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2004 OCT -5 AM 11:48
PHOENIX CLOSURES, INC.,
U.S. DISTRICT COURT

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

PHOENIX CLOSURES, INC.,
Plaintiff,

v.

SILGAN PLASTICS CORPORATION
Defendant.

Civil Action No. **04C 6406**
Judge: **JUDGE KENNELLY**
Magistrate Judge: **MAGISTRATE JUDGE MASON**

DOCKETED
OCT 05 2004

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Phoenix Closures, Inc. ("Phoenix") for its Complaint for patent infringement against Silgan Plastics Corporation ("Silgan" or "Defendant"), states as follows:

1. Phoenix is a corporation existing under the laws of the State of Illinois with its principal place of business at 1899 High Grove Lane, Naperville, IL 60540-3996.
2. On information and belief, Silgan Plastics Corporation ("Silgan" or "Defendant") is a corporation existing under the laws of the State of Delaware with its principal place of business at 14515 N. Outer Forty Road, Chesterfield, MO 63017.
3. This action arises under the patent laws of the United States, 35 U.S.C. §§ 1, et seq., and this Court has federal question jurisdiction of Phoenix's patent infringement claims pursuant to 28 U.S.C. §1331 and 1338(a).
4. Venue is proper in this district pursuant to 28 U.S.C. §§ 1391(b), 1391(c) and 1400(b).
5. United States Patent No. 6,257,432, titled "Cap and Container Assembly" issued on July 10, 2001. (Attached Ex. A.)
6. Phoenix is the lawful owner, by assignment, of the entire right, title, and interest in and to United States Patent No. 6,257,432.
7. Defendant has directly and/or through wholly owned subsidiaries manufactured,

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used, sold, and/or offered to sell products that infringe one or more claims of U.S. Patent No. 6,257,432 to customers in the United States and in this District.

8. A reasonable opportunity for further investigation or discovery is likely to provide evidentiary support that Defendant is also liable to Phoenix under: (i) 35 U.S.C. §271(b) for actively inducing others to directly infringe one or more claims of U.S. Patent No. 6,257,432, and/or (ii) 35 U.S.C. §271(c) as a contributory infringer with regard to others' direct infringement of one or more claims of U.S. Patent No. 6,257,432, in this district and other districts within the United States.

9. A reasonable opportunity for further investigation or discovery is likely to provide evidentiary support that Defendant committed the aforesaid infringements willfully.

10. Defendant has been and still is committing the above-referenced infringements and will continue to do so unless enjoined by this Court.

11. Phoenix marks its patented products sold under U.S. Patent No. 6,257,432 with the statutory notice required by 35 U.S.C. § 287.

12. Phoenix has given written notice to Defendant of its infringement of U.S. Patent No. 6,257,432.

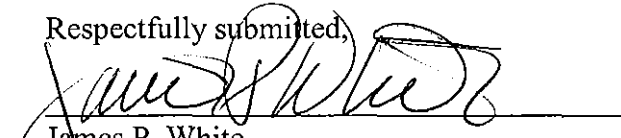
WHEREFORE, Plaintiff demands a permanent injunction against continued infringement, damages adequate to compensate for Defendant's infringements together with all applicable interest and costs, an increase of damages to three times the amount found or assessed, attorneys fees, and such other and further relief as the Court may deem just and proper and as is warranted by the evidence.

JURY DEMAND

Plaintiff demands a trial by jury on all issues triable by jury as of right.

October 5, 2004

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'James P. White', is written over a horizontal line. The signature is stylized and somewhat cursive.

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**Attorneys for Plaintiff
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US006257432B1

(12) **United States Patent**
Ekkert

(10) Patent No.: **US 6,257,432 B1**
(45) Date of Patent: **Jul. 10, 2001**

- (54) **CAP AND CONTAINER ASSEMBLY**
- (75) Inventor: **Len Ekkert, Lemont, IL (US)**
- (73) Assignee: **Phoenix Closures, Inc., Naperville, IL (US)**
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.
- (21) Appl. No.: **09/475,301**
- (22) Filed: **Dec. 29, 1999**
- (51) Int. Cl.⁷ **B65D 41/04; B65D 53/00**
- (52) U.S. Cl. **215/331; 215/44; 215/45; 215/341; 215/354**
- (58) Field of Search **215/43-45, 329, 215/331, 341, 343, 344, 354, DIG. 1, 330, 220/288, 304**

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Primary Examiner—Nathan J. Newhouse
(74) Attorney, Agent, or Firm—Welsh & Katz, Ltd.

