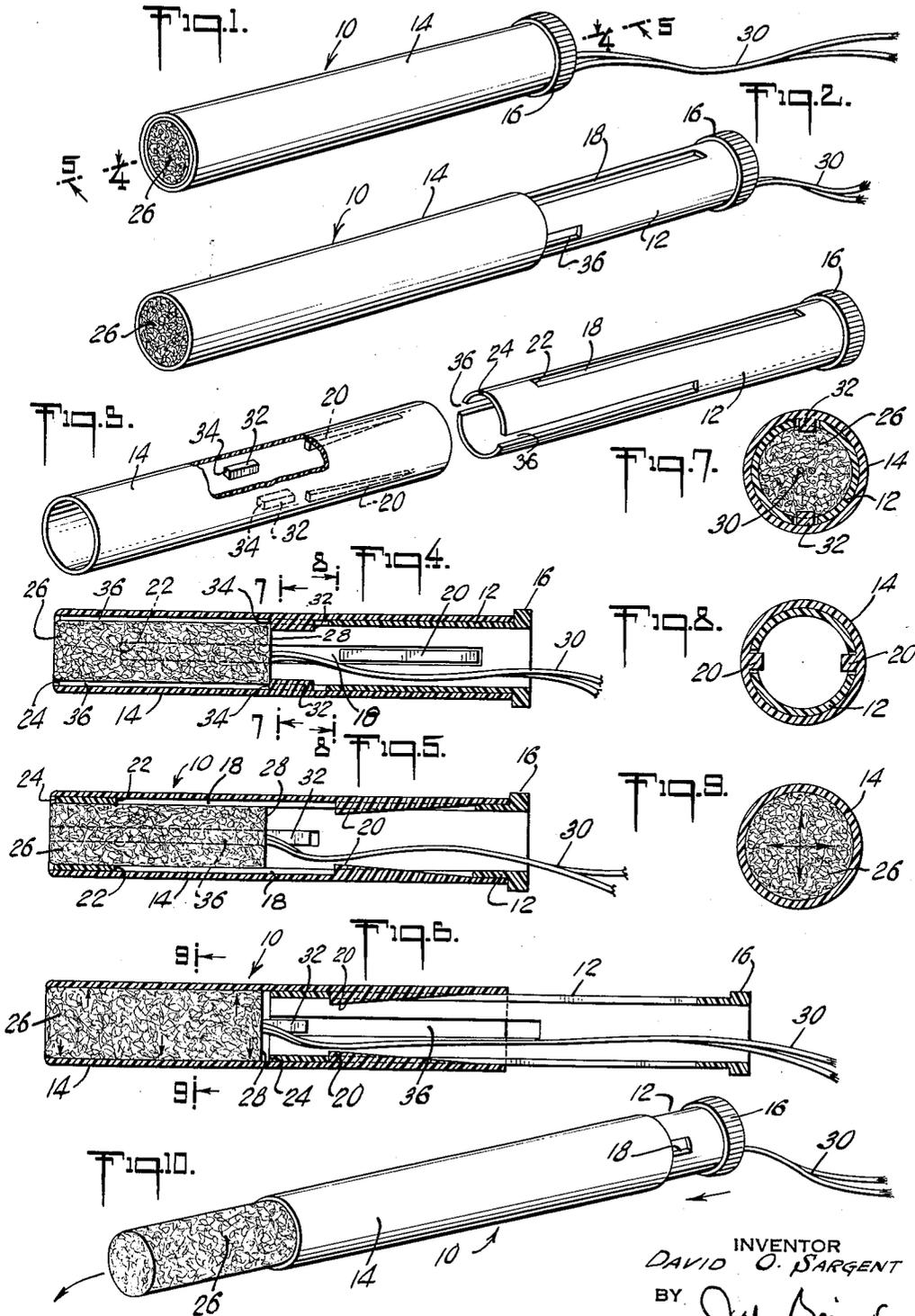


Aug. 27, 1963

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TAMPON APPLICATOR

3,101,713

Filed Feb. 23, 1961



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3,101,713

**TAMPON APPLICATOR**

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 Filed Feb. 23, 1961, Ser. No. 91,050  
 11 Claims. (Cl. 128-263)

This invention relates to catamenial devices and more particularly to applicators of improved construction and of reduced length for inserting tampons into the vagina.

