Feb. 25, 1969 P. W. STUMP 3,429,312

TAMPON APPLICATOR

Filed Nov. 21, 1966

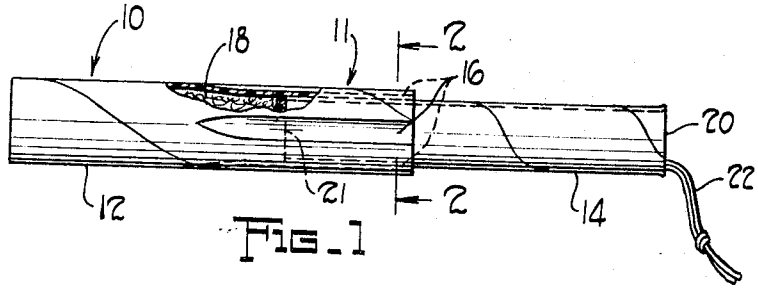


FIG. 1

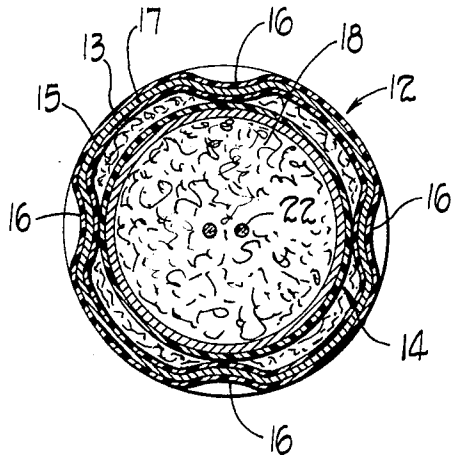


FIG. 2

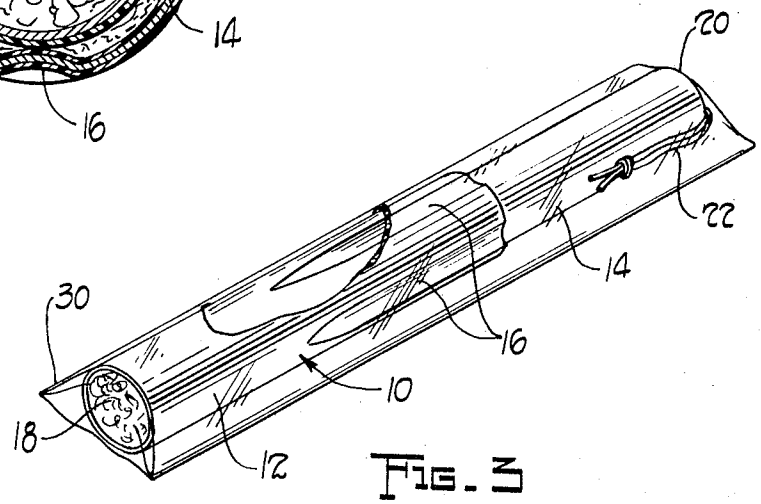


FIG. 3

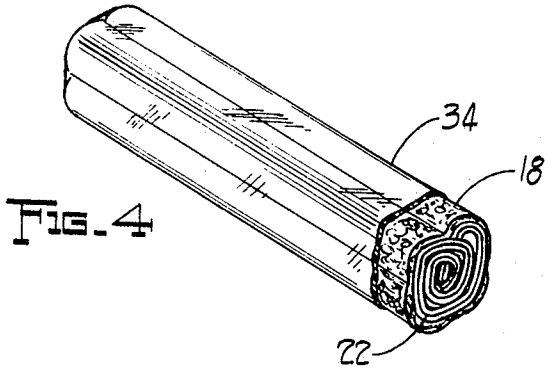


FIG. 4

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TAMPON APPLICATOR

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Continuation-in-part of application Ser. No. 309,050, Sept. 16, 1963. This application Nov. 21, 1966, Ser. No. 602,442
U.S. Cl. 128—263 12 Claims
Int. Cl. A61f 13/20, 15/00

ABSTRACT OF THE DISCLOSURE

A catamenial tampon applicator that includes a pair of telescoping tubes, one of which has longitudinal undulations that establish elongated, longitudinally disposed areas of low frictional contact that maintain the tubes in concentric, otherwise spaced, relationship.

