United States Patent

Link

[15] **3,690,523**

[45] **Sept. 12, 1972**

[54] CONTAINER FOR FLOWABLE CONTENTS

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[51] **Int. Cl.**.....**B67d 3/00**, B65d 5/10, B65d 5/46

[58] **Field of Search**.....229/52 B, 17 G, 54, 39 R; 222/538

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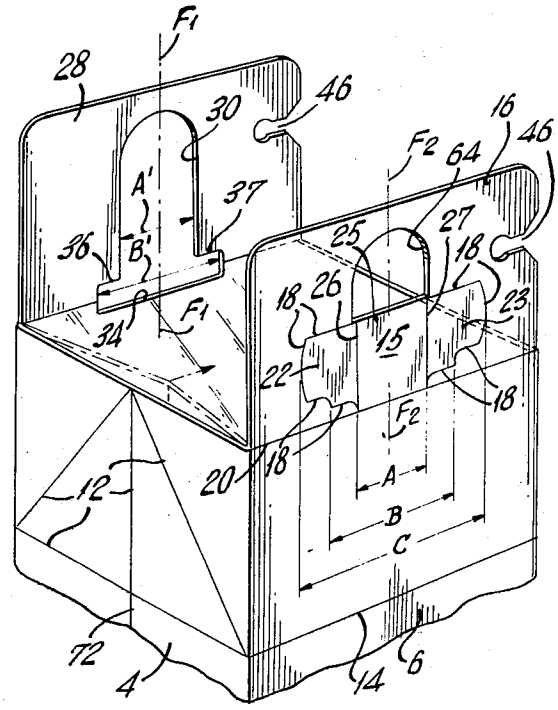
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[57] **ABSTRACT**

A container for transporting and administering flowable contents is provided with a closure comprising two panels and a closure device for positively locking the panels together. The closure device comprises an aperture having a narrow and a wide section in a first panel and an aperture-cooperating tab, hinged to a second panel. The dimensions of the tab are scaled, relative to the dimensions of the aperture, to provide the positive locking feature of this invention. The container is further provided with means for readily observing the contents level therein without the necessity for opening the closure device, these means comprising viewing orifices in one sidewall and light-admitting orifices in an opposing sidewall to provide a satisfactory level-viewing background, these orifices being so oriented on each of the respective sidewalls as to preclude substantial weakening thereof.

7 Claims, 6 Drawing Figures



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SHEET 1 OF 2

Fig. 1.

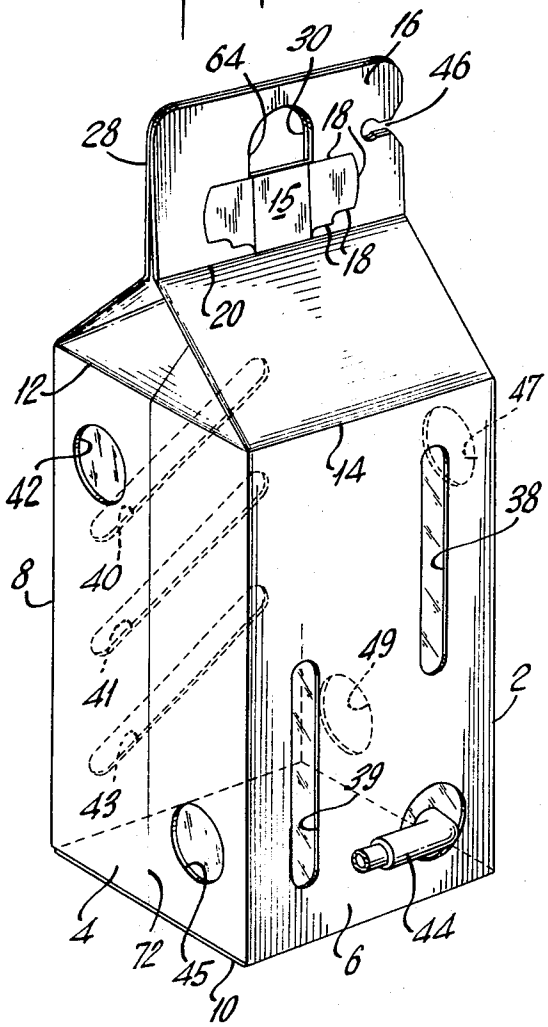


Fig. 2.

