it being understood that the original sheet was substantially larger and that the portion 12 was trimmed after the cavities 6 and 7 were formed. Normally the parts 10 will be formed in rows from sheet material of substantial width on a thermoforming machine having rows of multiple mold cavities whereby a number of the parts 10 will be simultaneously formed in the sheet then individually die cut and trimmed. The particular technique used in forming the parts 10 does not constitute a part of this invention.

The cavities or cup-like receptacles 6 and 7 are cylindrical and the vertical side walls are provided with uniformly spaced exterior reinforcing ribs 13—13. The cavity 6 is closed by end wall 14 while the cavity 7 is closed by end wall 15.

It will be noted that the cavities 6 and 7 are contiguous and integrally joined or connected in a relatively small and generally tangential weld area indicated at 16. As will be seen from FIGS. 2 and 3 the weld area 16 is generally rectangular in outline and is disposed in the cavity sidewalls intermediate the end walls 14 and 15 on the one hand and the flat sheet or flange like portion 12, on the other hand. However, a substantial portion of the juncture or weld area 16 lies adjacent the end walls 14 and 15 and serves to weld the cavities 6 and 7 together adjacent their respective end walls.

The tangential juncture area 16 is integrally formed by having an open area in the mold cavity into which the sheet material may be drawn. The open area in the mold terminates somewhat short of the end walls 14 and 15 so that a space 17 (FIG. 2) is left between the closed ends of the cavities 14 and 15 where they are contiguous. On the side of the tangential weld or juncture area 16 opposite from the space 17 an opening 18 is left between the cavities 6 and 7.

It will be understood that by altering the details of the mold cavities the shape and dimensions of the tangential juncture area 16 may be altered. Thus this area may be lengthened or shortened in a vertical direction or widened or narrowed in a circumferential direction. However in the preferred embodiment the area or connection 16 will be formed so that both spaces 17 and 18 will be present to some extent and a substantial portion of the area 16 will be located adjacent the closed ends of the cavities 14 and 15.

Considering now the generally flat closure number 11 it will be understood that this may also be thermoformed in multiple quantities from a plastic sheet of substantial width. The part 11 is formed so as to have two plug-like embossments which are indicated generally at 20 and 21. These portions 20 and 21 lie within margins of the remaining flat sheet or flange portion 22 which corresponds to the flat portion 12 of the part 10.

The plug-like embossments 20 and 21 are dimensioned so that they fit into and close the open ends of the cavities 6 and 7 with a stopper-like or plug-like action. The embossments 20 and 21 are contiguous and tangentially joined at 23 (FIGS. 2, 3 and 4). When the parts 10 and 11 are mated the bridge-like connection 23 fits into the open area 18 and wedges between the opposing projections 25—25 of part 10 as shown in FIG. 3.

While the container parts 10 and 11 are formed from flexible sheet material they each have built-in features which cooperate when the container parts 10 and 11 are assembled to rigidify the assembly.

The flat flange portion 12 of the part 10 adds considerable strength to that part and the tangential weld area 16 ties the cavities 6 and 7 together so as to prevent the part 10 from flexing on a line passing through the projections 25—25. The vertical ridges or grooves 13—13 also contribute to the strength of the part 10. The tangential juncture area 23 between the embossments 20 and 21 strengthens the part 11 and prevents flexing along the transverse line that includes the interconnection 23.

When the parts 10 and 11 are assembled the plug-like embossments 20 and 21 re-enforce the container and the wedging or locking engagement of the interconnection 23 between the projections 25 and 26 further contributes to the strength of the container.

When the cavities 6 and 7 are snugly filled with a solid or semi-solid product, as they usually are, the strength and rigidity of the package is materially enhanced.

In the drawings the package is shown with the cavities 6 and 7 filled with a sliced product indicated generally at 26 and 27, respectively in FIG. 2. As mentioned above this sliced product may be luncheon meat such as sliced bologna. However the cavities 6 and 7 could be filled with other products such as potted meat, cheese spread, sectioned and formed meats, etc.

The cavities 6 and 7 may be filled with the above or other desired products and the package 5 vacuumized and hermetically sealed using the same known techniques that have been previously used for semi-rigid plastic packages having single cavities. For example, one such method is disclosed in Seiferth et al. U.S. Pat. No. 3,498,018 dated Mar. 3, 1970. As described in that patent a seal-forming adhesive is applied or interposed between the opposing flange areas 12 and 22 of the container parts 10 and 11, respectively, so as to at least completely surround the open ends of the cavities 6 and 7. The adhesive substance (not shown) will be of a character to provide a sealable hermetic seal. A number of suitable adhesives which form sealable seals so as to permit separation of the parts 10 and 11 are known and several are specifically named in U.S. Pat. No. 3,498,018.

It will be understood that a number of changes may be made in the package 5 and its component parts without departing from the spirit and scope of the invention. It is normally advantageous to form the container part 10 of clear transparent plastic material so as to permit the contents of the package 5 to be viewed and to form the cover sheet or closure part 11 of a pig-
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A one-piece semi-rigid container part which is thermoformed from plastic sheet material, comprising, a flat sheet flange portion and a plurality of contiguous container cavities lying wholly within the margins of said portion, the side wall of each of said cavities being integrally joined to the side wall of a contiguous cavity only in a relatively small generally tangential weld area lying in a plane generally vertical to said flat sheet flange portion said side walls adjacent said weld area being unattached.

2. The one-piece container element of claim 1 wherein said cavities are generally cylindrical.

3. The one-piece container element of claim 1 wherein there is one pair of said cavities.

4. The one-piece container element of claim 1 wherein said tangential weld area lies intermediate the tops and bottoms of the side walls of said contiguous cavities joined by said area.

5. A container comprising in combination: (1) a one-piece container part which is thermoformed from plastic sheet material, comprising, a flat sheet flange portion and a plurality of contiguous container cavities lying wholly within the margins of said portion, the side wall of each of said cavities being integrally joined to the side wall of a contiguous cavity only in a relatively small generally tangential weld area lying in a plane generally vertical to said flat sheet flange portion said side walls adjacent said weld area being unattached; and, (2) a flat closure sheet part having a sufficient area to cover the open ends of all of said cavities.

6. The container of claim 5 wherein said flat closure sheet is thermoformed from plastic sheet material with relatively shallow plug-like embossments formed therein for mating stoppering engagement in the open ends of said cavities.

7. The container of claim 6 wherein said tangential weld area of said one-piece container part terminates short of the open ends of said cavities leaving an open area of communication therebetween, and wherein said plug-like embossments in said flat closure sheet part are integrally joined in a relatively shallow tangential bridge-like connection extending generally vertically to the plane of said flat closure sheet part, said bridge-like connection projecting into said open area of communication.

8. A vacuumized, hermetically sealed package comprising the container of claim 6 with said cavities completely filled with snug fitting contents so as to enhance the over-all strength of said package.

9. The package of claim 8 wherein said filler is sliced luncheon meat.

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