

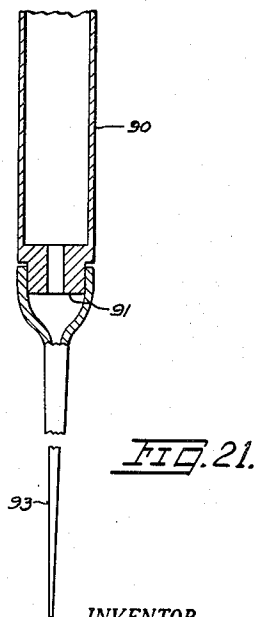
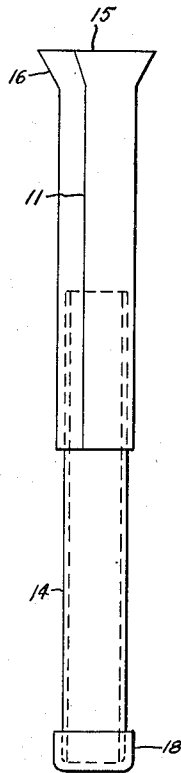
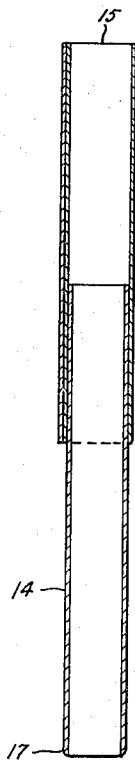
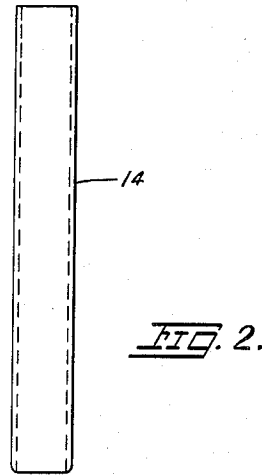
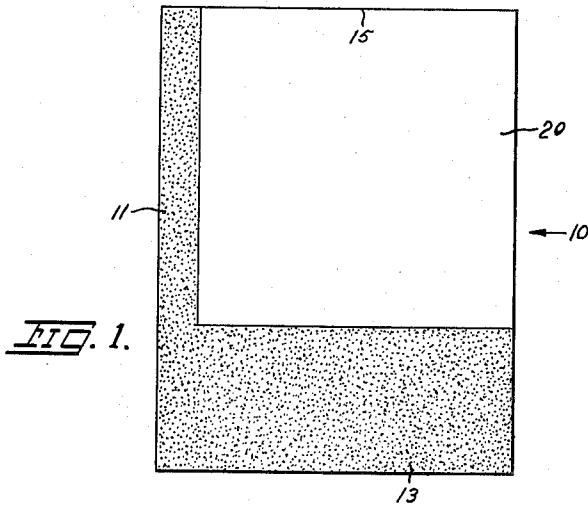
July 21, 1953

