

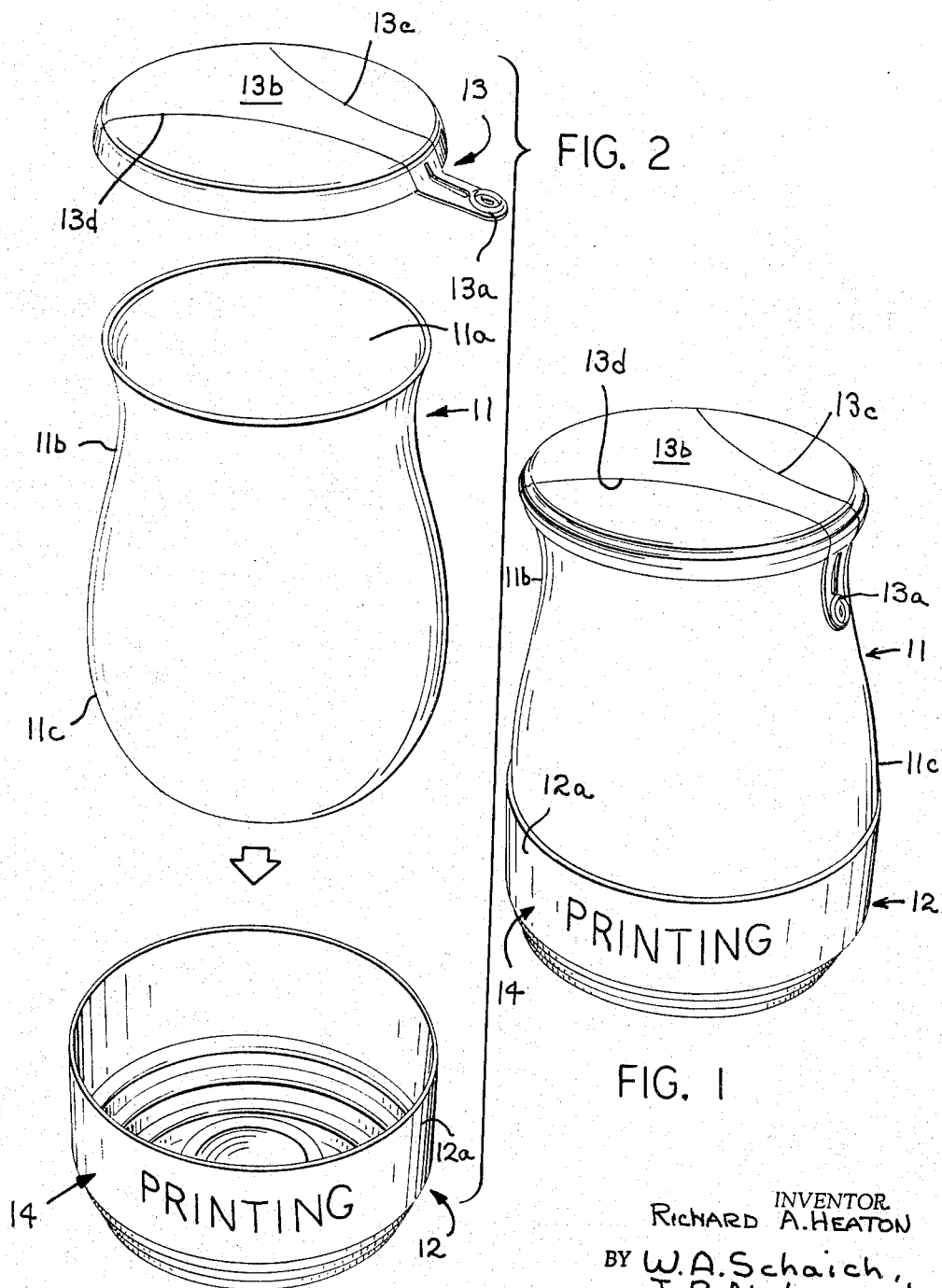
March 12, 1968

R. A. HEATON
COMPOSITE CONTAINER

3,372,826

Filed March 30, 1966

3 Sheets-Sheet 1



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