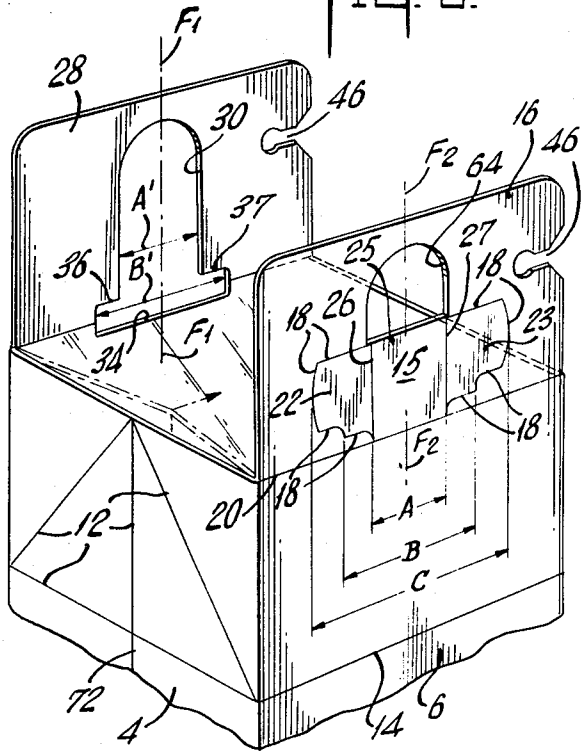


Fig. 3.

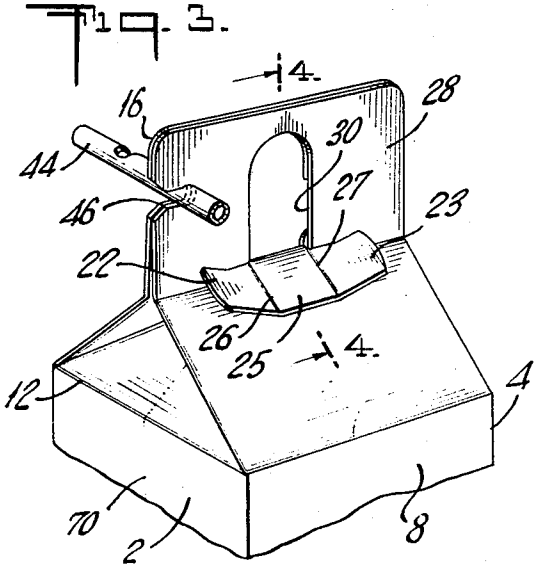
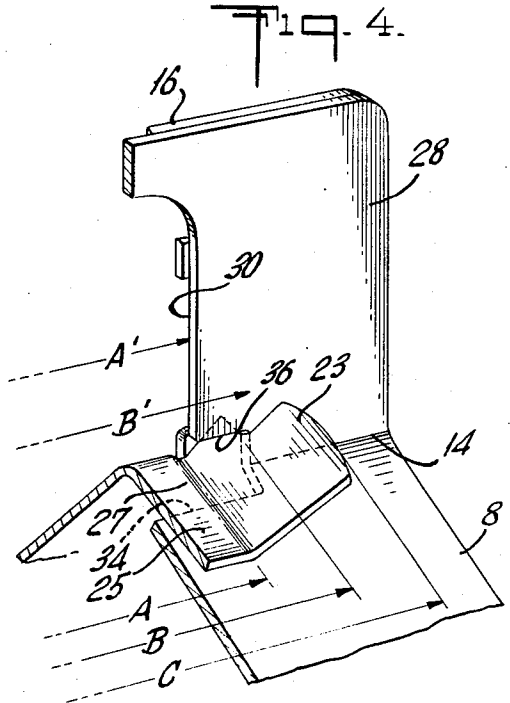


Fig. 4.



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FIG. 5.

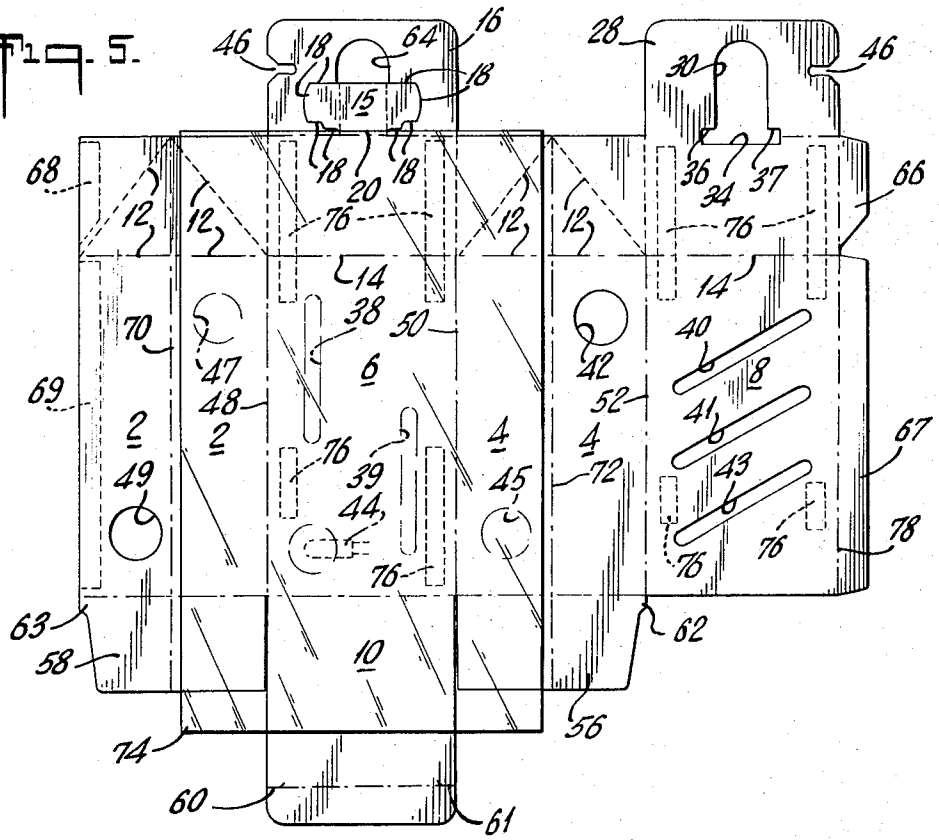
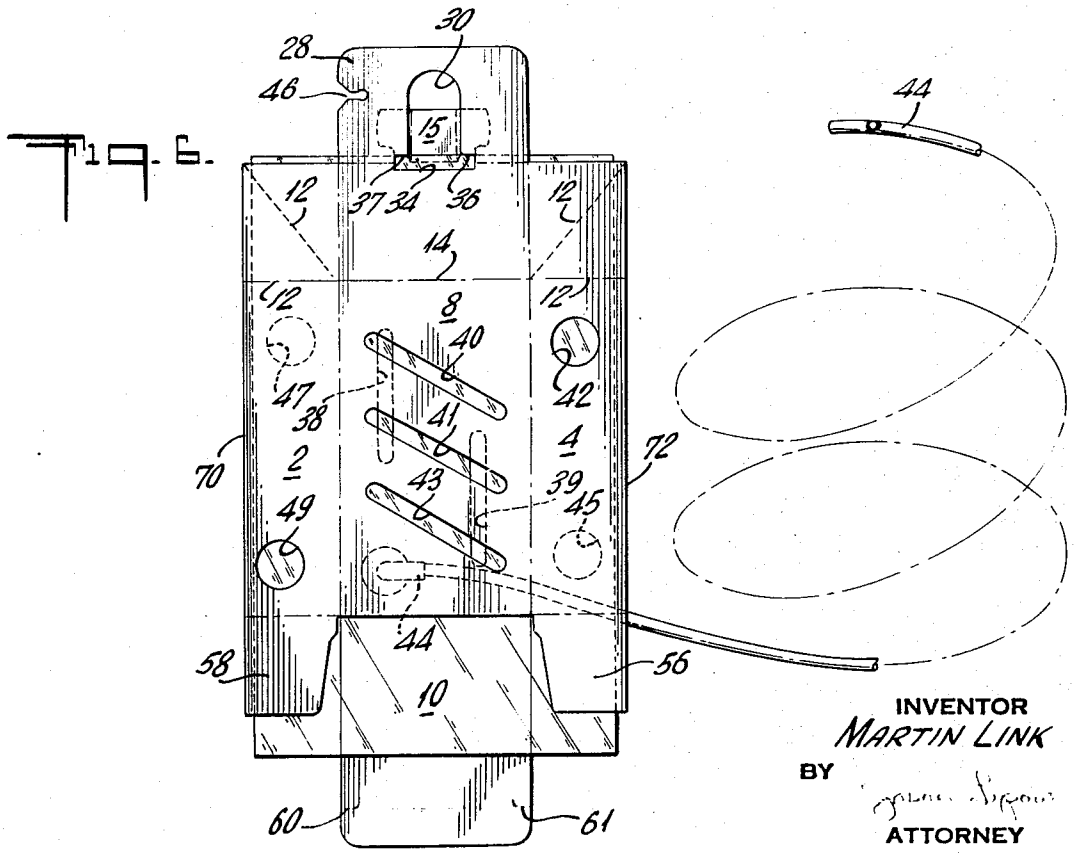


FIG. 6.



