

[54] **TAMPON APPLICATOR ASSEMBLY**

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[52] U.S. Cl. **128/263**

[51] Int. Cl. **A61f 13/20**

[58] Field of Search..... 128/263, 271, 264,
128/265, 285

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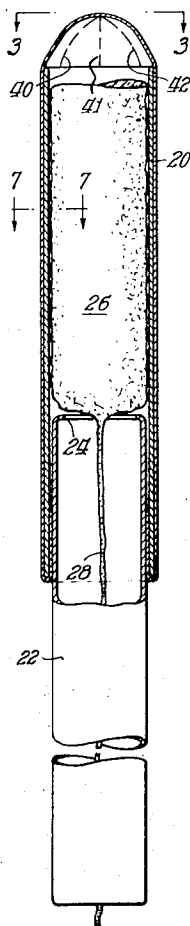
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Primary Examiner—Robert W. Michell

[57] **ABSTRACT**

A tampon applicator assembly having inner and outer telescoped cardboard tubes and an absorbent fibrous tampon body within the outer tube so that the inner tube may expel the fibrous body out of the outer tube, with a cap or sack of film covering the end of the fibrous body protruding from the outer tube and preferably covering a part or all of the outer surface of the outer tube with weld flanges of the cap or sack being inside, whereby insertion of the assembly into a body cavity is facilitated.

