

[54] **LOCKING ARRANGEMENT FOR TUBE-TYPE APPLICATORS FOR TAMPONS AND THE LIKE**

[72] Inventor: John D. Bates, Appleton, Wis.

[73] Assignee: Kimberly-Clark Corporation, Neenah, Wis.

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[58] Field of Search 128/263, 270, 285, 260, 264, 128/265; 285/424, 382.2, 304, 345

[56] **References Cited**

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Primary Examiner—Robert W. Michell

Assistant Examiner—R. P. Dyer

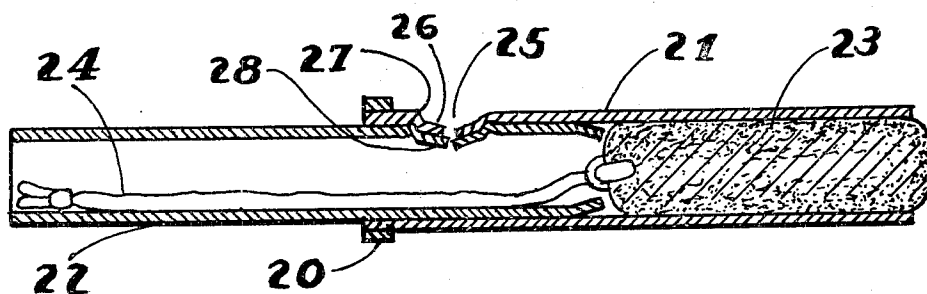
Attorney—Daniel J. Hanlon, Jr. and Raymond J. Miller

[57]

ABSTRACT

An improved locking arrangement for a tampon applicator of the type employing inner and outer tubes with a tampon seated in the outer tube and in which the inner tube is telescopically movable to eject the tampon or similar ejectable element. The improved arrangement temporarily locks together the inner and outer tubes to prevent premature separation during handling and processing. The locking arrangement is formed by punching through the wall of the outer tube, in an area where the inner and outer tubes overlap, an aperture defining at least one forward pointing, downwardly bent, triangular-shaped tab with a convex base depending from a concavely arcuate hinge line. The concavely arcuate hinge line from which the convex base the triangular-shaped tab downwardly depends, provides a stable construction which prevents the tab from losing its downward bend, due to its natural resilience until the tubes are manually pushed together by the user to eject the tampon. The aperture forming the locking arrangement may be circular and define a plurality of downwardly bent triangular segments with their convex bases and concavely arcuate hinge lines collectively forming the circumference of the aperture.

9 Claims, 8 Drawing Figures



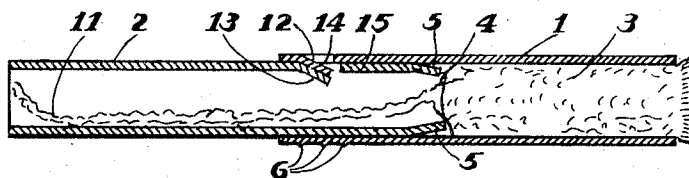


Fig. 1

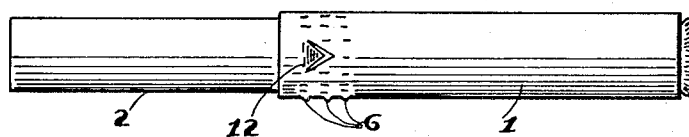


Fig. 2

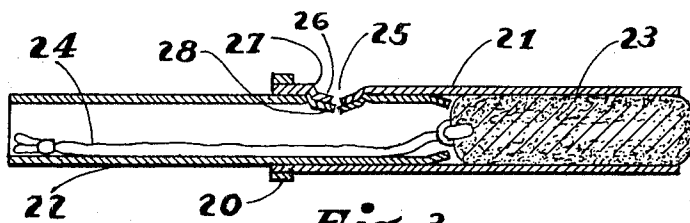


Fig. 3

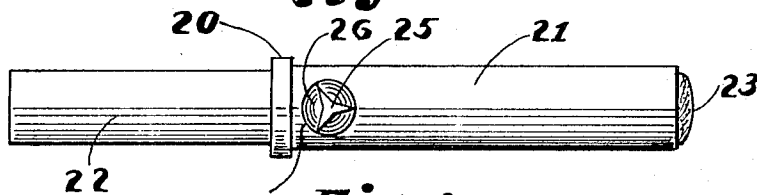


Fig. 4

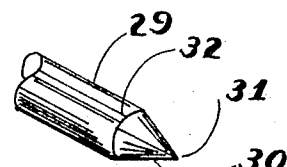


Fig. 6

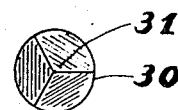


Fig. 7

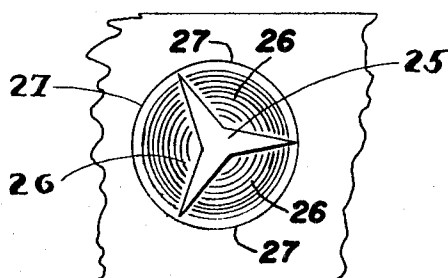


Fig. 5

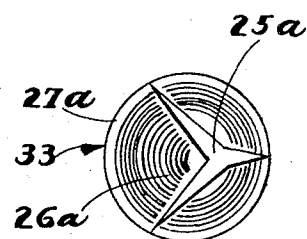


Fig. 8

LOCKING ARRANGEMENT FOR TUBE-TYPE APPLICATORS FOR TAMPONS AND THE LIKE

BACKGROUND OF THE INVENTION

In tampon applicators of the type which comprise an inner and outer tube with an absorbent tampon or similar element disposed in the outer tube, and the inner tube slidably disposed within the outer tube for the purpose of ejecting the tampon, it is necessary to provide a temporary locking arrangement to hold the tubes together prior to use. The purpose of the locking arrangement is to avoid accidental or premature separation of the tubes incident to normal handling of the structure by the user, or as a result of the jostling occasioned during manufacturing and shipping.

Prior to this invention, the most commonly used locking arrangement comprised a triangular tab which was punched through the inner and outer walls of the overlapped tubes, with the point extending below the circumference of the tubes and pointing towards the front end of the applicator. The tab is hinged downward along a straight line forming the base or side of the triangle opposite the point and in its ideal downwardly bent position resists rearward forces which attempt to separate the tubes, while permitting the inner tube to slide forward during ejection. However, it was found that the jostling the structure received during manufacturing, shipping and handling tended to move the tubes axially with respect to each other sufficiently to raise the point of the tabs on the outer tube from its desired downwardly disposed position below the circumference of the inner tube to a position flush with the original tube walls. When this happens, the locking arrangement is ineffective, permitting the tubes to disengage prematurely. In addition, it has been found that upon aging, as in time spent in a warehouse or on store shelves, the downwardly bent tab frequently tends to return to its original position flush with the outer tube wall due to the natural resilience of the tube material, thus rendering its locking function ineffective.

The present invention provides improved locking tabs or downwardly bent segments which resist displacement during normal handling or aging and thus provide a more positive locking arrangement.

SUMMARY OF THE INVENTION

The improved locking arrangement of this invention comprises a structure wherein downwardly bent triangular tabs with a convex base protrude from the wall of outer tube through an opening in the wall of the inner tube and are positively held in their depressed position by concavely arcuate hinge lines from which the tab depends.

The locking arrangement may comprise a single triangular tab with the point pointing toward the forward end of the tampon and with the convex base and concavely arcuate hinge line being disposed substantially transverse to the axis of the tube, or preferably, it may comprise a multiplicity of triangular tabs arranged similar to a segmented pie configuration, with the convex bases of the triangles and the concavely arcuate hinge lines collectively forming the circumference of a circular aperture with the points or apices of the triangles directed toward the center of the aperture.

The inner tube may have a precut opening into which the tabs project, or the inner tube and the outer tube may be punched simultaneously to provide matching downwardly depressed tabs in each wall.

Accordingly, it is the principal object of this invention to provide a tube-type tampon applicator with an improved locking arrangement which resists premature dislocation.

Another object is to provide a locking arrangement in which a downwardly bent tab is structured to prevent its returning to its original position prematurely.

Other objects will become apparent by reference to the following specification and drawings wherein there are described various selected embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal section of a tube-type applicator and tampon showing the structure of a popular prior art locking arrangement.

FIG. 2 is a plan view of the applicator of FIG. 1.

FIG. 3 is a longitudinal section of a tube-type applicator and tampon showing the structure of a preferred embodiment of the improved locking arrangement.

FIG. 4 is a plan view of the applicator of FIG. 3.

FIG. 5 is a greatly enlarged view of the locking arrangement of FIG. 3 as viewed from above.

FIG. 6 is a perspective view of a punching tool which may be employed to provide the locking arrangement shown in FIGS. 3-5.

FIG. 7 is a front view of the point of the tool shown in FIG. 6.

FIG. 8 is an enlarged view similar to FIG. 5 showing another embodiment of the locking arrangement in which the forward pointing tab has a hinge line with a longer arc.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For a better understanding of the improvements defined herein, the prior art will first be described.

