Jan. 2, 1962 G. BRECHT 3,015,332

APPLICATOR

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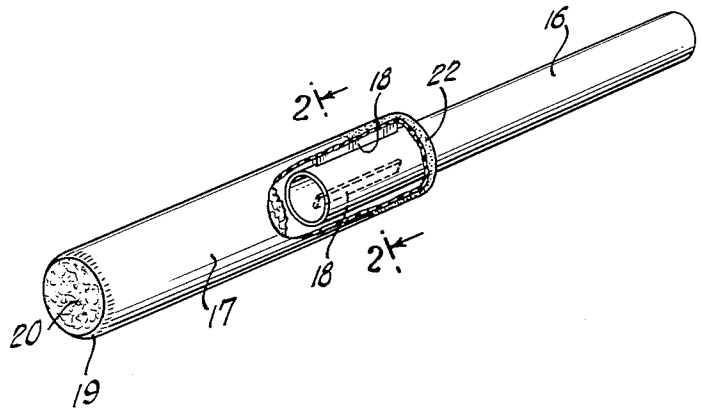
Fig. 1.



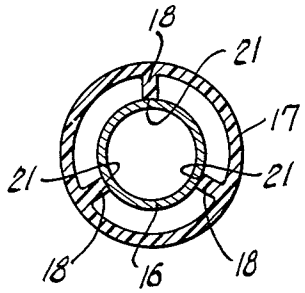


Fig. 2.

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APPLICATOR

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This invention relates to applicators and more particularly to applicators for introducing catamenial tampons into the vaginal cavity.

Commercial catamenial tampons are generally elongated and cylindrical in shape and are made by compressing absorbent material, usually fibrous, into the desired form. Such tampons are relatively rigid and have form stability and may, therefore, be introduced into the vaginal cavity by digital means. However, it is more common to position them in the vaginal cavity with devices called applicators. These are devices usually packaged assembled with tampons to provide a complete unit ready for use.

The tampon applicators in general use consist of an inner and outer tube arranged in a telescopic fashion with the inner tube longitudinally movable in the outer tube. A tampon is positioned in one end of the outer tube and is expelled therefrom by moving the inner tube in the outer tube in the direction of the tampon. In view of the nature of their use, most tampon applicators have been made of paper, cardboard, or similar materials so that they could be discarded after a single use.

Although they have been widely used and are still accepted, such tampon applicators have a number of disadvantages. For example, they can be easily dented and deformed with the result that the tampon becomes bound in the applicator and difficult to expel. Also, the front edges of the outer tube which contact the body first as the applicator is introduced into the vaginal cavity are often sharp or rough as a result of the forming and cutting operations involved in manufacturing applicators, and may irritate or chafe the body. A particularly significant disadvantage of the applicators becomes apparent when they are being inserted into the vagina. Normally, the outer surface of the outer tube of the applicator and the exterior parts of the vagina which the applicator contacts initially upon insertion are dry and unlubricated. Hence, as the applicator is being introduced, it binds upon the exterior parts of the vagina. This not only makes entry difficult, but also causes pain and discomfort.

The problem of binding may be overcome by properly lubricating the applicator with petroleum jelly or some similar material. However, this is inconvenient and not always possible under conditions of use. It also presents manufacturing problems. As a substitute for such lubrication, it has been the practice to coat the outer surface of the outer tube with a wax or similar material. While some improvement has been noted by providing such a coating, the results have not been satisfactory. Binding of the applicators still occurs to an appreciable extent.

It is an object of this invention to provide an applicator which will facilitate introduction of catamenial tampons into the vaginal cavity.

It is another object of this invention to provide a tampon applicator which can be inserted into the vaginal cavity with a minimum of discomfort to the user.

It is a further object of this invention to provide a tampon applicator which resists denting and distortion and which permits ready and easy expulsion of a tampon contained therein.

It is a still further object of this invention to provide a tampon applicator which may be economically manufactured and which may be formed with smooth surfaces and rounded edges.

Other and further objects of this invention will be apparent from a consideration of the attached drawing and the following specification.

In the drawings:

FIG. 1 is a perspective view of an applicator, partly cut away, incorporating the invention and containing a tampon; and

FIG. 2 is a view of FIG. 1, taken along lines 2—2.

In accordance with the invention, a tampon applicator attaining the foregoing objects and overcoming the disadvantages present in applicators heretofore available may be obtained by providing an applicator having an outer tube made from a relatively rigid material which does not absorb moisture and which may be formed or machined with a high finish and smooth rounded edges.