This application is a continuation-in-part of my copending application Ser. No. 309,050, filed Sept. 16, 1963, now abandoned, entitled "Package" and assigned to the assignee of this application.

This invention relates to packages and more particularly to a packaged applicator tube or dispenser for a catamenial tampon.

Numerous types of applicators have been employed in dispensing tampons and other devices formed of a compressed mass of unspun cotton or other absorbent fibers.

The usual applicator is composed of two tubes partially telescoped together. The tampon is usually partially inserted in the larger of the two tubes with an enlarged end portion external of and overlying the end of the tube. The enlarged end portions are provided to prevent accidental expulsion of the tampon through the wrong end of the large tube both during assembly and during use. The tampon is also maintained partially external of the larger tube to reduce the amount of surface contact between the two and therefore the force required to expel the tampon from the tube.

Recently developed masses of unspun cotton or other materials expand at a relatively high rate; i.e. of the order of five times as fast as prior types of masses. Applicators with tampons having the enlarged and exposed end portions mentioned above are not suitable for use with masses having these high rates of expansion because expansion of the exposed end portions tends to occur prematurely, making application difficult. One feature of the invention is to overcome this problem.

These prior art devices for dispensing tampons are usually formed of two substantially cylindrical close fitting telescoping tubes in which the outer surface of one tube frictionally engages the inner surface of the outer tube. This arrangement requires close tolerances between the diameters of the tubes to prevent the inner tube from falling from the outer tube during handling and to provide a limited frictional engagement between the tubes. The close tolerances of the diameters usually results in a frictional engagement which requires a relatively high pressure on the end of the inner cylinder to expel the tampon or compressed mass from the outer cylinder. A feature of this invention is to overcome this close tolerance problem.

Another feature of this invention is to provide an encapsulated tampon. Existing types of applicators are not suitable for dispensing these encapsulated tampons because of the requirement of an enlarged end portion as mentioned above.

Accordingly, an object of this invention is to provide an improved tampon applicator.

An important object of the invention is to provide a tampon applicator to which engagement between two telescopically associated tubes is minimized to reduce friction and thereby reduce the force required to expel a tampon from the applicator.

A further object of this invention is to provide a telescoping applicator for a compressed mass which includes means for easily controlling the frictional engagement between telescoping tubes.

An additional object of this invention is to provide a tampon applicator in which the requirement for close tolerances between two telescoping tubes is eliminated.

Another object of this invention is to provide an applicator for a tampon which permits complete insertion of the tampon within one of the tubes, which arrangement facilitates the insertion of the tampon in the body cavity before substantial expansion begins.

It is a further object of this invention to provide an applicator for a compressed mass, which applicator includes means for keeping two telescoping tubes together while permitting expulsion of the mass which structure also enables manual control of the friction between the telescoping tubes and control of the friction between the compressed mass and one of the tubes.

Briefly in accordance with aspects of this invention, a pair of telescoping tubes are provided in which at least one of the tubes has at least one and preferably at least three longitudinal undulations. This undulation or these undulations establish elongated, longitudinally disposed, substantially line, low friction areas of contact. These areas of contact maintain the tubes in concentric, otherwise spaced, relationship. The undulations also define means by which a relatively light manually applied radial force will increase the frictional engagement between the two tubes thereby permitting an easy manual control of the applied expulsion force. Further, this undulation or these undulations preferably extend at least over half of the length of the outer cylinder and provides means by which the manually applied radial force also determines the frictional engagement between the indented areas of the cylinder and the compressed mass.

Preferably, the outer tube of the telescoping pair of tubes is formed with at least three circumferentially spaced longitudinal undulations each of which produces an arcuate portion extending inwardly to engage the inner tube. Advantageously, the indentations extend over at least one half the length of the outer tube providing guides to maintain the telescopic, concentric relationship of the tube as the tampon is expelled. This is a particularly important advantage when the compressed mass is to be ejected by a relatively light expulsion pressure.

