Sept. 25, 1951 W. FRIEDMAN 2,568,915

DISPOSABLE SYRINGE

Filed April 19, 1949

Fig. 1

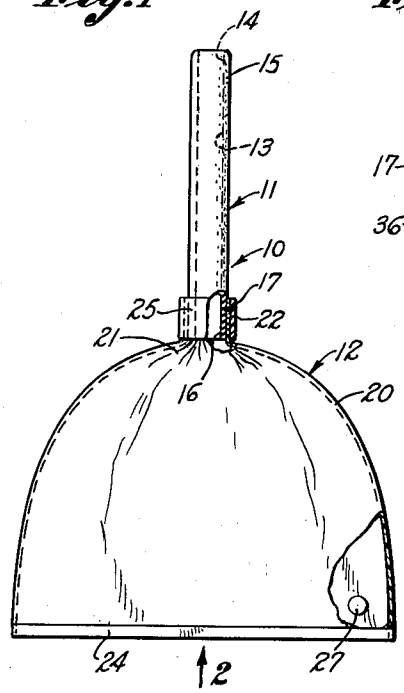


Fig. 9

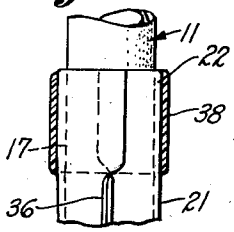


Fig. 7

Fig. 2

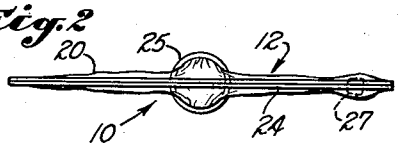


Fig. 8

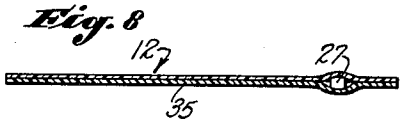


Fig. 5

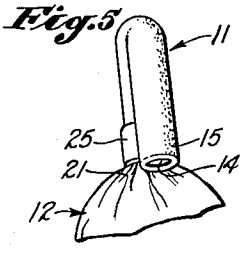


Fig. 6

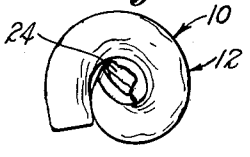


Fig. 3

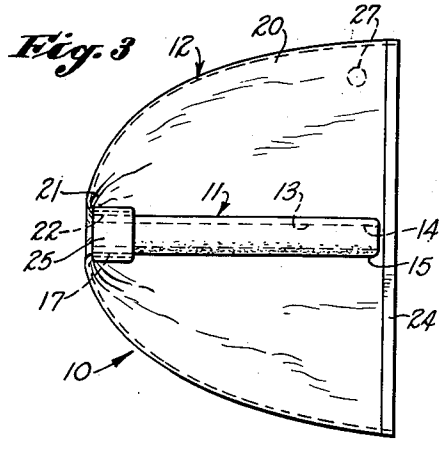
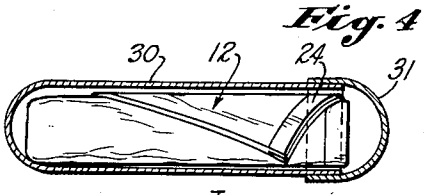


Fig. 4



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DISPOSABLE SYRINGE

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7 Claims. (Cl. 128—251)

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My invention relates to a single-use vaginal syringe marketable in extremely compact form and in conveniently usable, sanitary condition.

Heretofore, all vaginal syringes have been inherently bulky and in price range some of them so costly as to require a multitude of uses to attract the prospective purchasers of same. The medical profession recognizes the dangers of such re-use without careful sterilization and recommends boiling of the unit between uses. In practice, however, this is not done by the average user because of inconvenience, lack of immediately available sterilizing equipment, etc., resulting in many instances in seriously inflamed or infected vaginal conditions. Even if sterilized between uses, it is difficult to maintain the conventional vaginal syringe in sterile or sanitary state in the absence of similarly sanitary containers therefor. The bulkiness thereof often precludes their being packed in limited-space baggage and invariably precludes their being carried in handbags for ready and prompt use when desired. From any standpoint of convenience, prior syringes leave much to be desired.

It is an object of the present invention to overcome all these disadvantages and shortcomings of prior structures. Specifically, the invention comprises and claims the following arrangements and devices of the above-mentioned nature:

(A) A single-use, throw-away vaginal syringe insuring sanitation in use and manufacturable at such low cost that it can be used and discarded without prohibitive cost.

(B) A single-use vaginal syringe including an internally passaged neck and a permanently attached sack formed of such thin, flexible, yet substantially nonstretchable material as to have no natural distended form and which can be filled and emptied solely through the open passage of the neck, being emptied by manual pressure applied exteriorly to jet a stream of the contained liquid high into the vaginal tract.

(C) A device of this type in which the sack provides a hinge portion so flexible that the sack can be swung to any position relative to the axis of the neck while still not blocking flow of the liquid from the interior of the sack into and through the passaged neck.

(D) Such a device in which the sack can be swung to a position adjacent the neck, this sack being of such thin material as to be rollable about the straight or folded neck into a compact unit occupying a minimum of space and marketable in a small container from which the unit can be withdrawn, unrolled or unfolded, filled through the neck from any faucet, used and discarded.

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(E) A vaginal syringe in which a single dosage of medicament or water-soluble substance is disposed interiorly of the syringe when marketed, being of such size or amount relative to the predetermined maximum volume of the sack as to form a solution of predetermined or minimized strength when the syringe is filled with water.

(F) A vaginal syringe characterized by its convenience in carriage and in use to such extent as to permit use or medication in situations often denied by prior bulky and inconvenient devices.

These and other features and advantages of the invention will be better understood by consideration of the following description and the attached drawing which exemplify two embodiments of the invention and suggest other features and advantages.

Referring to the drawing:

Fig. 1 is a side or elevational view of one embodiment of the invention in extended position ready for filling, with one section broken away;

Fig. 2 is a bottom view, taken as indicated by the arrow 2 of Fig. 1;

Fig. 3 shows the neck and sack folded into adjacent position, preparatory to rolling;

Fig. 4 shows the rolled unit disposed in a typical container, shown in section;

Figs. 5 and 6 suggest alternative foldings or rollings of the device;

Fig. 7 is a side or elevational view of an alternative embodiment;

Fig. 8 is a sectional view taken along the line 8—8 of Fig. 7; and

Fig. 9 is a fragmentary elevational view taken along the line 9—9 of Fig. 7.

Referring particularly to Figs. 1 and 2, the disposable syringe is indicated generally by the numeral 10 and includes a tubular neck 11 and a sack 12 permanently attached thereto.

The tubular neck 11 is preferably a single-piece tube with a longitudinal passage 13 extending completely therethrough and providing an open filling-discharge orifice 14 at an outer end portion 15 of the tubular neck and an open inner orifice 16 at an inner end portion 17 of the tubular neck. The tubular neck 11 may be formed of relatively flexible or relatively rigid material. If relatively flexible, as is preferred, it may be a short length of rubber tubing or may be formed of any of the known thermo-setting or thermo-plastic materials of the flexible type. If relatively inflexible or rigid, it may be formed of such plastic mate-

rials of a less flexible or relatively inflexible type or of hard rubber, metal or even laminated paper or cardboard which may be more or less waterproofed.

The tubular neck 11 is preferably straight but may be slightly curved, if desired. It should provide a constantly open filling-discharge orifice 14 capable of receiving a stream of water running from a faucet, for example, to fill the sack 12 and should be capable of expelling a stream when the filled sack 12 is manually squeezed, preferably a stream which is directed high into the vaginal tract. A single stream is preferable, but this may tend to break up upon discharge or may be intentionally divided into a plurality of streams by the design of the orifice 14 so long as the device remains easily fillable by a stream of water, as distinct from being filled by a lowering of pressure within the sack to subatmospheric value because of its resiliency when external pressure is released—a type of filling not contemplated by the present invention.

The sack 12 provides a storage section 20, a hinge portion 21 and an attachment portion 22 of differential size. It is formed as a completely collapsible membranous sack of extremely thin material which is very flexible but preferably substantially nonstretchable so that when filled, pressure applied to one section will not cause undue localized bowing, swelling or expanding of another section. At the same time, it is desired that the sack have no predetermined form or shape, other than its peripheral shape when flat, and that it be completely collapsible, with no substantial tendency to assume other than a collapsed shape in the absence of differential internal and external pressures. This is in marked contradistinction to all prior bulbs on syringes which have a natural expanded state toward which they expand in the absence of external manual pressure to create a subatmospheric pressure therein for the purpose of filling. The sack of the present invention has no normal distended form and no normal internal volume, being normally completely collapsed and substantially volumeless except when filled through the tubular neck 11. It is characterized by the absence of any bellows-like folds or natural distended shape such as would normally be present if the sack were molded of an elastic material, such as rubber.

The sack 12 may be made of any extremely thin material sufficiently waterproof in use to withstand small expelling pressures and sufficiently flexible to be rolled or folded about the neck to form a compact unit. The preferred material is a commercial product widely sold under the trade name "Pliofilm," an almost transparent rubber hydrochloride, although other flexible but substantially nonelastic plastic materials can be used or even oiled silk, tough waxed or otherwise treated paper, etc. Preferably, the material is almost of tissue paper thinness, e. g., not more than several thousandths of an inch in thickness.

In the embodiment of Figs. 1 and 2, the sack 12 is formed of tubular stock, the rear end of the tube being sealed to form a sealed rear end 24. Such tubular stock can be purchased in rolls and a section cut off to form the sack, either before or after transverse sealing, which sealing can be accomplished by use of an adhesive but preferably merely by the use of heat applied locally in a transverse band if the material is of the heat-sealable type, as is "Pliofilm." The resulting seam at the rear end 24 should be

capable of withstanding the superatmospheric pressure built up in the filled sack when manually squeezed.

Any suitable means can be employed for attaching the sack 12 to the neck 11. The attachment is a permanent one and should form a fluid tight junction with the neck 11. In the embodiment of Figs. 1 and 2, the front end of the tubular-stock sack is contracted or promiscuously pleated to form the attachment portion 22 which surrounds and contacts the inner end portion 17 of the tubular neck, to which it can be directly sealed by use of an adhesive, heat or by mere clamping or pressure. If desired, the pleats may be initially heat-sealed together about a mandrel to form an opening for the sack of sufficient size to be slipped over and sealed to the inner end portion 17. Alternatively, the pleating can be accomplished at the same time the sack is sealed to the tubular neck. If a clamping action is desired to insure a fluid-tight joint, a thin clamping or pressure element 25 may be disposed around the pleated attachment portion 22 of the sack. This may be any metallic or nonmetallic ring-like element, preferably with rounded corners or edges, wound or pressed in place, but preferably is a thin band of heat-sealable or adhesive material wound tightly around the attachment portion 22 to compress it against the inner end portion 17 of the neck 11, one or more turns being used to insure adequate pressure to effect a seal.

In instances where the device is to be used for medication or treatment, a small water-soluble tablet or other form of medication may be dropped or poured into the sack through the opening in the tubular neck. Preferably, however, and where the device is to be thus used and where it is desired that the device should supply a solution of predetermined strength, a water-soluble substance is disposed inside the unit during the process of manufacture. The preferred arrangement is to place a small water-soluble tablet 27 in the sack before attachment to the tubular neck but the substance can be otherwise contained, as by being coated internally on the material of the sack 12 or tubular neck 11 or by being mounted within the tubular neck to close the passage 13 only partly to be released or dissolved by the inrushing water during filling. Disposing the substance or tablet 27 in the sack is distinctly preferable in view of its being protected from contamination or from atmospheric moisture by the folding to be presently described. If desired, the tablet 27 may be made of easily crushable material to be crushed by finger pressure applied through the sack. Alternatively, the substance may be placed in the sack in powdered or subdivided form and in predetermined amount. However, the use of a quick-dissolving medicated tablet is entirely satisfactory and gives the purchaser confidence in that its presence and size can be determined by inspection or feeling of the unit as purchased. The complete deformability of the sack makes it possible to switch the water to and fro in the sack when initially filled to aid in dissolving the tablet and produce a uniform-strength solution.

The amount of material in the tablet is correlated with the distended volume of the sack 12 to produce a solution of predetermined and minimized strength when the device is filled with water. By making the sack of substantially nonstretchable material, its volume is maximized and this makes possible the preparation of a so-

lution in situ and under entirely sterile conditions when the single-dosage tablet is dissolved.

The hinge portion 21 of the sack 12 is an important feature of the invention. It permits the tubular neck to be folded rearwardly to lie along the sack 12, in the position shown in Fig. 3, while forming an effective seal for the interior of the sack against contamination, atmospheric moisture, etc. When the device has been filled and in use, the hinge portion 21 forms a flexible connection between the sack and the tubular neck, permitting the former to be swung into any convenient position for expelling the liquid contents by manual pressure applied externally to the sack. This feature gives a freedom in use not common to prior bulb-type syringes.

When the device has been folded into the configuration of Fig. 3, the corners of the sack 12 may be brought together around the tubular neck 11 and the sack then rolled around the neck into the compact form suggested in Fig. 4. This rolling additionally seals the interior of the sack against ingress or egress of air and provides a unit in which the initial sterility of the tubular neck 11 is insured by wrapping in its own attached sack. Preferably, the longitudinal length of the sack is at least equal to the length of the tubular neck so that when the former is folded back along the latter, as in Fig. 3, the sealed rear end 24 lies opposite or beyond the outer end portion 15 of the tubular neck in protecting relationship thereto.

In the preferred embodiment, the rolled unit is then disposed in a suitable tubular container 30 closed by a removable cover 31. The container may be formed of thin aluminum, cardboard, plastic material, etc. and need be of an internal size very little larger than that of the rolled unit. The ratio of diameter to length has been increased in Fig. 4 merely for purpose of clarity in illustration. In practice, the device can be rolled into a unit little larger in diameter than the tubular neck itself, making for convenience in carrying one or more of the units in handbags and pockets and for dispensing in suitable equipment in public washrooms or for convenient packaging when initially sold in quantity.

If an even more compact unit is desired or if it is desired that the ratio of neck length to sack length be increased over that suggested in Fig. 3, the neck can be folded back on itself, as suggested in Fig. 5, before rolling within the sack. Even multiple folds of the neck can be employed. If the sack is of sufficient length, it may also be folded back upon itself, separately or encompassing the folded neck, and the unit then rolled to cause the sack to surround and protect the folded neck.

Alternatively, the already-rolled unit of Fig. 4 can be folded back upon itself to form a unit of decreased length, preparatory to packaging, or the longitudinally rolled unit of Fig. 4 can be rolled about itself, as suggested in Fig. 6 so that the longitudinal axis of the tubular neck is in spiral form or circular form and so that an extermely compact and somewhat disclike shape is achieved. Compact packages, suitable to the ultimate shapes suggested in Figs. 5 and 6 and discussed above, can be employed. The unit can be unrolled and any minor crimping of the neck, due to any folding thereof, removed by localized transverse squeezing to return the neck to tubular or circular form and reimpart the desired rigidity for use.

The embodiment of Figs. 7–9 differs primarily in the manner of forming the sack 12. Here the sack is formed from two sheets of material, such as "Pliofilm," sealed to form an end seam 35 at the rear end of the sack and side seams 36 of a contour to determine the shape of the sack when flat. Such seams can be made by the use of suitable adhesive or by heat-bonding of the sheets. The seams 36 are preferably made in curved paths, substantially as suggested in Fig. 7, to eliminate largely or completely any folds or pleats adjacent or below the hinge portion 21.

The seams 36 extend to the attachment portion 22 which is of a size to receive the tubular neck and be secured thereto by any of the means previously suggested. In Figs. 7 and 9 the seams 36 are shown folded peripherally of the attachment portion 22 and surrounded by a thin clamping or holding element 38, similar to the element 25 previously described. Alternatively, the seams 36 can be folded in this manner and heat-sealed or adhered in place, without use of any element 38, the tubular neck 11 being suitably adhered or bonded to the attachment portion 22.

The device can be sanitized during manufacture and will remain in such condition until withdrawn from the tube 30. It can then be unfolded or unrolled and the tubular neck 11 held under a faucet to fill and distend the sack 12. Manual pressure applied to the sack will swish the water therein to insure dissolving the capsule 27, if used, and forming a uniformly-concentrated solution. During use of the device, the sack 12 can be swung to any convenient position and manual external pressure in any desired degree can be applied to jet the liquid high into the vaginal tract. It is a feature of the invention that any release of such pressure will not create a reduced pressure within the sack sufficient to draw thereinto any mucus or previously-expelled liquid.