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CONTAINER FOR FLOWABLE CONTENTS

BACKGROUND OF THE INVENTION

This invention concerns containers for holding flowable contents and, in particular, containers which can be easily and positively locked and which, when so locked, will enable an observer to readily note the level of the contents therein. The containers are generally useful in transporting flowable contents such as liquids and flowable solids, e.g., particles, powders and the like, to a position for use and then drawing off such contents with, for example, an integral hose, the quantity of the contents removed at any time being observable without having to unlock the container.

In a particular embodiment the container is useful as an enema bag which may be filled, conveniently and positively locked, and then transported, without spillage, to a remote station for use. Fluid may be drawn off as needed by means of an integral hose and valve arrangement, and the level of the remaining liquid may be easily observed.

While the novel features of this invention will be presented herein in terms of a container for transporting liquids and observing the liquid level therein when in use, it will be clear to one skilled in the art that the invention disclosed is not so limited but, rather, that such features as the convenient, positive locking or the easily observable contents level appertaining to this invention may each be widely applied for a multitude of uses.

Several containers are already available with closure devices comprising tabs integral with one panel at the mouth of the container and designed to engage means located on an opposing panel. In the main, however, these tab-like closure devices have suffered from one or more drawbacks. For example, many prior devices, while being readily engageable and in some cases engageable with only one hand, have been deficient in that a positive locking action is not attained, and the package is subject to opening upon unavoidable stresses imposed upon the device as, for example, those stresses incident with the transportation of a filled package. Spillage or contamination of the contents results and is particularly disadvantageous when a carefully measured quantity of liquid is metered into such a container at a metering station and must be delivered to a second, remote station. While attempts have been made to correct this deficiency by providing closures with more positive locking action, these have generally resulted in a closure which is either expensive or difficult to use, often requiring the use of both hands.

A second problem exists where containers are used to carry contents to a station for use and where it is desirable to easily ascertain the amount used or the amount remaining in the container without the inconvenience of opening the same as, for example, in hospital use of enema bags where the filled and closed enema bag is moved to the bedside of a patient, and hung from some elevated fixture, the contents then being administered gradually. It is desirable to ascertain the quantity of fluid administered at any time without the inconvenience of having to detach the container, open the top and view the level of the contents. In addition to the inconvenience entailed thereby, it is difficult to observe a liquid level by viewing the inside of a container from an open mouth, this difficulty being

increased where the liquid is colorless and transparent as, for example, water, and a meniscus must be viewed to ascertain the liquid level.

To obviate this inconvenience, containers have been provided with an elongated window extending substantially along the length of one sidewall through which the level may be viewed. By providing such a window, however, a substantial weakening of the container along a vertical section, collinear with the window, has resulted, and when filling such a container with contents which exert a significant hydraulic pressure, the container disadvantageously tends to buckle along the weakened section.

SUMMARY OF THE INVENTION

In accordance with a first aspect of this invention a container for holding flowable contents, having a closure comprising first and second panels, is provided with a closure device for quickly and positively locking the panels together. The first and second panels may, for example, be opposing sidewalls or flaps extending above these sidewalls which are inclined toward one another at the top of the container to form a closed mouth and then are locked with the closure device of this invention.

The closure device comprises an aperture contained in the first panel and a planer, aperture-cooperating tab, attached to the second panel. The aperture comprises a wide and a narrow section, arranged contiguously along the longitudinal centerline of the aperture, the wide section having a width greater than that of the narrow section when such widths are measured along parallel lines perpendicular to the longitudinal centerline of the aperture.

The aperture-cooperating tab comprises a lateral bottom edge and a longitudinal centerline perpendicular to said bottom edge, the tab being hinged to the second panel along the lateral bottom edge. The tab further comprises first, second and third sections being arranged, respectively, along the longitudinal centerline, from the bottom edge of the tab. The dimensions of these sections are scaled so that the first section has a width that is less than the width of the narrow section of the aperture, the second section has a width that is greater than the width of the narrow section of the aperture but less than the width of the wide section of the aperture, and the third section has a width that is greater than the width of the wide section of the aperture, each of said widths being measured along parallel lines perpendicular to the longitudinal centerline.