6 Claims, 13 Drawing Figures



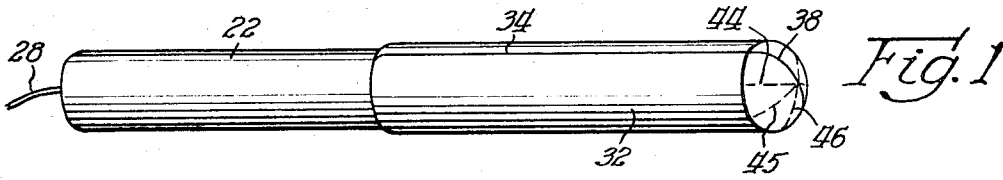


Fig. 2

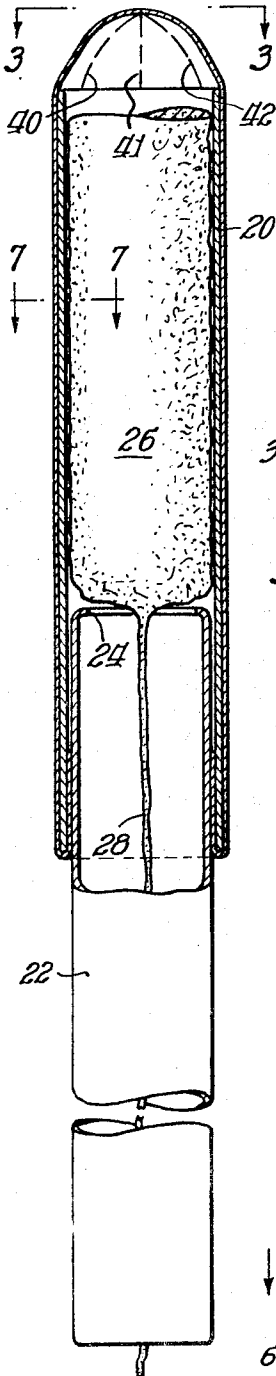


Fig. 3

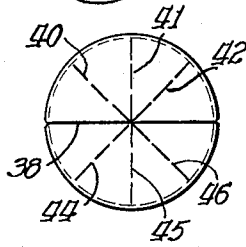


Fig. 4

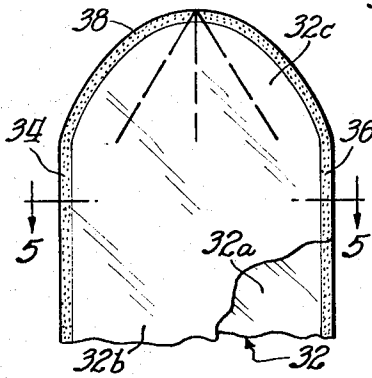


Fig. 5

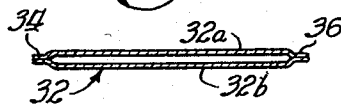


Fig. 7

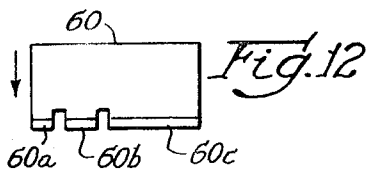
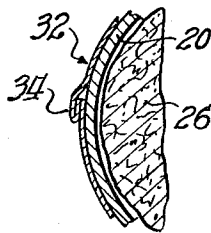


Fig. 6

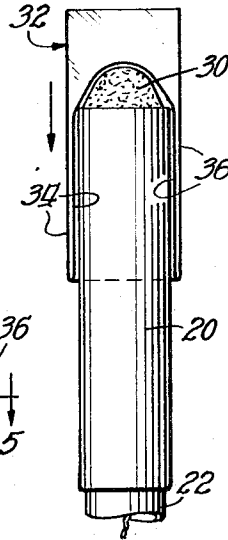


Fig. 9

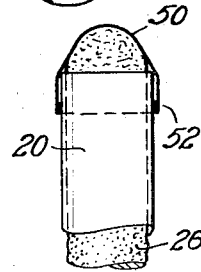


Fig. 11

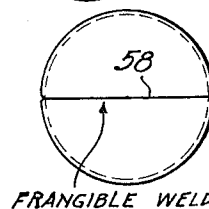


Fig. 8

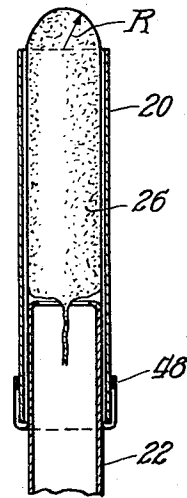


Fig. 10

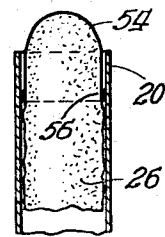
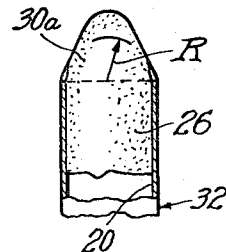


Fig. 13



TAMPON APPLICATOR ASSEMBLY

The invention relates to hygienic applicator assemblies and more particularly to catamenial tampon assemblies.

Conventional catamenial tampon assemblies now on the market include an outer cylindrical tube of cardboard, an inner cylindrical tube of cardboard telescoped into the outer tube and a fibrous fluid absorbent body within one end of the outer tube so that the fibrous body may be expelled from the outer tube by pushing the inner tube farther into the outer tube after the assembly has been positioned in the vagina. Such a tampon assembly is positioned with some discomfort due to the abrading effect of the sharp forward edge of the outer tube, and it is an object of the present invention to provide an improved form of such an assembly in which this edge and more particularly the forward end of the fibrous material body are covered with a smooth film for facilitating placement of the assembly.

In a preferred form of the invention, the assembly includes telescoped inner and outer cardboard tubes and a fluid absorbent body in the outer tube, with the fluid absorbent body having a rounded end protruding a substantial distance from the end of the outer tube, and a cap of smooth film is fixed over the end of the outer tube and fibrous body so as to facilitate the entrance of the assembly into the vagina. Preferably, the cap is a part of a film sack which covers the outer tube and is returned into the outer tube at its base end so as to be positioned between the inner and outer tubes and thereby held fixed with respect to the outer tube; and lines of weakness, such as perforations, are provided in the cap so that the cap breaks and allows the fibrous body to be expelled from the outer tube after the assembly has been put in place within the vagina.