As shown in FIG. 1, conventional tube-type applicators comprise an outer or holder tube 1, and an inner or ejector tube 2. The tubes may be made of a suitable grade of paper-board or other material, a preferred type presently comprising a multiplicity of specially wound paper strips, with the outer surface having a smooth, coated finish.

Inner ejector tube 2 is fitted inside outer tube 1 to be freely slidable therein. An absorbent tampon body 3, with a withdrawal string 11 attached to one end and disposed inside inner tube 2, is seated in the front end of outer tube 1, and the forward end 5 of ejector tube 2 is arranged to engage the rear end 4 of the tampon body 3.

To insure good contact with tampon body 3 during ejection, the forward end of ejector tube 2 is normally contracted or reduced in diameter as shown at 5. The rear portion of outer tube 1 is usually provided with a suitably roughened outer surface portion as indicated at 6 to facilitate grasping the tube end by the fingers of the user. The roughness here represented is provided by pin pricking outer tube 1 from inside to outside. For sanitary reasons, the applicator is also usually wrapped in a protective wrapper, not shown.

The prior art locking arrangement shown in FIGS. 1 and 2 comprises an inwardly disposed pointed tab 12 usually punched into the wall of outer tube 1 while simultaneously punching a complementary tab 13 onto the wall of inner tube 2. The point of tab 12 is depressed sufficiently to extend through opening 14 formed in the inner tube wall as an incident to punching the tabs therein. Tab 12 acts to engage edge portion 15 of inner tube 2 and thereby prevents rearward displacement of inner tube 2. However, it was found that as a result of the jostling the device receives during manufacturing and shipping, and in handling by the user, some forward motion of inner tube 2 within outer tube 1 frequently occurs, forcing tabs 12 and 13 back to their original flush position with their respective tube walls and rendering the locking arrangement ineffective. Long term aging in warehouses or on store shelves also had a similar undesirable effect as the points tended to return to their original configuration flush with their respective walls due to the natural resilience of the material from which the tubes are made. The improved locking arrangement of this invention is designed to prevent such premature unlocking which may result either from jostling or from aging.

As shown in FIGS. 3-5, a preferred embodiment of the improved applicator has the usual outer tube 21 and inner tube 22, with an absorbent tampon body 23 disposed in the forward end of outer tube 21, and an accompanying withdrawal string 24 attached to the rear of tampon 23 and extending rear-

wardly inside inner tube 22. The rear end of outer tube 21 is provided with a raised annular ring 20 to facilitate grasping the tube end by the fingers of the user.

Near the rear end of tube 21 in the area where it overlaps tube 22, an aperture 25 is punched to form at least one downwardly depending triangular shaped tab 26 with a convex base. The aperture in this preferred embodiment is circular or concave in at least the convex hinge portion from which each tab depends, and in the preferred form shown, comprises a multiplicity of triangular segments 26, with the respective convex bases of the segments and associated concavely arcuate hinge lines 27 from which the segments bend downwardly collectively forming a complete circle. Hinge lines 27, in addition to being concavely arcuate, preferably are slightly depressed at their periphery to form a shoulder as shown in the drawings. The depressed concavely arcuate hinge thus formed more positively prevents the triangular segment 26 with the convex base from moving out of its downwardly depending configuration except by physically forcing it upward, as by manually sliding inner tube 22 forward through outer tube 21. The downwardly depending position of segments 26 is also maintained during aging because of the forces exerted by the concavely arcuate hinge on the convex base of each segment, which counteracts the tendency of the resilient material to attempt to return to its original configuration. Tampon applicators with the described locking arrangements were extensively tested by a number of trials encompassing normal manufacturing, shipping, handling and aging steps, in matched comparison with the prior art locking arrangements, and it was found that less than 1 percent of the improved locking arrangements failed compared to more than 22 percent failure in the conventional devices.

While the act of punching the triangular segmented configuration into outer tube 21 will simultaneously form matching segments 28 in an underlying portion of inner tube 22 when the tubes are overlapped as shown in the drawings, the inner tube alternatively may be provided with a precut opening of suitable size and shape which is then matched or indexed with the aperture to be punched in the outer tube.

Thus, the downwardly depressed tabs may be formed only in the outer tube if desired, by matching or indexing the punching device with a precut opening in the inner tube.