One form of applicator for tampons which has received wide acceptance includes a pair of telescoped tubes of cardboard or similar material with the inner tube longitudinally movable within the outer tube. The applicator and a tampon of compressed absorbent fibrous material are pre-assembled as a unit to provide a complete article ready for use. The tampon is positioned within one end portion of the outer tube and the inner tube telescopically positioned in the other end with a major portion of its length extending beyond the end of the outer tube. To eject the tampon, the inner tube, which acts as a plunger, is moved longitudinally in the outer tube in the direction of the tampon.

Such tampon applicators, while acceptable and satisfactory in operation, are considerably longer than the tampon with which they are used. For example, in a tampon applicator of the above type the outer and inner tubes are each about three inches long, while the tampon is about two inches long. Therefore, the tampon occupies a major portion of the outer tube within which it is positioned, and the telescoped inner tube extends for more than one half its length beyond the end of the outer tube, thereby making the over-all length of the assembled tampon and applicator more than one and one half times the length of either tube, and about two and one half times the length of the tampon.

It is customary to package each of such assembled applicators and tampons individually and then package a number of them together, e.g. ten, to provide a sufficient number of tampons for a single menstrual period. Consequently, the individual packages and the combined packages are quite large in comparison to the size of the tampons which are to be ultimately used. By reducing the over-all length of assembled applicators and tampons, the size of the packages used to contain them may also be reduced and substantial savings in costs of packaging, of packaging materials and of storage space can be effected.

It would also be desirable to reduce the over-all length of assembled applicators and tampons because it is customary for one or more of such assembled units to be carried on the person, as for example in a purse, during the menstrual period. A package of smaller size would not only be more aesthetic and less noticeable but would also permit a greater number to be carried.

In accordance with the present invention, there is provided a tampon applicator of reduced size which may be furnished assembled with a tampon to provide a complete article ready for use. The over-all length of the assembled applicator and tampon is about the length of the outer tube with a portion of the inner tube extending just beyond the end of the outer tube to provide a finger-gripping portion. The applicator is economical to construct and package and is simple and efficient in operation.

A tampon applicator which achieves such objects includes an inner tube telescopically positioned within the outer tube and longitudinally movable therein. The inner tube, which acts as a tampon-ejecting plunger and which is about the same length as the outer tube, is fitted substantially entirely within the outer tube in its assembled, prior-to-use position. When the applicator is as-

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sembled with a tampon to provide a complete package ready for use, the forward end portion of the inner tube is positioned between the tampon and the inner wall of the outer tube; in effect, the tampon is held within the forward end portion of the inner tube.

When the inner tube is moved longitudinally outwardly from the outer tube in a direction away from the tampon, the forward end portion of the inner tube positioned between the tampon and the inner wall of the outer tube is withdrawn from such position. When the end of the inner tube has cleared the inner end of the tampon, the tampon is transferred to the outer tube, and the inner tube may then be moved longitudinally into the outer tube towards the tampon. During such movement, the front end of the inner tube engages the inner end of the tampon, causing the tampon to be ejected from within the outer tube.

The invention further includes means for indicating that the inner tube should not be withdrawn further from the outer tube to prevent inadvertent dissociation of the parts and also means for preventing withdrawal of the tampon from the outer tube simultaneously with retraction of the inner tube. In addition, the invention includes devices for holding the inner and outer tubes in aligned relation during longitudinal movement of the inner tube in the outer tube to insure direct application of the ejecting forces applied to the tampon when the inner tube is moved longitudinally into the outer tube.

Referring to the drawings, wherein a preferred embodiment of the invention is illustrated by way of example:

FIG. 1 is a perspective view of an applicator incorporating the invention, and containing a tampon to provide a complete article ready for use;

FIG. 2 is a view of the applicator with the inner tube moved outwardly from within the outer tube and illustrating the position of the inner tube prior to moving it into the outer tube to eject the tampon;

FIG. 3 is an exploded view of the parts of the applicator, cut away in part to reveal its inner construction, and with the tampon removed;

FIG. 4 is a view of FIG. 1, taken along lines 4-4, illustrating the tampon held within the forward end portion of the inner tube;

FIG. 5 is a view of FIG. 1, taken along lines 5-5;

FIG. 6 is a view similar to FIG. 5, illustrating withdrawal of the inner tube from within the outer tube and the transfer of the tampon from within the forward end portion of the inner tube to the forward end portion of the outer tube;

FIG. 7 is a view of FIG. 4, taken along lines 7-7;

FIG. 8 is a view of FIG. 4, taken along lines 8-8;

FIG. 9 is a view of FIG. 6, taken along lines 9-9; and

FIG. 10 is a view illustrating ejection of the tampon from the applicator.