S. L. DIACK
COLLAPSIBLE BOTTLE

2,646,044

Filed Nov. 16, 1948

3 Sheets-Sheet 1



INVENTOR.
Samuel L. Diack

BY
Cook and Schermerhorn
ATTORNEYS

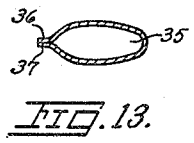
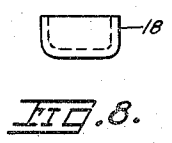
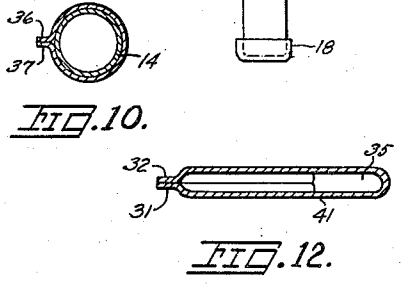
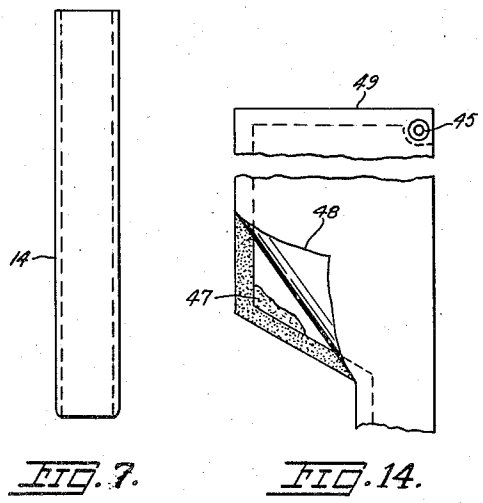
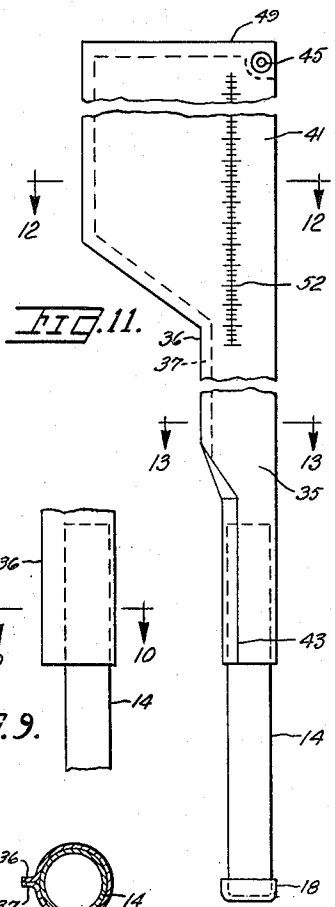
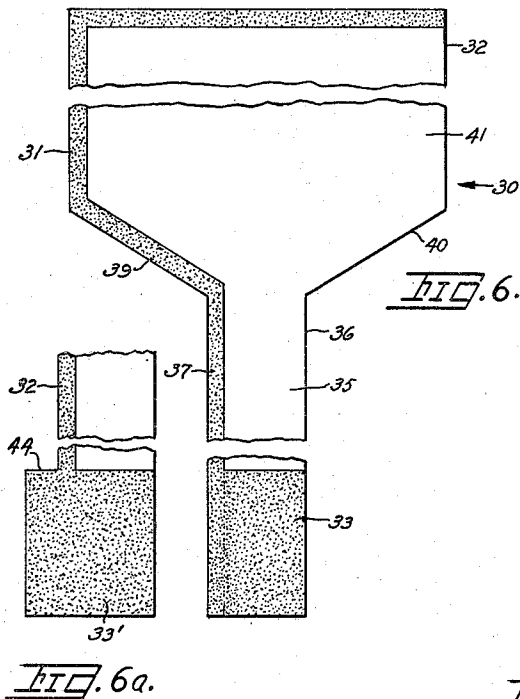
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S. L. DIACK
COLLAPSIBLE BOTTLE

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3 Sheets—Sheet 2



INVENTOR.
Samuel L. Diack
BY
Cook and Schermerhorn
ATTORNEYS

July 21, 1953

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COLLAPSIBLE BOTTLE

2,646,044

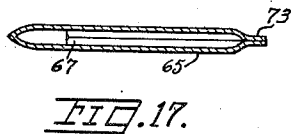
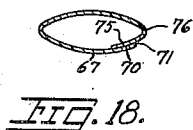
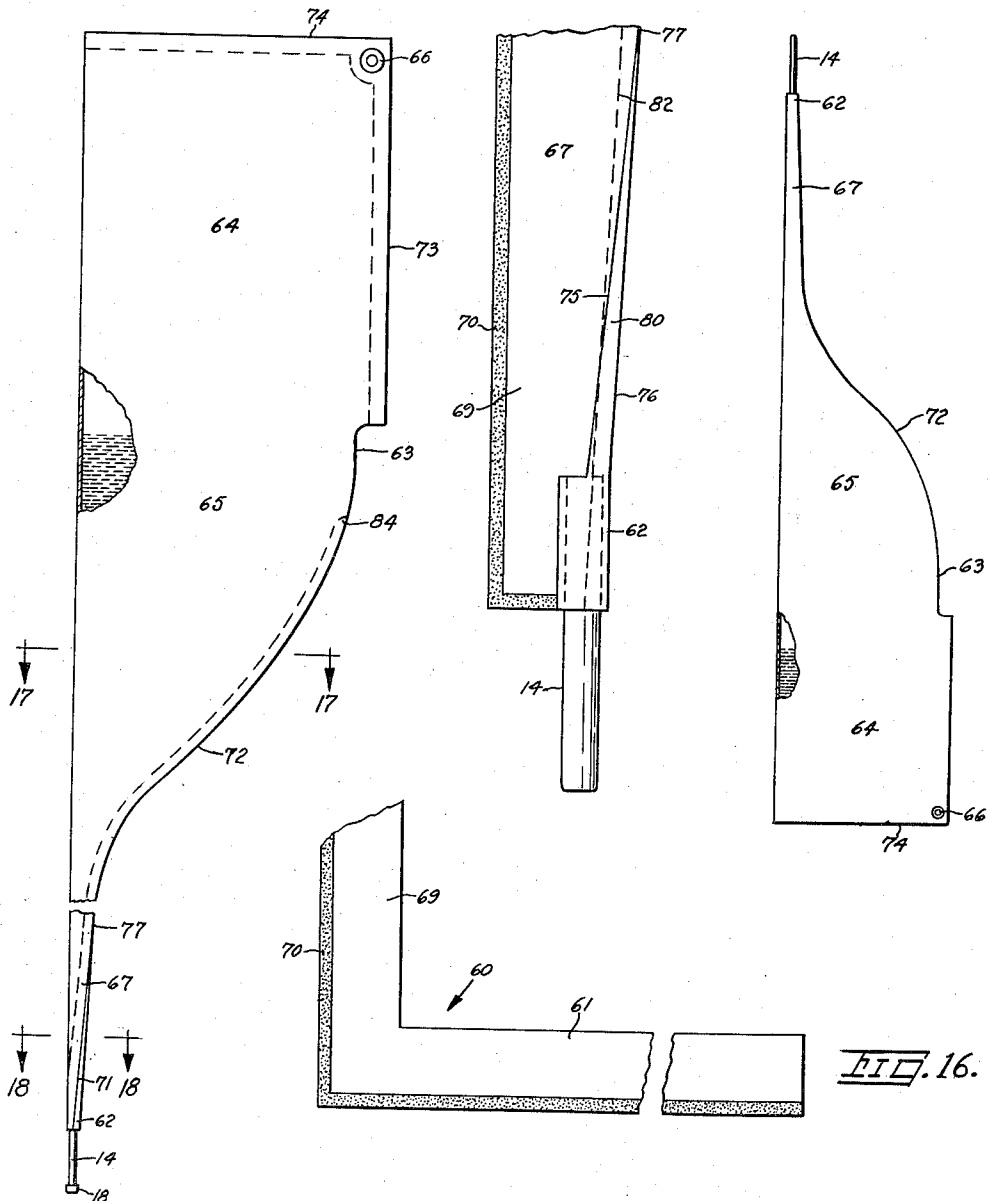
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3 Sheets-Sheet 3

FIG. 15.

FIG. 19.

FIG. 20.



INVENTOR.
Samuel L. Diack
BY *Cook and Schinnerhorn*
ATTORNEYS

UNITED STATES PATENT OFFICE

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COLLAPSIBLE BOTTLE

Samuel L. Diack, Portland, Oreg.

Application November 16, 1948, Serial No. 60,290

1 Claim. (Cl. 128-227)

1

This invention relates to a collapsible bottle of the type suitable for use as a disposable container for the administration of drugs and medicaments and the dispensing of liquids generally. It is particularly adaptable for individual use in the administration of enemas, douches, and other treatments administered through the body orifices. A special feature is the provision of sealing means enabling its use as a container for packaging, sale, and administration of medicaments in individual unitary dosages. It is also useful as a sanitary dispensing container for liquid materials.

Specifically, the present invention is useful, and provides numerous advantages as are hereinafter developed, as a liquid container in the administration of enemata, vaginal douches, nasal irrigation, rectal and nasal administration of drugs, intravenous or subcutaneous administration of drugs (when fitted with needle connection), and as a liquid dispenser. It will accordingly be appreciated that the present invention is designed for uses now served by containers of three general categories as follows: those denominated as douche bags, and hot water bottles; those having a compressible bulb attached to a dispensing nozzle of the type represented by douche syringes and nose and eye droppers; and collapsible tube containers such as used for dentrifices, vaginal jellies, medicaments and the like. However, it is to be understood that the invention is not limited to use in these fields, but, because of its economy of manufacture, flexibility and general adaptability, it may be employed in any art to which its novel features are advantageously applicable.

Collapsible containers, such as the conventional syringes, douche bags, hot water bottles, and the like, are ordinarily made of relatively expensive durable material designed for repeated use. When used in a clinic or hospital, the complete device must be sterilized after each use, entailing a considerable amount of expense in handling of the devices and requiring a large number of such devices to be kept on hand in order to have an adequate supply ready for use at any time. Still another difficulty is that the capacity of sterilizing equipment is usually inadequate for the number of items required to be sterilized. For individual personal use in the home, it is also customary to use a similar, re-usable type of device which, even if not sterilized, must be washed, dried, and stored after each use, occasioning inconvenience in the home and still greater inconvenience while traveling. Lack of sterilization of such devices for home use may also constitute a source of infection.

