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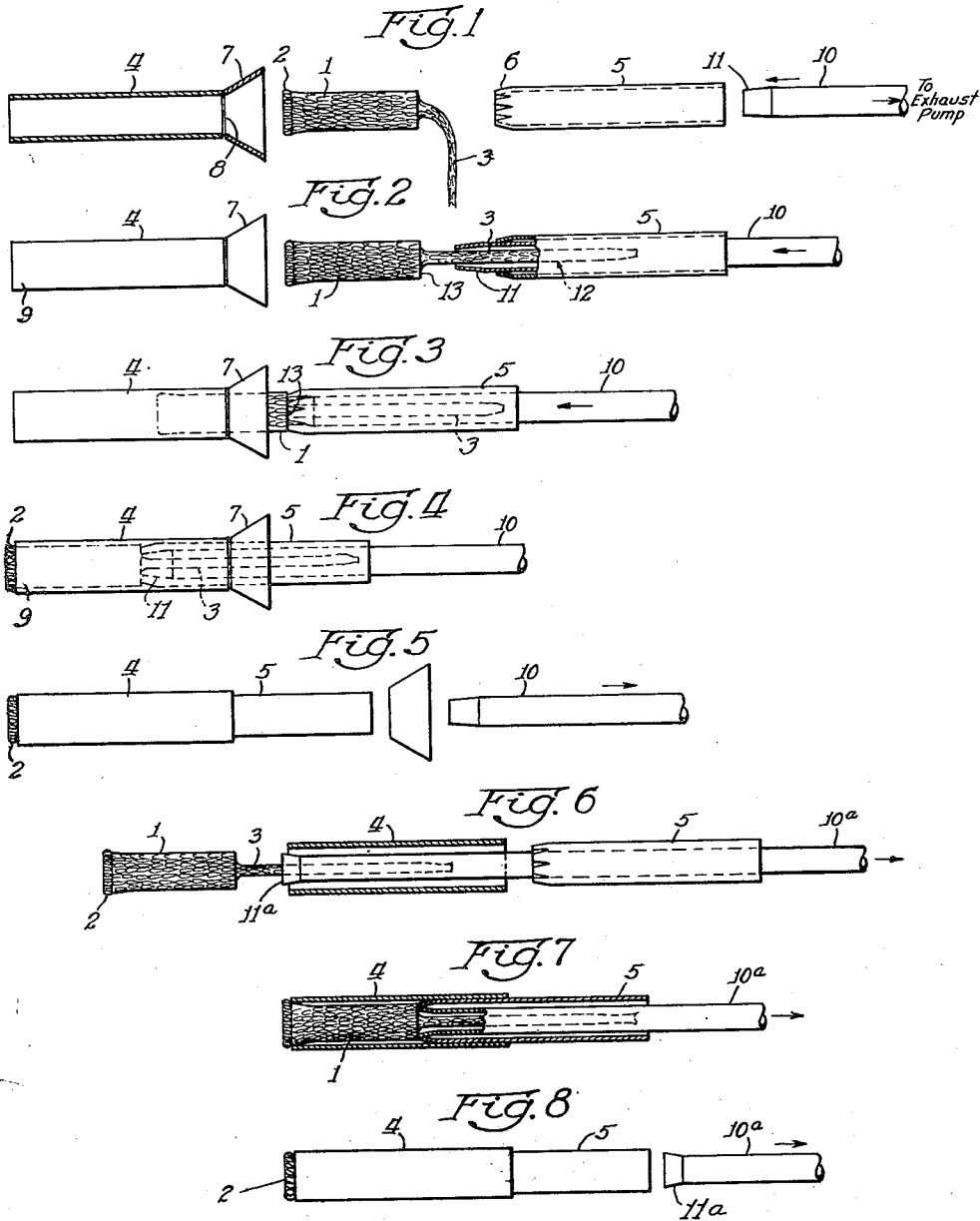
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2,690,598