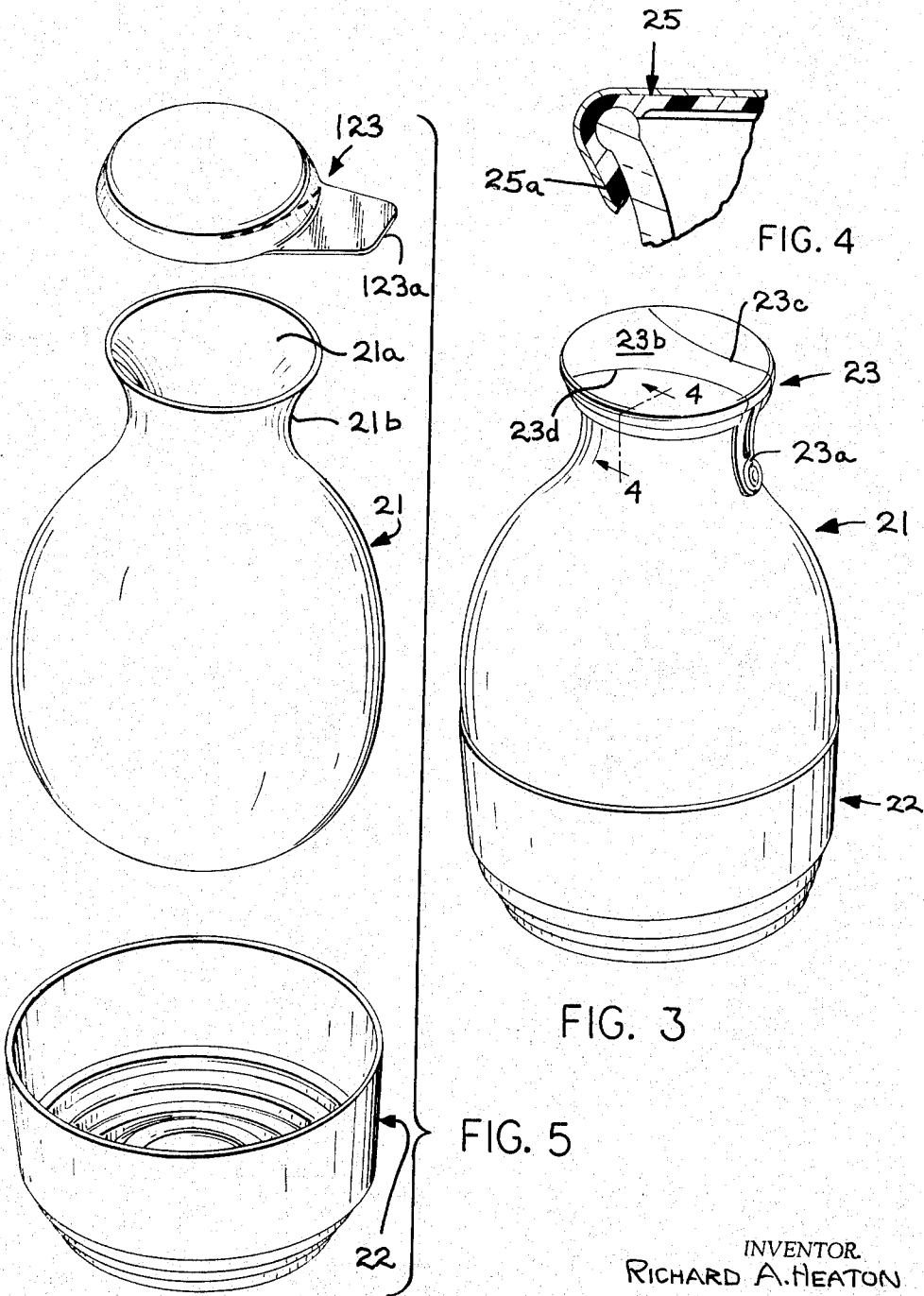
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3 Sheets-Sheet 3

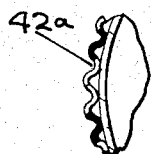
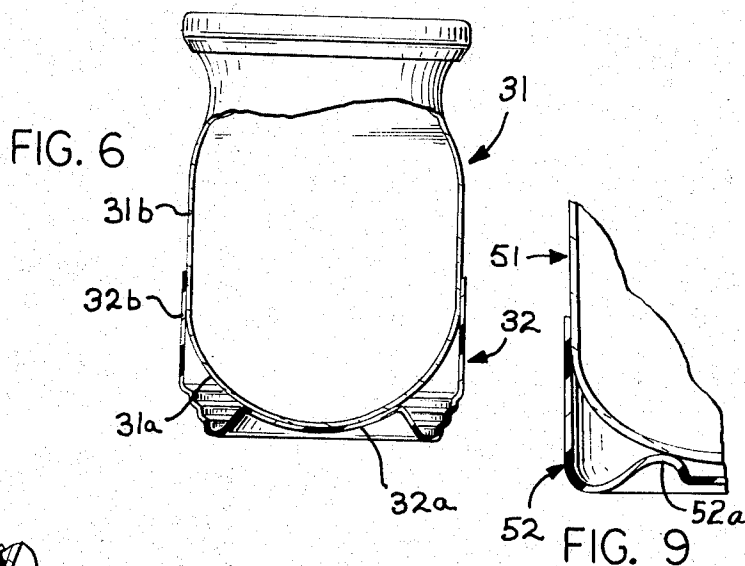