2

Collapsible containers of the type having a compressible bulb attached to a dispensing nozzle are subject to the objection that there may be a "suck-back" of fluid at the time the expressing pressure on the bulb is released, which is a very ready source of contamination by reason of withdrawal of mucous or alien matter from the vaginal, nasal, or other tract being treated.

Collapsible dispensing containers are usually made of metal having a dispensing throat portion or nozzle portion made integrally with the container portion by molding, soldering, or the like and provided with a screw cap. Metals are frequently in scarce supply and relatively expensive, so that the use of metal is not encouraged nor economical for the manufacture of disposable collapsible bottles or containers designed for a single, or at the most, a relatively few, usages.

Objects of the present invention are to provide a collapsible bottle of inexpensive construction and one which is readily disposable so that it may be used once and then discarded to obviate the problems attending the re-use of such devices. Other objects are to provide a novel type of container which may be made at low cost from paper or other inexpensive sheet material; to provide a collapsible container made from a minimum number of parts and with a minimum number of manufacturing operations. Other objects reside in the novel form of blanks from which the device is made, the provision of a liquid containing bag which may be carried in an inverted position without a stopper, the manner in which the seams are formed, and the method of forming the device.

The above and still further objects and advantages of the invention will become apparent from a study of the following specification, taken in connection with the accompanying drawings, wherein like reference characters designate corresponding parts throughout the several views, and wherein:

Figures 1, 2 and 3 are plan views of the component parts of one of the simplest forms of the invention;

Figure 4 is a longitudinal sectional view of an open container assembled from the blank of Figure 1 and the mandrel of Figure 2;

Figure 5 is a side elevation view of the closed container made from the parts shown in Figures 1, 2, and 3;

Figures 6, 7 and 8 are a blank, mandrel and sealing cap, respectively, for an embodiment of my invention having particular use as a douche bag or syringe;

3

Figure 6a is a variation in the form of blank shown in Figure 6;

Figure 9 is a fragmentary view showing an intermediate state in the assembly of the parts shown in Figures 6 and 7 prior to the completed form shown in Figure 11;

Figure 10 is a section view taken on the line 10—10 of Figure 9;

Figure 11 is a side elevation view of the completed syringe with the parts shown in Figures 6, 7 and 8 assembled and the sealing cap in place;

Figures 12 and 13 are section views taken on the lines 12—12 and 13—13 of Figure 11;

Figure 14 is a fragmentary view of the container of Figure 11 with one edge broken and turned back to show a deposit of a treating material contained therein;

Figure 15 is an elevation view of a modified form of syringe illustrating further features of the invention;

Figure 16 is a fragmentary view of the blank used to form the syringe shown in Figure 15;

Figures 17 and 18 are cross sectional views taken on the lines 17—17 and 18—18, respectively, of Figure 15;

Figure 19 is a fragmentary view showing the nozzle and the elongated tubular portion of the container in a partially completed state;

Figure 20 is a view showing the syringe of Figure 15 in inverted position for filling and carrying; and

Figure 21 shows a modification of a nozzle adapted for use with a dispensing needle.

The invention contemplates, broadly, a collapsible bottle or container comprising a container portion made from a single piece or blank or flat, sheet material and a nozzle or dispensing member made from a tube of rigid or semi-rigid material. The sheet material to be used for the blank for the container portion should be flexible, water-proof, or impervious and resistant to attack by chemical or physical action of the material contemplated to be used in the container. The nozzle may be made of glass, plastic materials, either hard or flexible rubber, or any similar material conventionally used for the making of either rigid or flexible nozzles having sufficient rigidity or wall thickness to resist collapse, for the conduction of liquids.

Different kinds of materials for forming the blank will readily occur to persons skilled in the art, one such material which is particularly suitable for making an inexpensive and easily disposable container being a water-proof paper parchment. The blank of sheet material is cut to a pattern designed to provide the body or container portion of the bottle and a tube portion designed to have one end portion rolled around or folded around one end of the nozzle for sealed attachment thereto. It will thereby be seen that the nozzle serves as a mandrel or support for rolling the blank of sheet material into the final shape and form of the container. In order to seal the edges of the blank of the sheet material to each other and to the nozzle, the blank may be made from a heat sealing material or the edge portions to be sealed may be coated with a suitable water-proof adhesive. In the ordinary course of manufacture, the blank will be a unitary piece cut from a sheet of specified material, but it will be understood that the blank may also be composed of a plurality of pieces sealed together to form a unitary structure. When the bag is to be used as a packaging container, sealing means are provided for the exposed end of the nozzle and

4

all edges of the container portion are prepared for sealing after the material to be packaged has been inserted. Otherwise, the container is left open for introduction of the treating material immediately prior to the treatment.

