NESTABLE POURING SPOUT WITH WALL-SUPPORTING CAP

9 Claims, 6 Drawing Figs.

ABSTRACT: A nestable pouring spout has a flexible wall with a portion reversible in curvature upon extension of the spout, and which is circumferentially supported by a portion of a spout-closing cap when the spout is in nested position.
NESTABLE POURING SPOUT WITH WALL-SUPPORTING CAP

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to containers, and more particularly to pouring spouts therefor of highly flexible material for convenient nesting and extension thereof.

Description of the Prior Art


In addition to the above group, there are patents on retractable container spouts U.S. Pat. Nos. 2,804,242; 3,075,676; and 3,093,273 issued to John E. Borah.

There are many instances when containers of fluid are subjected to temperature changes resulting in pressure changes internally. Increases of pressure, if sufficiently great, can cause deformation of the more flexible portion of a flexible spout, and with some materials the possibility of stress cracking arises. The present invention is directed toward overcoming such problems.

SUMMARY OF THE INVENTION

Described briefly, in a typical embodiment of the present invention, a flexible pouring spout with a comparatively rigid neck portion and comparatively flexible body portion joined thereto, is provided with a cap having a skirt portion extending a substantial distance axially into the space between the neck portion and body portion when the spout is in nested position. This cap, cooperating with the body portion as provided for by the contour of the latter, provides radial support therefor to avoid collapse thereof onto the neck portion which might otherwise result from internal pressures in a container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional view through a container (shown fragmentarily) at a plane containing the axis of a nested pour spout, illustrating in the solid lines the nested condition of a prior art spout as it might appear when not subjected to internal container pressure, and showing by the dotted line, the collapsing which can occur by generation of internal pressure in gas or vapor at 29.

FIG. 2 is a sectional view on a plane normal to the spout axis at line 2—2 in FIG. 1 and viewed in the direction of the arrows, showing the collapse which can occur in some prior art spouts subjected to internal pressure.

FIG. 3 is a top plan view of a container top with a pour spout and cap combination according to a typical embodiment of the present invention, shown in the nested condition with the tamper-proof metal seal cover removed therefrom.

FIG. 4 is a section taken at line 4—4 in FIG. 3 and viewed in the direction of the arrows.

FIG. 5 is a section through a combination according to another embodiment of the present invention wherein the cap is provided with support ribs.

FIG. 6 is a section taken at line 6—6 in FIG. 5 and viewed in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2, a portion 11 of a container is shown, this container having a circular opening in the top thereof with a closure assembly designated generally by reference 12. The top of the container, whether it be of plastic as shown, or metal, may have an axially extending flange 13 encompassing the opening 14 therein, the flange and opening wall 14 having collinear axes 15.

A flexible nestable spout unit 17 is shown in its nested condition and includes a neck portion 18, an inverted frustoconical body portion 19, and the annular mounting portion 21 of inverted U-shaped cross section. An integral outlet seal portion 22 is provided across the top of the neck portion. This unit is secured in place on the flange 13 by the anchor ring 23 cramped or otherwise attached over the combination flange and mounting portion of the container and the closure, respectively. This ring is typically made of steel, but can be made of other metals or materials which can be cold formed beyond their elastic limit to a desired shape and remain in that shape.

A tamper-proof seal cap 24 is secured to the inner margin of the ring 23 to cover the bail handled closure cap 26. Closure cap 26 is threadedly received on the neck 18 of the spout unit, and may be of a type generally shown and described in the Rieke, U.S. Pat. No. 3,250,428. The tamper-proof seal cap 24, which is usually made of the same material as the anchor ring 23, may be torn away from the anchor ring to provide access to the bail 28 to facilitate pulling the spout from the nested position to an aforementioned Rieke, U.S. Pat. Nos. 2,895,654 and 3,250,428. The closure cap 26 can then be unscrewed from the neck and thereby removed therefrom. The integral seal 22 can then be cut away to permit pouring contents from the container.

Because of the fact that the body portion 19 is quite flexible to facilitate movement of the spout between the nested and extended position, there is the possibility that internal pressure in the container will have an adverse effect upon this portion of the spout. This is illustrated in the dotted line showing at 19c in FIG. 1 where the pressure in area 29 in the container has collapsed the body portion toward the neck 18. The collapsing effect will typically occur in five or six equally spaced areas around the circumference of the body portion as better shown in FIG. 2. As a result of this collapsing of the body portion of the prior art configurations, stress cracking can occur near the crests or ridges between the recesses 19c, as shown generally at 30 in FIG. 2. This radius of the outer fibers of the body portion at such ridges may be as low as three sixteenths of an inch when the filled containers are subjected to various ranges of temperature which may be encountered during normal shipping conditions. This can occur at all five or six of such ridges, and is particularly detrimental when the contents of the container are such as would aggravate the condition.

Referring now to FIG. 3, the closure cap 31 according to the illustrated embodiment of the present invention has a first bail handle 28 and a second bail handle 32 virtually identical thereto but on an opposite side of the center line of the cap. Of course FIG. 3 shows the tamper-proof seal removed so that the closure cap 31 is plainly visible. The anchor ring 23 can be the same as in FIG. 1 and so can the container top 11 and collar 13.

According to one embodiment of the invention as shown in FIG. 4, the spout has a base portion 33 extending generally horizontally from the lower inner margin of the mounting portion 34, radially inwardly toward the axis 36 of the assembly. The body portion 37 extends downwardly from the base portion at a rather small angle with respect to a line parallel to the axis 36, as indicated by angle 38 in FIG. 4. In other words, the body portion, while being of inverted frustoconical shape as in the prior art construction, is of a much smaller vertex angle. Accordingly, the annular space 39 between the perimeter or circumference of the neck portion 18 and body portion 37 is of a much smaller radial dimension than in the prior art example. In addition, the cap 31 is provided with a skirt 41 extending coaxially with the neck and body portion to a point 42 near the bottom of this annular space and in close proximity to the body portion at 43.

When the combination is constructed in this manner according to one embodiment of the present invention, the outer periphery 44 of the skirt 41 serves to support the body portion 37 if it ever is subjected to pressures of the order which would ordinarily collapse it to result in the detrimental condition.
referred to above with respect to the prior art. In this example, because of the radial support provided by the skirt 41 for the body portion 39, when it is subjected to substantial internal container pressure, it may only be deformed a very slight amount as suggested by the dotted line 39 in FIG. 4, collapse of the upper region of the body portion being resisted both by virtue of the cap support provided for the lower region and also by virtue of the tensile strength of the thicker base portion 33 tending to hold the upper region of the body portion in the desired circular shape. Accordingly the maximum amount of cavity which might be caused by a high-internal pressure condition can be limited to as small an amount as desired to avoid forming ridges of sufficient severity (of the type indicated in FIG. 2) to result in stress cracking. In other words, while the annular space 39 is large enough to permit easy removal of the cap from the threads 46 of the spout, it is small enough to permit the cap skirt to support the body portion and avoid low-radius ridges such as shown in FIG. 2 and which would result in stress cracking.

In addition to the cap 31 serving to support the body portion of the spout, it serves as a most convenient means for raising the spout from the nested condition shown in FIG. 4 to the extended condition as shown by the dotted outline 47. For this purpose, in addition to incorporating the bail handle 28, the bail handle 32 is provided, both being joined to the radially extending lugs 48 integral with the cap, there being the "hinge" portions 51 of reduced cross sectional area to facilitate bending each of the bail handles upwardly in the direction of arrows 52 so that the outermost free portions 53 of the bail may be abutted between the fingers to provide a greater and more comfortable bearing area for the fingers for engaging for pulling the spout from the nested position. Because of the "memory" of the material of the cap, the bail will return substantially to their original coplanar relationship as shown in FIG. 4 when they are released. The spout, however, will remain extended until such time as it is pushed back into the nested position.

Referring now to FIG. 5, the construction of the spout is the same as in FIG. 4, incorporating the integral outlet seal 22, neck portion 18, body portion 37, base portion 33, and mounting portion 34, all of low-density polyethylene, for example. In the previous case, the body portion is highly flexible compared to the less flexible base portion portion, and comparatively rigid neck portion 18. It is capable of deformation into a reversed curvature at 54 and at 56 to form a shoulder as at 55 upon extension of the spout, just as in the previous embodiment. However, in this embodiment, the cap is provided with a plurality of circularly spaced axially extending ribs 57 as shown in FIG. 5 and in the section of FIG. 6. These project axially from beneath the overhang portion 58 of the cap and may be tapered slightly inwardly at 59 on the same angle 38 as is the inner wall of the body portion at 37. These circularly spaced axially extending ribs provide support for the body portion around its circumference so that, regardless of internal pressure, there is no collapse at all of the body portion. Here, therefore, there is no chance of stress cracking due to collapse which might otherwise result from internal pressure.

Because of the support provided for the body portion according to the present invention, the materials employed therein can be of less critical nature and can be selected with greater freedom of choice, giving more opportunities for cost savings and choice of physical and chemical characteristics. Other possible configurations of caps and spout body portions might be devised incorporating the support thereto to withstand various levels of internal pressure, all within the scope and teaching of the present invention.

The invention claimed is:
1. A nestable and extendable spout combination comprising:
a mounting portion securable to a container at an opening therein;
a base portion extending inwardly from said mounting portion;
a body portion extending downwardly from said base portion and inwardly;
a neck portion extending upwardly from said body portion and located inwardly from said body portion; and
a cap secured to said neck portion and having a skirt extending toward the junction of said body and neck portions;
said body portion being of inverted, generally frustoconical configuration of a comparatively small vertex angle;
said cap skirt projecting into the space between said neck portion and said body portion a distance more than two-thirds the length of said body portion;
said cap skirt having an outer surface engageable by said body portion for lateral support of said body portion by said cap skirt.
2. The combination comprising:
a container having an opening in a wall thereof;
a nestable and extendable spout made of a material subject to stress cracking and having a mounting, base, body and neck portions;
said mounting portion being secured to said wall and sealed thereto around said opening;
said body portion extending downwardly from said base portion and inwardly;
said neck portion extending upwardly from said body portion and located inwardly therefrom;
a cap secured to said neck portion and having a skirt extending toward the junction of said body and neck portions a distance of more than half the length of said body portion;
said body portion having a normal configuration when said spout is nested and the pressure inside said container is substantially the same as pressure outside said container; and
said skirt being disposed in closely spaced relationship to said body portion and engageable by said body portion in response to deformation of said body portion by generation of pressure in said container exceeding pressure outside said container, said skirt thereby limiting such deformation and thereby precluding stress cracking of the material of said body portion.
3. A nestable and extendable spout combination comprising:
a mounting portion securable to a container at an opening therein;
a base portion extending inwardly from said mounting portion;
a body portion extending downwardly from said base portion and inwardly;
a neck portion extending upwardly from said body portion and located inwardly from said body portion;
a cap removable secured to said neck portion and having a skirt extending toward the junction of said body and said neck portions;
a stop means on said cap cooperating with said neck portion to limit the extent of axial travel of said cap on said neck portion upon installation of said cap thereon,
said cap skirt having the outer surface remote from the top of said cap tapered to conform tangentially to the inner wall of said body portion when said cap travel is limited is said stop means.
4. The combination of claim 3 wherein:
said skirt has a plurality of circularly spaced, axially extending external ribs thereon engageable by said body portion.
5. The combination of claim 3 wherein said cap has a double bail handle having flexibility and memory.
6. A nestable and extendable spout combination comprising:
a container having an opening in a wall thereof;
a nestable and extendable spout having a mounting, base, body, and neck portions;
said mounting portion being secured to said wall and sealed thereto around said opening;
said body portion extending downwardly from said base portion and inwardly;
said neck portion extending upwardly from said body portion and located inwardly therefrom; and
a cap secured to said neck portion and having a skirt extending toward the junction of said body and neck portions;
the cap skirt having an external surface which contacts the body portion at a plurality of points, precluding deformation of the contacted area of said body portion by pressure generated in said container.

7. A nestable and extendable spout combination comprising:
a container having an opening in a wall thereof;
a nestable and extendable spout having mounting, base, body, and neck portions;
said mounting portion being secured to said wall and sealed thereto around said opening;
said body portion extending downwardly from said base portion and inwardly;
said neck portion extending upwardly from said body portion and located inwardly therefrom; and
the cap skirt having an external surface which is very close to the body portion at a plurality of points, precluding significant deformation of said body portion by pressure generated in said container.

8. The combination of claim 7 wherein said cap has a plurality of circularly spaced, axially extending external ribs thereon engageable by said body portion.

9. The combination of claim 7 wherein said cap has a double bail handle having flexibility and memory.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,613,966 Dated October 19, 1971

Inventor(s) Kenneth L. Summers

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On both sheets of drawing, "3,513,966" should be changed to --3,613,966--.

Column 1, line 12 "Irving" should be "Irvin"

Column 2, lines 21 and following, "position to an aforementioned Rieke U.S. patent Nos. 2,895,654 and 3,250,428." should be --position to an extended pouring position in a manner such as described in the aforementioned Rieke patents 2,895,654 and 3,250,428.--

Column 3, line 44, "base portion portion" should be --base portion--.

Column 4, line 30, "portion 1" should be --portion--.

Signed and sealed this 25th day of April 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents