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3,424,159

TAMPON INSERTION DEVICE

Howard A. Whitehead, Appleton, and Edward Rightor, Jr., Neenah, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis., a corporation of Delaware

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ABSTRACT OF THE DISCLOSURE

A tampon applicator having an outer tube and a hinged one-piece plunger for ejecting a tampon contained within the tube. The plunger has a flexible cup-shaped piston slidably disposed within the tube and, hingedly connected to the piston, a foldable handle which lies outside of, and is coextensive with, the tube. The piston is constructed with outwardly biased spring sections which resist rearward movement in the tube without inhibiting forward movement in the tube.

Background of the invention

This invention relates to an improvement in catamenial protection devices and more specifically relates to an improved tampon insertion device of the compact, reduced length type.

The prior art describes many tampon insertion devices comprising a tubular member containing a tampon and having a cooperating ejector member slidably disposed within the tube to eject the tampon. In the earliest devices, which are still commonly used, the ejector member was arranged with its leading end disposed in the trailing end of the tube and with the trailing end of the ejector projecting out of the tube for a distance approximating the length of the tube. Such tampon applicators, while generally satisfactory in operation, are considerably longer than the tampon body itself, and require unnecessarily large packages.

In an effort to improve costs by reducing package size, other insertion devices have been developed in which the ejector member is folded over, or otherwise arranged, to lie along one side of, and be coextensive with, the tampon-containing tube whereby it is possible to reduce the packaged length by about one-half. When such devices are used, the ejector member may be unfolded, or otherwise placed in operative position, for the purpose of ejecting the tampon.

Representative patents showing construction of tampon insertion devices of reduced length include U.S. Patents Nos. 2,222,088, 3,034,508, 3,059,641, 3,059,642, 3,101,713, 3,103,929 and 3,115,876. While the devices shown in these patents may be acceptable and satisfactory if adopted for use, the construction of the tampon insertion device herein described has certain advantages over those previously developed in simplicity of construction, improved function and ease of assembly.

Summary of the invention

In a preferred embodiment, the present invention comprises a tubular member and, in cooperation therewith, a one-piece plunger device of resilient material. The plunger device comprises a flexible cup-shaped piston element slidably disposed within said tube and having a pivotable handle hingedly connected thereto. The piston element preferably has a substantially flat bottom and outwardly slanted petal-like sidewalls which form spring sections to hold the piston in pressure engagement with the inner side of the tube. The petal-like spring sections of the piston walls are biased outwardly and extend rearwardly when in position in the tube. The outward pres-

sure exerted against the inner side of the tube by the biased spring sections holds the piston in place by resisting rearward movement, but offers little resistance to forward movement when finger pressure is applied to the handle by the user. This improved construction insures retention of the piston within the tube prior to use, while facilitating ejection of the tampon when the ejector handle is in operating position.

Accordingly, it is an object of this invention to provide an improved tampon inserting device of the type consisting of a tubular outer element and a cooperating inner ejection means, the injection means comprising a one-piece ejector unit having a piston member with outwardly biased leaf spring elements pressure-fitted into one end of the tubular element and an ejector arm means hingedly connected to the piston.

Another object is to provide a compact ejector element of simplified construction for cooperation with a tampon-containing tube.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawing wherein there is described and illustrated a tampon insertion device embodying a selected form of the invention.

Brief description of the drawing

In the drawing:

FIGURE 1 is a longitudinal section of the improved insertion device having a tampon mounted in an applicator tube and showing the improved ejector element in position.

FIGURE 2 is a section taken on line 2—2 of FIGURE 1, showing sectional details of the piston portion of the ejector element.

FIGURE 3 is a longitudinal section of the one-piece ejector element of FIGURE 1 as it appears before insertion in the applicator tube.

FIGURE 4 is a longitudinal section similar to FIGURE 1 but showing the ejector element in operative position with a tampon partially ejected from the applicator tube.

Description of the preferred embodiment

The improved structure as shown in the drawings comprises a tubular member 5 which may conveniently be a tube of cardboard, paper, or plastic, of a grade and thickness which is substantially self-supporting. The tube 5 is of sufficient stiffness to maintain itself against collapsing both longitudinally and transversely. No matter what stock material is used to make the tube, the outer side preferably is provided with a smooth, moisture resistant surface.

A tampon 6 of suitable absorbent material, of which there are many known types, is mounted in the forward end portion of tube 5 with the distal end of the tampon having the customary withdrawal string 7 attached thereto. The forward end of the tampon may be flat as shown, or pointed if preferred.

Tube 5 is of greater length than tampon 6 so that when a tampon is in place in the tube there remains, in the rear of the tube, an unoccupied rear portion into which the piston member of the ejector element is fitted.

