July 18, 1967 J. E. LAMBERT 3,331,421

LIQUID CONTAINER

Original Filed Jan. 20, 1964

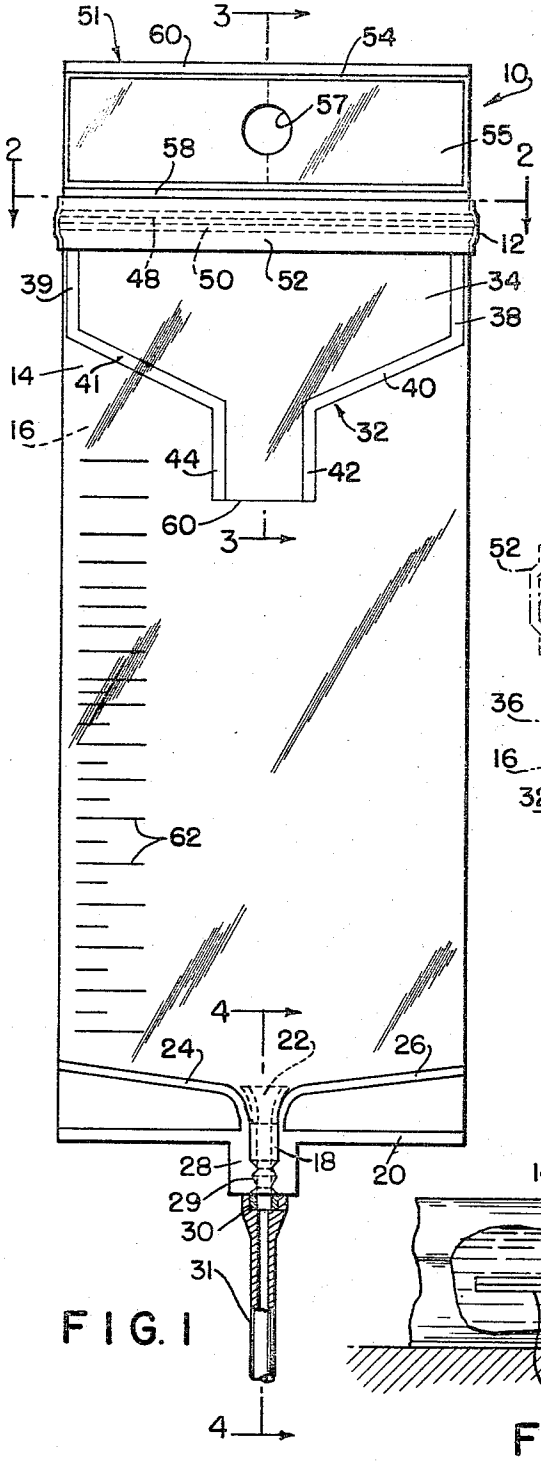


FIG. 1

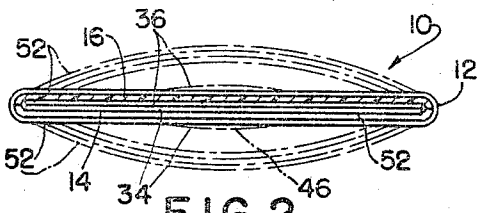


FIG. 2

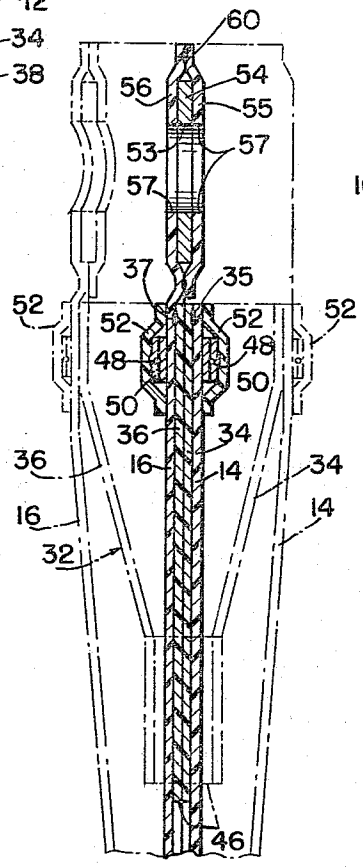


FIG. 3

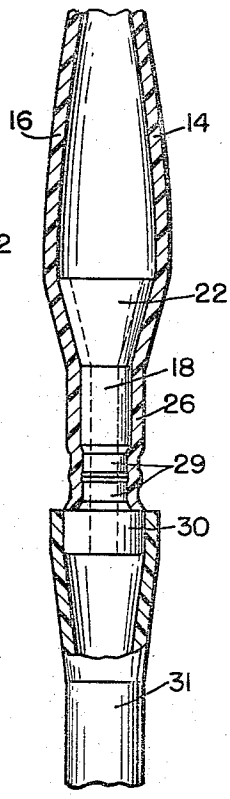


FIG. 4

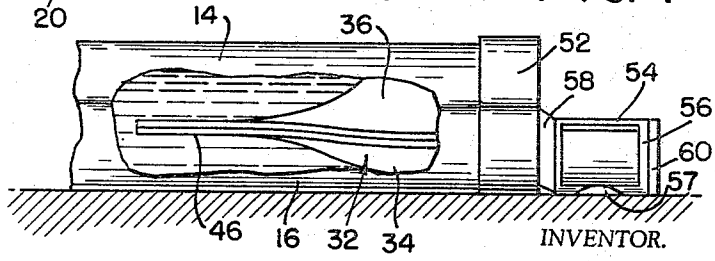


FIG. 5

INVENTOR.
JOSEPH E. LAMBERT
BY
Sutton & Michaelson
ATTORNEYS

United States Patent Office 3,331,421 Patented July 18, 1967

3,331,421

LIQUID CONTAINER

Joseph E. Lambert, Edgewood, R.I., assignor to Davol Rubber Company, Providence, R.I., a corporation of Rhode Island

Continuation of application Ser. No. 338,704, Jan. 20, 1964. This application Feb. 11, 1966, Ser. No. 526,848
1 Claim. (Cl. 150—9)

This is a continuation of application Ser. No. 338,704, filed Jan. 20, 1964, now abandoned.

The present invention relates to a liquid container. More particularly, the present invention relates to a disposable liquid container that includes an outer flexible bag in which the liquid is accumulated and an inner flexible member that is secured to the upper portion of the outer flexible bag and that defines a one-way valve for controlling entry of liquid into the outer bag.

Flexible liquid bags have been known heretofore and have taken various shapes and forms in accordance with the requirements of use therefor. However, one of the problems encountered in the prior known flexible bag constructions was the formation of an inexpensive yet practical liquid inlet. Permanent type liquid receptacles normally included neck constructions in which a stopper, cap or other form of sealing element was secured in any convenient manner. In the prior known flexible liquid receptacles of the disposable type, because of economic reasons, it was not practical to form the mouth of the bag with a sealing device, such as a cap or stopper. Hence, in these prior known disposable bags, the mouth of the bag was formed such that it was normally open and was closable by some form of a tie means or the like after liquid was introduced therein. However, such constructions have been found to be impractical, and furthermore, limit the use of the bag due to the problem of backflow of the liquid contained therein during handling and during the dispensing of the fluid from the bag.

Another problem that has been encountered in the prior known disposable bags has been the lack of a suitable discharge means. Usually, in the disposable bag constructions, the liquid is poured from the mouth thereof, which has been somewhat awakward due to the fact that the bag must be lifted in an inverted position and handled in such a discharge operation. If the bottom of the bag were formed with some sort of a discharge member, a suitable sealing means for the discharge member was heretofore not practical.

The present invention is directed to a unique form of flexible and disposable liquid container that avoids the attendant difficulties experienced with the prior known flexible bag constructions. In order to provide a suitable filling device for the liquid receptacle embodied in the present invention, an inner flexible member is joined to the mouth of the bag that defines the container, the inner member being provided with a lower reduced neck portion that forms a one-way valve. Since the inner flexible member is composed of opposed flexible walls, the portions of these opposed walls that form the valve opening tend to cling in engaging relation and thus act to retain the one-way valve in a normally closed position. When liquid is introduced into the mouth of the container, the opposed walls of the one-way valve are forced open in response to the passage of the liquid therethrough and thereby permit the liquid to be directed into the outer bag for accumulation therein. The valve not only controls the flow of liquid into the bag but also prevents backflow of the liquid through the mouth of the bag.

The lower end of the outer bag of the present invention is also provided with a unique discharge pipe that is sealed therein. A flexible sleeve that is formed as an integral part of the lower end of the outer bag envelopes

a portion of the neck of the discharge pipe and cooperates with a tubular conduit that fits over the end of the discharge pipe to securely seal the discharge end of the bag. The present invention has various forms in the application thereof and may be required to have indicia imprinted on the outer bag that could be calibrated to indicate the amount of liquid in the bag. The bag is also designed to be suspended in a vertical position, and for this purpose a header is secured to the outer bag and extends upwardly above the mouth thereof. The header can be provided with an opening for hanging the bag on a hook or the like, and the header may also include a cardboard member or the like on which instructive and descriptive indicia may be imprinted.

Accordingly, it is an object of the present invention to provide a disposable liquid container that is formed with a liquid controlling element that defines a one-way valve therefor.

Another object of the invention is to provide a liquid receptacle that includes and outer flexible bag for receiving the liquid therein and an inner flexible member that is secured to the outer bag at the mouth thereof, the inner member defining a means for controlling the flow of liquid into the outer bag.

Still another object is to provide a disposable liquid container that is formed with a flexible outer bag of tubular shape and that is sealed at the lower end and is open at the other end to form a mouth, an inner member being secured to the mouth of the bag but being otherwise disconnected from the bag walls and defining a valve member for controlling entry of liquid within the outer flexible container for accumulation therein.

Still another object is to provide a disposable liquid container having an open mouth in which a valve member is secured and that includes stiffening means that are located at the mouth for permitting the mouth to remain in an open position during the filling of the container.

Still another object is to provide a discharge element at the lower end of a liquid container that includes a discharge pipe that is sealed in said lower end.

Still another object is to provide a disposable liquid container that includes a header joined thereto at the upper end thereof, the header providing for hanging the container in vertical position and further providing for the inclusion of identifying and descriptive indicia thereon.

Other objects, features and advantages of the invention will become apparent as the description thereof proceeds when considered in connection with the accompanying illustrative drawings.

In the drawings which illustrate the best mode presently contemplated for carrying out the present invention:

FIG. 1 is an elevational view of the disposable liquid container embodied in the present invention;

FIG. 2 is a sectional view taken along lines 2—2 in FIG. 1 and illustrates the open position of the mouth of the container in dotted lines;

FIG. 3 is a sectional view taken along lines 3—3 in FIG. 1 and also shows the open position of the container in dotted lines;

FIG. 4 is a sectional view of the discharge end of the container taken along lines 4—4 in FIG. 1; and

FIG. 5 is a partial side elevational view with parts broken away, showing the closed position of the valve member that is secured to the mouth of the container when liquid is located in the container.

Referring now to the drawing, the liquid receptacle or container embodied in the present invention is illustrated and is generally indicated at **10**. As shown in FIGS. 1 and 2, the liquid container **10** includes an elongated outer

bag 12 that is formed of a flexible plastic material that is essentially tubular in construction. The tubular construction of the flexible bag 12 defines opposed walls 14 and 16, the wall 14 defining the front of the flexible bag 12, and the wall 16 defining the rear of the bag 12. The material from which the flexible bag 12 is constructed is preferably of inexpensive plastic material, such as polyethylene. However, it is understood that other materials of a flexible nature may be utilized in the present invention without departing from the spirit thereof. One of the features of the present invention is that the container 10 may be used once and then discarded, the relatively inexpensive materials making it feasible to employ the container as a disposable article. Furthermore, the use of plastic materials, such as polyethylene, make available the tubular construction of the flexible bag 12 and further enables the ends thereof to be heat sealed with a minimum of expense and labor.