Preferably, the cylindrical tubes are formed of fibers such as paper which are attacked by water. The fibers are coated, at least on the outer surfaces, with moisture resistant material, such as a suitable plastic so that the outer surfaces will not become sticky or adherent on insertion within a body cavity. The coatings are of a material which in time is attacked by water so that the applicator will eventually disintegrate and will not clog plumbing upon disposal. Suitable coating or film materials include polyvinyl alcohol, methyl cellulose, and a polymer of ethylene oxide sold under the trademark Polyox by Union Carbide Corporation.

These and various other objects and features of the invention will be more clearly understood from a reading of the detailed description of this invention in conjunction with the drawing in which:

FIGURE 1 is a view in elevation, partly in section, of one illustrative embodiment of this invention shown in combination with a tampon;

FIGURE 2 is a view in section taken along the line 2—2 of FIGURE 1 with play thicknesses of the tube walls exaggerated for clarity;

FIGURE 3 is a perspective view partly in section of a packaged applicator;

FIGURE 4 is a view in elevation, partly in section of an encapsulated tampon employed.

Referring now to FIGURE 1, one illustrative embodiment of applicator according to this invention is designated by the reference numeral **10**. This embodiment includes a first generally cylindrical outer tube **12** and a second smaller cylindrical inner tube **14** having an end within tube **12**.

The tubes **12, 14** have, then, overlapping portions at **11** which are in telescopic relationship. The smaller tube **14** is telescoped further into the outer tube when the applicator is used. With this invention one of the tubes is contoured such that a plurality of low friction, longitudinally disposed, substantially lined areas of contact are established between the two tubes. The tubes are, otherwise, maintained in spaced relationship. In the preferred and disclosed arrangement, the outer tube **12** has four undulations **16**. Each of these undulations **16** extends inwardly from the cylindrical contour of the outer tube and each extends longitudinally past the overlapping portions to about the longitudinal mid-point of the outer tube. These undulations maintain the tubes in concentric relationship with four line areas of contact and the tubes otherwise spaced. As noted above, with the disclosed form of the invention wherein one of the tubes has undulations projecting toward the other and there should be at least one undulation and preferably three so that the tubes are maintained in concentric relationship.

The construction of the two tubes is from identical material and for simplicity only the wall construction of the outer tube **12** will be described in detail. The outer tube **12** is formed of a spirally wound kraft paper **17**. Coatings **13** and **15** of moisture resistant plastic material, for example, polyvinyl alcohol, are provided on the outside and inside surfaces, respectively, of the paper **17**. As shown in the drawing, only the outside surface of the inner tube **14** has a moisture resistant coating. As previously mentioned, methyl cellulose or Polyox can be used instead of polyvinyl alcohol. While the moisture resistant plastic material is most conveniently and preferably applied to the paper **17** as a coating, the material can instead be applied as a separate film, spirally wound about the paper ply **17**.

The moisture resistant plastic coatings, in addition to advantages which will be described below, provide low friction surfaces between the two tubes, which facilitate operation of the applicator. Thus, the undulations and the surface coatings co-operate to provide a very low friction device. At the same time the undulations provide means for manually controlling the frictional engagement between the tubes **12** and **14** and also manually controlling the degree of frictional engagement between tube **12** and a compact mass or tampon **18**.

As the preceding description and an examination of the drawings will show, the mass **18** is in a portion of the outer tube **12** which may be referred to as a guide portion in that they extend inwardly from the contour generated by the mass portion to provide the spaced substantially line areas of contact with the inner tube or plunger **14** while maintaining the plunger otherwise out of contact with the outer tube **12**. As the plunger **14** is advanced within the outer tube **12**, it is maintained in spaced relationship with the outer tube **12** at all points other than along such spaced areas of contact.

The inner and outer coatings **13, 15** are sufficiently moisture resistant so that tube **12** will not be sticky on insertion within a body cavity. At the same time, the materials from which the tubes are made will ultimately absorb water and disintegrate and therefore not block or obstruct plumbing.