FIG. 8

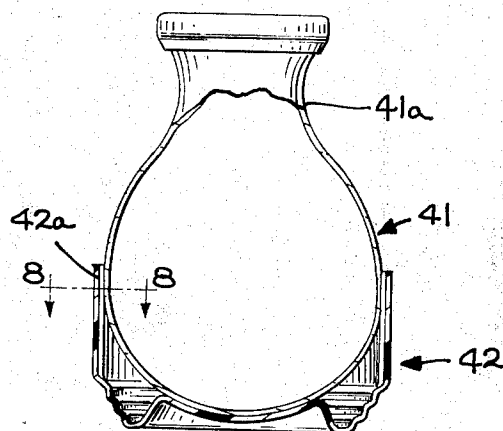


FIG. 7

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3,372,826

COMPOSITE CONTAINER

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18 Claims. (Cl. 215—12)

ABSTRACT OF THE DISCLOSURE

This invention relates to a composite container for packaging a product, the container being comprised of a paste molded glass envelope of substantially thin, uniform wall thickness and distribution. The glass envelope is seamless and has a lower bulbous portion that is substantially spherically contoured which defines the major diameter of the envelope. The upper portion of the envelope terminates in an orifice defining a mouth or finish of the container which receives a closure. A fitment made of a yieldable, less frangible material comprises a cup-shaped bottom or base that is adhesively or otherwise secured to the lower bulbular portion of the glass envelope to support the latter in its upright position and protect it from side-wise impact with other adjacent containers or the like.

This invention relates to a container of composite construction. More particularly, the invention relates to a container having a bulbously-shaped glass envelope for containing the packaged product and a base member of non-frangible material for protecting the glass envelope and maintaining it in an upright position.

In a preferred construction of such a container, the base member provides a surface which is well-situated to receive printing or other decorative matter, thereby to eliminate the need for placing such printing matter on the glass, either directly or by way of a separately-adhered paper or foil label, with the well-known problems and disadvantages attendant thereto. Additionally, the container envelopes may be formed in large quantities at high speed by a process similar to the ribbon process used in the forming of light bulb envelopes and wherein the wall of each envelope is of a more uniform and substantially reduced thickness in relationship to the wall portions of a conventional hot-iron mold blown glass bottle or jar. Such a high-speed forming process will result in manufacturing costs which compare favorably to the costs of conventional container forming processes and the features of a thin wall of more uniform thickness and of a bulbular configuration provide containers of improved thermal shock resistance, even when such envelopes are formed from a glass composition of a relatively high coefficient of thermal expansion. Obviously, improved thermal shock resistance helps to minimize breakage when such containers are immersed in a hot liquid for washing or sterilization, filled with a product at elevated temperature, or rapidly cooled from an elevated processing temperature. Another important feature of a container of reduced and more uniform wall thickness is that the resulting reduction in weight of glass used in a container of a given size, in relationship to the weight of a conventional glass container, makes it economically feasible where desired, to form such envelope from a glass composition of higher quality, and hence cost, than the customary soda-lime glasses used in the forming of conventional glass bottles and jars. This makes it possible to obtain even better thermal shock resistance, if desired, and/or makes it possible to use various known additives in the glass composition for the purpose of improving the strength, appearance, light transmission, chemical attack resistance or other properties of the glass.

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As a further feature of the present invention, the glass envelope in a composite container such as that described above, or at least a major portion of such envelope, may be provided with an essentially spherical configuration, or at least as close an approximation thereto as the designer wishes. The improved structural properties afforded to the container by such a configuration make it extremely well suited for the packaging of products which normally exhibit high pressure during shipment and storage such as beer or other malt beverage products, carbonated beverages, or aerosols.