The invention consists of the novel constructions, arrangements and methods to be hereinafter described and claimed for carrying out the above stated objects, and such other objects, as will be apparent from the following description of preferred forms of the invention and preferred ways for making them, illustrated with reference to the accompanying drawing, wherein:

FIG. 1 is a perspective view of a catamenial tampon assembly incorporating the principles of the invention;

FIG. 2 is a longitudinal sectional view of the tampon assembly;

FIG. 3 is an end view of the tampon assembly taken from line 3—3 of FIG. 2;

FIG. 4 is a fragmentary view of a thin plastic film sack in flat condition which provides the outer surface of a major portion of the tampon assembly;

FIG. 5 is a sectional view taken on line 5—5 of FIG. 4;

FIG. 6 is a side elevational view of the tampon assembly showing the film sack being placed over the rest of the tampon assembly;

FIG. 7 is a sectional view taken on line 7—7 of FIG. 2;

FIG. 8 is a longitudinal sectional view of a modification of the invention;

FIG. 9 is a fragmentary side view of another modification of the invention;

FIG. 10 is a fragmentary longitudinal sectional view of still another modification of the invention;

FIG. 11 is an end view, corresponding to the end view of FIG. 3, of a modified sack that may be used in lieu of that shown in FIG. 3;

FIG. 12 is a side elevational view of a knife that may be used to cut perforation lines in the sack shown in flat condition in FIG. 4; and

FIG. 13 is a fragmentary longitudinal sectional view of another modification of the invention.

Like characters of reference indicate like parts in the several views.

Referring to FIGS. 1-7 of the drawing, the illustrated tampon assembly may be seen to comprise an outer tube 20, an inner tube 22 having a flanged opening 24 in one end, a cylindrical tampon body 26 of fibrous material, and a string 28 fastened in the tampon body 26. The tampon body has a rounded end 30 (which in cross section has a radius R); and a sack 32 of thin, readily extensible, plastic film is disposed about the rounded end 30 of the tampon body 26 and extends in contact with the exterior surface of the tube 20 for the length of the tube 20. The sack 32 then has a return bend so that it extends upwardly for a short distance between the tubes 20 and 22 (see FIG. 2), effectively fixing the sack 32 with respect to the tube 20.

The sack 32 is made up of two thicknesses 32a and 32b which are welded together at the sides by straight welds 34 and 36 and at one end of each thickness by a round weld 38. As may be seen particularly in FIG. 3, the rounded end of the sack 32 has perforation lines 40, 41, 42, 44, 45 and 46 in it.

The tubes 20 and 22 may be of any suitable material which has some rigidity, such as paperboard, cardboard or plastic; and it will be observed that the inner tube is telescoped into the outer tube 20; and the inner tube 22 is slightly less in diameter than the outer tube 20, so that the tube 22 slides easily into the outer tube 20 with a part of the sack 32 lying between the tubes 20 and 22 as shown. The inner tube 22 is flanged inwardly at its upper end, as the device is shown in FIG. 2, so that the tube 22 as it moves inwardly or upwardly into the tube 20 has a surface to surface contact with the tampon body 26 to move the tampon body 26 upwardly or outwardly with respect to the outer tube 20.

The tampon body 26 may be made of cellulosic fibres compressed into the form of a cylinder with the rounded end 30 to form a fluid absorbent member. Other types of fibres may instead be used, or other fluid absorbent materials, such as cellulose sponge or sponge of elastomeric material, may instead be used; but it is preferred that the tampon body 26 have some substantial density and rigidity, since, as will be described, the body 26 when propelled out of the tube 20 has the function of breaking the perforation lines 40, 41, 42, 44, 45 and 46 and the body 26 also has the function of providing a rounded protruding end of the tampon assembly dilating the vagina due to its own rigidity and facilitating entrance of the assembly into the vagina of the user. Just for example, a tampon body 26 of suitable density and rigidity had a foreshortening of one thirty-second to one-sixteenth inch when placed longitudinally in compression between two flat surfaces with a force of one pound. In this case, the body 26 had a length of 1 5/8 inches, a diameter of nine-sixteenths inch, and the radius R of the rounded end 30 was nine thirty-seconds inch. It will be understood that tampon bodies 26 of other dimensions and rigidities may be used within the purview of the invention. The string 28 may be fastened to the body 26 in any suitable way, as by sewing, and the string 28 normally extends down-

wardly through and out of the inner tube 22 as is shown in FIG. 2.

The sack 32 is of a thin, readily extensible plastic film, such as polyethylene. In particular, a polyethylene film that is treated to have high slip characteristics is preferred; and a polyethylene film of this type is DuPont 100 S-101 polyethylene, which is high slip and low density, this film being made and sold by E. I. DuPont de Nemours and Co., Inc. of Wilmington, Delaware. The film is preferably quite thin, such as 0.0005 to 0.0015 inch; although other thicknesses are also satisfactory. The sack 32 is preferably made of the two parts 32a and 32b, and the welds 34, 36 and 38 may be made by using heat on the thicknesses 32a and 32b. For this purpose, an electrically heated wire may be applied to the thicknesses 32a and 32b in the shape of the welds 34, 36 and 38 or a hot iron may be run on the film thicknesses 32a and 32b in the form of the welds, for example. Such localized application of heat may also be used for sensing and cutting out the parts 32a and 32b from sheets of the film.

The welds 34, 36 and 38 are preferably made when the two thicknesses of film are in flat condition as shown in FIG. 4; and in this case the welds 34, 36 and 38 form outwardly extending flanges or ribs. The assembly of outer tube 20 and tampon body 26 may be inserted into the sack 32 if the sack is opened up after the welds are so formed, but it is preferred that the flanges formed by the welds shall not be on the outer surface of the sack 32 in the assembled condition of the tampon assembly so that the flanges do not abrade the walls of the vagina when the assembly is inserted therein. For this reason, the sack 32 is preferably turned inside out as it is put on the assembly of the tube 20 and body 26, and this operation of applying the sack 32 on the assembly of the body 26 and tube 30 is shown in FIG. 6 in which the sack is shown as being applied with the curved end 32c of the sack in contact with the rounded end 30 of the body 26 and with the rest of the sack 32 being drawn downwardly on the outer surface of the tube 20 as the sack is being turned inside out. The flanges formed by the welds 34, 36 and 38 are then inside the sack 32 as shown in FIG. 7.

The perforations 40, 41, 42, 44, 45 and 46 extend from the upper end of the tube 20, as seen in FIG. 2, for example, to the weld 38; and each of the perforations cut through the weld 38, so that the weld does not provide an initial high resistance to breakage of the perforation, as the tampon body 26 is expelled from the tube 20. The perforations 40 and 44 are in alignment in the flat condition of the thicknesses 32a and 32b as seen in FIG. 4; and the same is true for the perforations 41 and 45 as for the perforations 42 and 46.

The polyethylene film of the sack 32 is quite extensible, and although the sack 32 is preferably formed from the two thicknesses 32a and 32b in flat condition as shown in FIG. 4, the sack 32 is so stretched in applying it onto the assembly of the body 26 and tube 20 that the sack 32 fits the tube 20 and the rounded end 30 of the tampon body 26 quite tightly and with no substantial wrinkles. If desired, the fit of the sack 32 on the tube 20 and body 26 can be made even tighter if the assembly with the sack 32 thereon is moved through a heated shrink tunnel or is otherwise heated in accordance with the teachings, for example, in U. S. Pat. No. 3,441,129, issued on Apr. 29, 1969, to John H. Johansen and Walter H. Herman.

When the tampon assembly is used, it is inserted into the vagina with the rounded end foremost. The tampon body 26 protrudes from the outer tube 20 by a substantial distance, preferably for at least the distance "R," which is one-half the diameter of the body 26; and in addition the body 26 is rounded on its end 30 and is relatively rigid in comparison with the film of the sack 32, so that the rounded end 32c of the sack 32 provides a relatively rigid rounded end on the tampon assembly facilitating insertion into the vagina. It is understood that the rounded end 32c of the sack 32 is directly in contact with the rounded end 30 of the body 26 and is supported thereby; and, therefore, even though the film of the sack 32 is thin, flexible and flimsy, it nevertheless provides a forward end on the tampon assembly that is quite rigid and rounded, substantially with the radius "R." In addition, the polyethylene film of the sack 32 is quite slippery, and it thus provides a smooth high slip, rounded end to the tampon assembly that facilitates easy insertion, the rounded end being much less abrasive than would be the case if the rounded end 30 of the body 26 were uncovered.

After the tampon device is fully inserted into the vagina, the outer tube 20 is held in place, and the inner tube 22 is moved upwardly into the outer tube 20 so as to expel the tampon body 26 from the upper end of the outer tube 20. The body 26, as it moves out of the tube 20 breaks the perforations 40, 41, 42, 44, 45 and 46 so that the body 26 moves out of the sack 32 at the same time as the body 26 moves out of the tube 20. In this connection, it should be noted that the perforations 40, 41, 42, 44, 45 and 46 are sufficiently strong so that they do not open as the tampon assembly is being inserted into the vagina, but they do break under manual force after full insertion. Since there is practically no force tending to break the perforations during insertion into the vagina, no particular design of perforation need be used to obtain this result. The tubes 20 and 22, and the sack 32 fixed to the tube 20 by virtue of the lower portion of the sack 32 lying between the tubes 20 and 22, are then withdrawn from the vagina, leaving the tampon body 26 in place, with the string 28 extending outwardly so as to act as a withdrawal cord.

The embodiment of the invention shown in FIG. 8 is the same as that just described except that the sack 32 is disposed within the outer tube 20 for the full length of the tube 20, and the sack 32 is folded outwardly at the lower end of the tube 20 to extend upwardly a short distance on the exterior surface of the tube 20. The sack 32 is welded at 48 to the exterior surface of the outer tube 20.

The embodiment of the invention shown in FIG. 9 is the same as the first described embodiment with respect to the upper rounded end of the tampon device, but the sack 32 is shortened to that it amounts to only a cap 50 of polyethylene located over the rounded end 30 of the body 26. The cap 50 is welded at its peripheral edge 52 to the exterior surface of the tube 20 for holding it in place on the tube 20.

The embodiment of the invention shown in FIG. 10 is the same as the FIG. 9 embodiment; but, in the FIG. 10 form, the cap 54, corresponding to the cap 50, extends within the tube 20 and is welded at 56 to the inside surface of the tube 20.

FIG. 11 shows a sack 32 without the perforations 40, 41, 42, 44, 45 and 46; and, instead of the perforations, the weld 58 of the rounded end of the sack 32 which

takes the place of the weld 38, is made frangible or easily breakable. The weld 58 may be made frangible most simply by applying either too much heat or too little heat in making the weld so that the two thicknesses 32a and 32b of polyethylene come apart easily.

The amount of heat either for making good firm welds or poor welds of polyethylene film is well known to those skilled in the art. The weld 58 provides sufficient strength so that the sack 32 with the weld 58 does not separate when the tampon assembly is being inserted into the vagina, but under manual force the weld 58 does separate similarly to the opening action of the perforations 40, 41, 42, 44, 45 and 46 so as to allow the tampon body 26 to be expelled out of the tube 20 into the vagina.

The embodiment of the invention shown in FIG. 13 is the same as the first described embodiment but in the FIG. 13 embodiment the tampon body 26 protrudes more than the distance "R" (one-half the diameter of the body 26) from the end of the tube 20. In the FIG. 13 embodiment, the tampon body 26 has an end 30a that decreases in cross section away from the end of the tube 20 and is generally of conical shape in cross section but with a rounded tip.