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(57) **ABSTRACT**

A cap and container assembly can be opened and closed repeatedly and continue to achieve a good seal between the cap and the container. The good seal results from the engagement, of the container neck with cap protrusions, which temporarily deforms the shape of the container and/or the cap as the cap is secured to the container, and from stopping surfaces which limit the extent of that deformation.

19 Claims, 3 Drawing Sheets

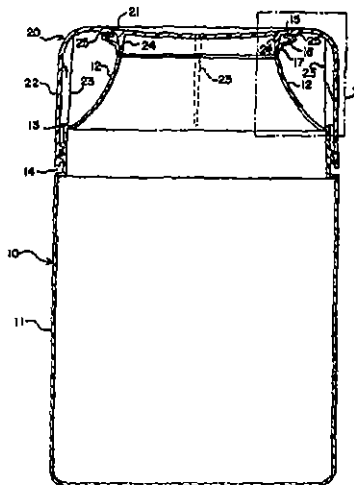


FIG. 1

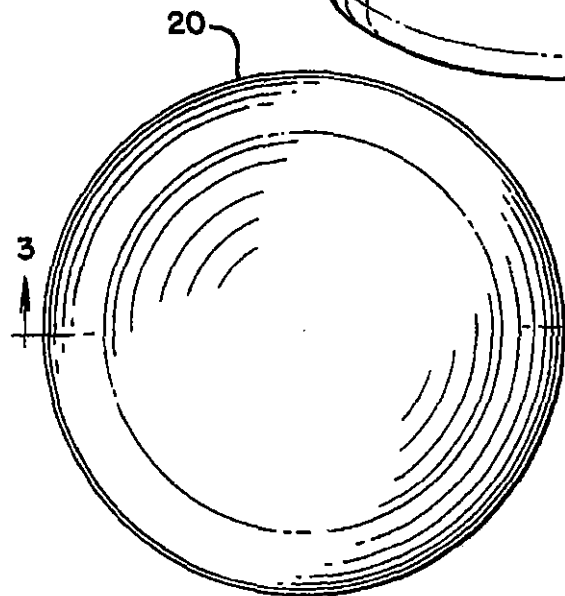
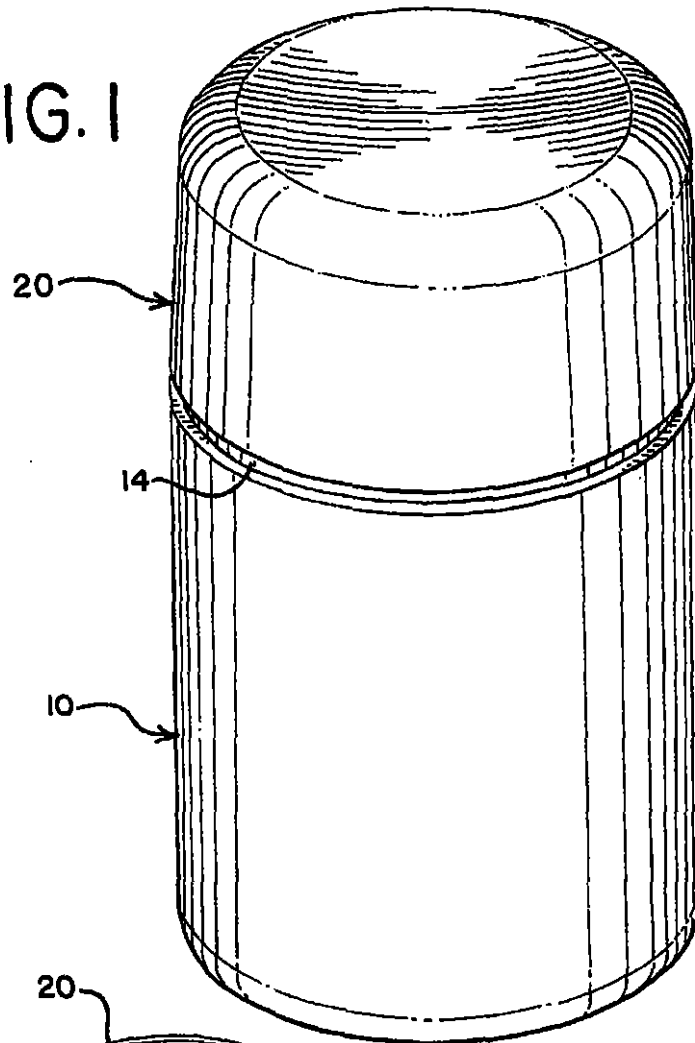
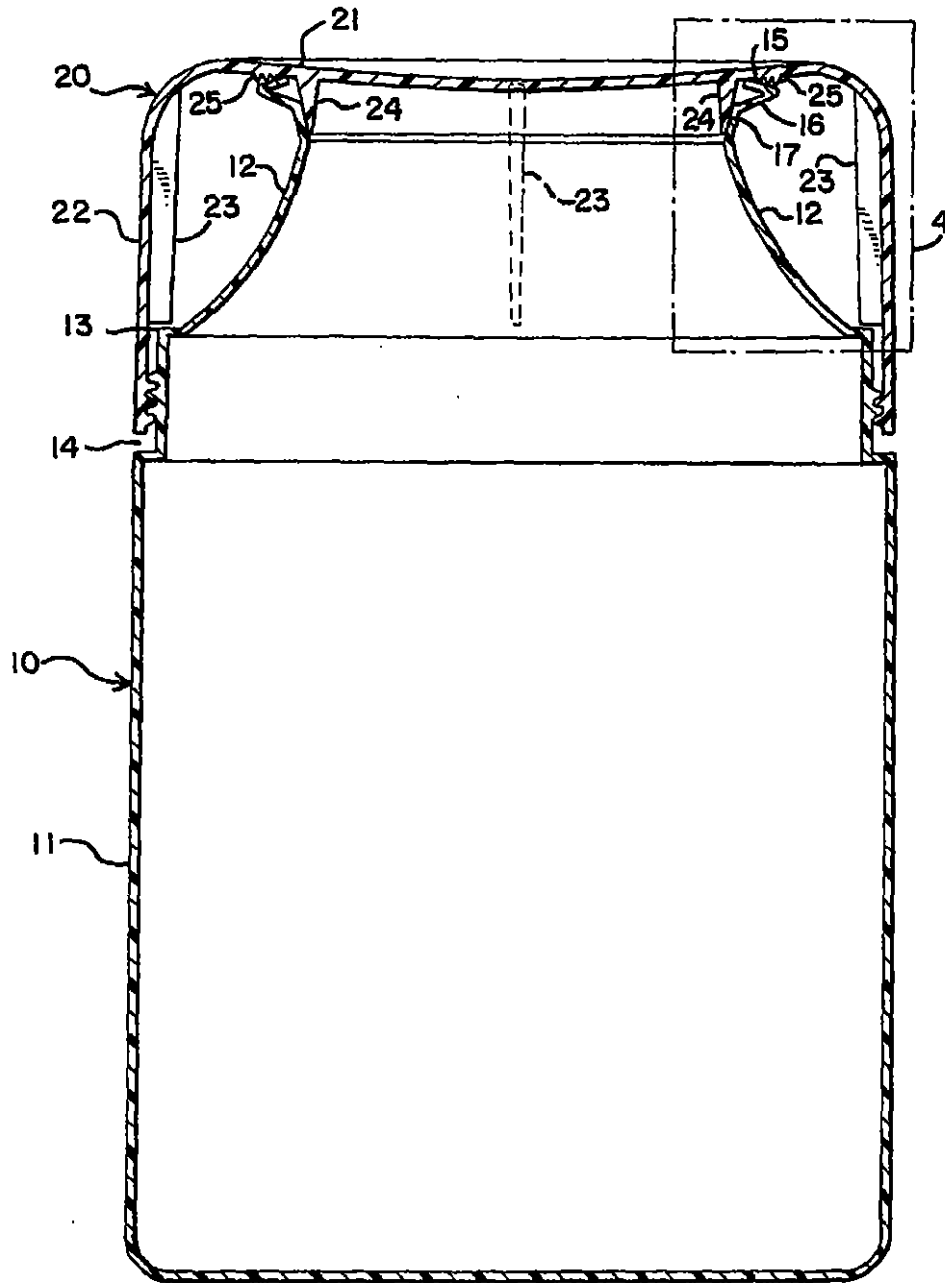