In the embodiment of the invention illustrated in the drawings, the applicator 10 includes an inner tube 12 and an outer tube 14 arranged in telescopic relationship and in this respect has the general appearance of conventional cardboard tube applicators. The tubes are of approximately the same length, with the inner tube being slightly longer to provide a finger-gripping portion 16 in the form of a raised rib or flange extending just beyond the end of the outer tube. The finger-gripping portion also acts as a stop as will be explained below.

The inner tube has one or more longitudinally extending grooves or slots in its wall. One longitudinally extending slot 18, whose length is shorter than the over-all length of the inner tube and whose ends therefore terminate inwardly of the ends of the tube, is provided in the wall of the inner tube to co-operate with a radially extending protuberance 20 on the inner wall of the outer tube to

act as a means for stopping complete withdrawal of the inner tube from the outer tube during retraction. The protuberance 20 fits into and rides in the slot 18 in the wall of the inner tube during inward and outward longitudinal movement of the inner tube in the outer tube. The end 22 of the slot 18 adjacent the forward end 24 of the inner tube, i.e., the end which engages the tampon during ejection of the tampon 26, is located inwardly from the forward end of the tube a sufficient distance so that when the inner tube is withdrawn rearwardly from the outer tube, the end 22 will engage the front end of the protuberance 20 in abutting relationship, thereby stopping further rearward movement of the inner tube, just after the end 24 of the inner tube clears the inner end 28 of the tampon.

The inner and outer tubes, when arranged in assembled prior-to-use relationship, are substantially coextensive, with the tampon-engaging end 24 of the inner tube adjacent the forward end of the outer tube and with the finger-gripping portion 16 of the inner tube extending slightly beyond the rear end of the outer tube; thus the inner tube is contained substantially entirely within the outer tube. With the tubes so assembled, the tampon 26 of absorbent, fibrous material is positioned and held within the forward end portion of the inner tube. If the tampon is provided with a withdrawal cord 30, as is customary, the cord may extend through the opening in the rear of the inner tube and beyond. The applicator and tampon so assembled comprise a complete package ready for use.

To use the applicator as thus described with a tampon contained therein, the inner tube is first drawn longitudinally rearwardly from within the outer tube. Since the tampon is held within the forward end portion of the inner tube, it may tend to move rearwardly simultaneously with such rearward movement of the inner tube. To prevent the tampon from so moving, the inner surface of the outer tube may be provided with another radially-extending protuberance 32 having an abutting forward surface 34 extending at an angle to the inner wall of the outer tube and disposed at a sufficient distance from the forward end of the outer tube so that it will be at a point just beyond the inner end 28 of the tampon when the tampon is positioned within the applicator.

To enable the abutting surface to engage the inner end of the tampon, the inner tube is provided with another longitudinally-extending groove or slot 36 in its wall which extends rearwardly from the tampon engaging end 24 of the inner tube for a major portion of its length. The protuberance 32 fits into and rides in the slot 36 as the inner tube is moved. The height of the protuberance is sufficient to extend through and beyond the slot in order to engage the inner end of the tampon, i.e., the height of the protuberance is slightly greater than the thickness of the wall of the inner tube.

Accordingly, as the inner tube is withdrawn rearwardly from the outer tube, the inner end 28 of the tampon engages the abutting surface 34 of the protuberance 32 on the inner wall of the outer tube, and movement of the tampon is stopped. During such rearward movement of the inner tube, the tampon is transferred from its position within the forward end portion of the inner tube to the forward end portion of the outer tube.

When the tampon engaging end 24 of the inner tube has cleared the inner end 28 of the tampon, the tampon will be wholly transferred from the inner tube to the outer tube. Since the tampon is usually of compressed fibrous material, it will expand to some extent, as illustrated by the direction of the arrows in FIG. 9, to contact the inner surface of the outer tube to fill or partially fill the void between the outer surface of the tampon and the inner surface of the outer tube which occurs when the forward end portion of the inner tube is withdrawn from that position. The inner tube may then be moved longitudinally inwardly into the outer tube to eject the tampon. In such movement, the tampon-engaging end 24 of the inner tube, which has just cleared the inner end 28 of the

tampon during rearward movement of the inner tube, engages the inner end of the tampon. Continued inward movement of the inner tube into the outer tube causes the tampon to be ejected from the forward end portion of the outer tube when the tampon-engaging end of the inner tube reaches the end of the outer tube.