As noted above, a conventional tampon applicator made from paper, cardboard or similar material binds on the surfaces of the vagina as it is being introduced into the vaginal cavity. Initial insertion of the applicator is resisted because of the lack of lubrication between these parts and the applicator. It has been determined that binding occurs because the outer surfaces of the applicators are dry and also because the applicators are made from materials which absorb moisture almost immediately upon contact. Even in those instances where there is some moisture present, the applicator binds because it quickly absorbs the moisture.

I have found that tampon applicators having an outer tube which presents a smooth outer surface of hydrophobic material having the properties of and especially the surface characteristics of polyethylene may be easily and readily inserted into the vaginal cavity without binding even when the surface of the exterior parts of the vagina and the applicator are dry. Polyethylene and plastics having the characteristics of polyethylene have excellent molding and machining characteristics and may be made with very smooth, waxy-like, slippery surfaces which, in combination with the other properties, such as machineability and moldability, may be utilized to provide a tampon applicator in accordance with the objects of the invention. With applicators of this type, tampons may be inserted into the vagina more readily, more easily and more comfortably than has been possible with applicators heretofore available. In addition, tampon applicators made from polyethylene-like materials are stable and resist denting and deformation. Because of the machining and molding characteristics of these materials, the applicators may be formed with certain constructional features which facilitate their use, as will become apparent below.

Referring to the drawings, there is shown a tampon applicator embodying the invention comprising an elongated outer tube 17 with a rounded leading edge 19 and an elongated inner tube 16 of smaller diameter arranged inside the outer tube in a telescopic fashion. The inner tube is longitudinally movable in the outer tube and is maintained in its telescopic relationship with the outer tube by a frictional fit between the two tubes. The edge 19 of the outer tube, which is the part of the applicator which first contacts the body when the applicator is introduced into the vaginal cavity, is rounded, thus eliminating sharp edges and corners which cause pain and discomfort.

The outer tube is made from a relatively rigid hydrophobic plastic polyethylene-like material which does not absorb moisture and which can be manufactured with a smooth, high finish. The outer tube may be made entirely of polyethylene or of other synthetic plastic material having properties similar to polyethylene, or it may be made from a laminate of a polyethylene-like material and another material, such as cardboard or paper, arranged so that the polyethylene forms the outer surface of the tube. The inner tube may be made from the same mate-

rial or any other suitable material, such as a paper or cardboard.

A particularly suitable material for making the outer tube is a highly crystalline, high density polyethylene plastic offered by Phillips Chemical Company under the name Marlex 50. This polyethylene has a high rigidity and an outer tube of an applicator made from this type of polyethylene may be made with thin walls. It has a low coefficient of friction, thus making insertion of the applicator and expulsion of the tampon contained therein easier. A suitable applicator has an outer tube of polyethylene, approximately 3 inches long, ½ inch in diameter and a wall thickness of from 1/64 to 3/64 of an inch. An applicator having an outer tube of polyethylene with this wall thickness has good form stability and will resist denting and crushing. The polyethylene is sufficiently resilient to permit a reasonable amount of distortion to be imposed upon the tube so that it will return to substantially its original shape after being distorted. The formation of kinks and bends in the tube which would cause a tampon to bind are substantially eliminated.

An longated cylindrical tampon **20** formed by highly compressing absorbent fibrous material, such as absorbent cotton, is positioned in the end of the outer tube opposite the end in which the inner tube is located with the end of the tampon substantially adjacent the rounded edge **19**. The tampon has a withdrawal string attached to aid in removing the tampon after use. The withdrawal string extends through the bore of inner tube **16** and beyond the end thereof.

The applicator with the tampon contained therein is used in the usual manner by introducing outer tube **17** into the vaginal cavity, tampon containing end first, for substantially three-quarters of its length and then moving inner tube **16** longitudinally in the outer tube in the direction of the tampon until the tampon has been expelled from the outer tube and positioned in the vaginal cavity. The applicator is then withdrawn.

The inner tube **16** and the outer tube **17** are both made from polyethylene or similar material. However, the inner tube may be made from a dissimilar material such as paper or cardboard. The form illustrated lends itself readily to molding operations and has additional desirable constructional features which aid in its use.

In this form, the outer tube is made entirely from polyethylene or a polyethylene-like plastic and has a plurality of protuberances such as longitudinally aligned elongated ribs **18** on its inner surface opposite end **19** adjacent which the tampon is placed. The ribs extend radially inwardly towards the longitudinal axis of the outer tube a short distance from the inner surface of the outer tube to form bearing surfaces **21** upon which the inner tube rests when it is telescopically associated with the outer tube. The bearing surfaces **21** of the ribs define an opening in the interior of the outer tube of a diameter substantially the same as the outer diameter of the inner tube so that the inner tube will fit snugly. In the example, three ribs equally disposed around the inner periphery of the outer tube are shown; a greater number of ribs may also be used, if desired. Also, the bearing surfaces and the opening within which the inner tube is positioned may be provided by a series of raised protuberances of other forms. The ribs extend longitudinally from adjacent the end of the outer tube opposite the tampon toward the end containing the tampon a sufficient distance to provide adequate bearing surfaces for the inner tube so that it will be held firmly and will not rock or tilt appreciably. For example, in an applicator having an outer tube three inches long, the ribs may be one inch long.

The outer surface of the outer tube **17** adjacent the end opposite end **19** may be formed with a rough surface **22** to provide finger gripping portions which enable the user to hold the applicator more securely. These roughened surfaces may be formed in the manufacture of the outer tube by molding the surface of the tube with a pebble grain finish, by cross-hatching the surface, or by knurling the surface after the tube is formed.

In its preferred form, the outer tube of the applicator is made from a hydrophobic synthetic polyethylene-like plastic material and the inner tube from cardboad, paper or similar material. However, the inner tube may also be made from the same material from which the outer tube is made; e.g., polyethylene, or from other suitable materials which have been used heretofore in applicators of this type.

It is apparent that modifications, changes, alterations and substitutions may be made in the foregoing illustrative embodiments of the invention without departing from its spirit and scope.

What is claimed is:

1. An applicator for introducing catamenial tampons into the vaginal cavity comprising an elongated outer tube presenting an outer surface of hydrophobic plastic material having the surface characteristics of polyethylene, an elongated inner tube telescopically positioned in said outer tube and longitudinally movable therein, said outer tube having on its inner surface at one end section a plurality of inwardly extending protuberances reinforcing said end section, the ends of said protuberances presenting continuous surfaces extending an appreciable distance in the direction of the length of said outer tube a distance at least about as great as the diameter of the inner tube and defining an opening within which said inner tube is slideably positioned, said surfaces supporting said inner tube along its length maintaining said inner tube in fixed spaced relationship with respect to said outer tube for guiding said tube axially with respect to said outer tube as said inner tube is slideably moved therein.

2. An applicator for introducing catamenial tampons into the vaginal cavity comprising an elongated outer tube of hydrophobic plastic material having the surface characteristics of polyethylene, an elongated inner tube telescopically positioned in said outer tube and longitudinally movable therein, said outer tube having on its inner surface at one end section a plurality of elongated ribs extending radially inwardly reinforcing said end section, the ends of said ribs presenting continuous surfaces extending an appreciable distance in the direction of the length of said outer tube a distance at least about as great as the diameter of the inner tube and defining an opening within which said inner tube is slideably positioned, said surfaces supporting said inner tube along its length maintaining said inner tube in fixed spaced relationship with respect to said outer tube for guiding said tube axially with respect to said outer tube as said inner tube is slideably moved therein.

3. An applicator for introducing catamenial tampons into the vaginal cavity comprising an elongated outer tube of polyethylene, an elongated inner tube telescopically positioned in said outer tube and longitudinally movable therein, said outer tube having on its inner surface at one end section a plurality of protuberances extending radially inwardly reinforcing said end section, said protuberances presenting continuous surfaces upon which said inner tube rests, said surfaces extending an appreciable distance in the direction of the length of said outer tube a distance at least about as great as the diameter of the inner tube and defining an opening within which said inner tube is slideably positioned, said surfaces supporting said inner tube along its length maintaining said inner tube in fixed spaced relationship with respect to said outer tube for guiding said tube axially with respect to said outer tube as said inner tube is slideably moved therein in a snug fit.

4. An applicator for introducing catamenial tampons into the vaginal cavity comprising an elongated outer tube of hydrophobic plastic material having the surface characteristics of polyethylene, an elongated inner tube telescopically positioned in said outer tube and longitu-

dinally movable therein, said outer tube having on its inner surface at one end section a plurality of elongated ribs extending radially inwardly reinforcing said end section, the ends of said ribs presenting continuous surfaces extending an appreciable distance in the direction of the length of said outer tube a distance at least about as great as the diameter of the inner tube and defining an opening within which said inner tube is slideably positioned, said surfaces supporting said inner tube along its length maintaining said inner tube in fixed spaced relationship with respect to said outer tube for guiding said tube axially with respect to said outer tube as said inner tube is slideably moved therein, the outer surface of said outer tube adjacent an end thereof being roughened to provide finger gripping portions, the opposite end of said outer tube having rounded edges.

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