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

In the drawing:

FIG. 1 is a perspective view of an embodiment of a wide-mouth composite container constructed in accordance with the present invention;

FIG. 2 is a perspective view of certain of the elements of the container of FIG. 1 in disassembled relationship;

FIG. 3 is a perspective view of an embodiment of a narrow-mouth composite container constructed in accordance with the present invention;

FIG. 4 is a fragmentary sectional view taken on line 4—4 of FIG. 3;

FIG. 5 is a perspective view of certain of the elements of the container of FIG. 3 in disassembled relationship;

FIGS. 6 and 7 are elevational views, partly in section, of additional wide-mouth and narrow-mouth composite containers constructed in accordance with the present invention, respectively;

FIG. 8 is a sectional view taken at line 8—8 of FIG. 7; and

FIG. 9 is a fragmentary sectional view of yet another embodiment of a composite container constructed in accordance with the present invention.

In accordance with the present invention there is provided a composite container comprising a glass envelope which terminates in an open mouth at its upper end and which has a bulbularly-shaped bottom portion that causes the envelope to be unstable in its upright position. The container further comprises a cup-shaped bottom or base member formed of a material substantially less frangible than the glass of the envelope, which member is secured to and snugly engages the lower portion of the glass envelope to support it in its upright position and to protect it from impact with objects and articles of many types including adjacent containers of the same type, for example, in a shipping carton filled with such containers or in a filling line. In the composite container of FIGS. 1 and 2, the glass envelope thereof is designated by numeral 11 and the base member by numeral 12. Additionally, such a container, after introduction of the packaged product into the envelope thereof through a mouth or aperture 11a in an upper minor portion 11b thereof, is desirably sealingly closed by a closure of any suitable construction. In the container of FIGS. 1 and 2, the closure is designated by numeral 13 and is shown as a convenience-type metallic closure having a downwardly extending and upwardly deflectable tab 13a that is attached to a medial portion 13b of the top panel which is separated from the remaining portions of the top panel by weakened and readily rupturable lines 13c and 13d.

Envelope 11 of the container of the present invention may be formed of a wide variety of known glass compositions including the relatively inexpensive soda-lime glass compositions used in forming conventional glass bottles and jars and other glass containers. Envelope 11 differs from prior art glass containers, however, in that the wall thereof is substantially thinner than the wall even of a lightweight glass container such as the popular non-

returnable beer bottle, and the distribution of glass in the wall is considerably more uniform. For example, it is highly desirable and entirely feasible if the average wall thickness of the envelope of a container in accordance with the present invention be in the range of 0.035–0.050 inch when such envelope is formed of a soda-lime glass composition. Envelopes such as envelope 11 with reduced and more uniform wall thickness in relationship to prior art glass containers may be economically formed at high speed by the ribbon forming process used in the forming of electric lamp bulb envelopes, as generally disclosed in U.S. Patent 1,790,397 (to W. J. Woods et al.), and in Handbook of Glass Manufacture, page 356, by F. V. Tooley, (1953). This forming process is a paste mold process in which the glass heat content is removed through a steam layer, hence at a lower rate than in a hot-iron mold process. This lower heat transfer rate reduces the formation of stresses in the formed article. The reduced and more uniform wall thickness further imparts improved thermal shock resistance to the envelope, relative to a prior-art glass container, even when the envelope is formed of a glass of comparable coefficient of thermal expansion.

The lower and major portion of the envelope 11, designated by reference character 11c, is constructed with an outline approximating that of a major section of a sphere, a configuration readily obtained in the ribbon forming process heretofore mentioned. If, for reasons of design or otherwise, it is desirable to depart from a true spherical configuration in forming portion 11c, it is, nonetheless, quite structurally important that a lower and major portion of envelope 11 be of a substantially circular configuration in horizontal section at every elevation of such portion and that such portion be substantially continuously convexly arcuate in all axial sections (vertical planes passing through the central vertical axis of the envelope), of the envelope. It is to be noted that the use of a small flattened surface portion (not shown) in the lower portion 11c of the envelope, for example one of a diameter materially less than one-half of the major diameter of the envelope, may be of benefit in providing a locating or registration point for post-forming operations and an envelope with such a flattened surface portion is to be considered to be within the scope of the terms "substantially circular" or "substantially continuously convexly arcuate" as such terms have been hereinbefore used. In any event, the flattened surface portion will be of insufficient extent to provide satisfactory stability to the container in its upright position and the radius of the wall approaching such flattened surface will, desirably, be of gradually increasing length to avoid abrupt changes in radius of curvature.

Base member 12 of the container of the present invention securely engages a lower portion of envelope 11 thereof to support the envelope with stability in its upright position and to protect such engaged portion from impact damage. To this end, base member 12 must, of course, have a level lowermost extent (e.g. a flat base) and it must be constructed of a material substantially less frangible (more resistant to shock breakage) than glass. It is also desirable for the material to be capable of appreciable deformation under impact load to minimize the transmission of impact forces through the base member to the glass envelope. The popular thermoplastic materials, such as low and medium density polyethylene, incorporate these desirable properties to a large degree and are relatively inexpensive and readily formable by well-known production or molding techniques. The use of other materials in the formation of base member 11 including other thermoplastic materials, paper, molded pulp, plastisol formed in place, foamed plastics, and thermosetting plastics, as well as composites of any of such materials, is also contemplated. The use of various metallic materials, such as tinplate and aluminum, can

also be satisfactory if suitable cushioning techniques are employed.

If envelope 11 of the container of the present invention is to be positively protected from such surface abuse, such as impact damage caused by contact with adjacent containers in a shipping carton or in a filling line, it is important to provide base member 12 with a side wall portion 12a which extends upwardly at least to the major diameter of envelope 11. Such a construction feature is additionally advantageous in that the cylindrical outer surface of portion 12a which may thereby be provided is well situated for the placement of descriptive, advertising or other decorative material, as shown generally at 14 in FIGS. 1 and 2, thereby eliminating the need for the placement of such decorative material on the glass surface of envelope 11. This is particularly advantageous when the base member is formed of pigmented polyethylene (or other plastic), for example because it makes it possible to do such decoration with fast curing organic inks which results in a more opaque decoration than the decoration obtained on a glass surface when popular printing inks are used. Furthermore, when the wall of base member 12 extends upwardly to the major diameter of envelope 11, assembly of the base member and the envelope may be facilitated by forming base member 12 of a heat shrinkable plastic material and by heating it after the envelope has been placed therein; additionally or alternatively, such assembly may be accomplished by the use of an adhesive suitable to bond glass to the material of the base member, e.g., an epoxy resin adhesive, or by a simple shrink-fit of base member over envelope.

In the embodiment of the invention illustrated in FIGS. 3–5, there is provided a glass envelope 21 which is generally the same as envelope 11 of the embodiment of FIGS. 1 and 2 except that the upper minor portion 21b thereof is narrower to define a narrow-mouth 21a therefor. Base member 22 of the embodiment of FIGS. 3–5 can be considered to be identical to base member 12 of the embodiment of FIGS. 1 and 2.

In FIGS. 3 and 4, mouth 21a of envelope is shown as being closed by a closure 23 which is similar to closure 13 in that it incorporates an upwardly deflectable tab 23a attached to a removable medial portion 23b, as defined by weakened lines 23a and 23d, of the top panel of the closure. As is shown in FIG. 4, attachment of closure 23 to open mouth of envelope 21 may be facilitated by providing a liner cap 25 of resilient material, such as polyethylene, which has a downwardly and inwardly extending flange 25a, to snugly engage the upper portion of the rim of envelope 21 and over which closure 23 is placed. Such a liner cap may also be used in other embodiments of the present invention if desired.

As is shown in FIG. 5, it is also contemplated that narrow-mouth embodiments of containers in accordance with the present invention may also, when desired, be provided with other well-known convenience-type closures such as manually removable closure 123 which has a stiff outwardly extending removal tab 123a similar to that in use in some prior art crown closure constructions.

FIG. 6 illustrates an embodiment of a container in accordance with the present invention in which the envelope 31 thereof is provided with a hemispherical bottom portion 31a, a feature common to other envelope configurations, and a cylindrical portion 31b immediately thereabove. Because of its departure from the optimum configuration of a sphere by virtue of the incorporation of cylindrical portion 31b, envelope 31 is not as well suited for the packaging of pressurized products, such as carbonated soft drinks and malt beverage products, as are other of the illustrated envelope configurations. For example, FIG. 7 illustrates an embodiment wherein envelope 41 has about as close an approximation to the configuration of a sphere as can be provided consistent with the provisions of a suitable neck portion 41a,