FIG. 2

FIG. 3

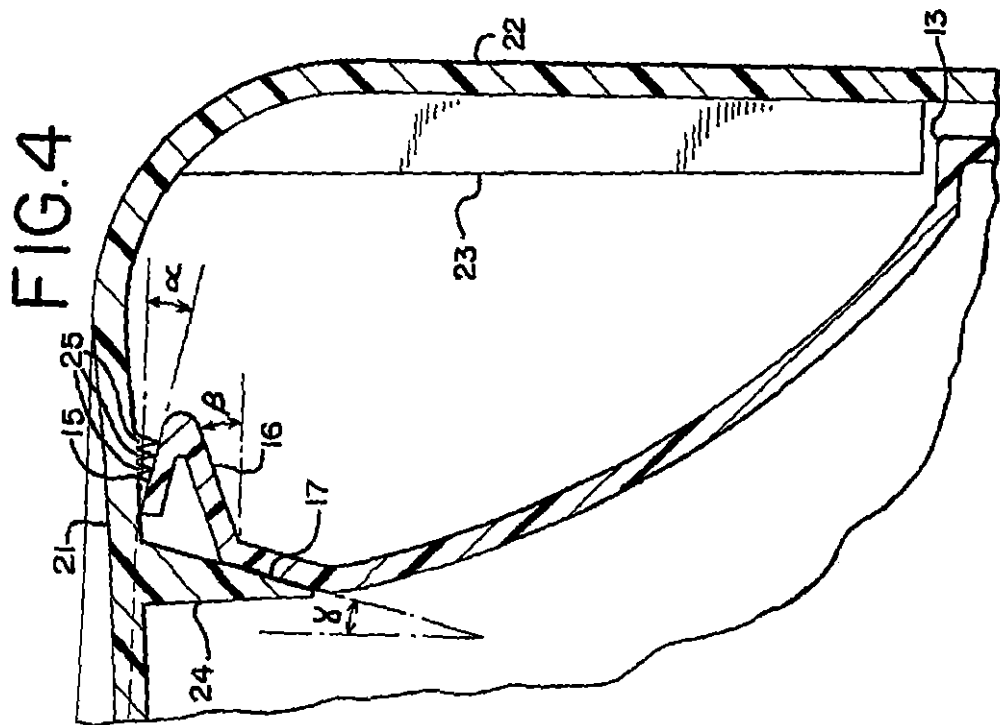
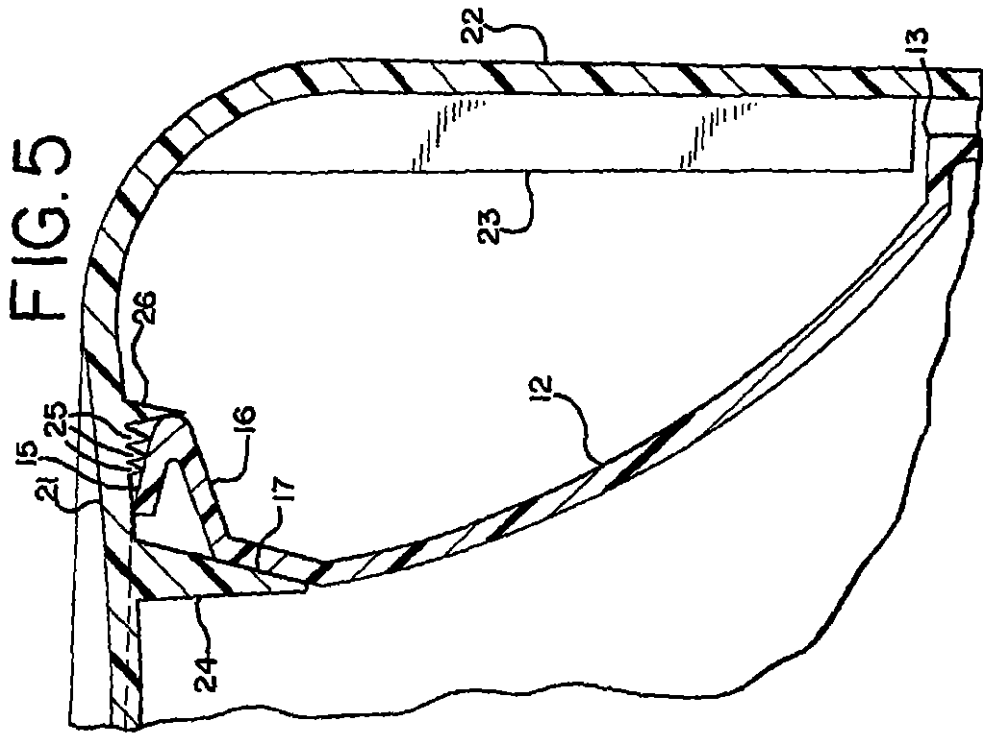