The tab also contains two bending scores extending longitudinally across the tab which laterally divide the tab into two extreme portions and one center portion. These bending scores are oriented so that the center portion will have a width less than that of the narrow section of the aperture whereby, when locking the closure device, the two extreme portions may be folded out of the plane of the tab and the tab may be inserted through the narrow section of the aperture, when the plane of the tab is in a position transverse to the plane of the aperture. Once through the aperture, the extreme lateral portions of the tab are unfolded and the tab is impelled into the wide section of the aperture, the tab and the aperture co-engaging at a position on the tab where the second and third sections meet and a

position on the aperture where the narrow and wide sections meet.

Because the third section of the tab is wider than the wide section of the aperture, the tab cannot move out of the aperture in a direction having a vector component perpendicular to the plane of the aperture. Because the second section of the tab is wider than the narrow section of the aperture, the tab cannot move out of the aperture in a direction having a vector component parallel to the plane of the aperture. Accordingly, a positive lock is accomplished.

In another aspect of this invention, a container comprising at least two sidewalls is provided with means for ascertaining a contents level therein without being opened by providing level-viewing orifices in a first sidewall and light-admitting orifices in an opposed sidewall, both sets of orifices being oriented so as to maintain the rigidity of the container.

The viewing orifices are provided as a series of at least two longitudinally extending orifices on the first sidewall, arranged parallel to one another and staggered, with respect to the height of the container, so that the upper orifices can be used for viewing contents levels when the container is relatively full and the lower orifices can be used for viewing contents levels when the container is relatively empty. The viewing orifices are staggered to assure that each vertical section of the sidewall has sufficient material to resist buckling due to the hydraulic pressure of the contents, i.e., if, contrary to the teachings of this invention, only one orifice were provided extending longitudinally along substantially the full length of the sidewall, a major portion of the container material in a vertical section of the sidewall would have to be removed to form the orifice and the container would tend to buckle at this section.

The light-admitting orifices are provided in the opposed sidewall to supply sufficient light for ascertaining the contents level in the container when sighting through the viewing orifices. As in the case of the viewing orifices, the light-admitting orifices are oriented to preclude weakening of the container by providing these in a series of elongated orifices, arranged parallel to one another and diagonally across the face of the opposing sidewall at an elevation sufficient to insure that the uppermost portion of the highest light-admitting orifice corresponds to the uppermost portion of the highest viewing orifice and, similarly, the lowest portion of the lowest light-admitting orifice corresponds with the lowest portion of the lowest viewing orifices whereby light is provided for sighting through each portion of each viewing orifice.

The contents can be prevented from flowing out of the various orifices by several means such as, for example, providing each orifice, in the case of liquid contents, with a transparent, liquid-impermeable "window" which may be secured to the sidewall containing the orifice. Alternatively, the entire container may be lined with a transparent, liquid-impermeable lining or bag for containing liquids, this latter method being particularly advantageous as the container sidewalls then need not be themselves liquid-impermeable but instead could be fabricated from an inexpensive material such as untreated paperboard.

The invention may be more clearly understood by reference to the appended drawings, which are described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a container incorporating the embodiments of this invention and shown in a closed-mouth, unlocked position;

FIG. **2** is an enlarged, perspective view of the upper portion of the container of FIG. **1** shown in an opened-mouth, unlocked position;

FIG. **3** is an enlarged perspective view of the upper portion of the container of FIG. **1** shown in a closed-mouth, locked position;

FIG. **4** is an enlarged, fragmentary, cross-sectional perspective view of the portion of the locked container shown in FIG. **3** and taken along line **4—4**;

FIG. **5** is a plan view of a one-piece blank from which the container of FIG. **1** may be assembled; and

FIG. **6** is a plan view of the one-piece blank of FIG. **5**, shown in a partially assembled, lay-flat position.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

In FIG. **1**, a container embodying the aspects of this invention is shown in an assembled position, with the mouth of the container closed and the closure device in the unlocked position. FIG. **2** illustrates the top of the container of FIG. **1** in an opened-mouth position. Referring to these figures, the container comprises two sets of opposing sidewalls **2**, **4** and **6**, **8** and a floor **10**. Sidewalls **2** and **4** are provided with bending scores **12**, best illustrated in FIG. **2**, so that they may be infolded, to an intermediate position, as shown by the broken lines in FIG. **2**, and a closed position, as shown in FIG. **1**. Sidewalls **6** and **8** are provided with bending scores **14** so that these sidewalls may be inclined toward one another after infolding sidewalls **2** and **4** and thereby closing the mouth of the container.

As viewed in FIG. **2**, sidewall **8** is provided with a flap **28** containing an aperture comprising a wide section **34** and a narrow section **30**, contiguous to one another along the longitudinal centerline of the aperture F1, the width of the wide section being greater than the width of the narrow section when measured along lines perpendicular to the centerline F1, i.e., dimension A′ is less than dimension B′.

Opposing sidewall **6** comprises a flap **16** which extends longitudinally above and coplanar with sidewall **6** and has through-cuts **18** and bending score **20** outlining a planar aperture-cooperating tab **15** which comprises a lateral bottom edge, collinear with bending score **20**, and a longitudinal centerline F2. First, second and third sections are arranged serially, starting, respectively, from the lateral bottom edge of the tab (at bending score **20**), and proceeding along the longitudinal centerline F2, each of these sections having varying widths, as measured along lines parallel to each other and perpendicular to the longitudinal centerline. The width of the first section, shown as dimension A, is narrow enough to fit through the narrowest section of the aperture, i.e., dimension A is less than dimension A′. The width of the second section, dimension B, is narrow enough to be withdrawn through the wide section of the aperture but too wide to be withdrawn through the narrow section, i.e., dimension B is less than dimension B′ but greater than dimension A′. The width of the third section, dimension C, is too wide to be withdrawn from the wide section of the aperture, i.e., dimension C is greater than dimension B′.

Tab 15 is further provided with bending scores 26 and 27 extending transversely across the tab and dividing the tab into three lateral portions: extreme portions 22 and 23 and center portion 25. The bending scores are oriented so that the width of the lateral center portion 25 will be narrow enough to allow the tab to pass through the narrow section of the aperture, when the extreme lateral portions 22 and 23 are folded, along the bending scores, out of the plane of the tab.

FIGS. 3 and 4 illustrate the upper portion of the container of FIGS. 1 and 2 in a locked position. This position may be obtained, starting with the configuration shown in FIG. 2, by infolding sidewalls 2 and 4 and then inclining the upper portion of sidewalls 6 and 8 along their bending scores 20 toward one another to obtain the position illustrated in FIG. 1. The extreme lateral portions 22 and 23 of the tab fold along bending scores 26 and 27 out of the plane of the tab, allowing the tab to fit through the narrow section of the aperture. The extreme lateral portions then unfold and the tab is impelled into the wider portion of the aperture.

As best viewed in FIG. 4, a positive lock is accomplished and the tab cannot be removed from the aperture without first refolding the wings. Because dimension A' is narrower than dimension B, the tab cannot move out of the aperture in a direction having a vector component parallel to the plane of the aperture and because dimension B' is narrower than dimension C, the tab cannot move out of the aperture in a direction having a vector component perpendicular to the plane of the aperture.

In the specific embodiment illustrated in FIGS. 1 through 4, the tab 15 is shown as a portion of the flap 16, outlined by through-cuts 18 and bending score 20 and hence free to rotate out of the plane of the flap. It should be understood by one skilled in the art that the closure device described herein is not limited to this particular configuration of a flap 16 and a tab 15 outlined therein and would be equally effective if, for example, the material of the flap, other than that which makes up the tab, were removed. It is advantageous to retain this flap material, however, in that, firstly, the manufacturing step of removing such material is unnecessary and hence may be eliminated and, secondly, when the container is in a locked position, a handle is formed comprising the two upstanding flaps 28 and 16 by which the container may be conveniently transported or suspended.

As shown in FIGS. 1 through 4, the aperture comprises an elongated, narrow, substantially rectangular section 30 and a short, wide, rectangular section 34 thereby forming shoulders 36 and 37 wherein the tab, in the locked position, will seat. It should be understood that many other aperture configurations will be effective provided that they conform with the criteria set forth above concerning the width of the portions of the aperture relative to the width of portions of the winged tab. For example, a triangular or truncated triangular aperture will have a narrow upper portion and a wider base and can be scaled to conform with the dimensional teachings of this invention. A particular advantage is derived from the configuration shown in FIGS. 1 through 4, however, in that the shoulders formed thereby provide substantial bearing surfaces which resist tearing or otherwise failing when the locked closure is stressed. This is particularly important when a relatively weak material such as paperboard is used to construct the container.

