

[54] COVERED GLASS BOTTLE OR THE LIKE
[75] Inventor: Edward R. Campagna, Horseheads,
N.Y.
[73] Assignee: Dart Industries Inc., Los Angeles,
Calif.
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117/41; 313/110, 116, 117; 356/108, 109

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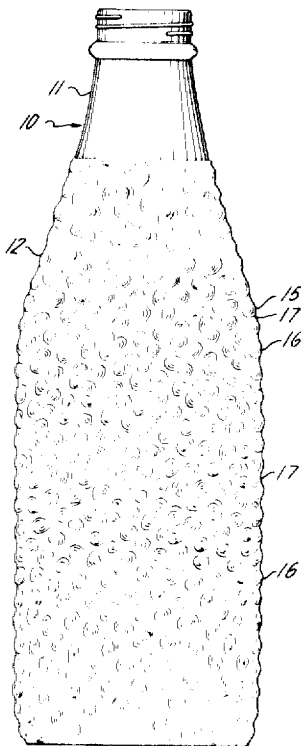
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Primary Examiner—William I. Price
Assistant Examiner—Stephen Marcus

[57] **ABSTRACT**

A container comprising an inner glass receptacle and a closely adhering, but not chemically bound exterior protective sheath substantially covering said receptacle. The exterior protective is comprised of a shape-retaining, preferably thermoplastic resin adapted to restrain and retain glass fragments should the glass receptacle become broken. The sheath is further provided with a plurality of outwardly protruding nodular means that minimize the container surface frictional characteristics, increase shock resistance and provide maximum non-slip characteristics to the sheath when the container is hand-held.

6 Claims, 2 Drawing Figures



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FIG. 1

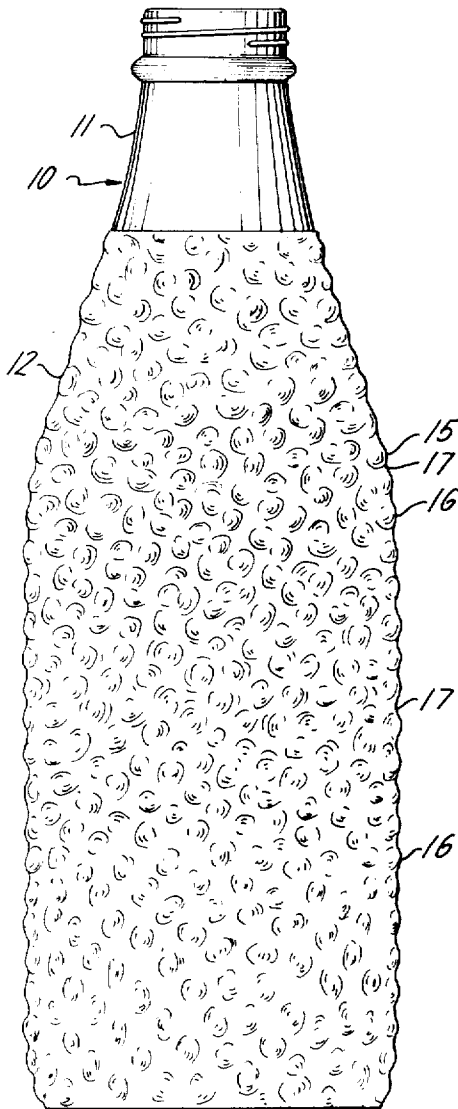
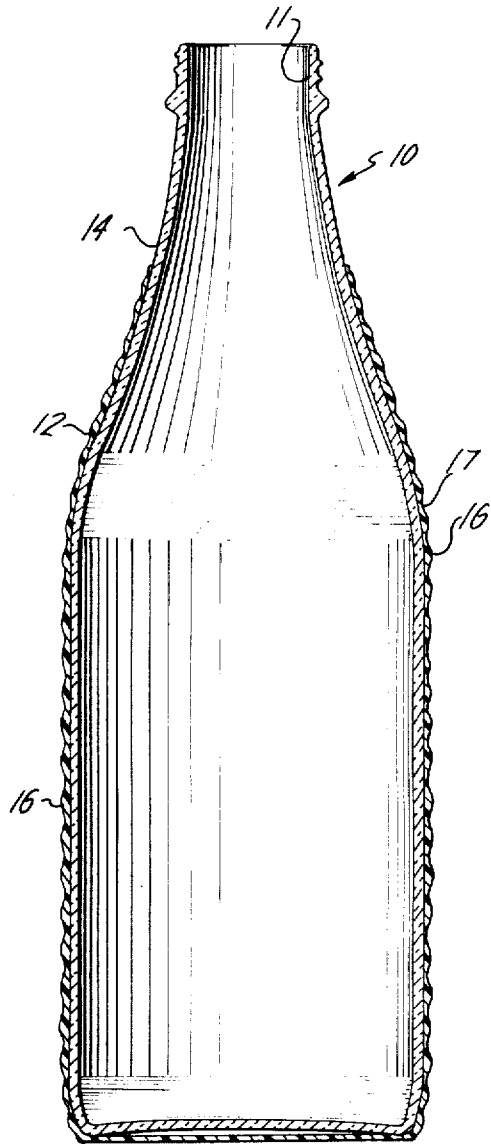


FIG. 2



INVENTOR.
EDWARD R. CAMPAGNA

BY *Michael L. Drumm*

ATTORNEY

COVERED GLASS BOTTLE OR THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention concerns protectively sheathed glassware containers and, more particularly, concerns glass receptacles which are so protected with a plastic overcoat that substantially covers the exterior surface thereof.

