June 20, 1967 R. G. PEACE 3,326,421

RETRACTABLE PLASTIC BOTTLE SPOUT

Filed Nov. 12, 1965

FIG. 1

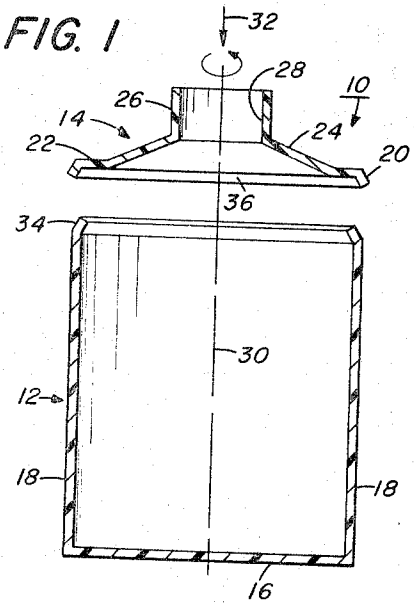


FIG. 2

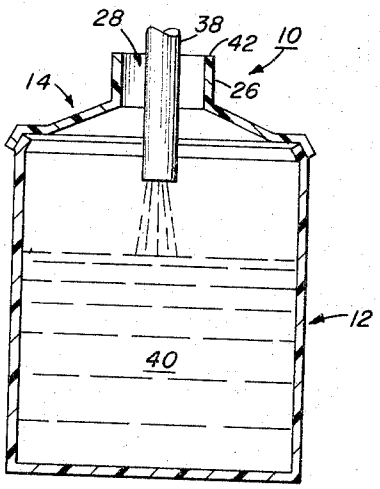


FIG. 3

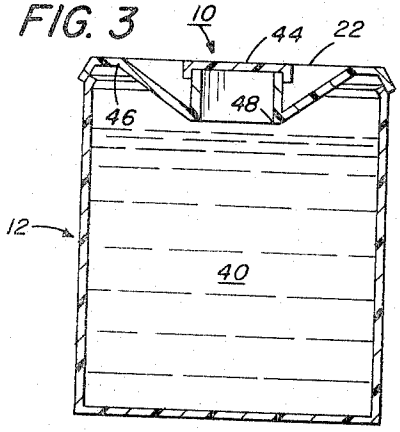


FIG. 4

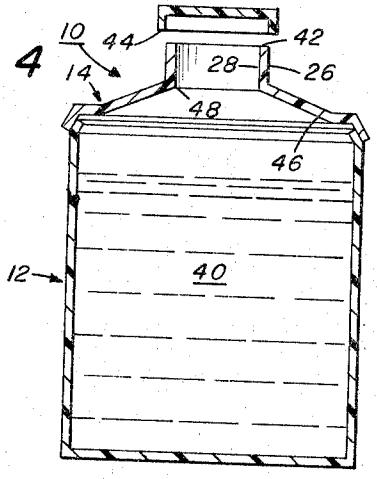
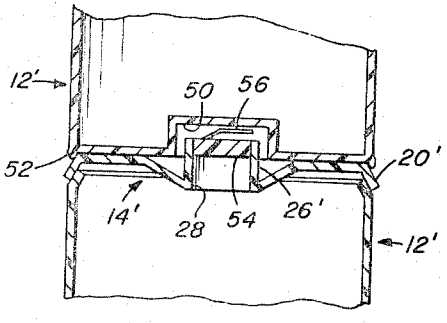


FIG. 5



ROBERT G. PEACE
INVENTOR.

BY R. Frank Smith

Daniel B. Reece III

ATTORNEYS

United States Patent Office 3,326,421
Patented June 20, 1967

3,326,421

RETRACTABLE PLASTIC BOTTLE SPOUT

Robert G. Peace, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y., a corporation of New Jersey

Filed Nov. 12, 1965, Ser. No. 507,495
1 Claim. (Cl. 222—143)

ABSTRACT OF THE DISCLOSURE

An air tight container having one flexible end wall with an open-mouth spout formed therein. The flexibility of the end wall allows the spout to be forced back into the container and held there by a differential in air pressure if the container is evacuated.

This invention relates to a novel container for use in packaging, storing and dispensing both commercial and domestic products. More particularly, this invention relates to an air tight container having a retractable discharge nozzle or spout that is stored in a retracted position until the seal on the container is broken after which the nozzle moves into an extended position thereby permitting the packaged contents to be readily dispensed.

Over the last few years there has been a continuous rise in the total number of packaged products that are being offered for sale in disposable containers. Thus the exact status of the container art has been brought sharply into focus and this has revealed the need for an inexpensive container which can be readily stacked or otherwise handled without danger of being damaged or the contents thereof spilled. The need for such a container is particularly acute in the consumable products field where many of the products shipped are of the perishable type and must not be permitted to spill or be tampered with by unauthorized personnel.

The handling and shipment of fresh milk is one particular area in which much work has been done to perfect a suitable container. In containers of this type it has heretofore been customary to provide the top of the container with an opening in which there is secured an upstanding spout. This spout may be rigid as in the case of a metal or glass "bottle," in which case a cap is used to seal the bottle, or flexible such as the "folded-spouts" now in common use. In any case the spout extends upwardly above the top surface of the sealed container. This upwardly extending spout configuration gives rise to several problems that have until now gone unresolved.

Perhaps the most bothersome problem presented by a spout that extends above the top surface of a sealed container is how can these containers be stacked for storage. Heretofore this problem has been solved through the use of special crates or cartons which are placed around both the container and the extended spout. However, due to the upstanding spout projection, the carton must be somewhat larger than the container and the sealing flaps of the carton are necessarily spaced above the top of the container to accommodate the spout. Since a flat surface is necessary for supporting the sealing flaps of the carton during the pressing operation required for sealing them, it is also customary to provide some additional room at the top of the carton. Such extension of the carton, plus the cost of the main portion of the carton per se, greatly increases the total expense involved in packaging the product to be stored or shipped. Furthermore, the increase in the overall dimensions of the packaged item brought about by its being placed in the carton reduces the number of such items that can be stored within a given area.

Another problem that has been of some concern is how

can a container be made that is easily opened and placed in use. This problem is again of special interest to the milk producing industry since children are often the ones who wish to open milk containers. Another related question is how can a container be made that will clearly indicate when it has been opened thus giving additional protection against spoilage or unauthorized opening and tampering with the contents thereof.

According to this invention it has been found that a container can be produced which will eliminate those problems hereinabove enumerated. The novel container of this invention is provided with a top having a retractable spout built therein which is normally biased so that with no external pressure applied thereto it will remain in an upstanding position. However, as long as the contents of the container are under at least a partial vacuum the spout will be pulled into and below the surface of the top of the container. Once the air pressure differential between the inside and outside of the container is removed the spout will be free to extend above the top of the container and into a position whereby its contents may be readily dispensed.

Therefore an object of this invention is to provide a container having a retractable spout that, when retracted, will permit end-on-end stacking.

Another object of this invention is to provide an air tight container having a retractable spout that is held in a stored and inoperative position until the seal within the container is broken after which the spout will move into a dispensing position.

A further object of this invention is to disclose an evacuated container having a flexible spout that is held in a compressed and inoperative position until the vacuum within the container is released after which the spout will move into an operative position thereby indicating that the container has been opened while at the same time permitting its contents to be readily dispensed.

These and other objects and advantages of this invention will be more apparent upon reference to the following description, appended claims, and drawings wherein:

FIGURE 1 is an exploded sectional view showing the various parts of a container made in accordance with this invention;

FIGURE 2 is a cross sectional view of the container being filled with a product to be stored;

FIGURE 3 is a cross sectional view of the filled container after the spout has been compressed below the surface of the container top and sealed in this position;

FIGURE 4 is a sectional view through the container illustrated in FIGURE 3 after the seal has been broken and the spout extended to permit the contents of the container to be readily dispensed; and

FIGURE 5 is a cross sectional view illustrating how the container of this invention can be modified to facilitate the end-on-end stacking of such containers.

With continued reference to the accompanying figures wherein like reference numerals designate similar parts throughout the various views, and with initial attention directed to FIGURE 1, reference numeral **10** is used to generally designate a container having a retractable spout constructed in accordance with the concepts of the present invention. For simplicity and ease of construction this container **10** is shown as being made in two parts; namely, a base or main section **12** and a top section **14** that contains the retractable spout. The base section **12** is illustrated as consisting of a bottom **16** and parallel walls **18** which form a unitary compartment. The section **12** can be made of any suitable material but is preferably constructed of a plastic since this permits the section to be produced at a relatively low cost and at a rapid rate

through the use of injection, blow or multi-cavity molding.

The top section **14** is also preferably made of the same plastic material as is the main section **12** since this permits ease of manufacture plus imparting to the finished product the required degree of flexibility or resiliency as will be more fully explained hereinafter. This top section **14** is constructed with a turned down lip **20** which fits over the edges of the walls **18** to seal the top section to the lower section **12**. The ring seat **22** which follows the lip **20** is flared or otherwise shaped into frustum section **24** that supports a spout **26** which has an opening or mouth **28** formed therein.

When both the bottom and top sections **12** and **14**, respectively, are made of the same type of plastic material, these two parts can be joined together with a permanent bond by spin or friction welding. This is done by holding one section stationary, as for example, the bottom section **12**, and spinning the other section at a relatively high rate of speed about the longitudinal axis **30** of the container. The two sections are then brought together as indicated by the arrowhead **32** and the friction generated between the moving and non-moving parts causes the plastic to become molten along the contacting areas **34** and **36**. The friction which is generated plus the welding effect causes the part which is rotating to stop almost immediately. For optimum results it is highly desirable to have a slight taper on the two mating faces **34** and **36** which will be pressed into engagement during the spin welding operation. This assures better contact when the sections are friction welded and also that welding will occur over a broad band rather than a line.

After the sections **12** and **14** have been joined together to form the completely enclosed compartment or container **10** shown in FIGURE 2, the container is ready to be filled with the contents that are to be stored. For purposes of illustration a nozzle **38** is shown positioned within the mouth **28** of the spout for filling the container with a liquid **40** such as milk. Once the container **10** is filled to the desired level with the product to be stored, light pressure is applied to the top edge **42** of the spout **26** in a direction along the longitudinal axis of the container to cause the spout to be retracted into the container as shown in FIGURE 3. After the spout **26** is retracted an air tight cap **44** is placed over the mouth **28** of the spout. This cap **44** may be threaded, molded, clamped or otherwise secured about or within the neck of the spout so long as an air tight seal is formed over the mouth **28**.

For purposes of assuring that the flexible top section **14** will buckle or fold in the proper manner when pressure is applied to the top of the spout **26** a plurality of pleats or creases **46** and **48** are formed into the section. These creases **46** and **48** also act to assure that there is a constant resilient pressure exerted on the spout **26** which, in the absence of any counteracting forces, will return the spout to its original extended position. However, since the container is sealed in an air tight manner and may even have a partial vacuum drawn therein, the air pressure differential existing between the inside and outside of the container will prevent the spout being extended until the cap **44** is removed or the seal otherwise broken. Once the container is to be opened and the cap **44** is removed as illustrated in FIGURE 4, the spout **26** will be urged into its extended position as the top section **14** is being returned to its initial shape through the action of the creases **46** and **48**.

As will be apparent the capped spout **26** of the container **10** is even with or below the uppermost edge or seat portion **22** of the top section **14** when the container is in a sealed condition. Thus a plurality of such sealed containers can be readily stacked end-on-end without the use of a special crate and without danger of damaging the containers. However, once the container is opened by removing the cap **44** the spout **26** will automatically extend thereby permitting the contents to be dispensed. Not only is this extending of the spout important from a dispensing position since it prevents any spilling of the contents or the handling of the spout, but it also serves to indicate the air tight conditions of the container. That is, if the sealed container **10** has been cracked or is otherwise not air tight the spout will move to its extended position as the air seeps in thereby giving a visual indication that the container is no longer under vacuum. In those instances where perishable foods are being shipped in the container this indicator feature will be of special value.

Numerous modifications of the present invention are possible including the molding of a recess **50**, as shown in FIGURE 5, into the bottom **16'** of each container **10'** for facilitating stacking of the containers. In such an instance the spout **26'** can be designed to extend slightly above the top of the seated container **10'** when in its fully retracted position so that it interlocks into the recess **50**. The edge **52** of the bottom **16'** can also be flanged down so that it grips the tapered lip **20'** of the top section **14'**. The mouth **28'** of the spout can also be sealed with a stopper-like plug **54** that has an opening or grip tab **56** formed thereon.

Therefore, since this invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof, the present embodiments are to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claim rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claim are intended to be embraced therein.

What is claimed and desired to be secured by the United States Letters Patent is:

An air tight container for receiving a product comprising:

(a) a bottom wall and spaced, parallel side walls, all constructed of plastic material and forming a unitary, open-ended compartment;

(b) said parallel side walls having individually tapered portions at the open-end of said unitary compartment;

(c) a flexible end wall constructed of the same plastic material as said parallel walls and including

a turned down lip portion spin welded to the tapered portions of said side walls,

a frustum shaped section integral with and extending upwardly from said lip,

a spout having an opening formed therein integral with and supported at the upper end of said frustum section, and

creases formed in said flexible end wall causing said spout to be biased above said unitary compartment when no force is applied thereto; and

(d) removable means for sealing said opening in said spout whereby said container can be evacuated and sealed in an air tight manner to create an air pressure differential between the inside and outside of the container which will hold said spout recessed within said unitary compartment until said air pressure differential is equalized whereby a plurality of said containers may be stacked end-on-end.

References Cited

UNITED STATES PATENTS

3,042,271	7/1962	Winstead	222—530 X
3,094,239	6/1963	Baker	220—44
3,154,226	10/1964	Petitto	222—529 X
3,162,327	12/1964	Bennett	222—143
3,199,750	8/1965	Livingstone	222—529

FOREIGN PATENTS

741,427	12/1955	Great Britain.

RAPHAEL M. LUPO, *Primary Examiner.*