Further, it should be understood that while a specific embodiment of the tab, comprising three sections of varying widths, is illustrated in the drawing, many other configurations are possible and are within the scope of this invention. For example, the second and third sections may collectively consist of a truncated isosceles triangle whose base defines the top edge of the tab and which is contiguous with the first section at its minor parallel edge. The acute angles of the isosceles triangle may be scaled so that the resulting tab will conform to the dimensional criteria set forth above, thereby gaining the advantages of this invention.

Still further is this connection, it should be clearly understood by one skilled in the art that, while the term "longitudinal centerline" is used herein in connection with the description of the tab and the aperture, it is not meant to be implied that either the tab or the aperture need exhibit line symmetry about any centerline, but rather that the term is used to denote a longitudinal direction as distinguished from a lateral direction and provide a reference in connection with the orientation and dimensions of the various components of both the tab and the aperture.

FIG. 1 further illustrates another aspect of this invention. Sidewall 6 is provided with viewing orifices 38 and 39, arranged parallel to the upstanding direction of the sidewall and staggered, with respect to the height of the sidewall so that orifice 38 can be used for viewing the level of contents in the container when the container is relatively full and orifice 39 can be used when the container is relatively empty. By so staggering the heights of the viewing orifices a full range of contents levels may be viewed without the concomitant excessive weakening of the sidewall in any one vertical section. That is to say, in accordance with the teachings of the invention, the staggered viewing orifices permit leaving sufficient sidewall material along a vertical section collinear with each orifice to resist buckling of the sidewall along that section due to the outward pressure exerted by the contents. While only two viewing orifices are shown in FIG. 1, it should be clear to one skilled in the art that such resistance to buckling can be increased to meet the necessities of a particular situation, such as large hydraulic pressure or weak sidewall material, by merely providing a plurality of short, staggered, viewing orifices and thereby increasing the quantity of sidewall material remaining in each vertical section of sidewall collinear with each orifice.

Sidewall 8 is provided with light-admitting orifices 40, 41, and 43 oriented parallel to one another and diagonally across the sidewall. Preferably, the orifices are oriented at substantially the same angle as a line drawn through the top of the uppermost and the lowermost viewing orifices, this orientation providing an advantageous background for viewing the meniscus of a liquid level in the container through the viewing orifices.

FIG. 1 illustrates further aspects of the novel container of this invention. Additional light-admitting orifices 42, 45, 47, and 49 are provided to further aid in viewing a contents level, these further orifices being particularly useful when viewing the meniscus of transparent liquids, such as water. A portion of a hose 44 in-

tegrally connected to the container is illustrated. Further, as best shown in FIG. 3, a hose resting notch **46** is provided in flaps **28** and **16**, for conveniently holding the discharge end of the hose in a position which prevents contaminating the top thereof and will preclude discharging the contents when, for example, the filled container is being transported to a remote station for use.

FIG. **5** illustrates a one-piece blank from which the container of FIG. **1** may be constructed. Bending scores **48**, **50** and **52** define sidewalls **2**, **6**, **4**, and **8**, respectively. Sidewall **6** is extended to provide the floor **10** which can be constructed by infolding floor flaps **56** and **58** and interlocking slits **60** and **61** with shoulders **62** and **63**. Sidewall **6** is provided with cutouts defining viewing orifices **38** and **39** and sidewall **8** is provided with cutouts defining light-admitting orifices **40**, **41**, and **43**. Additional cutouts in sidewalls **2** and **4** define additional light-admitting orifices **42**, **45**, **47**, and **49**, respectively. The upper portions of sidewalls **6** and **8** are provided with bending scores **13** and **14** and the upper portions of sidewalls **2** and **4** are provided with bending scores **12** whereby the mouth of the container may be closed in the manner illustrated in FIGS. **1** and **2**.

Sidewall **6** is extended to provide the flap **16** containing the tab **15** defined by through-cuts **18** and bending score **20**. The flap **16** is also provided with cutout **64** to form a portion of the handle of the package and a notch **46** for resting a hose.

Sidewall **8** is extended to provide the flap **28** containing the tab-receiving aperture having sections **30** and **34** and a notch corresponding to the one in flap **16** for resting a hose.

Sidewall **8** is additionally provided with bending score **78** which defines glue laps **66** and **67**, corresponding to sealing areas **68** and **69** on sidewall **2**.