The lower end of the flexible bag 12 is sealed so as to form a closed bottom for the container 10. However, the lower end or bottom of the bag 12 is also designed to provide for discharge of the liquid within the container and for this purpose is provided with a discharge plug 18. The discharge plug 18 extends through a sealed bottom edge 20 that defines the lowermost edge of the flexible bag 12. The uppermost end of the plug 18 is formed in a funnel-like construction 22, the funnel 22 being sealed between heat seals 24 and 26 that extend in an inclined direction and then in a vertical direction. As seen in FIG. 1, the inclined portions of the seals 24, 26 tend to direct the liquid in the bottom of the bag 12 into the funnel 22. The seals 24 and 26 further cooperate with the seal 20 to form a positive closure for the bottom of the flexible bag 12. Formed as an integral part of the seal 20 and depending therebelow is a sleeve 28 through which the plug 18 extends. Referring to FIG. 4, it will be seen that the lower end of the plug 18 is formed with recesses 29 and an enlarged head 30. The sleeve 28 is heat sealed in intimate relation to the body of the plug and is received within the recesses, thereby insuring that a positive seal is provided between the plug 18 and the sleeve 28 on the bottom of the bag through which the plug 18 extends. As further shown in FIGS. 1 and 4, a flexible tube 31 is squeezed over the enlarged head 30 of the plug 18 and communicates with the interior of the plug for directing the liquid from the interior of the bag 12 to a required discharge point. Any suitable clamping device (not shown) may be secured to the flexible tube 31 for clamping the flexible tube and thereby preventing the discharge of the liquid contained in the flexible bag 12.

Prior to the instant invention, one of the problems encountered with disposable liquid containers was the backflow of the liquid in the container when it was filled to capacity. Heretofore, some form of tying means, stopper or the like was necessary in order to enclose the flexible container, and such additional means for enclosing the upper end of the container not only was impractical to apply but necessarily increased the cost of the container. The present invention incorporates a unique form of closure for the flexible bag 12 that also defines a means for controlling the flow of liquid into the interior of the flexible bag. Referring again to the drawing and particularly to FIG. 1, a flexible inner member is generally indicated at 32 and is shown secured to the upper end of the front and rear walls 14, 16 of the bag 12. The upper end of the front and rear walls 14 and 16 defines the mouth of the bag 12, and secured to the walls 14, 16 respectively at the mouth are a front wall 34 and a rear wall 36 of the flexible inner member 32. The flexible inner member 32 defines a separate bag construction, the walls 34 and 36 thereof being sealed at their edges. As shown in FIG. 1, the extreme side edges of the walls 34 and 36 extend in a generally vertical direction and are heat sealed as indicated at 38 and 39 to form the sides of the inner bag. Joined to the sealed side edges 38, 39 are inclined bottom edges 40, 41 of the walls 34, 36, the inclined sealed edges 40, 41 terminating in vertical seals 42, 44 that define a reduced neck portion therebetween. The lower end of the reduced neck portion is unsealed and defines an opening 46 through which the liquid is directed in the filling operation of the bag 12. It is understood that the uppermost edges of the walls 34, 36 are disconnected from each other and thus define a mouth for the inner bag. It is only these edges that are sealed to the upper edges of the walls 14, 16 respectively. The remaining portions of the inner member or bag 32 are disconnected from the walls 14 and 16 of the outer bag 12, thereby providing for flexibility of movement of the inner member 32. Since the upper edges of the walls 34, 36 of the inner member 32 that define the mouth therefor are heat sealed to the mouth of the bag 12, any fluid that is introduced into the container 10 will necessarily be directed into the inner member 32 downwardly toward the reduced neck portion and through the opening 46 formed thereby.