While one longitudinally-extending slot 18 which co-operates with the radially extending protuberance 20 on the inner wall of the outer tube to provide a stop to prevent withdrawal of the inner tube from the outer tube, and one longitudinally-extending slot 36 in the wall of the inner tube which permits the protuberance 32 on the inner wall of the outer tube to engage the inner end of the tampon to prevent its withdrawal provides a satisfactory way of effecting the results desired, it is preferred that there be a plurality of each of such slots and each of such protuberances. As illustrated in the drawings, the wall of the inner tube is provided with two diametrically-opposed, longitudinally-extending slots 18, 18 which co-operate with two diametrically-opposed, radially-extending protuberances 20, 20 on the inner wall of the outer tube to provide the means for stopping complete withdrawal of the inner tube. Similarly, the wall of the inner tube is also provided with two other diametrically-opposed, longitudinally-extending slots 36, 36 extending rearwardly from the tampon-engaging end which co-operates with two diametrically-opposed protuberances 32, 32 on the inner wall of the outer tube to provide the means for preventing withdrawal of the tampon during rearward movement of the inner tube in the outer tube. As illustrated, the respective pairs of slots and inwardly-extending protuberances may be disposed alternately at 90° with respect to each other.

The inwardly extending protuberances 32, 32 which act as stops to prevent withdrawal of the tampon during retraction of the inner tube may be relatively small providing they are of sufficient height to extend through the slots 36, 36 and beyond the inside surface of the inner tube. As illustrated, they may be rectangular shaped blocks integrally molded on the inner wall of the outer tube. They may, of course, be of other forms.

The other inwardly extending protuberances 20, 20 which co-operate as stops with grooves 18, 18 in the inner tube are preferably wedge shaped, inclining upwardly from the rear end of the outer tube towards the end which contains the tampon. This permits the inner and outer tubes to be associated more easily. As the inner tube is moved into the outer tube, the front ends of the inner tube will ride up on the inclined surfaces of the protuberances, causing the ends to converge, and thus enabling them to clear the protuberances 32, 32. When the forward ends 22 of the slots 18 clear the forward ends of protuberances 20, the protuberances will snap into the slots, and the front ends of the inner tube will diverge into contact with the inner wall of the outer tube. The two tubes are then associated, ready to receive the tampon.

The respective slots in the wall of the inner tube and the respective protuberances on the inner surface of the outer tube also act as guides for directing movement of the inner tube in the outer tube during longitudinal movement. Such guiding action insures positive ejection of the tampon by controlling the direction of the forces applied to the tampon by the inner tube during its inward longitudinal movement. Canting, twisting and similar movements of the inner tube in the outer tube during such longitudinal movement, which may cause binding, are prevented.

The inner and outer tubes are preferably made from a plastic material, such as polyethylene, which may be readily molded by conventional techniques. In view of the cost of materials, and in view of the simplicity of molding the applicator, the applicator of the present invention may be economically produced consistent with its use as a disposable item.

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It is apparent that numerous variations, modifications, and substitutions in the foregoing illustrative embodiment can be made without departing from the spirit of the invention and that such variations, modifications and changes are contemplated to be therein.

What is claimed is:

1. A tampon applicator comprising an outer tube and an inner tube telescopically positioned substantially within said outer tube and longitudinally movable therein, said inner tube being slightly longer than said outer tube, an end of said inner tube extending beyond said outer tube to provide a finger-gripping portion, the opposite end of said inner tube being open to receive a tampon, said inner tube having a longitudinally extending slot in its wall for a portion of its length terminating inwardly of the end of said tube opposite the end providing said finger-gripping portion, and means on said outer tube co-operating with the terminal portion of said slot to check withdrawal of said inner tube from said outer tube when said opposite end of said inner tube has cleared the inner end of a tampon positioned within said applicator.