The cheapness of the unit makes it feasible for the first time to discard it after a single use. The unit can be disposed of in any convenient receptacle or can be flushed into sewage systems. If the latter disposition is desired, it is quite feasible to make the device of material sufficiently waterproof to stand up under the intended use but to gradually weaken, disintegrate and dissolve upon immersion in water for a reasonable length of time.

The invention as claimed herein defines novel features and combinations of the preferred embodiments of the invention but it will be apparent that various changes can be made without departing from the spirit of the invention as defined. The preceding portion of this specification indicates features, coactions and combinations which I believe and claim to be new as a part of my invention and which are to be broadly construed as to equivalents. The same is true as to the following specific claims expressing specific features, coactions and combinations.

I claim:

1. As an article of manufacture, a single-use sanitary vaginal syringe comprising: a tubular neck providing inner and outer end portions and a longitudinal passage extending completely therethrough from end to end, said passage providing an open filling-discharge orifice at said outer end portion and an open inner orifice at said inner end portion; and a completely collapsed membranous sack formed of thin flexible but substantially nonstretchable material and providing a hinge portion permanently attached to said inner end portion of said tubular neck and communicating with said open inner orifice,

said sack being distendable into container form of predetermined volume by filling with water, said filling-discharge orifice and said longitudinal passage forming the sole communication with the interior of said sack and comprising the sole means whereby said sack may be distended and filled with water, said water being expellable through said longitudinal passage and said filling-discharge orifice by manual pressure applied exteriorly of said sack, said hinge portion permitting said sack to swing at any angle relative to said neck, while still permitting said water to be thus expelled, said sack being formed of such thin collapsible material as to be void of any natural distended shape thereby preventing any indrawing of such expelled water into said sack upon release of said manual pressure.

2. An article of manufacture as defined in claim 1, in which said sack provides side walls collapsed into contact with each other and sealed together at a peripheral portion to be watertight even upon application of said water-expelling manual pressure.

3. An article of manufacture as defined in claim 1, including a single dosage of water-soluble substance within said sack, the substantially non-stretchable material maximizing the volume of water insertable in said sack during filling to dissolve said substance and produce a solution of predetermined and minimized strength.

4. As an article of manufacture, a rolled unit unfoldable into a single-use throw-away vaginal syringe and comprising a tubular neck and a completely collapsed sack connected to one end of said tubular neck and folded back along said neck and rolled therearound as a multilayer protective cover, said sack encompassing said tubular neck substantially throughout the length of the latter to protect same against contamination prior to use of the syringe.

5. As an article of manufacture, a single-use disposable vaginal syringe comprising: a tubular neck providing inner and outer end portions and a longitudinal passage extending completely therethrough from end to end, said passage providing an open filling-discharge orifice at said outer end portion and an open inner orifice at said inner end portion; and a membranous sack formed of thin flexible but substantially non-

stretchable material and providing a hinge portion attached to said inner end portion of said tubular neck and communicating with said open inner orifice, said sack providing side walls collapsible into surface contact with each other to expel substantially all air from the interior of said sack, said hinge portion permitting said sack to be swung to a position in which it lies along said tubular neck, said sack being rolled about said neck to form a compact unit and to protect said neck against contamination prior to use of the syringe, said sack being unrollable and then distendable into container form of predetermined volume by filling with water through said filling-discharge orifice, said water being expellable through said longitudinal passage and said filling-discharge orifice by manual pressure applied exteriorly of said sack.

6. An article of manufacture as defined in claim 5 in which said sack is formed of such thin material as to be substantially void of any natural distended shape upon unrolling, thereby substantially preventing indrawing of air before filling and substantially preventing any sack-induced indrawing of expelled water following use and upon release of said manual pressure.

7. An article of manufacture as defined in claim 5 in which the longitudinal length of said sack measured from said inner end portion is not substantially less than the longitudinal length of said tubular neck to surround the latter when rolled therearound and thus protect the neck from contamination prior to unrolling said sack preparatory to filling same.

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