When a liquid is introduced into the liquid container the mouth of the outer bag 12 and the inner bag member 32 must be open and since the materials from which the bags are formed are of a flexible plastic some means must be provided for fixing the mouths in an open position so as to prevent the collapsing thereof during the filling operation. It is seen that with the mouths fixed in an open position the liquid may be directed between the upper edges of the bag 12 and inner member 32 without the user having to manually hold the upper edges in spaced apart relation. In order to maintain the mouth of the container in a relatively open position, thereby facilitating entry of the liquid within the container, stiffening means in the form of bendable wire elements 48 are secured to the walls 14, 16 adjacent to the container mouth. As shown in FIG. 3, the wire elements 48 embedded in paper strips 50 are secured to the walls 14 and 16 of the flexible bag 10 by any suitable material, such as tapes 52. The tapes 52 extend around the front and rear walls 14, 16 of the flexible bag 12 to secure the paper strips 50 to the mouth of the bag, and since the wire elements 48 may be flexed from one fixed position to another, movement of the walls 14 and 16 from a closed to an open position at the mouth thereof will cause the mouth of the bag 12 to be maintained in an open position for filling. As shown in dotted lines in FIGS. 2 and 3, the mouth of the bag 12 and the mouth of the inner member 32 are fixed in the open position by the bendable wire elements 48. The bendable wire elements 48 are movable to the fixed open position and will remain in this position after pressure is removed therefor since they are formed of a material that does not have spring characteristics. Thus when it is required to move the mouth of the bag and inner member 32 to the closed position, a positive pressure is applied to the wire elements 48 to return them to their closed position.

As discussed hereinabove, the inner member 32 defines a means for introducing liquid into the outer bag 12 and further defines means for sealing the bag 12 from backflow after the liquid has been introduced therein. In effect, the inner member 32 defines a one-way valve construction wherein liquid may be directed through the inner member but is prevented from returning therethrough. By reason of the sealing of the flexible walls 34 and 36 of the inner mmeber or bag 32 at the edges thereof, these walls have a tendency, particularly in the area of the reduced neck section, to engage in collapsed face-to-face relation. This relationship is shown in particular in FIG. 5. When liquid is introduced into the mouth of the bag 12 and flows downwardly through the inner member 32, the weight of the liquid will automatically force the walls 34 and 36 in the area of the reduced neck section to an open position. The liquid then flows into the interior of the bag 10 for accumulation therein. As seen in FIG. 5, when the bag 12 is filled with liquid, the liquid in the area of the reduced neck portion will force the walls of the reduced

neck portion in engaging relation and backflow of liquid therethrough will be prevented. This in effect defines a one-way valve and permits entry of liquid in only one direction, that is, in a downward direction from the mouth of the bag into the interior thereof. The inclined seamed edges **40** and **41** of the interior member **32** facilitate the entry of the liquid into the reduced neck portion and insure that all the liquid introduced into the inner member **32** will flow downwardly through the opening **46** in the reduced neck portion into the interior of the bag **12**.

Under normal circumstances, the container **10** will be suspended in vertical relation so that liquid introduced into the inner member **32** will flow downwardly into the interior of the bag **12**. In order to suspend the container **10** in vertical position, a header generally indicated at **51** in FIG. 1 is provided. The header **51** includes an inner cardboard **54** that is enclosed by a plastic envelope defined by a front wall **55** and a rear wall **56**. The rear wall **56** of the plastic envelope may be a continuation of the rear wall **16** of the bag **12** or a separate sheet. In any event the plastic envelope is formed by sealing the walls **55** and **56** along the bottom edge at **58** and along the top edge at **60**. The cardboard **54** is fixed between the walls and since the walls are formed of a clear plastic, the cardboard is visible therethrough. Any suitbale identifying or instructive indicia may be imprinted on the cardboard; and it is understood that it is not necessary that the cardboard be enclosed within the plastic envelope but may be directly secured by any suitable means, such as adhesive, staples or the like, to the upper edge of the flexible bag **12**. An opening **53** may be formed in the cardboard **54** and similar openings **57** may be formed in the walls **55**, **56** for suspending the container **10** from a hook, support or the like.

As seen in FIG. 1, the opening **53** in the cardboard header **55** defines an area of weakness at the center of the header. Thus when the ends of the header are pressed in a direction toward the front of the container, the header will bend at the center as defined by the area of weakness. Since the walls of the container are joined to the walls **55**, **56**, the bending movement of the header will cause the wire elements **48**, **50** to be flexed to the bent position thereof, which position defines the open position for the mouth of the bag **12**.

As further shown in FIG. 1, the flexible bag **12** may contain calibrations **62** thereon that represent the amount of liquid contained in the bag. The liquid introduced within the flexible bag **12** would then be measurable at a glance since the material from which the bag is formed is of a clear plastic.

In use of the liquid container **10**, the container may be suspended in vertical relation by locating the openings **53**, **57** of the header **51** on a suitable support or hanger. The mouth of the bag and the inner member **32** are then flexed to an open position by pressing or collapsing the header **54**, the wires **48** facilitating the maintaining of the mouth of the bag **12** and the inner member **32** in the open position thereof. Liquid is then introduced into the interior of the inner member **32**, the liquid flowing downwardly toward the reduced neck portion. Flow of the liquid into the reduced neck portion causes the walls defining the inner member **32** to part, and the liquid then flows through the opening **46** and into the interior of the bag **12** for accumulation therein. Backflow of the liquid from the bag **12** is prevented since the opening **46** is maintained in a closed position and prevents liquid flow in a reverse direction therethrough. When it is necessary to discharge the liquid from the container **10**, the clamping means on the tube **31** is reelased, and the liquid flows through the discharge plug **18** and tube **31**.

It is contemplated that the liquid receiving container **10** embodied herein may be used for a variety of purposes, such as an enema bag, a barium administration unit, a bag for feminine hygiene, gastric feeding unit, trans-urethal set-up, intravenous feeding unit, bladder irrigation unit, urinal collection bag, liquid storage bag and other similar devices. As discussed above, the bag may be disposed of after one use thereof, or, if necessary, the bag may be reused as desired.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular forms herein shown and described except insofar as indicated by the scope of the appended claim.

What is claimed is:

In a liquid container, a flexible, elongated outer bag defined by a continuous plastic sleeve having opposed walls that are joined by creased side edges and that is sealed at the lower end, the upper end of said bag being open and defining a mouth, a discharge element located in the sealed lower end of said bag, an inner flexible member located within said outer bag at the open end thereof, said inner flexible member including opposed walls that define a liquid receiving mouth at the upper end thereof and that terminate at the lower portion thereof in a reduced neck section that defines a valve element, the upper portion of the side edges of said inner flexible member being secured to the outer bag adjacent to the side edges thereof so that the mouth of said inner flexible member extends substantially the width of said outer bag and is located within the mouth thereof, a stiffening element mounted on each of the opposed walls of said outer bag and at the upper end of said inner flexible member adjacent to the mouth thereof, said stiffening elements being separable from each other and being bendable from a relatively straight to a fixed bowed position for locating the mouth of said inner flexible member in an open position when a liquid is to be introduced into said outer bag, said individual stiffening elements extending the full width of the mouth of said inner flexible member and extending substantially the width of said outer bag adjacent to the mouth thereof, the reduced neck portion of said flexible inner member defining a one-way valve that is responsive to the introduction of a liquid therein for permitting the liquid to pass between the opposed walls of said inner flexible member into said outer bag for accumulation therein, a header joined to said outer bag and inner flexible member and extending upwardly with respect thereto and beyond the mouths thereof, said header having an opening formed therein intermediate the ends thereof, the portions of said header above and below said opening defining an area of weakness, wherein said header is bendable at the center thereof along the area of weakness to force the side edges of said outer bag and inner flexible member joined thereto toward each other, thereby causing the mouth of said inner flexible member to be moved to the open position thereof.

References Cited

UNITED STATES PATENTS

1,257,628	2/1918	Murphy	229—65
2,697,531	12/1954	Hood	229—62.5
3,189,252	6/1965	Miller	229—62.5

FOREIGN PATENTS

454,327	1/1949	Canada.

FRANKLIN T. GARRETT, *Primary Examiner.*