In FIGS. 6 and 7 there is shown a suitable tool for punching the assembled tubes to form the improved locking tab arrangement. It comprises a cylindrical rod 29, of from about 1/16 to 1/4 inches in diameter, with one end being ground with a plurality of flat triangular faces 30 to form a point 31 as the apex of a pyramidal configuration with a circular base. In using the tool, the point is forced into the overlapping tubes sufficiently far so that circular base or round shank portion 32 penetrates through at least the thickness of the outer tube wall and preferably partially through the inner tube wall. This will provide the concavely arcuate hinge line 27 with a depressed shoulder configuration which is a structurally stronger form for maintaining segments 26 with their convex bases in a downwardly bent attitude than is a simple concavely arcuate line which is flush with the wall surface.

While the preferred embodiment comprises a circular depression with multiple depressed tabs, it will be seen that the advantages of the invention can suitably be applied to a single tab structure somewhat similar to that shown in the prior art. The concavely arcuate hinge line thus provided will serve to keep a single locking tab bent downwardly from its convex base through handling and aging processes, although the number of failures has been found to be slightly higher than when the full circular configuration used, and such embodiment is therefore less desirable.

Similarly, the circular configuration may be retained with the geometric center of the tab points moved forward so that the triangular tab at the rear of the aperture with its point facing forward has a concave hinge line of substantially longer arc. This is shown in FIG. 8 where aperture 25a at the point of penetration is offset toward the forward end of the tube

providing a longer triangular tab 26a with a convex base having a longer arc 33 at hinge line 27a. To provide this configuration, the pyramidal grinding of the tool utilized would also be offset forwardly.

The frictional grasping aid at the rear of the outer tube may be of any suitable type in addition to the perforations or the ring shown in the drawings, and its shape, size or configuration is not material to the invention.

The shape and form of the tampon body may also vary, and the tampon may be either compressed or noncompressed.

While the improvement has been particularly described as being especially applicable for use with tube applicators containing absorbent tampons, it will be seen that it may be readily adapted to tube applicators used for inserting other ejectable elements such as suppositories, medical sponges, medicaments and the like.

In addition, the frontal end of the outer tube may be tapered or otherwise shaped, to aid insertion. The rear end of the inner tube may also be rounded or tapered for comfort and efficiency in use.

What is claimed is:

1. In the applicator device comprising telescopically inter-fitted inner and outer tubes wherein the forward portion of the outer tube is adapted to receive an ejectable element and the inner tube is forwardly movable within the outer tube to eject said element therefrom and wherein said inner tube is provided with an aperture spaced rearwardly from its front end and a portion of the wall of said outer tube is disposed over said opening and provided with temporary locking means depending downwardly through said opening, the improved locking arrangement in which said locking means comprises at least one triangular-shaped segment with a forwardly disposed point and a rearwardly disposed convex base with said base depending downwardly from a concavely arcuate hinge line, and in which said concavely arcuate hinge line is depressed below the outer wall surface to form an arcuate shoulder.

2. The improved locking arrangement of claim 1 in which the aperture in said inner tube is provided by a downwardly depending triangular-shaped segment similar to and in registry with the triangular-shaped segment depending from the wall of said outer tube.

3. In an applicator device comprising telescopically inter-fitted inner and outer tubes wherein the forward portion of the outer tube is adapted to receive an ejectable element and the inner tube is forwardly movable within the outer tube to eject said element therefrom and wherein said inner tube is provided with an aperture spaced rearwardly from its front end and a portion of the wall of said outer tube is disposed over said opening and provided with temporary locking means depending downwardly through said opening, the improved locking arrangement in which said outer tube is provided with a plurality of downwardly depending tabs projecting through said opening, said tabs comprising triangular-shaped segments with convexly arcuate bases, the apices of said segments being bent downward to extend through said opening, and the convex bases of each of said segments depending downwardly from hinge lines which form the downward bend, said hinge lines being concavely arcuate in plan view, and which hinge lines collectively form a circle.

4. The improved locking arrangement of claim 3 in which said concavely arcuate hinge lines collectively form a depressed circular shoulder.

5. The improved locking arrangement of claim 3 wherein the opening in said inner tube is provided by a plurality of triangular shaped downwardly bent segments with convex bases similar to and in registry with the downwardly bent segments depending from the wall of said outer tube.

6. The improved locking arrangement of claim 5 in which a set of said registered triangular segments comprising one overlying outer tube segment and one underlying inner tube segment is arranged with apices of said set pointing towards the forward end of said tubes along a line substantially parallel to the axis of said tubes.

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7. The improved locking arrangement of claim 6 in which said apices are offset forward from the geometric center of said aperture.

8. The improved locking arrangement of claim 3 in which one of said triangular segments is arranged with its apex pointing towards the forward end of said outer tube along a line

substantially parallel to the tube axis.

9. The improved locking arrangement of claim 8 in which said apex is offset forward from the geometric center of said aperture.

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