Referring now to the drawings, Figures 1 to 5 show the making of a cylindrical-shaped collapsible bottle in accordance with the invention. The blank 10 shown in Figure 1 is cut from a flat sheet of flexible material of the nature hereinbefore described and is provided with an adhesive coating along one edge 11, and over the lower end portion 13, which is designed to be rolled around one end of nozzle 14 in smooth surface-to-surface laminated relation, as shown in Figure 4, and secured thereto by adhesive engagement therewith. The adhesive along longitudinal edge 11 secures the edge at the completion of the rolling of the blank upon the nozzle 14. It will thereby be seen that the nozzle 14 constitutes both a dispensing conduit for the container and a support or mandrel upon which the blank is rolled to form the body portion of the collapsible container. The outwardly projecting or exposed portion of the mandrel constitutes in one form of the invention a tip or nozzle for insertion into a body orifice to deliver the treating material and in another form of the invention serves as a dispensing nozzle.

It is to be understood that in the embodiment just described, as well as in all other embodiments yet to be described herein, the adhesive coating shown is not necessary if the blank is formed from a heat sealing material such as "Vinylite," "Pliofilm," or other thermoplastic material, and that in such cases, the shading on the drawing to indicate the adhesive is to be understood to designate merely the areas of the blank which are used to form the necessary seals. Whether or not adhesive need be applied to the portion of the blank designed for engagement with mandrel 14 will depend on whether or not the heat sealing material is compatible with the material from which the mandrel is made, and in case of the use of materials not compatible, an adhesive will still be necessary on this portion, even though the blank itself is a heat sealing material. In any case, the conventional showing of adhesive is adopted primarily to designate the location of the seams or sealed joint surfaces rather than the type of seal or the nature of the sealing material.

It is also possible to use ordinary inexpensive, low strength, water absorbent paper by coating the paper over its entire area with a thin, tough film of suitable water-proof heat sealing material. The paper may then merely form a backing for the film, which in itself provides the necessary wet strength and heat sealing properties. The joints are formed by applying heat to the approximate areas designated while the edges or parts are held in contact with each other.

If the container is to be used as a sealed package, the upper end 15 will also be provided with the self-sealing means specified, or any conventional sealing means may be applied such as a crimping or clamping device, or a stopper may be inserted, or a plug of wax or other sealing material may be formed therein. When the end is sealed by adhesive or hot welding of the material, as is preferred, the upper end 15 will be flattened as indicated at 16 in Figure 5. The exposed end 17 of the nozzle will also be provided with appropriate releasable sealing means as illustrated by friction cap 18. A mechanical clo-

5

sure type of means is preferred such as a friction cap made of either a flexible or elastic material. It may range from metal or plastic to a rubber membrane. Scotch tape or adhesive coated cellophane may also be employed. However, plugs, either of durable material such as cork, rubber, or wood, or of wax may be employed. The closure cap illustrated is dependent entirely upon frictional engagement with the nozzle.

Figures 6 to 14 illustrate a modification of the invention primarily useful as a syringe or water bag. The blank 30 shown in Figure 6 is constructed along the same principles as the blank 10 hereinbefore described, being provided with an adhesive coated edge 31 and an adhesive coated lower end portion 33 for engagement with the mandrel 14 shown in Figure 7, but it differs principally in the provision of an elongated tube forming portion 35 which is designed to provide the tubular portion of the syringe for connecting the main container body with the nozzle. The mandrel 14 is the same member as provided for the embodiment in Figures 1 to 5 and functions in the same manner.

The adhesive coated lower end 33 of the elongated portion 35 is folded around the end of the mandrel 14 in smooth surface-to-surface contact therewith rather than rolled in the manner hereinbefore described for Figure 5, and thereby results in the formation of a flange-like joint, radially extending from the mandrel 14, as will more fully appear from inspection of Figures 9 and 10. The plain edge 36 and the adhesive edge 37 of the connecting tubular portion 35 are likewise brought together and sealed, the cross section of such joint being illustrated in Figure 13. When the edges 36 and 37 are thus brought together, the inclined edges 39 and 40 are also folded over upon each other and the vertical edge 32 is folded over even with the adhesive coated edge 31. When the edges are thus all united with the respective mating edge, the container is substantially completed having a main body portion 41, a flexible elongated tube portion 35, and a nozzle member 14, as illustrated in Figure 11. In order to eliminate the knife-like flange edge portion which extends radially from the mandrel 14, as shown in Figures 9 and 10, additional adhesive may be applied to one of the outer sides of said flange, and the flange turned over on itself and pressed tight to conform to the contour of the mandrel 14, as shown at 43 in Figure 11. An alternative method of obtaining the same objective is to form the adhesive covered portion 33 of the blank 30 with a lateral extension 44 as shown in Figure 6a, wherein the adhesive coated lower portion is designated 33'. The extension 44 then serves to bind the radially extending flange to the contour of the mandrel 14 in the same manner as indicated at 43 in Figure 11. A grommet 45 may be installed in one corner with a waterproof seal to provide means for attaching the bag to a supporting hook when in use. As it will appear from Figures 11 and 12, the side walls are shown in somewhat flattened condition as they may be left for packing and shipment, but it is obvious that when the bag and tube portion are filled with liquid, the sides will round out under the liquid pressure to provide the necessary capacity.

In a preferred application of this embodiment of the invention, a measured quantity, such as a unit dosage, of treating material 47, such as a salt or other medicament is placed in the bag, as indicated in Figure 14 where a portion of the bag surface is torn open along the line 48 to show

6

the deposit of treating material, and the top of the bag is sealed at 49. A releasable cap 18 shown in Figure 8 is placed on the exposed end of the nozzle 14, and there is then available for sale, distribution, and instant use a disposable sanitary package containing an accurately measured proper dosage for any particular specified treatment. To use the package, a rupture is made in the container portion 41 around its upper end, as by tearing, and a prescribed measured quantity of water is admitted and mixed with the treating material, as by gently shaking the package. The cap 18 is removed and the syringe is ready for use. The advantages of such a prepared package will be readily apparent. It can be folded, packed, carried, occupying a minimum of space. The user knows that the correct dosage is included, and it requires no separate container for treating material, and no equipment for measuring out the material. The user is assured of absolutely sanitary and sterile equipment, and there is no problem of cleaning, drying, sterilizing and storage after use.

A further aid to use of the bag may be provided in the form of graduation marks on the outside of the bag as indicated at 52 to thereby constitute a measuring guide for the amount of water or other solvent to be added. When thus provided, the user is spared any need of a measuring utensil for the water to be added, and the bag then constitutes a completely self-contained apparatus except for the solvent supply.

It will be apparent to those skilled in the art that many modifications may be made in the uses to which the bag may be adapted. For instance, the bag may be completely filled with a treating fluid, sealed and sold as a unitary package. Various treating materials may be used in the bag designed to be admixed with water. They may range from solids to liquids in concentrated form and from soluble solids to solid matter which is not intended to dissolve in the solvent, but to form a suspension with the liquid to be added. The original treating material may be supplied in quantities larger than the amount required for one dose, for instance, two, three, or more doses, in which case the unit dosage is controlled by metering, by means of the graduation marks, the amount of fluid discharged. This latter practice is not preferred for treatments made through a body orifice, because the advantages of use of a sterile container are thereby lost unless great care is taken in the cleaning of the nozzle portion 14. However, the use of the bag, or of any of the containers described herein, as a container for multiple dosages or portions, to be metered out in unit amounts by means of the graduation scale, or even by discharging into a measuring cup, is particularly advantageous as a sanitary, sterile, sealed container. Being collapsible, no vent to the air is needed and the contents of the container can be dispensed in desired amounts without admitting air to the interior. It is thereby seen that the invention has a particular use as a dispensing container for fluid materials subject to spoilage or oxidation on contact with the air.

If the edges 36 and 37 were united by a lap joint, as used in Figure 5, instead of a flange joint, the making of a sealed contact between the elongated portion 35 and the nozzle 14 is greatly simplified, but then the transition between the elongated portion 35 and main body portion 41 of the container is more difficult to make leak-tight. Various other lapping and sealing arrangements may be devised to make the necessary

joints and transitions as will occur to persons skilled in the art in the light of the present disclosure. Another form of construction of the joints is shown in the embodiment illustrated in Figures 15 through 20, to be presently described. In this embodiment, the collapsible portion of the container bag is made from a blank 60 of sheet material of a general shape as shown in part in Figure 16, with the bag appearing in final form as shown in Figures 15 and 20. A laterally extending portion 61 of the blank is rolled on the mandrel to build up a thickened shoulder or shank portion 62 comprising a plurality of convolutions, illustrated in Figure 19. The opposite edges of the blank 60 above the shoulder portion 62 are folded over and united in a manner hereinafter more fully described to form a water bag or other container of the desired shape.

The thickened shoulder or shank portion 62 serves to provide as a special feature of the invention a shield or limiting means for the extent to which the nozzle may be introduced into the body orifice.

A second special feature of the invention of special applicability to its use as a water bag or syringe is also illustrated in this embodiment, reference being made to the provision of a filler opening 63 appearing substantially intermediate the extreme ends of the bag on the right-hand edge of the illustration in Figures 15 and 20. The opening is formed by suitably notching the blank prior to folding of the same into final container shape. Its location is preferably arranged so as to provide an equal volume capacity on either side of the notched opening. There is thus provided an upper part 64 and a lower part 65 of the main container body. The syringe, with the filler opening thus provided, is filled by inverting it, as shown in Figure 20, and pouring in water to substantially fill the normally upper part 64 of the bag. The extended seal around the eyelet 66 prevents leakage at this point while the bag is inverted. This form of construction makes it easy to carry a number of filled syringes, without loss of their contents, by merely grasping the elongated tubular portions 67 of all the syringes together in one hand. In this position, the syringes may be subjected to considerable jostling without loss of water through the filler openings. When the syringe is to be used, it is merely tipped or rotated in a counterclockwise direction from the position shown in Figure 20 to cause the water in the part 64 to run down into tube 67 and fill the water bag portion 65 to the approximate level shown in Figure 15, whereupon it may be hung by the eyelet 66 upon a hook provided for the purpose.

It will be understood, however, that the filler opening is an optional feature and that the container illustrated in Figures 15 to 20 may be made without this opening; likewise, that bags may be made with any combination of the various features shown in any of the different embodiments.

Returning to the construction of the bag with reference to the formation of the seams, it will be apparent that after the laterally extending portion 61 of the blank 60 has been formed into the shoulder portion 62 on mandrel 14, the lower end of the elongated tube portion 67 of the blank will be formed concurrently from the portion 69 of the blank 60. Thus, when the rolling of the shoulder portion 61 is completed, the adhesive coated area 70 on the inside surface of the outer edge of the blank portion 69 will roll over on top of the outer surface at the edge 71 to

form a simple lap joint to establish an integral water-tight connection between the lower end of the tubular portion 67 and the shoulder 62. The lap joint, however, is an unsatisfactory form of joint to follow the reverse curves of the bag portion along the contour 72, because the material of the blank cannot be readily folded on a curve. Whereas the lap joint is formed on the shoulder 62 on a cylindrical surface without any folding of the paper, it is preferred to form the other sealed joints on a flat supporting surface with one side of the blank folded over to lie flat on the other side in the manner described in connection with the embodiment described in Figures 6 to 14, thereby making it desirable to change to a different type of joint above the shoulder.

The type of joint employed along the vertical edge 73 above the filler opening 63, and the top edge 74, and also along the reversely curved edge 72, is, therefore, designated a flap or flange joint, illustrated in Figure 17, to distinguish from the lap joint in the tubular portion 67 near the nozzle as illustrated in Figure 18. The term flange joint is employed to describe the form of joint shown in Figure 17 because when the sides of the bag are filled out with liquid the edge portions of the two sides of the blank extend in the same direction and are disposed to stand out like a flange in substantially perpendicular relation to the adjacent surface of the container, while in a lap joint, as shown in Figure 18, the opposite edge portions of the blank are oppositely directed and lie in the contour of the container walls as viewed in cross section. It will be apparent that the lap joint shown in Figure 18 is most suitable on a cylindrical shape, and that the flange joint shown in Figure 17 is most suitable to follow a curved edge when the bag is to be pressed flat.

Thus, in the sealing operation there must be some kind of a transition between the lap joint on the cylindrical surface of the nozzle shank 62 at the lower end of the tubular portion 67 and the flange joint in the upper part of this tube and along the curved edge 72. If the sealing operation requires a continuous solid backing for pressing the parts together to form the joints, a suitably shaped mandrel may be inserted from the upper end.

Figure 19 shows one form of transition from the lap joint on the nozzle shank 62 to the flange joint on the upper part of the tubular portion 67. When the nozzle shank has been rolled to the point shown in Figure 19, the under edge 75 of the portion 69 of the blank is folded over and a crease 76 is formed extending from the shank 62 and terminating at a point 77 some distance from the nozzle. The crease, of course, cannot be pressed flat at the shoulder, but begins with a circular shape at the shoulder and gradually changes to an oval shape in cross section and a decreasing thickness. If a flattened mandrel is used, the crease 76 would disappear at the upper end of the mandrel. Thus, when the adhesive coated edge 70 is rolled up on the shank 62, it forms a lap joint on the shank and also on the lower end of the tube 67 in those portions having oval cross sections. However, where the tube 67 is pressed flat, the sealing area 70 on the inside surface adjacent the edge 75 will attach itself both to the outer surface 80 of the fold formed by the crease 76 and to a portion 82 of the inside surface which is exposed beyond the edge 75. The width of the sealing area on the outer surface 80 will thereby gradually di-

minish and become zero at the point 77, while the width of the sealing area on the inside surface 82 will gradually increase up to the point 77, whereby the sealing area 70 will be caused to unite with both surfaces 80 and 82 in the transition. Between the point 77 and the upper end of the seal at 84 a simple flange joint will be formed as shown in Figure 17. In this way, the elongated tube 67 may have a gradual taper, but it preferably will not enlarge appreciably between the nozzle and the point 77. Above the point 77 the curve 72 may be cut to any shape desired for convenience in handling the necessary quantity of water.

The embodiment of Figure 15 provides a disposable syringe bag which is inexpensive to manufacture and which may be compactly folded in a flat package. The upper part 64 of the bag provides a convenient measuring and carrying container for the water while the bag is in inverted position and before it is turned upright for use. A number of the filled bags may easily be carried by their tubes 67 without spilling the contents and without requiring stoppers in the filler openings or pinching devices on the nozzle tubes. After use, the whole device may be disposed of, thereby relieving hospital and clinic facilities of a considerable amount of washing and sterilizing.

Various modifications may be made in the mandrel forming the nozzle for use with any of the container embodiments of the invention. It will be understood, of course, that the nozzle may be of any size or shape appropriate for the body orifice into which it is to be inserted. While the nozzle is generally referred to as rigid and being made of rigid material, such term is used in a relative sense compared to the greater flexibility of the sheet material from which the bag or container portion is made. The nozzle may be made of flexible material such as rubber. All that is necessary is that it have sufficient rigidity to constitute a mandrel for rolling thereon the flexible sheet material and that it maintain its directional shape during insertion into the body orifices. A modification of the nozzle is shown in Figure 21 where the nozzle 90 is provided with a shoulder tip 91 of the type conventionally used for fitting with hypodermic or injection needles. Such a nozzle is necessary, of course, where the container is to be used for the giving of intravenous and subcutaneous injections. The shoulder tip 91 would be sealed with a suitable cap or other closure during storage or shipping, which is removable for attachment of the injection needle 93. Incidentally, the container is particularly adapted and advantageous for such use. It is a big problem in the giving of intravenous injections to maintain the fluid container and the connecting tube in an absolutely sterile condition. The slightest impurities in the treating material cause great pain and impairment of health to the patient to be treated. The present inven-

tion will, therefore, constitute a boon for the giving of such treatment, because it will eliminate the concern heretofore necessary over sterilizing the equipment after each use.

It is to be understood that the drawings herein are for the purpose of illustrating the invention, but the invention is not limited to the embodiments disclosed. It is also to be understood that the various novel features disclosed in connection with the different embodiments described herein are not limited to use with the embodiment in which they are disclosed, but may be used singly, or in any combination. It is believed that the many advantages of a collapsible bottle constructed in accordance with the present invention will be readily understood. The language and expressions which have been employed throughout the specification are used as terms of description only and not of limitation, and said terms are intended to include all the equivalents and such modifications as will occur to those skilled in the art. The term "rigid" as used in the claim for defining the dispensing nozzle is to be construed in a relative sense, having the meaning ascribed thereto in the specification.

What is claimed is:

A disposable, collapsible bottle suitable for administering liquids for hygienic irrigational purposes, said bottle comprising a unitary blank of flexible, water-impervious sheet material having a wide, generally rectangular portion at one end, a narrow elongated portion at the other end and a trapezoidal-shaped portion intermediate the wide and narrow portions, said blank being symmetrical with respect to its longitudinal medial line and folded about said medial line with opposite longitudinal edges of the blank sealed in superposed edge-to-edge relation, whereby said folded blank defines a bottle having a reservoir for a liquid, said reservoir having a sloping bottom communicating with a delivery tube, the delivery tube terminating in a liquid-discharge outlet, the lower portion of said delivery tube having an adhesive therein and a rigid tubular dispensing tip sealed within the tube by said adhesive and projecting from the discharge outlet of the delivery tube.

SAMUEL L. DIACK.

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