A number of design features can be provided in the construction of a base member or fitment for use in the practice of the present invention which improve the ability of the base member to absorb impact. For example, in the embodiment of FIG. 6, fitment 32 has a bottom spherical surface portion 32a which contacts an adjacent surface portion of envelope 31 in surface-to-surface contact and a cylindrical surface portion 32b spaced from portion 32a which likewise contacts a portion of envelope 31 in surface-to-surface contact. Thus, fitment 32 between portions 32a and 32b is free to deflect under impact to absorb loads which otherwise would be transmitted to envelope 31. In some cases, further impact absorbing properties can be imparted to the base member or fitment of the present invention by constructing the fitment to contact the adjacent envelope only in point or line contact. Thus, the upstanding wall 42a of base member 42 of the embodiment of FIGS. 7 and 8 is of corrugated construction to minimize the area of contact of envelope 41 therewith and the bottom of base member 52 of the embodiment of FIG. 9 is shaped with an upstanding annular protuberance 52a to contact the lower portion of associated envelope 51 in the pattern of a thin circumferentially extending ring.

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 container of composite construction comprising, in combination: a glass envelope having a bulbular bottom portion which is substantially continuously convexly arcuate in outline along an axial plane, said portion constituting the major portion of said envelope, and an upper portion terminating in an orifice at its upper end, the wall of said envelope being seamless and of substantially thin and uniform thickness characterized by forming said envelope by the paste mold forming process; and a fitment of a yieldable material that is substantially less frangible than the material of said envelope, said fitment being adhesively secured to said bottom portion of said glass envelope, said fitment having a bottom portion characterized in its shape and configuration to provide stable support for the container in an upright position and having an upstanding wall portion extending at least to the major diameter of the glass envelope that is normal to the axis of said envelope, said wall portion serving to protect the glass envelope from sidewise contact with other similar articles adjacent thereto when said container is in an upright position.

2. A container according to claim 1 wherein the glass in said envelope consists essentially of soda-lime glass.

3. A container according to claim 2 wherein the average thickness of the wall of the envelope is 0.035-0.050 inch.

4. A container according to claim 1 and further comprising a closure for said orifice for retaining a product in said envelope.

5. A container in accordance with claim 4 and further comprising a product packaged in said envelope.

6. A container in accordance with claim 5 wherein said packaged product is a pressurized liquid.

7. A container in accordance with claim 6 wherein a lower major portion of said envelope has the outline of a section of a sphere.

8. A container in accordance with claim 1 wherein the fitment is provided with a substantially cylindrical

outer surface and wherein such outer surface is provided with decorative material.

9. A container of composite construction comprising, in combination: a glass envelope having a mouth which, when said envelope is disposed in an upright position, is at the upper extremity thereof, the wall of said envelope being seamless relatively thin and of a substantially uniform thickness and distribution, said wall being circularly-shaped in its horizontal sections and in its central axial section, being substantially continuously convexly arcuate along a bottom portion of substantial extent, said envelope thereby being highly unstable in an upright position; and a generally cup-shaped base member formed of a yieldable material substantially less frangible than the envelope securely engaging the bottom portion of the envelope and having a level surface on the base portion to support the glass envelope in an upright position with stability, and means for permanently securing said base to said bottom portion on the continuously convexly arcuate surface of the glass envelope to fabricate said glass envelope and cup-shaped base member into a composite container.

10. A container according to claim 9 wherein said envelope consists essentially of soda-lime glass, wherein the thickness of the wall of the envelope is in the range of 0.035-0.050 inch, and wherein the base member is formed of a heat-softenable plastic material.

11. A container in accordance with claim 9 wherein a lower major portion of said envelope has the outline of a section of a sphere.

12. A container in accordance with claim 11 and further comprising a pressurized product packaged in said envelope and closure means sealingly closing the mouth of the envelope to retain the product under pressure in the envelope.

13. A container in accordance with claim 9 wherein the lower extremity of the envelope is hemispherically-shaped.

14. A container in accordance with claim 9 wherein a major portion of the envelope immediately above said lower extremity is cylindrically-shaped.

15. A container in accordance with claim 9 wherein said base has a surface adjacent said envelope which is shaped to contact said envelope at spaced-apart locations of said envelope and to be spaced from said envelope at locations other than said spaced-apart locations.

16. A container in accordance with claim 15 wherein one of said spaced-apart locations is a circumferentially extending area of substantial depth immediately adjacent the upper extremity of the base.

17. A container in accordance with claim 16 wherein another of said spaced-apart locations is a location of substantial area at the lowermost extremity of the envelope.

18. A container in accordance with claim 16 wherein another one of said spaced apart locations is a thin circumferentially extending ring located proximate to the lowermost extremity of the envelope.

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DONALD F. NORTON, *Primary Examiner.*