TAMPON AND TAMPON APPLICATOR ASSEMBLING METHOD

Filed May 16, 1949

3 Sheets-Sheet 1



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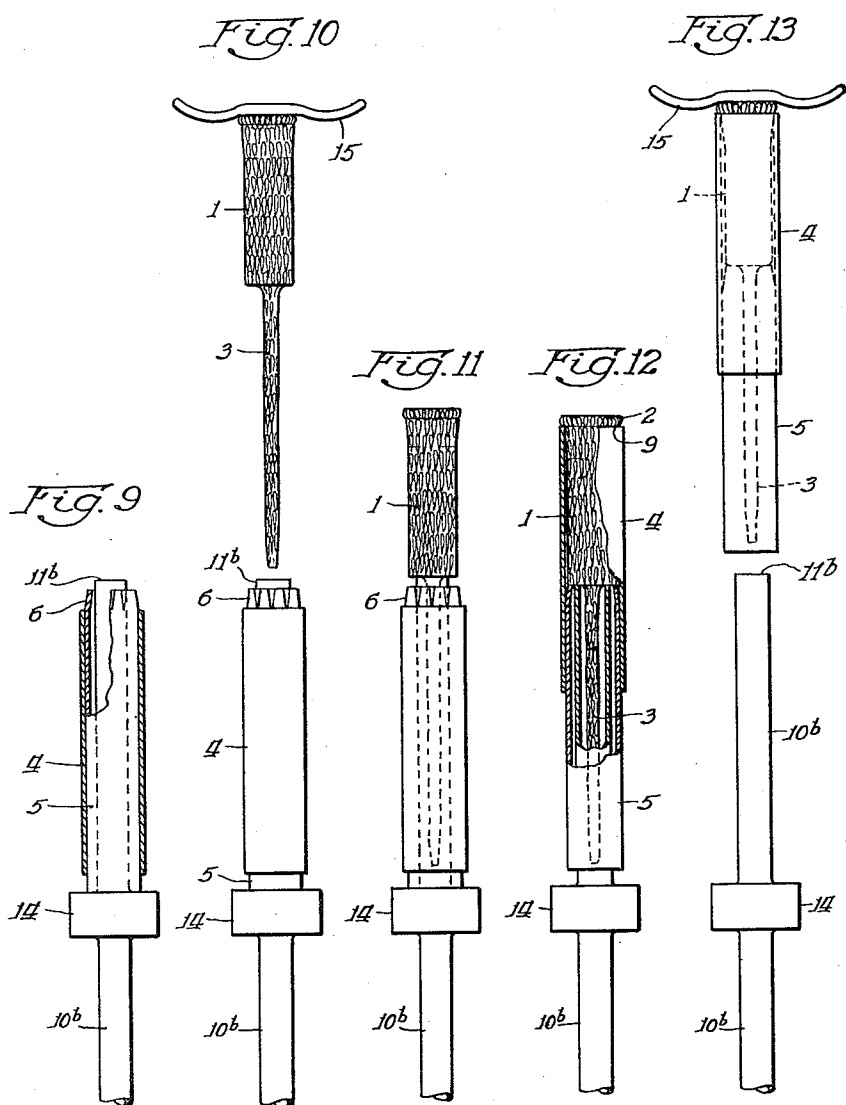
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TAMPON AND TAMPON APPLICATOR ASSEMBLING METHOD

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TAMPON AND TAMPON APPLICATOR ASSEMBLING METHOD

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Fig. 14

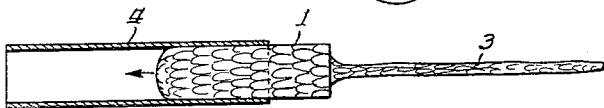


Fig. 15

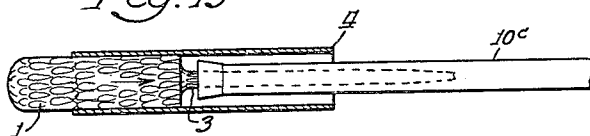


Fig. 16

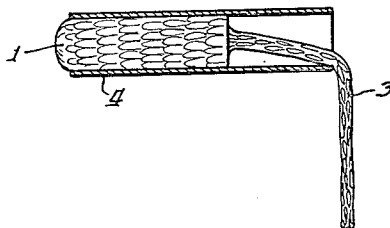


Fig. 17

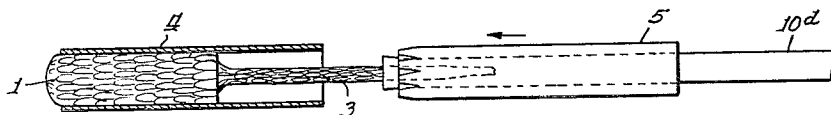


Fig. 18

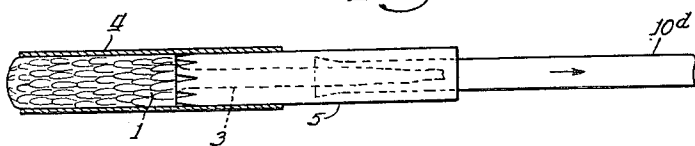
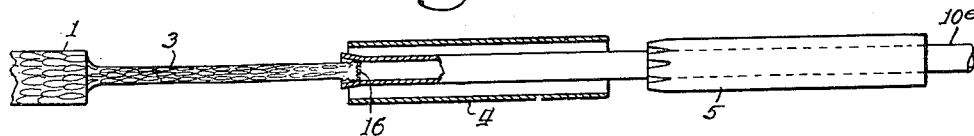