FIG. 12 shows a knife 60 that may be used for making the perforations 40, 41, 42, 44, 45 and 46. The sharp edge of the knife 60 may be moved through the two thicknesses 32a and 32b of polyethylene film in the flat condition of the film as it is shown in FIG. 4, and a single knife stroke may be used for making the two perforations 40 and 44, since these two perforations are in alignment in the FIG. 4 condition of the sack 32; and the same is true of the perforations 41 and 45 and the perforations 42 and 46. The two knife portions 60a and 60b are used for making the inside slits of the perforations, and the longer knife 60c is used for making the outermost slits of the perforations as the perforations are seen in FIG. 4. The knife portion 60c is longer than the portions 60a and 60b to assure that the outermost slit of each perforation goes completely through the weld 38, to its outermost edge, whereby the perforations are certain to open under manual force in operation. The knife portions 60a and 60b may be of equal or unequal length.

Although polyethylene film is preferred, for the sack 32 and caps 50 and 54, other films may be used, such as, films of a cellulose ether selected from the group of aliphatic and aromatic ethers; films having ethyl cellulose as the essential base constituent; or films of methyl cellulose; flexible, highly plasticized cellulose acetate, formate and similar lower alkyl esters; vinylidene chloride or methyl methacrylate; rubber hydrochloride, as for example Pliofilm; or vinylite resin. When films are used for the sack 32 and caps 50 and 54 that are not bonded or welded readily by heat; in these cases, suitable adhesives are used for making the welds.

Advantageously, the sack 32 or caps 50 and 54, fitting unfolded and tightly over and supported by the rounded end 30 of the tampon body 26 provide a relatively slick, rounded end for the tampon assembly allowing the facile insertion of the device into the vagina while yet allowing the easy ejection of the tampon body 26 from the outer tube 20 under manual force with breakage of the perforations 40, 41, 42, 44, 45 and 46 or of the frangible weld 58. Although the sack 32 and caps 50 and 54 are shown as fully covering the end 30 of the tampon body 26, it is apparent that alternately

central circular portions may be cut out of these on the central axis of the body 26 allowing only the outer peripheral surface of the rounded body end 30 to be covered by film. The various embodiments, it is apparent, are similar in that the end of the sack 32 covering the rounded body end 30 constitutes a "cap portion" which functions in the same way as the caps 50 and 54.

Although I have described the tampon assembly as being for catamenial use, it is obvious that it also may have anal use. In this case, the tampon body 26 would be formed of a relatively rigid medicinal material.

I claim:

1. In a method of making an hygienic applicator assembly, the steps which comprise, placing an inner tube into an outer tube and placing a body of an hygienic medium into said outer tube so that the inner tube may move said body out of said outer tube when said inner tube is moved farther into said outer tube, providing a cap portion of a flexible film by fixing two plies of the film together at edges of the film plies leaving flanges of the film at said edges, providing a line or lines of weakness in said cap portion, turning said cap portion inside out so that said flanges are inside and fixing the cap portion with respect to said outer tube so that the film cap portion facilitates the entrance of the applicator assembly into a human body cavity and said lines of weakness break to allow said body of hygienic medium to be expelled from said outer tube by the action of said inner tube.

2. In a method of making a hygienic applicator assembly as set forth in claim 1, said two film plies each being in the form of one-half of an elongate sack that is longer than the length of said outer tube so as to form such a sack, said film being of stretchable thermoplastic material and said plies being heat welded together to form the sack with a flange on the end and sides of the sack, the closed end of said sack forming said cap portion, the method including the method step of turning said sack inside out so that said flanges of said cap portion and the rest of said sack are inside and the method step of then applying said sack on said outer tube and over the end of said hygienic medium body while stretching the film so as to provide a snug fit of the film on the outer tube and hygienic medium body and the method step of fixing the sack adjacent the end of said outer tube remote from the closed end of the sack when installed on said outer tube so as to thereby fix said cap portion with respect to said outer tube as aforesaid.