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CAP AND CONTAINER ASSEMBLY

BACKGROUND AND SUMMARY

This invention relates to containers which can be opened and closed repeatedly and continue to achieve a good seal between the cap and the container.

A good seal is especially desirable if the substance in the container needs protection from the outside environment, such as a powdered beverage mix which can cake with continuous exposure to very humid air. It is desirable to be able to manufacture an inexpensive cap and container assembly, which can be used for initial packaging of the product prior to sale, and which can continue to be opened and resealed by the purchaser of the product.

Some existing containers are too expensive for the packaging of inexpensive products, difficult to reseal effectively, or simply cannot be resealed effectively.

The present invention is a novel cap and container assembly which can repeatedly achieve a good seal. Annular protrusions depend from a curved cap top, and the top of the container neck slants out, then in, and then out as the neck extends down from the mouth of the container. As the cap is secured to the container, the protrusions engage exterior and interior surfaces of the neck, and the curved cap top and the upper part of the neck flex to facilitate forming a good seal. Stopping surfaces form a positive stop to lower engagement of the cap with respect to the container beyond a certain point, limiting the temporary deformation of shape caused by the flexing. The dimensions of the protrusions and the neck surfaces are matched to achieve a good seal at the lowest engagement of the cap with respect to the container permitted by the stopping surfaces.

The features of the present invention which are believed to be novel are set forth below with particularity in the claims. The invention, together with further advantages thereof, may be understood by reference to the following description in conjunction with the accompanying figures, which illustrate some embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side perspective view of the cap and container assembly with the cap secured to the container.

FIG. 2 is a top perspective view of the cap and container assembly.

FIG. 3 is a cross-sectional view taken along line 3—3 depicted in FIG. 2.

FIG. 4 is an enlarged view of the identified portion in FIG. 3.

FIG. 5 is a similar view as illustrated in FIG. 4, but of an alternative embodiment.

DETAILED DESCRIPTION

FIGS. 1 through 4 show an example of the present cap and container assembly. It comprises a container 10 and a cap 20 designed for mating engagement with each other. The container 10 and cap 20 are manufactured as molded plastic parts, preferably composed of polypropylene, polyethylene, or similar materials.