A still further advantage of the longitudinal indentations **16** is that of providing engagement with the tampon **18** during assembly when the tampon **18** is inserted in the tube **12**. Thus the indentations or undulations **16** serve as a means by which the insertion of the tampon **18** may be limited to prevent overloading.

Further, because of the presence of undulations **16**, it is not necessary that there be a close tolerance between the outside diameter of tube **14** and the inside diameter of tube **12**. Thus the presence of the undulations or recesses **16** facilitate the manufacture of the tubes **12, 14**.

A conventional string **22** is connected to the inner portion of the fibrous mass as best seen in FIGURE 2. The purpose of string **22** is to facilitate the removal of the tampon **18** from a body cavity after it has been used. Other than in the embodiment in FIGURE 4, the string projects through the smaller tube **14**.

The most recently developed tampons or absorbent tampons expand at a rate approximately 5 times faster than prior types of devices. Accordingly, these more rapidly expanding tampons or masses must be expelled more rapidly from the tube than they were expelled from the prior types of applicators. Because of the low friction inner coating on the tube **12** there is little resistance to the expulsion of the tampon. This coupled with the limited contact of the tubes described above permits the removal or expulsion of the tampon by only a very slight force. Thus, it is possible rapidly to expel the tampon by a relatively light pressure on the end **20** of the tube **14** and to control the expulsion by a relatively light radial pressure with the ends of the fingers in the region of indentations or undulations **16**. The expulsion pressure required is from 3 to 5 ounces as compared with typical prior types of dispensers which required a pressure of the order of 10 ounces.

In FIGURE 3 the applicator is shown encased within a plastic bag **30**. The bag **30** may be made of polyethylene and may, for ease of opening, include a tear strip or perforations. The plastic bag **30** serves a number of advantages in addition to the relatively obvious advantage of cleanliness. The bag will maintain the applicator in an assembled condition. A less apparent advantage is that, especially where the bag is relatively snug, the end of the string **22** is held in a position external of the smaller tube **14**. This tends to overcome a previous problem in that the user often had to feed the string through the inner tube for use because the string tended to fall into the inside of the small tube **14**.

In FIGURE 4, the tampon **18** is encased within a water soluble bag **34**. The water soluble bag is preferably made from a film of methyl cellulose. This material is water soluble but impervious to oil, grease and such. One such material is manufactured by Morningstar-Paisley of New York, N.Y. under the trademark M-Aquafilm. This material is clear and has no odor. It is bland in taste and has a temperature range from 33° to 125° F. The material is heat sealable at low temperature ranges, and has good flexibility at all temperature ranges. This material can be used for edible products and has the Federal Drug Administration's approval.

The encapsulated tampon **18** has its string **22** enclosed in the bag **34** such that the capsule when loaded positions the string **22** adjacent the inner end **21** of the tube **14**. Thus when the tampon is in the body cavity and the capsule or plastic coating **34** dissolves, the string **22** will be adjacent the opening to the body cavity to provide means for removal of the tampon from the body cavity.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. A catamenial tampon applicator comprising:
(a) a first tube for receiving a tampon;
(b) a second tube having an outside diameter smaller than the inside said first tube;
(c) one of said tubes having a plurality of longitudinal undulations therein providing means to establish spaced, substantially line, elongated longitudinally extending areas of contact between the tubes to provide limited frictional engagement between the inner surface of said first tube and the outer surface of said second tube; and
(d) said tubes being in spaced relationship other than along said lines of contact.

2. An applicator according to claim 1 wherein said first tube has the plurality of longitudinal undulations therein.

3. An applicator according to claim 2 wherein said outer surface is coating formed of a material selected from the group consisting of polyvinyl alcohol, methyl cellulose and ethylene oxide.

4. An applicator for compressed fluid absorbent masses comprising:
(a) a first cylinder and a second cylinder telescopingly mounted in said first cylinder, said cylinders being of a water resistant material which disintegrate on prolonged contact with water;
(b) said cylinder having a plurality of diametrically positioned longitudinal indentations extending at least half the length thereof;
(c) the inner surfaces of said indentations defining means for controlling the frictional engagement between tubes;
(d) a compressed fluid absorbent mass positioned in said first cylinder to engage at least a portion of the inner surfaces of said indentations, in elongated, substantially line contact;
(e) the lines of contact between the inner surfaces of said indentations and said mass defining means for manually controlling the force required to expel said mass; and
(f) said undulations of said first cylinder engaging said second cylinder and said cylinders being otherwise spaced.