2. History of the Prior Art

As is well known in the trade, glassware is readily susceptible to breakage during handling and use. Further, the consequences of such breakage may be significantly aggravated if the contained product is carbonated or the container thereof is otherwise internally pressurized. Therefore it has long been an objective of ware manufacturers and users to minimize the hazards of breakage by treating the exterior surface in numerous ways and by even adding protective overcoatings of various sorts thereto. These prior art approaches have, in fact, improved glassware standards and quality quite significantly since such have tended to effectively reduce the quantity of surface scratches and flaws in the ware and of course this reduction in the points of stress concentration enable the ware to retain its characteristic strength.

Prior art surface treatments, for example, metal oxide, and even combination thin film polyethylene coatings provide good scratch and abrasion resistance to glassware thereby decreasing surface flaws and reduce the likelihood of breakage.

Even protective overcoatings having substantial thicknesses have been known for use on ware. These, however, have been applicable only to specialized containers, for example, those employed in aerosol spray-type applications and for overcoat protections to very thin wall, light-bulb-like, bottles. Increased costs, production inefficiencies in capably coating ware in the quantities required, providing a coating of the quality capable of restraining a retaining glass upon fragmentation under pressure, and employment of such ware in conventional filling and handling equipment have therefore been thought to make impossible the fruitful addition to the market of composite glass, plastic-protected ware.

Specific problems presented and overcome by this invention have been to provide the ware with a protective sheath of a sufficient thickness and resiliency to adequately restrain and retain the glass receptacle portion of a pressurized container against fragmentation. To economically accomplish this end, the volume of coating material must be minimized, yet the effective thickness thereof must be maximized to render the needed protection. Similarly, a consistently uniform, proper and good adhesion should be maintained between the glass receptacle portion and sheath portion of the container to provide the proper restraining effects. Additionally, in order for plastic coated ware to be easily processed in conventional equipment, exterior surface coefficients of friction must be minimized, yet that same surface should effectively produce a high coefficient when the coated container is handheld. Both of these diametrically opposed propositions (i.e., minimum material yet maximum protection and low yet high coefficients of friction) are satisfied by the novel construction of this invention.

BRIEF DESCRIPTION OF THE INVENTION

In accordance with this invention, a novel container capable of internal pressurization is provided which has an inner glass receptacle and a closely adhering, but preferably not chemically bonded, exterior sheath which substantially covers the inner glass receptacle. The exterior protective sheath comprises a shape-retaining, flexible resin which is able to restrain and retain fragments of the glass receptacle if the receptacle breaks.

The exterior sheath is further provided with a plurality of outwardly protruding nodular means, nodal areas or nodes that minimize the surface frictional characteristics between abutting bottles and in mechanical handling, are shock absorbent, and due to its stippled effect, provide maximum non-slip characteristics when hand-held.

However, the nodal areas provide the noted increased shock protection while employing a minimum of resin material. Such result is obtained due to an increase in thickness at the nodular areas which will bear the brunt of any physical abuse to which the container is subjected. Similarly, substantial portions of the coating are of a reduced thickness thus providing a material saving and creating voids into which portions of the material forming the nodes may flow upon impact. Thus, the effective thickness of the resin sheath is that of the nodal areas and the necessity of providing a uniform overall coating thickness which would employ substantially more resin is avoided.

The nodes likewise reduce the area of contact exposed for example between container surface to surface contact or contact between containers and equipment since, in general, only the nodular surface areas will be in contact, thus the frictional resistance therebetween will be reduced. At the same time, the nodes characteristically provide a maximum non-slip effect when the container is hand-held, since the flexible supple surface of the human fingers conforms to the nodular or stippled, knurled-like surface of the container and contacts both the surface of the nodes and the surface of the depressions, effectively increasing the contacted surface area in such instances.

The novel plastic or resin covering or sheath also restrains and retains fragments of the glass receptacle should such receptacle be broken even when the container is pressurized to conditions approximating sixty pounds per square inch. This effect is produced in accordance with the invention, by providing the plastic covering or sheath of a flexible, resilient resin which will stretch and expand rather than itself fragment in the event of receptacle failure. Such expansion of the covering before its own failure enables glass fragments to be restrained until the pressure within the receptacle escapes through initially formed, relatively small openings or fissures which may appear in the covering or sheath as it fails or until the pressure is otherwise relieved.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of a container of the preferred embodiment; and

FIG. 2 is a cross-sectional view of the container shown in FIG. 1 along line 1—1 of FIG. 1.

PREFERRED EMBODIMENT

In the preferred embodiment of the invention, container 10 as shown in FIGS. 1 and 2 comprises an inner glass receptacle 11 and an exterior sheath 12 comprised of a flexible shape-retaining resin contiguously covering a majority of the exterior surface 14 of receptacle 11. Sheath 12 is provided on its outer exposed surface 15 with a plurality of preferably randomly positioned outwardly extending shock absorbing nodes 16. Nodes 16 are separated by depressions 17 which are believed to permit maximum deflection and expansion of nodes 16 in a direction parallel to surface 14 upon receipt of excessive impacts. Accordingly, this maximized deflection is believed to increase the shock absorbing characteristics of sheath 12 and in addition, reduces the amount of material needed for an effective shock absorbing sheath 12, thus reducing the cost of manufacturing container 10.

In the preferred embodiment, inner glass receptacle 11 has a wall thickness of from about 0.03 to about 0.12 inches and sheath 12 has a thickness of from about 0.004 to about 0.018 in. As indicated above, the coating thickness is not uniform throughout and the maximum such thickness is created at the nodal areas 16; whereas in each instance the thickness at depression 17 will be within the noted range but less than at the nodes.

The material of construction of sheath 12 may be any flexible and resilient resin which will stretch and expand rather than crack or fragment if inner receptacle 11 should break under internal pressure or otherwise. Thermosetting resins such as flexible cross-linked urethane rubbers or others may be used; however, thermoplastic resins are preferred since they can be formed into coatings and films more easily and react in the manner above described as is important in carrying out the invention.

Thermoplastic polymers of butadiene, acrylates, ethylene, propylene, styrene, vinyl, chloride, vinyl acetate, cellulose acetate, cellulose butyrate and cellulose propionate may be used. In addition, fluoroplastics, methyl pentenes, polyamides, phenoxy resin, polycarbonates, polyamides, polyphenylene oxides and polysulfone may be used.

The preferred plastics are inexpensive, have a relatively high tear strength have high impact resistance, easily form a contiguous film or coating and are flexible. Within those above mentioned, still further the preferred plastics which meet the foregoing requirements are polyethylene, acrylonitrile-butadiene-styrene copolymers and impact polystyrene.

It is, of course, appreciated that a suitable means of application of the coating material or sheath 12 to inner glass receptacle 11 is a necessity and as examples it is suggested that any of the following may be employed depending upon the manufactures desired:

- a. By spraying the thermoplastic material as a powder, optionally by an electrostatic spraying method, onto the hot external surface of the inner receptacle;

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- b. By dipping the inner receptacle, maintained at an appropriate temperature, into a fluidized bed of the plastic material in powder form;

- c. By dipping the inner receptacle, if desired while hot, into a molten bath of the plastic material or into a solution or a dispersion of such material, or

- d. By any other method of providing a sleeve type coating to an inner glass receptacle known in the art.

What is claimed is:

1. A container formed as a bottle having base means, side walls and a neck portion comprising an inner glass receptacle and a closely and consistently adhered exterior protective sheath substantially covering the sides and bottom of said receptacle, said exterior protective sheath being comprised of a shape-retaining flexible thermoplastic resin adapted to restrain and retain fragments of said glass receptacle upon breakage, substantially the entirety of the exposed surface of said sheath being further characterized by a plurality of randomly positioned outwardly protruding nodes that are separated one from another by depressions of approximately like size thereto and into which portions of the material forming the nodes may flow upon impact so as to minimize the container surface frictional characteristics, increase the shock resistance thereof and provide maximum nonslip characteristics thereto when it is handheld.

2. The container according to claim 1 wherein said shape retaining flexible thermoplastic resin is polyethylene.

3. A container formed as a bottle having base means, side walls and a neck portion comprising an inner glass receptacle having a wall thickness of from about 0.03 to about 0.12 inches and further comprising an exterior adhered contiguous sheath of a flexible shape retaining thermoplastic resin having a thickness of from about 0.004 to about 0.018 inches that is adapted to retain and minimize glass fragmentation in the event of breakage, substantially the entirety of the outer exposed surface of said sheath being provided with a plurality of randomly positioned outwardly protruding nodes that are separated one from another by depressions of approximately like size thereto and into which portions of the material forming the nodes may flow upon impact so as to improve the surface frictional characteristics thereof, protect said receptacle from abrasion and shock, and lend good hand holding characteristics thereto.

4. The container according to claim 3 wherein said flexible shape retaining thermoplastic resin is polyethylene.

5. The container according to claim 3 wherein said thermoplastic resin is acrylonitrile-butadiene-styrene copolymer.

6. The container according to claim 3 wherein said thermoplastic resin is impact polystyrene.

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