The ejector element comprises a handle 11 (11a) of the approximate length of tube 5, and a cup-shaped piston member 19 having sidewalls comprising outwardly biased, circumferentially spaced, flat spring sections 14, 15, 18, and 20. Spring section 20 is hingedly connected at hinge 16 to a J-shaped arm comprising handle 11 (11a) and connective segments 12 (12a) and 13 (13a). When the piston of the ejector element is initially inserted into the tube, the J-shaped arm is maintained in its rest position as shown in FIGURE 3, and by the dotted lines at 11a, 12a and 13a in FIGURE 1. The piston 19 is pressure-

fitted within the rear unoccupied portion of the tube, with biased spring-like sections 14, 15, 18 and 20 exerting outward pressure against the inside of the tube. The entire ejector element is preferably made of flexible plastic material, such as polypropylene, although other materials of similar flexibility may be used. When made of plastic, the entire ejector element preferably is made in a single piece by injection molding, casting or the like. The cup-shaped piston 19 preferably has a substantially flat bottom 17 and upwardly extending sidewalls which slant outwardly from bottom 17. Portions of the sidewalls are cut away at spaced intervals circumferentially thereof to provide a serrated or notched configuration. At least one cut-out portion in the sidewalls extends into bottom 17 to provide an aperture for the withdrawal string of the tampon. In the embodiment shown, the sidewalls of the piston comprise four spaced petal-like projections in the form of leaf spring sections 14, 15, 18 and 20. As shown, each of the intervening notches between the four spring sections extend into the bottom 17 providing apertures therein, through one of which tampon withdrawal string 7 extends. While four spring sections are shown in this preferred embodiment, the number of sections may, of course, be varied. At least two such sections should be provided to allow sufficient flexibility for the piston to move easily within the tube when ejection is performed.

The bottom diameter of the piston is narrower than the inner diameter of the tube. The top diameter of the piston, before insertion in the tube, and measured at the top ends of the spring sections is substantially larger than the inner diameter of the tube in order that the spring sections of the piston may be biased outwardly to exert pressure against the tube interior whereby a snug fit is assured when inserted in the tube. A good representation of this difference in diameter may be seen by reference to FIGURE 3 in which the petal-like spring sections of the piston are in relaxed position outside the tube before insertion, and to FIGURES 1 and 2 wherein the spring section of the pistons are in their outwardly biased or pressure-fit position within the tube.

As shown in FIGURE 1, the piston 19 has attached to the top end of one of its spring sections 20 at hinge 16, J-shaped ejector handle comprising arm 11a and extension segments 12a and 13a. The ejector arm and extensions are shown at rest at 11a, 12a and 13a and in their rotated operational position, ready to eject the tampon, at 11, 12 and 13. In FIGURE 4, the ejector arm and piston in operating position are advanced within the tube to partially eject tampon 6.

In the preferred piston structure shown, the outwardly-biased and directional attitude of the spring sections of the piston element when fitted in position in the trailing end of the tube, resists undesirable rearward movement because of the pressure forces involved. At the same time, the arrangement shown provides little resistance to forward movement of the piston within the tube when operated by the user.

Changes in the described construction may be made without departing from the spirit of the invention, the

scope of which should be determined by reference to the following claims.

What is claimed is:

1. An improved tampon insertion device comprising an outer tubular member and a one-piece ejector element associated therewith, said ejector element comprising a flexible cup-shaped piston having outwardly slanting sidewalls divided into circumferentially spaced spring sections and an elongated ejector arm hingedly connected to the end of one of said spring sections, said piston being fitted into one end of said member with said spring sections being biased against the interior of said member, said ejector arm extending from the end of said spring section around the end of said member in axially parallel relationship with the exterior of said member.

2. An improved tampon insertion device comprising an outer tubular member for housing a tampon and a hinged ejector element associated therewith, said ejector element being of unitary construction and comprising a flexible cup-shaped piston slidably disposed within one end of said tubular member and having an elongated ejector arm cooperatively connected thereto, said cup-shaped piston having a bottom portion of smaller diameter than the inner diameter of said tubular element and outwardly slanting sidewalls, said sidewalls having circumferentially spaced portions cut away to divide said sidewalls into spaced spring sections disposed in pressure engagement with the interior of said tubular element, said ejector arm being J-shaped having its shorter end hingedly connected to the end of one of said spring sections and its longer end disposed adjacent to and axially parallel with the exterior of said tubular element, said arm being adapted for rotation at said hinge connection into longitudinal alignment with said tubular element.

3. The device of claim 2 in which the bottom portion of said piston is substantially flat.

4. The device of claim 2 in which the sidewall is divided into four spring sections.

5. The device of claim 2 in which at least one of said circumferentially spaced cut-out portions extend into said bottom.

6. The device of claim 2 in which the ejector element is polypropylene.

7. The device of claim 2 in which the absorbent tampon is disposed in one end of said tubular member.

References Cited

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ADELE M. EAGER, *Primary Examiner*.

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