Bending scores **70** and **72** are provided in sidewalls **2** and **4**, respectively. By folding along these bending scores and then joining the glue laps to sidewall **2** at the sealing areas, the blank is in a lay-flat position, as shown in FIG. **6**, and can be readily set up to form the container shown in FIG. **1**. A transparent, liquid-impermeable bag **74** is provided adhered to sidewalls **6** and **8** at adhesive areas **76**.

While the materials for constructing the container of this invention in no way form part of the invention, it is contemplated that generally the containers will be made of paperboard material, such paperboard types known as cylinder board, solid bleached sulfate, laminated board and a water-resistant sized board being particularly useful. There is no need to protect the paperboard surface from the liquid contents when a water-impermeable lining bag is used. Such a bag may be constructed of polymeric materials such as polyolefins, polyvinyls and laminated materials.

It should be understood by those skilled in the art that, while the invention has been described and illustrated above in connection with certain specific embodiments, many variations and modifications may be employed without departing from the scope of the invention.

What is claimed is:

1. In a container, a closure device for locking together first and second panels;

said first panel having an aperture therein comprising a wide and narrow section, said sections being contiguous to one another along the longitudinal centerline of the aperture and said wide section having a width greater than the width of said narrow section, said widths being measured along parallel lines perpendicular to the longitudinal centerline of the aperture;

said second panel having a planar, aperture-cooperating tab comprising a lateral bottom edge and a longitudinal centerline perpendicular to said bottom edge, said tab being hinged to said second panel along said bottom edge;

said tab further comprising first, second and third sections being arranged respectively along said longitudinal centerline of the tab from the bottom edge of the tab, said first section having a width less than the width of the narrow section of the aperture, said second section having a width greater than the width of the narrow section of the aperture but less than the width of the wide section of the aperture, and said third section having a width greater than the width of the wide section of the aperture, each of said widths being measured along parallel lines perpendicular to the longitudinal centerline of the tab; and

said tab having two bending scores extending longitudinally across said tab and laterally dividing said tab into two extreme portions and one center portion, the bending scores oriented so that the center portion will have a width less than that of the narrow section of the aperture whereby the two extreme portions may be folded out of the plane of the tab, the tab may be inserted through the narrow section of the aperture, the extreme lateral portions of the tab may be unfolded and the tab may be impelled into the wide section of the aperture, thereby attaining a positive lock.

2. The container of claim **1** wherein the narrow and the wide sections of said aperture are substantially rectangular, said sections forming at their junction shoulders for seating said tab when the closure device is locked.

3. The container of claim **1** wherein the container comprises at least two upstanding sidewalls and the first panel comprises a flap extending beyond a first sidewall.

4. The container of claim **3** wherein the second panel comprises a flap extending beyond a second sidewall opposing said first sidewall, said flap provided with through-cuts and a bending score defining respectively said planar, aperture-cooperating tab and the lateral bottom edge of said tab.

5. The container of claim **4** wherein the flaps of each of the first and second panels are provided with hose-resting notches.

6. The container of claim **5** provided with opposing third and fourth upstanding sidewalls, and a floor, said third and fourth sidewalls having bending scores at the upper portions thereof for infolding, and said first and second sidewalls having bending scores at their upper portions so that they may be inclined toward one another after infolding said third and fourth sidewalls, whereby the mouth of the container may be closed.

7. A one-piece blank for assembling a container having first and second panels and provided with means for locking said panels together comprising:

bending scores defining said first and second panels;

said first panel having an aperture therein comprising a wide and narrow section, said sections being contiguous to one another along the longitudinal center line of the aperture and said wide section having a width greater than the width of said narrow section, said widths being measured along parallel lines perpendicular to the longitudinal center line of the aperture;

said second panel having a planar aperture-cooperating tab comprising a lateral bottom edge and a longitudinal center line perpendicular to the bottom edge, said tab being hinged to said second panel along said bottom edge;

said tab further comprising first, second and third sections being arranged, respectively, along said longitudinal center line of the tab from the bottom edge of the tab, said first section having a width less than the width of the narrow section of the aperture, said second section having a width greater than the width of the narrow section of the aperture but less than the width of the wide section of the aperture, said third section having a width greater than the width of the wide section of the aperture, each of said widths being measured along parallel lines perpendicular to the longitudinal center line of the tab; and

said tab having two bending scores extending longitudinally across said tab and laterally dividing said tab into two extreme portions and one center portion, the bending scores oriented so that the center portion will have a width less than that of the narrow section of the aperture.

* * * * *