As best seen in FIG. 3, the container 10 includes a base 11 and a neck 12. The neck 12 is the portion of the container 10 to which the cap 20 is engaged, and the end of the neck 12 defines a mouth of the container. The cap 20 includes a curved top 21 and a skirt 22 depending peripherally from the top 21. A portion of the exterior surface of the neck 12 is

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threaded, a portion of the interior surface of the skirt 22 is threaded, and the cap 20 can be secured to the container 10 by mating engagement of those two threaded-ports. A number of stops or projections 23 on the interior surface of the skirt 22 are designed to contact a shoulder 13 on the exterior surface of the neck 12 at a certain point as the cap 20 is secured to the container 10. Those projections 23 and shoulder 13 act as stopping surfaces to stop any lower engagement of the cap 20 with respect to the container 10 and to provide a gap 14 between a bottom edge of the cap 20 and an upper part of the base 11. In FIGS. 3 and 4, the shoulder 13 is seen above the threaded portion of the exterior surface of the neck 12.

As best seen in FIGS. 3 and 4, a relatively long sealing flange or first annular protrusion 24 and a plurality of much smaller second annular protrusions 25 depend from an interior surface of the top 21. The top 21 is generally convex as viewed from inside the cap 20. The neck 12 is substantially symmetrical about a central vertical axis. As the neck 12 extends down from the mouth, it is preferable if the neck 12 initially doubles back creating a flexible lip and then has a lower interior sealing surface 17 for sealing with the first protrusion 24, before extending down to the threaded portion. That is, the neck 12 initially becomes wider forming an upper exterior sealing surface 15 at an angle of about 10° to about 20°, and preferably about 15°, with an imaginary horizontal plane in an unstressed state. The second annular protrusions 25 are positioned to engage this upper exterior sealing surface 15 of the neck 12. It is preferable that the neck 12 then become narrower first forming an exterior surface 16 at an angle of about 10° to about 25°, and preferably about 20°, with an imaginary horizontal plane, and second becoming more vertical while continuing to narrow and forming the lower interior sealing surface 17 at an angle of about 10° to about 20°, and preferably about 14°, with a surface of an imaginary vertical cylinder (in an unstressed state). The first annular protrusion 24 can engage this lower interior sealing surface 17 of the neck 12. The neck 12 can then become wider than the lip as it continues down to meet the base 11.

The surfaces 15, 16, and 17, like all of the neck 12 in the example illustrated by FIGS. 1 through 4, curve symmetrically about a central vertical axis. However, the surfaces 15, 16, and 17, may be characterized as generally frusto-conical. That is, in a cross-sectional view taken along any plane which includes the central vertical axis, the surfaces 15, 16, and 17 would appear as straight line segments. As seen in FIG. 4, the angle of surface 15, 16, or 17, mentioned above, would be the angle of such a straight line segment—as represented by angles α , β , and γ , respectively.

With the example just described, and illustrated in FIGS. 3 and 4, the first annular protrusion 24 will protrude down further from the top 21 than the second protrusions 25, as both are designed to engage and seal with a particular surface area of the neck 12. It is preferable that materials and the geometry of the top 21, the first protrusion 24, and the neck 12 render them sufficiently flexible to allow for some temporary deformation of shape. This is facilitated by the curvature of the top 21 and the bends in the neck 12. The temporary deformation results from the pressure exerted as the cap 20 is secured to the container 10. The resilience of the materials used maintains that pressure and the resulting good seal between the cap 20 and the container 10.

It is preferable that the angles, of the first annular protrusion 24 and of the lower interior sealing surface 17 of the neck 12 with which the first protrusion 24 will engage, are generally matched to achieve a good seal at the lowest

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engagement permitted by the stopping surfaces 13 and 23. Similarly, as seen in FIGS. 3 and 4, the lengths of the second annular protrusions 25 will vary to match the angle of the upper exterior sealing surface 15 of the neck 12 with which the second protrusions 25 will engage. Of course, the particular configuration described is only an example and is not the only one which will work. Upon engagement, the interior surface of the top 21 will be pressed upward, and the upper exterior sealing surface 15 will be pressed downward putting inward pressure on the lower interior sealing surface 17 and on the first protrusion 24.

In addition to facilitating a good seal, the shape of the neck 12, as best seen in FIG. 3, is ergonomically desirable. A typical opened container 10 may be held easily with one hand around the neck 12 below the flexible lip.

As seen in FIG. 3, a bottom section of the neck 12 is generally vertical, and its exterior surface includes the threaded-portion below the shoulder 13. That bottom section of the neck 12 is narrower than the adjacent and integral upper part of the base 11, and the skirt 22 is generally the same diameter as the upper part of the base 11.

As best seen in FIGS. 1 and 3, a gap 14 remains between a bottom edge of the cap 20 and an upper part of the base 11 in the illustrated embodiment, when lower engagement of the cap 20 with respect to the container 10 is blocked by contact between the stopping surfaces 13 and 23. The gap 14 facilitates the cutting of any label or tamper-evident tape applied to the filled cap and container assembly before sale to the consumer.

In an alternative embodiment illustrated, in part, in FIG. 5, an additional annular protrusion 26 depends down from the interior surface of the top 21. When the cap 20 is engaged with the container 10, the additional protrusion 26 is radially outside of the flexible lip of the neck 12, and is sufficiently rigid and extends low enough and close enough to the lip to resist the lip from moving outwardly when the lip is pressed down upon engagement of the cap 20 with the container 10. The curved cap top 21 flexes up, causing the rigid additional protrusion 26 to press the flexible lip inwardly. This will maintain the pressure on the sealing surfaces 15 and 17, and improve the sealing between the upper exterior sealing surface 15 and the second protrusions 25 and between the lower interior sealing surface 17 and the first protrusion 24. The additional annular protrusion 26 will compensate for manufacturing imperfections, such as a surface of the neck 12 being slightly out of the round, which would diminish the ability to achieve a good seal. The possibility of such imperfections cannot always be eliminated given the tolerances achievable in the manufacture of inexpensive containers.

The embodiments discussed and/or shown in the figures are examples. They are not exclusive ways to practice the present invention, and it should be understood that there is no intent to limit the invention by such disclosure. Rather, it is intended to cover all modifications and alternative constructions and embodiments that fall within the spirit and the scope of the invention as defined in the following claims:

What is claimed is:

1. A cap and container assembly comprising:

a container and a cap;

the container including a base, and a neck for engagement with the cap, an end of the neck defining a container mouth;

the neck being substantially symmetrical about a central vertical axis, the neck forming a flexible lip, proximate the mouth, with an upper, generally frusto-conical,

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exterior sealing surface, the neck further forming a lower, generally frusto-conical, interior sealing surface, the neck further forming an exterior circumferential shoulder of greater diameter than a diameter of the lip; the cap including a top, a skirt depending peripherally from the top, first and second annular sealing protrusions depending from an interior surface of the top, and at least one stopping projection on an interior surface of the skirt;

the top being generally convex as viewed from inside the cap;

wherein, upon securing engagement of the skirt with a bottom section of the neck, the first sealing protrusion sealingly engages the lower interior sealing surface, and the second sealing protrusion sealingly engages the upper exterior sealing surface; and

wherein the shoulder and the at least one stopping projection engage to form a positive stop to lower engagement of the cap with respect to the container, ensuring sealing contact between the first sealing protrusion and the lower interior sealing surface and between the second sealing protrusion and the upper exterior sealing surface, and forming a gap between a bottom edge of the cap and an upper part of the base.

2. A cap and container assembly as in claim 1 wherein an intersection of the upper exterior sealing surface with any plane which includes the central vertical axis would form a straight line segment which would form an angle of about 10° to about 20° with its projection on an imaginary horizontal plane, and an intersection of the lower interior sealing surface with any plane which includes the central vertical axis would form a straight line segment which would form an angle of about 10° to about 20° with its projection on a surface of an imaginary vertical cylinder.

3. A cap and container assembly comprising:

a container and a cap;

the container including a base, and a neck for sealing engagement with the cap;

a land area at an end of the neck defining a container mouth, and an exterior surface of the neck below the land area and an exterior surface of the base defining an exterior side surface of the container;

the cap including a top and a skirt depending peripherally from the top;

the skirt including a horizontal stopping surface;

wherein the stopping surface of the skirt and a horizontal stopping surface of the container engage to form a positive stop to lower engagement of the cap with respect to the container.

4. A cap and container assembly as in claim 3, the stopping surfaces comprising at least one stopping projection on an interior surface of the cap and a shoulder on the exterior side surface of the container.

5. A cap and container assembly as in claim 3, wherein a gap remains between a bottom edge of the cap and an upper part of the base, upon engagement of the stopping surfaces.

6. A cap and container assembly as in claim 3, wherein the sealing engagement of the cap with the neck temporarily deforms a shape of at least one of a group consisting of the cap and the neck, and wherein an extent of said deformation can be limited upon engagement of the stopping surfaces.

7. A cap and container assembly as in claim 3, the cap including at least one annular protrusion which can sealingly engage an interior surface of the neck.

8. A cap and container assembly as in claim 3, the cap including at least one annular protrusion which can sealingly engage the exterior surface of the neck.

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS

Civil Cover Sheet

This automated JS-44 conforms generally to the manual JS-44 approved by the Judicial Conference of the United States in September 1974. The data is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. The information contained herein neither replaces nor supplements the filing and service of pleadings or other papers as required by law. This form is authorized for use only in the Northern District of Illinois.

Plaintiff(s): **Phoenix Closures, Inc.**

Defendant(s): **Silgan Plastics Corporation**

County of Residence:

County of Residence:

Plaintiff's Atty: James P. White
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120 So. Riverside Plaza - 22nd Flr.
Chicago, Illinois 60606
312-655-1500

Defendant's Atty:

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04C 6406

II. Basis of Jurisdiction: **3. Federal Question (U.S. not a party)** . .

III. Citizenship of Principal Parties
(Diversity Cases Only)

Plaintiff:- N/A
Defendant:- N/A

JUDGE KENNELLY

IV. Origin : **1. Original Proceeding**

MAGISTRATE JUDGE MASON

V. Nature of Suit: **830 Patent**

VI. Cause of Action: **35 U.S.C. Section 271, et seq.; Patent Infringement**

VII. Requested in Complaint

Class Action:
Dollar Demand: **To be determined**
Jury Demand: **Yes**

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CLERK
U.S. DISTRICT COURT

VIII. This case **IS NOT** a refiling of a previously dismissed case.

Signature:
Date: 10-5-04

**UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS**

EASTERN DIVISION

In the Matter of

Phoenix Closures, Inc., Plaintiff,
vs.
Silgan Plastics Corporation, Defendant.

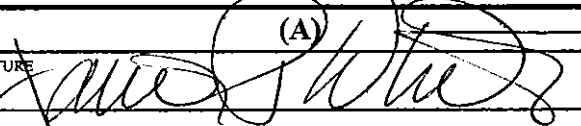
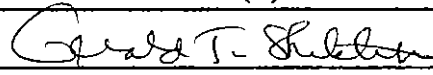
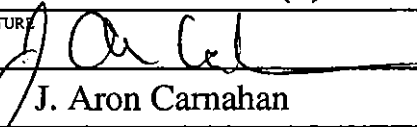
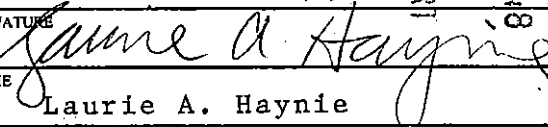
Case Number: **04C 6406**

APPEARANCES ARE HEREBY FILED BY THE UNDERSIGNED AS ATTORNEY(S) FOR:

Phoenix Closures, Inc., Plaintiff

JUDGE KENNELLY

MAGISTRATE JUDGE MASON

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E-MAIL ADDRESS jpwhite@welshkatz.com		E-MAIL ADDRESS gtshekleton@welshkatz.com	
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		DESIGNATED AS LOCAL COUNSEL?	
		YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
(C)		(D)	
SIGNATURE 		SIGNATURE 	
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IDENTIFICATION NUMBER (SEE ITEM 4 ON REVERSE) 06242642		IDENTIFICATION NUMBER (SEE ITEM 4 ON REVERSE) 06195230	
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		DESIGNATED AS LOCAL COUNSEL?	
		YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	

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