Fig. 19



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UNITED STATES PATENT OFFICE

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TAMPON AND TAMPON APPLICATOR
ASSEMBLING METHOD

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This invention relates to improvements in the art of assembling tampons and applicators therefor, particularly with reference to catamenial tampons which are supplied to the user in an applicator. An applicator such as herein contemplated comprises a paper tube in which the tampon is seated and whereby the tampon may be inserted to the desired location in the vaginal cavity, the tube being then withdrawn so as to leave the tampon alone in place. Some applicators of this kind embody a second tube which is telescoped into the tampon holding tube, this second tube constituting an ejector for aiding expulsion of the tampon from the applicator tube.

Catamenial tampons are generally provided with a drawstring or withdrawal cord, sometimes in the form of a string or thread or similar cord, tied or otherwise secured to the tampon. Such cord sometimes consists of an extension of a wrapper which encloses the tampon, the extension being more or less gathered to constitute the withdrawal cord. This withdrawal cord is also enclosed in portions of applicator structures of the kind referred to.

The main object of the present invention is to provide an efficient method for handling the draw-string part of a tampon to facilitate its introduction into a tubular applicator usually as a part of the operation of assembling the tampon with the applicator; another object is to provide a method as aforesaid which is especially adapted to the assembling of tampons and applicators where the applicator is of a form that mere air currents are insufficient to insure positive insertion and placement of the withdrawal cord; and another object is to provide such a method which is readily adaptable to both manual and mechanical performance.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawings in which several embodiments of the invention are illustrated.

In the drawings,
Figs. 1 to 5 inclusive, represent successive steps in one form of the method;

Figs. 6, 7 and 8 represent a second form of the method; and

Figs. 9 to 13 inclusive, represent a third form of the method;

Figs. 14 to 18 inclusive illustrate still another form in which the method may be employed; and

Fig. 19 is an illustration similar to Fig. 6 but showing a slightly modified arrangement.

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In the arrangement shown in Figs. 1 to 5 inclusive, a tampon 1 having a slightly enlarged head 2 and a withdrawal cord 3 extending from its rear end is initially located intermediate and in longitudinal alignment with an applicator tube 4 and an ejector tube 5. The tampon 1 may be of any desired construction, the details of which form no part of the present invention. It should be understood, however, that the tampon is a firm self-sustaining body which in many cases consists of absorbent material under a considerable degree of compaction. The material is, however, not hard but is soft enough to be capable of being further compressed and of some flexing.

The applicator tube 4 may comprise a thin-walled paperboard tube of sufficient stiffness to serve its indicated purpose, and these applicator tubes are in the order of $\frac{1}{8}$ " in outside diameter and $2\frac{3}{4}$ " in length.

The ejector tube or plunger 5 is also generally formed of thin-walled paper tubing and it preferably has its front end 6 crimped inwardly so as to provide, in effect, a wide seat on the end of the ejector for engagement with the rear end of the tampon for pushing the tampon out of the applicator tube.

In the method illustrated in Figs. 1 to 5 inclusive, the tampon body is to be moved forwardly into the applicator tube 4, and the withdrawal cord 3 is to be introduced into the ejector tube 5 which is to be advanced into engagement with the rear end of the tampon. The assembling of the ejector tube 5 relative to the tampon may be effected either preliminary to the introduction of the tampon into the applicator tube or simultaneously therewith.

In order to facilitate insertion of the enlarged or head end 2 of the tampon into the applicator tube 4, a funnel 7 may be provided through which the tampon may be passed into the applicator tube 4. The outlet end 8 of the funnel 7 should have its internal diameter approximately the same as the internal diameter of the applicator 4, or just slightly smaller, and the funnel should, of course, be of sufficiently rigid construction to be capable of compressing the tampon end 2 incident to movement of the tampon forwardly through the funnel. A funnel such as described will effect the necessary contraction of the enlarged head 2 to permit it to be moved forwardly into the tube 4, and the resiliency of the material of the tampon is sufficient to cause said compressed enlargement to re-expand upon emerging from the front end 9 of the applicator tube. Tampons which are tapered over their

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entire lengths may also be similarly assembled with applicators.