2. A tampon applicator according to claim 1 wherein said finger-gripping portion is in the form of a raised surface.

3. A tampon applicator comprising an outer tube and an inner tube telescopically positioned substantially within said outer tube and longitudinally movable therein, said inner tube being slightly longer than said outer tube, an end of said inner tube extending beyond said outer tube to provide a finger-gripping portion, the opposite end of said inner tube being open to receive a tampon, said inner tube having a plurality of longitudinally extending slots in its wall for a portion of its length, said slots terminating inwardly of the end of said tube opposite the extending end providing said finger-gripping portion, and means on said outer tube co-operating with the terminal portions of said slots to check withdrawal of said inner tube from said outer tube when said opposite end of said inner tube has cleared the inner end of a tampon positioned within said applicator.

4. A tampon applicator comprising an outer tube and an inner tube telescopically positioned substantially within said outer tube and longitudinally movable therein, said inner tube being slightly longer than said outer tube, an end of said inner tube extending beyond said outer tube to provide a finger-gripping portion, the opposite end of said inner tube being open to receive a tampon, said inner tube having a longitudinally extending slot in its wall for a portion of its length terminating inwardly of the end of said tube opposite the extending end providing said finger-gripping portion, and an inwardly extending protuberance on the inner wall of said outer tube fitting into said slot and co-operating with the terminal portion thereof to check withdrawal of said inner tube from said outer tube when said opposite end of said inner tube has cleared the inner end of a tampon positioned within said applicator.

5. A tampon applicator comprising an outer tube and an inner tube telescopically positioned substantially within said outer tube and longitudinally movable therein, said inner tube being slightly longer than said outer tube, an end of said inner tube extending beyond said outer tube to provide a finger-gripping portion, said inner tube having a first and a second longitudinally extending slot in its wall for a portion of its length, said first slot terminating inwardly of the end of said tube opposite the extending end providing said finger-gripping portion, said second slot extending from said opposite end of said inner tube towards said finger gripping portion, means on said outer tube co-operating with the terminal portion of said

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first slot to check withdrawal of said inner tube from said outer tube when said opposite end of said inner tube has cleared the inner end of a tampon positioned within said applicator, and means on said outer tube extending through said second slot to engage the inner end of said tampon.

6. A tampon applicator comprising an outer tube and an inner tube telescopically positioned substantially within said outer tube and longitudinally movable therein, said inner tube being slightly longer than said outer tube, an end of said inner tube extending beyond said outer tube to provide a finger-gripping portion, said inner tube having a first and a second longitudinally extending slot in its wall for a portion of its length, said first slot terminating inwardly of the end of said tube opposite the extending end providing said finger-gripping portion, said second slot extending from said opposite end of said inner tube towards said finger-gripping portion, an inwardly extending protuberance on the inner wall of said outer tube fitting within said first slot and co-operating with the terminal portion of said slot to check withdrawal of said inner tube from said outer tube when said opposite end of said inner tube has cleared the inner end of a tampon positioned within said applicator, and another inwardly extending protuberance on the inner wall of said outer tube extending through said second slot to engage the inner end of said tampon.

7. A tampon applicator according to claim 6 wherein said protuberance extending through said second slot is in the form of a surface inclined upwardly from the finger-gripping portion of said inner tube.

8. A tampon applicator comprising an outer tube and an inner tube telescopically positioned substantially within said outer tube and longitudinally movable therein, said inner tube being slightly longer than said outer tube, an end of said inner tube extending beyond said outer tube to provide a finger-gripping portion, said inner tube having a plurality of first and a plurality of second longitudinally extending slots in its wall for a portion of its length, said first slots terminating inwardly of the end of said tube opposite the extending end providing said finger-gripping portion, said second slots extending from said opposite end of said inner tube towards said finger-gripping portion, inwardly extending protuberances on the inner wall of said outer tube fitting within each of said first slots and co-operating with the terminal portions of said slots to check withdrawal of said inner tube from said outer tube when said opposite end of said inner tube has cleared the inner end of a tampon positioned within said applicator, and other inwardly-extending protuberances on the inner wall of said outer tube extending through said second slots to engage the inner end of said tampon.

9. A tampon applicator according to claim 8, wherein said first and said second slots are disposed alternately with respect to each other.

10. A tampon applicator according to claim 8 wherein said first and said second slots each compose a pair of oppositely disposed slots.

11. A tampon applicator according to claim 10 wherein said first and said second slots are disposed alternately with respect to each other.

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