

[54] **COMPOSITE CONTAINER**
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 [73] Assignee: Owens-Illinois, Inc., Toledo, Ohio
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 [52] U.S. Cl. 229/1.5 B, 229/4.5
 [51] Int. Cl. B65d 3/00
 [58] Field of Search 229/1.5 B, 1.5 R,
 229/4.5

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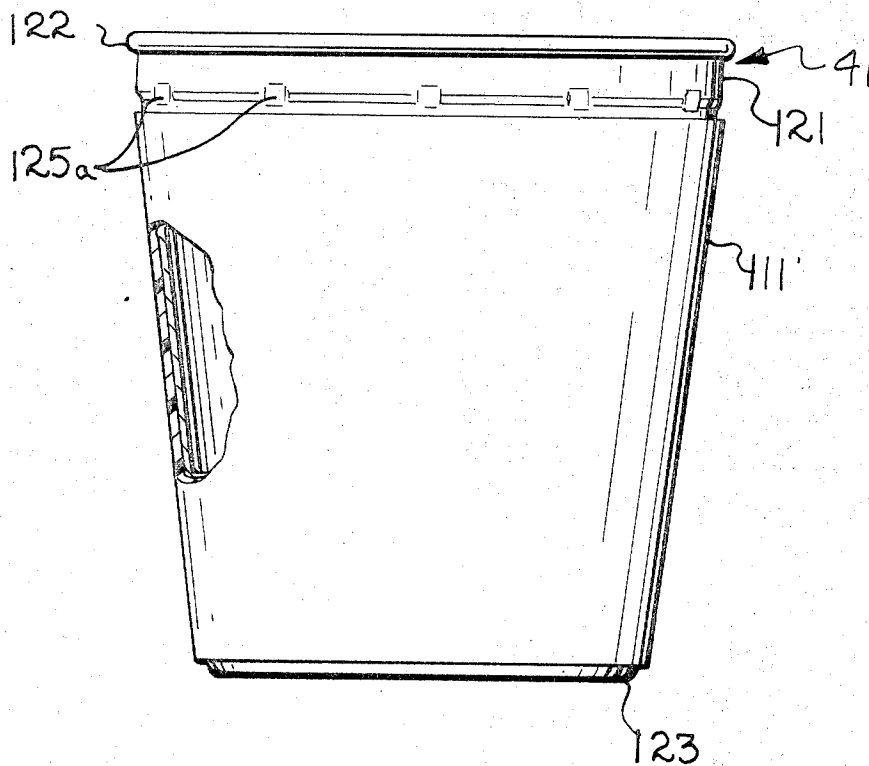
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 Attorney—E. J. Holder et al.

[57] **ABSTRACT**

A container of composite construction which comprises a wide-mouthed inner shell formed of seamless thermoplastic material in a generally frusto-conical configuration so that like shells are nestable in a compact stack, the sidewall portion of the shell being of relatively thin and fragile construction, and which further comprises an externally decorated, relatively stiff paperboard sleeve which is wound around the side wall portion of the shell and which is adhesively secured in face to face reinforcing contact therewith, the opposed ends of the blank from which the sleeve is formed each comprising a series of alternating recesses and protrusions which are interengageable with corresponding protrusions and recesses in the other end to accurately register the ends of the sleeve with respect to one another in a serpentine-shaped butt seam. In the preferred embodiment, the side wall of the inner shell is provided with a stacking shoulder immediately below the rim portion of the shell to facilitate denesting of nested shells and/or denesting of nested finished containers and, when the outer sleeve is joined to the inner shell by a water based or solvent-based adhesive, the stacking shoulder may advantageously be provided with a circumferentially spaced series of vent indentations to permit the escape of adhesive vapors from a stack of nested finished containers.

7 Claims, 8 Drawing Figures



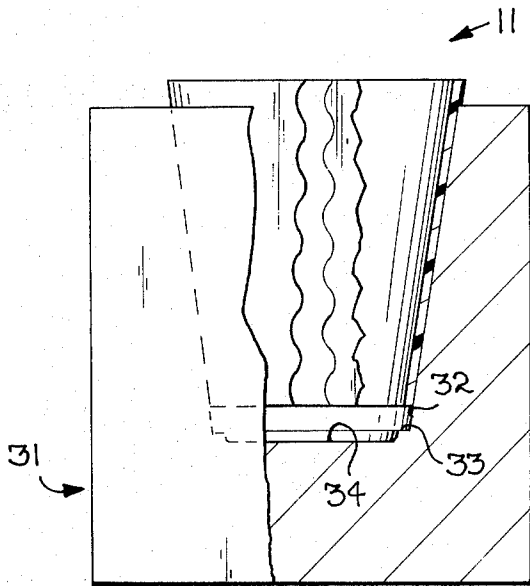


FIG. 3

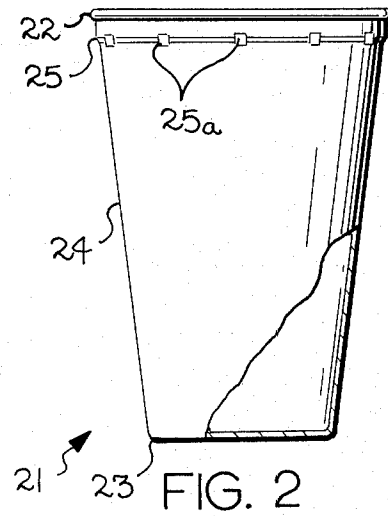


FIG. 2

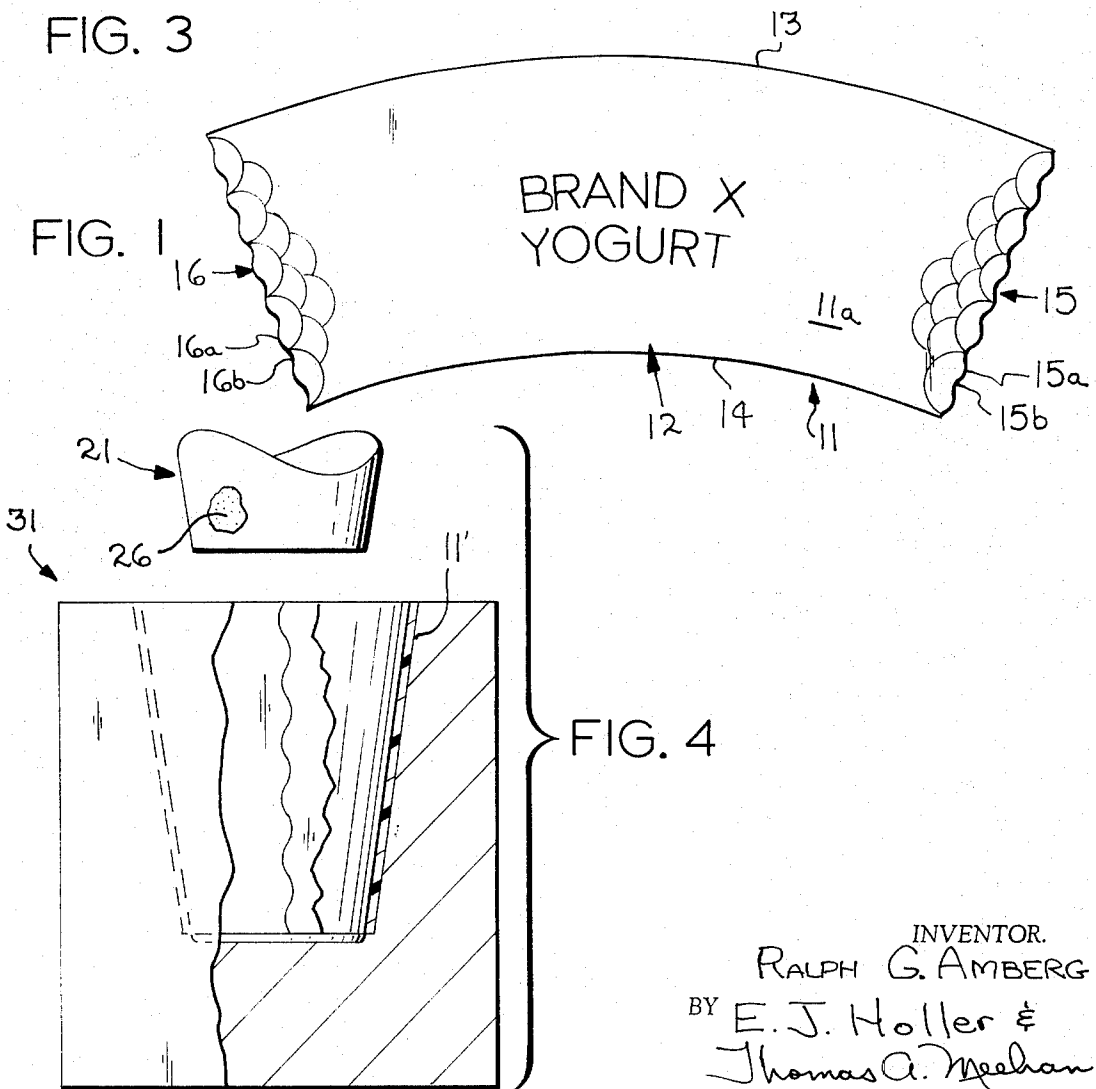


FIG. 1

FIG. 4

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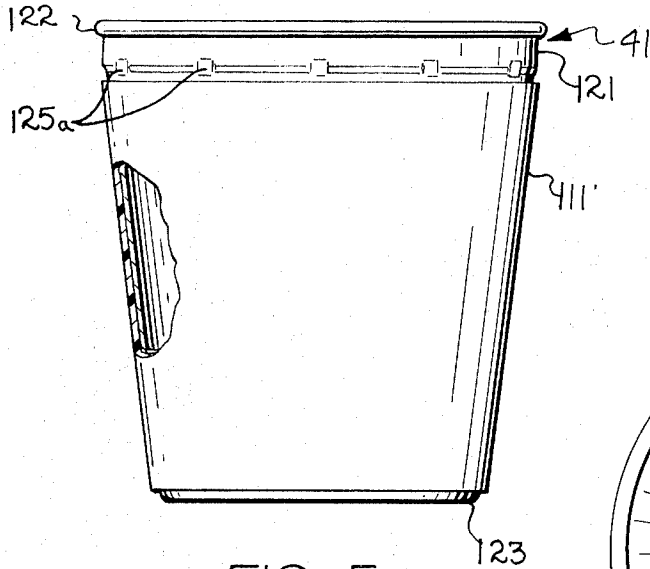


FIG. 5

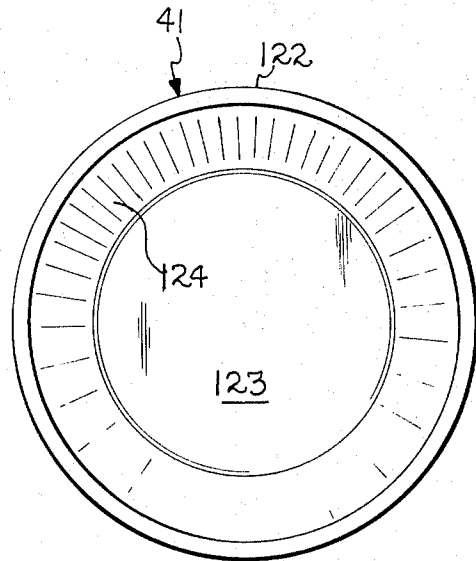


FIG. 6

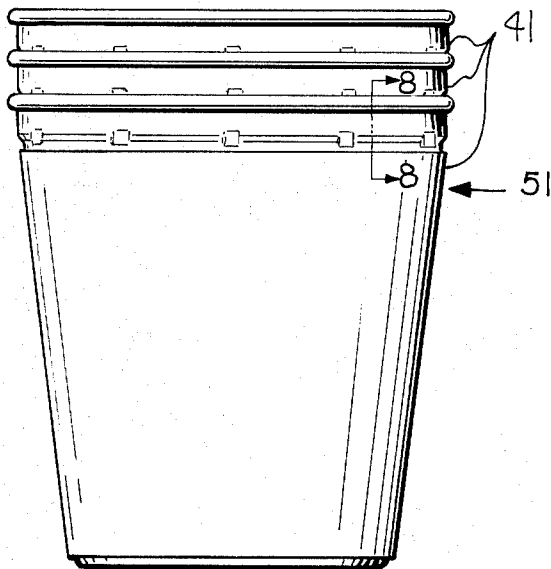


FIG. 7

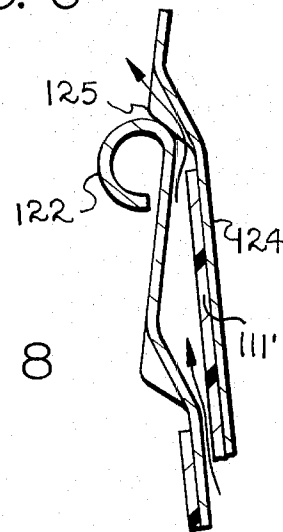


FIG. 8

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COMPOSITE CONTAINER

GENERAL DESCRIPTION OF THE INVENTION

As is pointed out in the copending application Ser. No. 747,183, now abandoned of Stephen W. Amberg and Rodney E. Ludder, which is assigned to the assignee of the application, a wide mouthed container with an externally decorated surface may advantageously be formed of composite construction with an undecorated inner shell formed of seamless thermoplastic material and with an outer reinforcing sleeve formed by rolling a paperboard blank around the inner shell and by adhesively securing the thus-formed sleeve to the inner shell to form a unitary structure therewith. In such a case, the decorative material desired by each concern which is interested in packing its products in such containers may be placed on the outwardly facing surface of the sleeve, thereby making it possible to utilize an identical or universal inner shell for all or a wide variety of such containers, and thereby greatly simplifying the production scheduling and inventorying problems connected with the manufacture of such shells, especially when such shells are of nestable configuration. Additionally, the decorating problems involved in the manufacture of containers for the purposes served by composite containers of the present invention may be greatly simplified by the present invention, as the outer sleeve may be rapidly formed by severing the blank from a preprinted web or sheet comprising a multitude of such blanks. In such case it is generally considerably less expensive to impart high quality decorative material to the web or sheet by known techniques, as by flexographic or rotogravure printing, which can not be employed if the decorating step is done after the container is formed and which is generally the manner in which containers formed of unitary construction are decorated. Furthermore, as paperboard is generally a considerably less expensive material than the polymeric materials which are suitable for the formation of the inner shell of the composite container of the present invention, or the unitary containers of the prior art which are useful for similar packaging applications, an economic savings in materials can be realized with the present invention by constructing the inner shell with a much thinner wall than that which a corresponding unitary container would require for adequate rigidity and durability, and by utilizing the rigidifying properties of the associated outer sleeve to reinforce the inner shell. The substantial reduction in resin weight which can be obtained in the practice of the present invention, and which was in a known instance involving containers of 8 fluid ounce capacity for packing yogurt, over 55% of the weight of a comparable unitary plastic container, makes it economically feasible to use more expensive resins which have superior properties relative to those which could otherwise be used.

In the manufacture of composite containers according to the aforesaid application Ser. No. 747,183, now abandoned, the outer sleeve was wrapped with its opposed ends joined in a lapped seam. The use of a lapped seam for this purpose involves the usual problems of longitudinally aligning or registering the end portions of the sleeve with one another so that the decorative material on the end portions of the sleeve is in registration. Likewise, the double thickness of paperboard in the seam region limits the compactness of the nesting arrangements for like finished containers of this type.

To overcome the foregoing problems of a lapped seam, the sleeve of the composite container of the present invention, may, in cases of small containers where the added strength of a lapped seam is not required, be sized so that the circumferential extent of all portions thereof are equal to or slightly less than the circumferential extent of the sidewall of the inner shell which is overlapped thereby, so that the sleeve can be wrapped with a butt seam. In a preferred embodiment of the invention, the opposed ends of the blank from which the outer sleeve is formed are cut in a serpentine pattern with an alternating series of protrusions and recesses which are interengageable with corresponding or complementary recesses and protrusions in the other end so as to form a serpentine shaped butt seam in the rolled sleeve, and to thereby insure very accurate registration of the decorative material in the portions of the sleeve adjacent such ends. Additionally, the irregularity in the butt seam provided in this manner serves to inhibit the tearing of the relatively fragile underlying shell along a line extending through the seam, as might be caused when the container is subjected to compressive loads of the magnitude encountered during capping.

For many of the end use applications of the present invention, it is desirable that similar finished containers be nestable in compact stacks with one another, and indeed, it is often desirable for conservation of inventorying space during manufacturing that the internal shells also be nestable with one another until it is desired to finish the container by the affixing of outer sleeves thereto. Accordingly, in such instances the inner shell of such a container is constructed with a sidewall which tapers upwardly and outwardly from the bottom or base portion of the shell to the rim portion thereof, and to facilitate denesting of such shells from one another, or denesting of finished containers comprising such shells, each such shell is provided with a stacking shoulder or ring near the rim portion thereof for engagement with the top of the rim of the shell or container into which such shell or container is inserted during nesting. In instances where the sleeves of such containers are affixed to the shells thereof by means of a water-based or solvent based adhesive, such stacking shoulder or ring may be advantageously provided with a circumferentially spaced plurality of narrow indentations to form vent openings to permit residual adhesive moisture or vapors to escape from a stack of such nested containers.

Accordingly, it is an object of the present invention to provide an improved composite container. It is a further object of the present invention to provide a composite container comprising a seamless, thermoplastic inner shell with a relatively thin sidewall that is reinforcedly surrounded by a butt-seamed paperboard sleeve that is secured thereto and which bears all requisite printing or other decorative material on the outer surface thereof. It is a further object of the present invention to provide a composite container which is nestable with similar composite containers and which comprises means for venting vapors from the adhesive used in joining the elements of such composite containers from a nested stack of such containers.

For a further understanding of the present invention and the objects thereof, attention is directed to the drawing and to the following description thereof, the detailed description of the invention and the appended claims.

DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of a blank from which an element of the composite container of the present invention is formed;

FIG. 2 is an elevational view, partly in section, of another element of the composite container of the present invention;

FIG. 3 is a fragmentary elevational view, partly in section, depicting a step in the manufacture of the composite container of the present invention;

FIG. 4 is a fragmentary elevational view, partly in section, depicting a step subsequent to that shown in FIG. 1 in the manufacture of the composite container of the present invention;

FIG. 5 is an elevational view, partly in section, of a composite container embodying the present invention;

FIG. 6 is a plan view of the composite container of FIG. 5;

FIG. 7 is an elevational view of a stack of similar nested containers of the type shown in FIG. 5; and

FIG. 8 is a fragmentary sectional view at an enlarged scale and taken on line 8—8 of FIG. 7.

DETAILED DESCRIPTION OF THE INVENTION

As is shown in FIG. 1, the outer wrapper of a composite container according to the present invention is formed from a flat blank, shown generally at 11, of a suitable foldable sheetlike material such as paperboard or laminates of paperboard and metal foil or plastic sheeting. The surface 11a of blank 11 which will serve as the outer surface of the completed container is provided with printing and decorative material, shown generally at 12, which is preferably, for economic reasons, applied by known high-speed techniques to the web or sheet from which a multitude of identical blanks may be severed, prior to such severance. Blank 11 is sized and shaped to conform, when assembled, to the configuration of the associated inner shell of the composite container in which it is to be used, as hereinafter described.

Thus, in the illustrated embodiment of the invention, in which the composite container is to be of generally frusto-conical configuration for nestability, blank 11 is of generally trapezoidal configuration with the top and the bottom edges 13 and 14 thereof having an arcuate configuration. The ends 15 and 16 of blank 11, as shown, comprise an alternating series of protrusions 15a and 16a, respectively, and recesses 15b and 16b, respectively, for purposes which will be hereinafter described more fully.

The other element of the composite container of the present invention is a generally cup-shaped inner shell, shown generally at 21, which is formed of a thermoplastic material which is compatible with the product to be packaged therein, for example, polystyrene, polypropylene, polyethylene or any of a wide variety of other polymeric materials. Shell 21 is preferably of seamless construction, and such a shell may be formed from the suitable resins as mentioned above by known techniques, such as by vacuum forming.

As is shown in FIG. 2, shell 21 comprises a rim portion 22 which defines the upper open end or mouth thereof, a closed base portion 23 and a sidewall portion 24 which extends upwardly and outwardly from base portion 23 to rim portion 22.

Because it may be desirable to compactly store a multitude of similar shells 21 after the shell manufacturing stage and before the container assembling stage, the side wall portion 24 of each shell is advantageously provided with an outwardly projecting and circumferentially extending stacking shoulder 25, the lower portion of which is adapted to rest on the top of the rim portion of a similar shell in which such a shell may be inserted in a stack of such nested shells to maintain sufficient space between adjacent shells to facilitate denesting of the shells when desired. Stacking shoulder 25 in certain situations, as hereinafter described more fully, may advantageously be provided with a circumferentially spaced series of narrow recesses or indentations 25a.

A composite container of the present invention may be formed from a paperboard blank 11 and a thermoplastic shell 21 in any suitable way, but it has been found that the assembly may be expeditiously accomplished by the use of a fixture, shown generally at 31 in FIGS. 3 and 4, which has an inner cavity defined by a surface 32 which corresponds to the outer surface of a sleeve 11' formed from blank 11 when ends 15 and 16 thereof are brought together. Blank 11 is, accordingly, inserted into fixture 31 and is continually advanced downwardly thereinto until the lower edge of blank 11 rests on a thin radially extending shoulder 33 at the bottom of wall 31, thereby bringing the protrusions and recesses 16a and 16b of edge 16 into interengaging or interlocking relationship with the corresponding protrusions and recesses 15b and 15a of edge 15. After the completion of this step, which is shown in FIG. 3, a shell 21, to which has previously been applied a suitable adhesive 26 to at least a major surface portion of the exterior side wall portion 24 which will contact the inner surface of the sleeve formed from blank 11, and preferably to substantially all of such surface portion, is advanced into the fixture containing such sleeve and is retained therein until adhesive 26 sets to firmly secure or bond the sleeve to the side wall of the shell in a rigid, reinforced relationship. Thereupon, the container comprising such bonded elements may be removed from the fixture. In the practice of the invention, as described, it is desirable to maintain the extreme, inherently rounded corner at the juncture of the side wall and the base of the shell 21 at an elevation slightly below the lower edge of sleeve 11' in the assembled container. This is the reason for the incorporation of a shoulder 33 above the elevation of the main portion 34 of the bottom surface of fixture 31 against which the base 23 of shell 21 is brought during assembly.

A completed composite container according to the present invention, formed in the manner heretofore described or in any other suitable manner, is shown generally at 41 in FIGS. 5 and 6, the decorative material on the outer surface of sleeve 111' being omitted for the sake of simplicity, with other visible portions of the sleeve 111' and shell 121 components of container 41 being identified by three-digit reference characters whose last two digits are the same as the reference characters used with respect to the description of corresponding elements of FIGS. 1 and 2. Such containers may be stored and/or shipped in a compact stack by nesting a multitude of such containers together, as is shown generally at 51 in FIG. 7. Because of the fact that such stack of nested containers may be formed

shortly after the manufacture thereof, when the adhesive is of a water-based or solvent-based type, some of the water or solvent may remain in the adhesive at the time such stack is formed. In these situations, indentations 125a in the stacking rings 125 of the shell portions 121 serve to provide an escape path for the escape of the moisture or solvent vapors from the stack, as is shown in FIG. 8.

To obtain the full economic advantages of the present invention, it is important that the strength and rigidity of the side wall of the composite container be derived largely from the paperboard sleeve 11, rather than from the inner shell 21. To this end, it is recommended that a relatively sturdy grade of paperboard be used for the outer sleeve, and that the thickness of the side wall of the inner shell be very light and fragile. For example, satisfactory composite containers according to the present invention have been made for packaging yogurt in 8 fluid ounce capacity using an inner polystyrene shell of a weight of 10 lbs. per thousand shells (compared to a weight of 23 lbs. per thousand unitary polystyrene containers for a comparable application) and a paperboard sleeve of a thickness of 10 mils (0.010 inch).

Composite containers according to the present invention will, of course, ordinarily be closed after filling with the product to be packed therein, but such closing means have not been described, as known closing techniques are adaptable to a container as described.

The best mode known to me to carry out this invention has been described above in terms sufficiently full, clear, concise and exact as to enable any person skilled in the art to make and use the same. It is to be understood, however, that it is within my contemplation that certain modifications of the above-described mode of practicing the invention can be made by a skilled artisan without departing from the scope of the invention and it is, therefore, desired to limit the invention only in accordance with the appended claims.

I claim:

1. A composite container comprising, in combination: an inner shell formed of a thermoplastic material and including a rim portion defining the open end of said container, a base portion, and a surrounding side wall portion extending upwardly from said base portion to said rim portion; and a sleeve formed from a double-ended blank of paperboard stock which is decorated on one surface thereof, said sleeve being wound around the side wall portion of the inner shell with the other surface of the sleeve covering a major portion of said

side wall portion and being secured thereto in reinforcing relationship, the circumferential extent of all portions of said sleeve being no greater than the circumferential extent of the portion of the side wall of the inner shell which is immediately adjacent thereto so that no portion of one end of the blank from which the sleeve is formed overlaps any portion of the other end thereof in the finished container, the opposed ends of the sleeve each comprising a series of alternating protrusions and recesses with the protrusions and recesses on each end being so arranged as to be interengageable with corresponding recesses and protrusions of the other end to form a serpentine shaped butt seam between the ends of the sleeve and to thereby insure accurate registration of the decorated portions of the outer surface of the sleeve which are proximate to said opposed ends thereof.

2. A composite container according to claim 1 wherein the side wall portion of the inner shell extends upwardly and outwardly from the base portion of the shell to the rim portion thereof whereby said shell is nestable with similarly shaped shells.

3. A composite container according to claim 2 wherein said side wall portion of said shell comprises a stacking shoulder immediately below the rim portion of the shell, said stacking shoulder being engageable with the rim of another similarly shaped shell into which said shell may be inserted in nested relationship to permit rapid denesting of said shell when desired.

4. A composite container according to claim 3 wherein a major portion of said other surface of the sleeve is adhesively joined to the side wall portion of the shell in face to face contact therewith.

5. A composite container according to claim 4 wherein said stacking shoulder comprises a plurality of circumferentially spaced vent indentations therein to permit the escape of adhesive vapors from a stack of nested and similarly shaped composite containers with which said composite container may be nested.

6. A composite container according to claim 1 wherein said sleeve is secured to said shell by means of an adhesive which adhesively joins at least a major portion of the inner surface of the sleeve to the adjoining portion of the side wall of the shell.

7. A composite container according to claim 6 wherein substantially the entire inner surface of the sleeve is adhesively joined to the adjoining portion of the side wall of the shell.

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