For the purpose of introducing the withdrawal cord 3 into the ejector tube 5 there is provided a suction pipe 10, the front end 11 of which may be slightly tapered if desired although this is not necessary. Some suitable means, for example, an exhaust pump, is employed to induce or produce an air flow or suction into the front end of the pipe. This suction pipe 10 is moved forwardly through the ejector tube 5 to a position such as illustrated in Fig. 2 where the suction occurring in the front or inlet end 11 of the pipe will cause the cord 3 to be picked up and drawn into the pipe as illustrated at 12 in Fig. 2. The pipe is advanced into engagement with the rear end 13 of the tampon and the ejector tube 5 is moved forwardly over the pipe 10 to bring its contracted end 6 also into engagement with the said rear end of the tampon. The pipe 10 and ejector 5 are advanced in unison as represented in Fig. 3 to thereby push the tampon 1 through the funnel 7 and into the applicator tube 4. When the tampon has reached its proper position in the applicator tube as shown in Fig. 4, the front end portion 2 of the tampon emerges and re-expands and the suction pipe 10 is withdrawn, leaving the assembled tampon, applicator and ejector tube free to be transported to a wrapping station, or to such other treatment as may be desired.

The employment of the suction pipe 10 provides a very effective means for introducing the withdrawal cord 3 into the ejector tube, especially because it provides a shield for keeping the cord out of contact with the front end of the ejector tube. In some instances the cord 3 is formed of openly knitted or braided material which has a pronounced tendency to catch on any slight burr or corner or other projection. Snagging of the withdrawal cord on any part of the tube is effectively prevented by the described means and method.

Suitable valve means (not shown) may be provided for regulating the strength of the suction in the pipe 10 and for turning it on and off to facilitate pickup and release of the withdrawal cords; or, the suction may be maintained constant since it need not be so strong as to prevent manual or mechanical withdrawal of the assembled structure from the funnel 7 and the suction pipe.

Not all tampons have the described enlarged head arrangement. In cases where the tampon is of substantial cylindrical form the funnel 7 may be dispensed with.

In the arrangement shown in Figs. 6, 7, and 8, the suction pipe is represented at 10a and it is provided with a slightly flared front end 11a which makes it somewhat easier to pick up the withdrawal cord and cause the cord to be drawn into the suction pipe. In the arrangement shown in the last mentioned figures the suction pipe is initially moved forwardly through the axially aligned applicator and ejector tubes 4 and 5 to pick up the withdrawal cord 3 of the tampon 1 which is disposed forwardly of the applicator tube and in substantially axial alignment therewith. When the cord 3 has been drawn into the suction pipe 10a, the suction pipe and the tampon 1 may then be moved rearwardly to introduce the tampon into the applicator tube as indicated in Fig. 7. The ejector tube 5 may be moved forwardly into place in the applicator tube as shown in Fig. 7 either before or after or at the

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same time that the tampon is introduced into the applicator. If desired, the ejector 5 may be moved forwardly into the applicator to the required extent and the assembled applicator and ejector tubes then moved forwardly into assembled relation with the tampon while the withdrawal cord thereof is housed in the suction pipe. Whichever way it is done, the result is that the tampon with its withdrawal cord is positioned in the applicator and ejector tubes whereupon the suction pipe 10a may be withdrawn rearwardly as represented in Fig. 8, leaving the tampon and applicator as a unit ready for wrapping or other treatment.

The arrangement shown in Figs. 9 to 13 inclusive, is generally the same as that represented in Figs. 6, 7 and 8. As there shown, the suction pipe 10b is provided with a fixed shoulder or collar 14 at a distance from the front end 11b of the suction pipe which is slightly greater than the length of the ejector tube 5 which is here represented as being slightly longer than the applicator tube 4.

The ejector tube 5 is initially telescoped into the applicator tube 4, this being readily accomplished since these tubes are of fairly firm, form-maintaining construction. The telescoped tubes in the relationship shown in Fig. 9 are then telescoped over the front or upper end portion of the suction pipe 10b, one or both of the tubes 4 and 5 being seated on the shoulder 14 as shown in Fig. 9. The front or upper end portion 11b of the suction pipe then projects slightly beyond the crimped front end 6 of the ejector tube so as to constitute a shield as aforesaid to facilitate movement of the withdrawal cord 3 through the front end of said applicator tube.

A tampon 1 with its withdrawal cord 3 is positioned substantially in axial alignment with the suction pipe and the applicator thereon, whereby the withdrawal cord 3 is placed in the field of the air current entering the suction pipe; the tampon is then lowered, the withdrawal cord entering the pipe 10b and the rear or lower end of the tampon body being brought into engagement with the end of the suction pipe on which it becomes as shown in Fig. 11. A suitable positioning device or gauge member 15 mounted in fixed relation to the suction pipe 10b, may be employed to facilitate the described initial positioning of the tampon relative to the suction pipe and applicator thereon.

The tampon is held in its seated position on the end of the suction pipe as shown in Fig. 11, and the applicator tube 4 is moved upwardly until the crimped end of the inner tube 5 engages the rear end of the tampon to stop the movement of the inner tube; upward movement of the outer tube is continued until the front end 9 of the outer tube comes into engagement with the flange-like end portion 2 of the tampon. The tampon and the applicator and ejector tubes are then in their properly assembled relation and may be withdrawn as a unitary structure from the suction pipe as represented in Fig. 13. It may be observed that although the ejector tube 4 is a sliding fit in the outer tube 5, there is sufficient friction between them to cause the inner tube to be moved upwardly as explained when the outer tube is grasped (manually or mechanically) and moved upwardly. The gauge member 15 also serves as a stop for holding the tampon against upward movement during the last described assembling steps.

The arrangement shown in Figs. 14 to 18 in-

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clusive contemplates what might be called a 2-stage assembling method. According to this method, a tampon 1 is initially introduced into the outer applicator tube 4 to produce the incomplete structure illustrated in Fig. 16.

This may be effected by introducing the tampon body forwardly into the applicator tube as represented in Fig. 14, or by introducing the tampon rearwardly with the aid of a suction pipe 10c to handle the drawstring 3 as represented in Fig. 15. The assembling of the tampon with the outer applicator tube to produce the incomplete structure shown in Fig. 16 constitutes the first stage of the 2-stage assembling method.

The second stage of the 2-stage assembling method comprises the steps of placing an ejector tube 5 over a suction pipe 10d as shown in Fig. 17, so as to cause the front or intake end of the suction pipe to project slightly beyond the contracted front end of the ejector tube. An assembled tampon and outer applicator tube such as shown in Fig. 16 is then brought into axial alignment with the ejector tube 5 and suction pipe 10d to enable the latter to pick up the withdrawal cord 3 whereupon relative movement is effected between the parts to bring the ejector tube into assembled relation to the outer tube 4 as shown in Fig. 18. The assembled tampon and applicator structure is separated from the suction pipe 10d. The tampon and its applicator are then completely assembled and ready for wrapping or other desired processing.

This two stage method is advantageous in that a portion of the withdrawal cord 3 is initially supported by the applicator tube 4, leaving a reduced portion of the length of said cord to be picked up and handled by the suction pipe 10d. Such a shortened length of cord can be picked up faster and with weaker air currents.

In the methods above described, the withdrawal cord portion of the tampon is drawn into the suction pipe and the suction pipe is accordingly made large enough to permit the cord to slide freely into the pipe. A somewhat smaller diameter pipe may be employed with corresponding reduction in air pumping requirements by the arrangement shown in Fig. 19 wherein the suction pipe is designated 10e and is represented as being somewhat smaller in diameter than in the other figures. At the front or inlet end of said suction pipe, it is suitably flared as illustrated, and provided with a screen or similar element 16 which will prevent the cord 3 of the tampon from moving into the pipe. The air current flowing into the pipe will, however, be effective to more or less attach the withdrawal cord to the screened end of the pipe as illustrated in Fig. 19. The pipe may then be withdrawn from tubes 4 and 5 or the tubes 4 and 5 moved off the pipe and into assembled relation to the tampon and cord in approximately the same manner as shown in Figs. 6 and 8 inclusive. The screen 16 is preferably set into the inlet end of the pipe 10e as shown, so as to provide more or less of a socket in the end of the pipe for receiving and confining the pneumatically attached end portion of the cord 3.

It has heretofore been proposed to pneumatically guide a tampon cord through applicator tubes of the character herein shown, the tubes being employed as a part of the air conduit. This arrangement is defective and inefficient because of snagging tendencies already referred to, especially when the withdrawal cord receiving tube has a constricted end or similar portion

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as herein shown. Also, a fairly large volume of air had to be drawn through the tubes in order to produce sufficient suction effect for guiding the tampon cords into the tubes. By employing a relatively small diameter suction pipe in the manner herein shown, snagging is prevented and the air pumping requirement is very greatly reduced; increased efficiency and important savings in respect of pumping equipment required and power consumption are thereby attained.