3. An hygienic application assembly comprising an outer tube, a body of an hygienic medium disposed in one end of said tube and protruding from the tube with a rounded end portion, an inner tube telescoped into said outer tube and protruding from the other end of said outer tube and adapted to abut against said body of hygienic medium to move it out of said outer tube as said inner tube is moved inwardly of said outer tube, and a cap portion covering and overlying said rounded end portion of said body and fixed with respect to said outer tube, said cap portion being of flexible film and having a continuous unpleated outer surface and constituting a uniform thickness layer of film having the same rounded conformation as said rounded end portion of said body and being in contact with and supported by said end portion of said body so that said cap portion facilitates the entrance of the applicator assembly into a human body cavity, said cap portion being

provided with one or more lines of weakness along which the flexible film of the cap portion tears under the force from said body of hygienic medium as said body of hygienic medium is forced out of said outer tube by the action of said inner tube, said cap portion having a seam therein with a flange of said flexible film running along said seam, said flange being located within said cap portion and on the inner surface thereof in contact with said hygienic medium body.

4. An hygienic applicator assembly comprising an outer tube, a body of an hygienic medium disposed in one end of said tube and protruding from the tube with a rounded end portion, an inner tube telescoped into said outer tube and protruding from the other end of said outer tube and adapted to abut against said body of hygienic medium to move it out of said outer tube as said inner tube is moved inwardly of said outer tube, and a cap portion covering and overlying said rounded end portion of said body and fixed with respect to said outer tube, said cap portion being of flexible film and having a continuous unpleated outer surface and constituting a uniform thickness layer of film having the same rounded conformation as said rounded end portion of said body and being in contact with and supported by said end portion of said body so that said cap portion facilitates the entrance of the applicator assembly into a human body cavity, said cap portion being provided with one or more lines of weakness along which the flexible film of the cap portion tears under the force from said body of hygienic medium as said body of hygienic medium is forced out of said outer tube by the action of said inner tube, said cap portion being part of a sack of said film that extends for at least the major part of the length of said outer tube and is fixed with respect to said outer tube at the end of the sack, said sack having a longitudinal seam therein with a flange running along said seam and the sack being disposed to encase said rounded end of said hygienic medium body and said outer tube with said flange being located inside the sack and in contact with the hygienic medium body and said outer tube.

5. An hygienic applicator assembly comprising a body of an hygienic medium, and a tubular container for said hygienic medium body having a forward end through which the hygienic medium body may be thrust, said forward end of said container being formed by a cap portion of flexible film which covers and overlies the forward rounded end portion of said hygienic medium body and which has the same shape and is supported by said forward end of said hygienic medium body so that the cap portion facilitates the entrance of the hygienic medium body into a human body cavity, the outer surface of said cap portion being continuous and unpleated so as to facilitate the entrance of the hygienic medium body into a human body cavity and the cap portion having a seam with a flange of the flexible film running along the seam with the flange being located within the cap portion and on its inner surface in contact with said hygienic medium body, said cap portion being provided with one or more lines of weakness adapted to rupture the film of the cap portion when the hygienic medium body is thrust through said cap portion.

6. In a method of making an hygienic applicator assembly, the steps which comprise, placing an inner plunger in telescoping relationship within an outer tube and placing a body of an hygienic medium into said outer tube so that said plunger may move said hygienic medium body out of said outer tube when said plunger is moved farther into said outer tube, providing a cap portion of a flexible film by seaming the film together leaving a flange of the film running along the seam, providing a line or lines of weakness in said cap portion, turning said cap portion inside out so that said flange is inside and fixing the cap portion with respect to said outer tube so that the film cap portion facilitates the entrance of the applicator assembly into a human body cavity and said lines of weakness break to allow said body of hygienic medium to be expelled from said outer tube by the action of said plunger.

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