5. An applicator for compressed fluid absorbent masses comprising:
(a) a first cylinder and a second cylinder telescopingly mounted in said first cylinder, said cylinders being of a water-resistant material which disintegrates on prolonged contact with water including a paper layer and outer water affected plastic layers;
(b) said first cylinder having a plurality of diametrically positioned longitudinal indentations extending at least half the length thereof;
(c) the inner surfaces of said indentations defining means for controlling the frictional engagement between the tubes;
(d) a compressed fluid absorbent mass positioned in said first cylinder to engage at least a portion of the inner surfaces of said indentations in elongated, substantially line contact;
(e) the lines of contact between the inner surfaces of said indentations and said mass defining means for manually controlling the force required to expel said mass; and
(f) a water soluble bag encapsulating said mass.

6. The applicator of claim 5 wherein the bag is composed of a material which is clear, odorless, bland in taste, and has a temperature solubility of 33° to 125° F.

7. The applicator of claim 6 wherein said bag is methyl cellulose.

8. A tampon applicator combination comprising:
(a) inner and outer elongated tubes having end portions in telescopic relationship, said outer tube being a container tube and said inner tube being an expulsion tube;

(b) each of said tubes comprising a wound structure including:
(i) a body ply and
(ii) a smooth low friction surface covering that is water resistant;
(c) said outer tube including a plurality of circumferentially spaced, longitudinally extending, inwardly projecting, undulations establishing substantially line areas of contact between the tubes maintaining the tubes in concentric otherwise spaced relationship, said undulations extending from one end of the outer tube toward the other through said portions; and,
(d) a tampon within the outer tube and near said other end, the tampon including a string projecting through the inner tube.

9. The combination of claim 8 wherein said surface coverings are plastic coatings and said body ply is kraft paper.

10. The combination of claim 8 wherein said undulations have terminations intermediate the ends and said tampon abutting one of said terminations.

11. An applicator for a fluid absorbent mass comprising:
(a) an outer open ended tube having a mass receiving portion adjacent one end and a plunger guide portion adjacent the other end, said guide portion having a plurality of longitudinal undulations of substantial axial length to maintain and guide a plunger in axial alignment with the mass receiving portion;
(b) an elongated tabular plunger telescoped into said guide portion and reciprocal therein, said plunger having an outside diameter smaller than the inside diameter of the mass portion whereby it is spaced from the wall of the mass portion when projected into said mass portion, and being in sliding, guided, axially relatively movable engagement with inwardly extending longitudinal undulations of said guide portion;
(c) a compressed fluid absorbent positioned in said mass portion and abuttable by an end of said plunger; and
(d) said plunger being reciprocal through said guide portion and projectable substantially completely through said mass portion while still in sliding engagement with said guide portion whereby to eject said mass from said mass portion while spaced from the walls of said mass portion thereby providing limited frictional resistance to the axial displacement of said plunger in said outer tube.

12. A catamenial tampon applicator comprising:
(a) a first tube for receiving a tampon;
(b) second tube having an outside diameter smaller than the inside said first tube;
(c) one of said tubes having a contour providing means to establish spaced, substantially line, elongated longitudinally extending areas of contact between the tubes to provide limited frictional engagement between the inner surface of said first tube and the outer surface of said second tube;
(d) said tubes being in spaced relationship other than along said lines of contact; and
(e) said tubes being wound structures each including an outer surface of a water resistant but susceptable material on a ply of paper.

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CHARLES F. ROSENBAUM, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,429,312 February 25, 1969

Paul W. Stump

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 2, "play" should read -- ply --. Column 5, line 26, "disintegrate" should read -- disintegrates --; line 28, after "said" insert -- first --. Column 6, line 9, before "maintaining" insert -- and --; line 39, after "absorbent insert -- mass --.

Signed and sealed this 7th day of April 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents