This invention has to do with a liquid handling dispenser and it is a general object of the invention to provide a simple, practical, effective structure normally serving as a container or storage vessel for liquid and operable to dispense or deliver desired quantities of liquid when required.

The device of the present invention is similar in certain respects to the device which is the subject of my copending application entitled "Sealed Fluid Container," Serial No. 189,241, filed on even date herewith, now Patent No. 2,679,336, and it is a general object of this invention to provide a structure useful in such situations as is the subject of the companion application and which may be employed broadly in the carrying out of the method which is the subject of the companion application.

A general object of this invention is to provide a construction which involves few simple, inexpensive parts that can be manufactured economically, which are easy to assemble, and which handle liquid with a minimum danger of contamination.

The structure as provided by the present invention involves a body in the form of a case, at least one portion of which is flexible and subject to being deflected or collapsed. The body has a neck and in a preferred form may be bottle-like in formation. A liquid carrier is provided in the body and is preferably a device or element made of rubber or the like closed at one end and having a discharge duct at the other end carried in the neck of the body with a portion folded back around the neck. A flow control device is provided on the assembly of the body and carrier and includes, generally, a mounting, a valve mechanism, and a cap carried by the mounting and surrounding the said mechanism.

The valve mechanism is normally closed and is subject to being opened by the application of pressure to liquid in the carrier and the cap is initially provided as a seal of the valve mechanism and has a tip portion that is severable from the base or nozzle portion when the structure is to be made ready for use.

The various objects and features of my invention will be fully understood from the following detailed description of typical preferred forms and applications of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side elevation of a structure embodying the present invention. Fig. 2 is a view illustrating the device or structure in the course of being used, being a view showing the air port of the body closed and a portion of the body flexed or deformed to generate pressure on the carrier within the body. Fig. 3 is an enlarged vertical detailed sectional view of the structure, being a view taken as indicated by line 3—3 on Fig. 1. Fig. 4 is an enlarged detailed sectional view of a part of Fig. 2 showing the manner in which liquid is passed by the valve mechanism and discharged by the nozzle portion of the cap. Fig. 5 is an enlarged detailed sectional view of the supplemental air handling port provided in the body. Fig. 6 is an enlarged detailed sectional view of a portion of the structure shown in Fig. 3, being a view taken as indicated by line 6—6 on Fig. 3. Fig. 7 is a detailed transverse sectional view taken as indicated by line 7—7 on Fig. 6. Fig. 8 is an enlarged transverse sectional view taken as indicated by line 8—8 on Fig. 6. Fig. 9 is a view similar to Fig. 3 showing another form of construction, and Fig. 10 is a view similar to Fig. 4, showing the construction that is illustrated in Fig. 9.

Referring, first, to the form of the invention shown in Figs. 1 to 8, inclusive, the structure of the present invention involves, generally, a body A, a liquid carrier B in the body and a flow control C on the structure formed by the assembled body and carrier.

The body A may, in practice, vary widely in form and construction and may be made to handle various quantities of liquid. In the typical case illustrated the body A is bottle-like in form and has a cylindrical side portion 10, a bottom 11 preferably concave in form, a top 12 and a neck 13 projecting up from the top 12. In accordance with the broader principles of the present invention a portion, if not all, of the body is subject to being flexed or depressed, as by the application of pressure on the exterior of the bottom. In the case illustrated it is contemplated that the side wall 10 of the body be flexible so that this portion of the body can be depressed or flexed as shown in Fig. 2 of the drawings.

In practice it is desirable to form the body as a unit and it may be formed of various materials, for instance, rubber or a rubber-like composition, or it may be formed of a so-called plastic, it being essential only that the body be such as to normally maintain its shape and that a portion at least be subject to flexure so that pressure can be generated on air within the body.

The body A is provided with means for admitting air into the body and in the case illustrated it is shown provided with an air inlet opening or port 20 located in the side wall 10 and in position where it can be closed by a finger or thumb of a hand employed to flex the body.

The port 20 is shown provided with a removable seal 21 which may be a sheet of impervious material and, in practice, may be normally held in place by a pressure adhesive. When the structure is being used the seal 21 is removed and a finger or thumb of the user is employed to close the port when necessary.

An alternate or supplemental air inlet is shown provided in the structure. This air inlet is shown as involving a port 22 normally closed by a valve which freely admits air into the body but checks its exit therefrom. In the case illustrated the air port 22 is shown provided in the bottom 11 of the body and the valve that controls the port 22 is shown as a thin disc 23 of rubber, or the like, at the inner side of the bottom held by a stem 24 that projects through the port with clearance, and which is provided at the outer side of the bottom with a head 25. The valve unit formed by the disc 23, the stem 24 and the head 25 may be formed of rubber, or the like, and the parts proportioned and related so that one or more air passages 26 occurs beneath the head and around the stem to extend through the port 22. It will be apparent that when the pressure at the exterior of the bottom exceeds that within the body air will readily flow out from under the disc 23 and into the body. However, the structure checks the exit of air from the body. The valve controlled port just described may be used in place of the port 20 above described, or the structure can be provided with both ports for selective use, as circumstances require.

The carrier B is a seal-like element with a main portion 30 extending the length of the body, which main portion is closed at its lower end by a wall 31 and has an outlet duct portion 32 at its upper end engaged in or through the neck 13. The duct portion 32 has an ex-
In the form of the invention illustrated in Figs. 9 and 10 the valve mechanism is somewhat different than that first described. In this case the projection in communication at a valve seat 53 and the port 56 extends through the top 41 to the seat. A valve member 52 of the poppet type is normally held in engagement with the seat 53, as by a spring 90, and in the case illustrated the spring is shown under compression between the valve 52 and the end wall 64 in the body 50. From the drawings how this valve mechanism operates to pass liquid out of the carrier each time pressure is applied, as by inward flexure of the body.

Having described only typical preferred forms and applications of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A container including, a deformable unitary case-like body with an air inlet port therein, a flexible liquid carrier in the body and having an outlet duct and adapted when expanded to fully conform to the interior of the body, a mounting carried by the body in fixed position thereon and closing the duct, a projection carried by the mounting and rigid therewith and having an outlet port in communication with the duct, and an expandable sleeve carried by the projection normally stopping flow through the port of the projection.

2. A container including, a deformable unitary case-like body with an air inlet port therein, a flexible liquid carrier in the body and having an outlet duct, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a mounting carried by the body in fixed position thereon and closing the duct, a projection carried by the mounting and rigid therewith and having an outlet port in communication with the duct, an expandable sleeve on the projection normally stopping flow through the port, and a cap rigid with the projection, surrounding the sleeve and having a nozzle opening therein.

3. A container including, a deformable unitary case-like body with an air inlet port therein, a flexible liquid carrier in the body and having an outlet duct, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a mounting carried by the body in fixed position thereon and closing the duct, a projection carried by the mounting and rigid therewith and having an outlet port in communication with the duct, an expandable sleeve on the projection normally stopping flow through the port, and a cap rigid with the projection, surrounding the sleeve and having a nozzle opening therein, the cap having a detachable top portion normally closing the nozzle opening.

4. A container including, a unitary case-like body with an air inlet port therein and having a flexible portion and a neck, a flexible liquid carrier in the body and having an outlet duct in the neck, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a mounting carried by the neck of the body and closing the duct, a projection carried by the mounting and rigid therewith and having an outlet port in communication with the duct, and an expandable sleeve carried by the projection and normally stopping flow through the port.

5. A container including, a unitary body with a flexible portion and having a neck and a valve controlled air inlet opening, a collapsible liquid carrier in the body with an outlet duct carried by the neck and extending to the outer end thereof, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a base carried by the neck and engaging the duct, an elongate element carried by the base and having an outlet port in communication with the duct,
and an expansible sleeve surrounding the said element and normally closing the port thereof.

6. A container including, a unitary body with a flexible portion and having a neck and an air inlet opening, a collapsible liquid carrier in the body with an outlet duct extending through the neck, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a base carried by the neck and closing the duct, an elongate element carried by the base and having an outlet port in communication with the duct and opening at one side of said element, an expansible sleeve surrounding the said element and normally closing the port, and a cap carried by said element and surrounding the said element with clearance where the port opens at the side thereof and having a nozzle opening therein.

7. A container including, a unitary body with a flexible portion and having a neck and an air inlet opening, a collapsible liquid carrier in the body with an outlet duct extending through the neck, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a base carried by the neck and engaging the duct, a valve mechanism supported from the base, and a cap over the valve mechanism including an elongated projection with a reduced portion, there being a port in said projection receiving liquid from the carrier and opening laterally of the projection at said reduced portion, and an expansible sleeve surrounding the reduced portion and normally closing the opening.

8. A container including, a unitary body with a flexible portion and having a neck and an air inlet opening, a collapsible liquid carrier in the body with an outlet duct extending through the neck, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a base carried by the neck and having sealed engagement with the duct, a valve mechanism supported from the base, and a cap over the valve mechanism, said mechanism including an elongated projection with a reduced portion, there being a port in said projection receiving liquid from the carrier and opening laterally of the projection at said reduced portion, and an expansible sleeve surrounding the reduced portion and normally closing the opening, the cap including a tubular housing carried by the projection and fitting over the sleeve with clearance and having a reduced outer end portion with a nozzle opening therein.

9. A container including, a unitary body with a flexible portion and having a neck and an air inlet opening, a collapsible liquid carrier in the body with an outlet duct extending through the neck, the carrier when full of liquid being in engagement with the interior of the body throughout the entire extent thereof, a base carried by the neck and having sealed engagement with the duct, a valve mechanism supported from the base, and a cap over the valve mechanism, said mechanism including an elongated projection with a reduced portion, there being a port in said projection receiving liquid from the carrier and opening laterally of the projection at said reduced portion, and an expansible sleeve surrounding the reduced portion and normally closing the opening, the cap including a tubular housing carried by the projection and fitting over the sleeve with clearance and having a reduced outer end portion with a nozzle opening therein and having a detachable top normally closing the nozzle opening.

References Cited in the file of this patent

UNITED STATES PATENTS

1,230,052 Stevenson ........................ June 12, 1917
1,751,129 Cocks ............................ Mar. 18, 1930
1,854,458 De Quincy et al. ................. Apr. 19, 1932
1,878,833 Ellyson ........................ Sept. 20, 1932
2,014,881 Carlstrom ........................ Sept. 17, 1935
2,032,776 Van Ness ........................ Mar. 3, 1936
2,295,865 Rentschler ....................... Sept. 15, 1942
2,387,593 Mercier ........................ Oct. 23, 1945
2,608,320 Harrison, Jr. ..................... Aug. 26, 1952

FOREIGN PATENTS

109,109 Australia ......................... Nov. 30, 1939