The suction pipe arrangement constitutes, in effect, a picker or hook which is passed through the applicators, whether of double tube construction herein illustrated or of single tube form, in order to grip the free end of the tampon cord for the purpose of pulling said cord through the tubes. Various forms of holders, guides, stops and other devices may of course be employed to facilitate the performance of the described assembling steps. The described method may be practiced manually, automatically or semi-automatically as desired.

In the following claims where reference is made to effecting movement of the suction pipe relative to a tube, it is intended that movement of a tube relative to the pipe be included within the scope of the claims. It is not generally essential that the suction pipe be moved since any preferred relative movement between the parts may be employed to produce the desired relationships. Accordingly, in the claims, it is intended that any suitable relative movement of the parts be referred to except where movement of a specific part is necessarily indicated by the wording employed.

We claim:

1. The method of assembling a tampon having a withdrawal cord extending therefrom, and an applicator having a pair of telescopically interfitted tubes, one of said tubes being adapted to receive said tampon, and the other of said tubes being adapted to receive said cord, which method comprises the steps of placing said tampon and said pair of tubes in longitudinal coaxial alignment with said cord receiving tube spaced lengthwise from said tampon and said tampon disposed intermediate said tubes, passing a suction pipe through said cord receiving tube so as to position the intake end of said pipe in such proximity to said tampon as to cause the suction current in said pipe to pick up and draw said cord into the alignment of said tubes, and then effecting relative movement between said pipe, tubes and tampon, to effect seating of said tampon in one of said tubes, housing of said cord in the other of said tubes, and telescopically interfitted relationship of end portions only of said tubes.

2. The method of assembling a tampon having a withdrawal cord extending therefrom, and an applicator having a pair of telescopically interfitted tubes, one of said tubes being adapted to receive said tampon, and the other of said tubes being adapted to receive said cord, which method comprises the steps of telescoping said tubes one within the other, effecting disposition of said telescoped tubes around a suction pipe with the inlet end of the pipe externally of the telescoped tubes, placing the tampon with its withdrawal cord into substantially coaxial alignment with said tubes and in such proximity to the inlet end of said suction pipe as to cause the suction of said pipe to attract said cord and pull the cord directly into said pipe, and adjusting said tubes relative to each other to telescope said outer tube over said tampon while also main-

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taining a telescopic interfitted relationship between end portions of said tubes, and effecting relative movement of said telescoped tubes and tampon as a unit and said suction pipe to effect withdrawal of said pipe from within said tubes to thereby leave said withdrawal cord in said inner tube.

3. The method of assembling a tampon having a withdrawal cord extending therefrom, and an applicator having a pair of telescopically interfitted tubes, one of which is an outer tube adapted to receive said tampon and a front end portion of the other of said tubes which is an ejector tube in which said cord is adapted to be disposed, said method comprising the steps of placing said tampon and said pair of tubes in longitudinal, coaxial alignment with said tampon and its cord in longitudinally spaced relationship to said ejector tube and the ejector receiving portion of said outer tube spaced lengthwise from said front end portion of said ejector tube, passing a suction pipe through said ejector tube so as to position the intake end of said pipe in such proximity to said tampon as to cause the suction current in said pipe to pick up and draw said cord directly into said pipe without engaging either of said tubes, and then effecting relative movement between said pipe, tubes and tampon to effect seating of said tampon in said outer tube, housing of said cord in said ejector tube, and seating of the front end portion of said ejector tube in said outer tube.

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4. The method of assembling a tampon having a withdrawal cord extending therefrom, and an applicator having a pair of telescopically interfitted tubes, one of which is an outer tube adapted to receive said tampon and a front end portion of the other of said tubes which is an ejector tube in which said cord is adapted to be disposed, said method comprising the steps of placing said tampon and said pair of tubes in longitudinal, coaxial alignment with said tampon at one end of the alignment and spaced endwise from said tubes, passing a suction pipe through both of said tubes so as to position the intake end of said pipe externally of said tubes and in such proximity to said tampon as to cause the suction current in said pipe to pick up and draw said cord directly into said pipe without engaging either of said tubes, and then relatively moving said pipe, tubes and tampon, to effect seating of said tampon in said outer tube, housing of said cord in said ejector tube, and seating of the front end portion of said ejector tube in said outer tube.

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