

[54] DISPENSER

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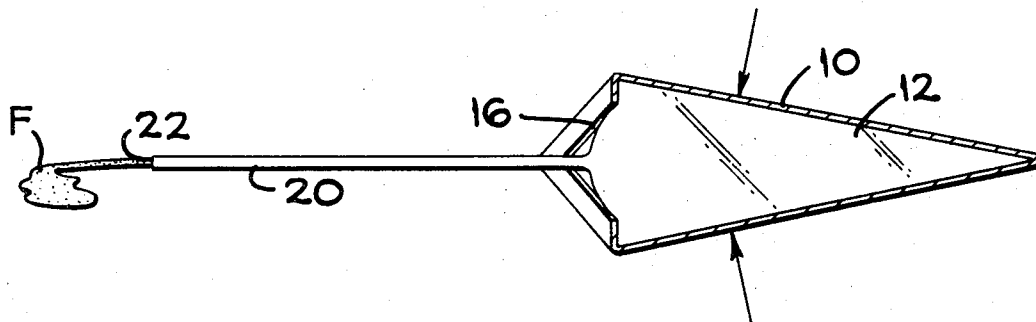
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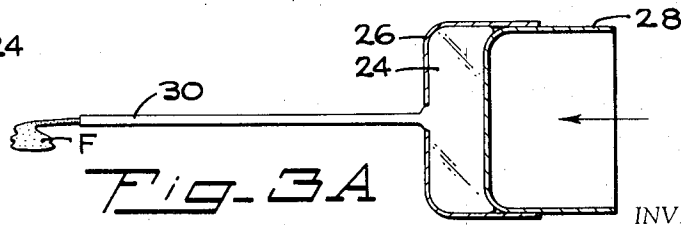
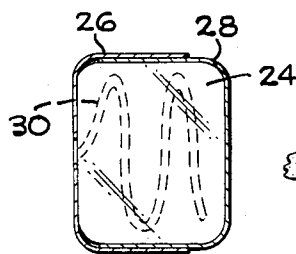
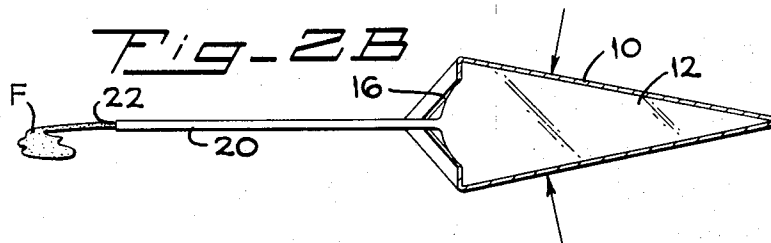
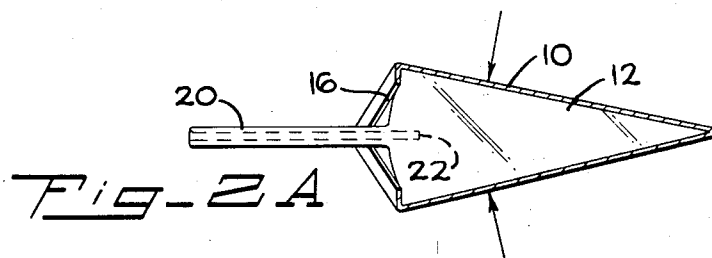
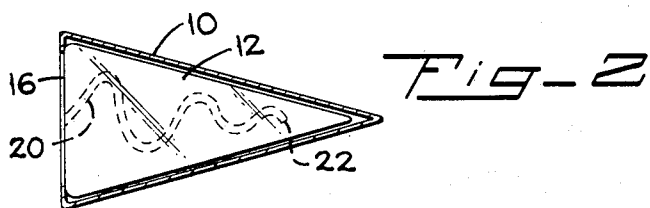
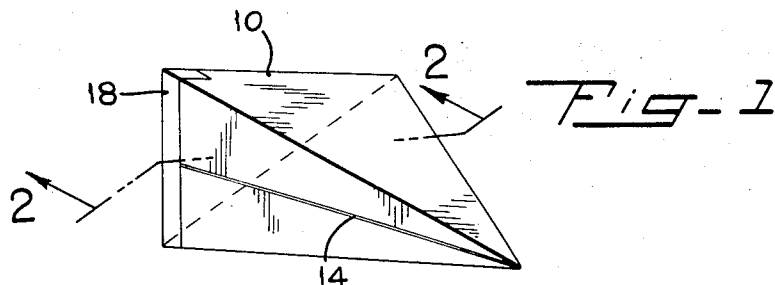
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[57] **ABSTRACT**

A dispenser arranged for the injection of fluent pharmaceutical formulations into body cavities including an integral flexible container for the formulation and a flexible dispensing tube arranged to move from an invaginated collapsed disposition to a projecting operative dispensing disposition in response to application of external pressure through, for example, a collapsible package for the unit.

3 Claims, 6 Drawing Figures





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DISPENSER

FIELD OF THE INVENTION

The present invention relates generally to dispensers, and more particularly, to a dispenser adapted for the injection of fluent pharmaceutical formulations or the like into body cavities, such as the vagina of the human female.

BACKGROUND OF THE INVENTION

Over the years, a considerable number of dispensers or applicators have been designed for injecting various medicaments or other pharmaceutical preparations into body cavities, such as the female vagina, the anus, the urethra, etc. Among these, some have taken the form of reusable structures, such as syringes, and are obviously exposed to some environmental conditions between uses so that the possibility of contamination and ultimate infection of the user has existed. In an effort to solve this serious problem, some single-use, throw-away dispensers containing the pharmaceutical formulation have been utilized; and while this has somewhat alleviated the problem, there has remained some possibility of contamination after removal of the outer package. Furthermore, because certain body cavities are relatively deep, the dispenser for proper use has been relatively elongated (e.g. 5 inches in the case of vaginal applicators) which has presented both a difficulty in storage, for example, in a woman's purse, and somewhat uncomfortable in its insertion and use, frequently causing irritation of the body cavity.

SUMMARY OF THE PRESENT INVENTION

Accordingly, it is the general objective of the present invention to provide a dispenser for the injection of fluent pharmaceutical formulations into body cavities which constitutes a small size sterile unit preferably arranged for the injection of but a single dose in a manner which is both convenient and comfortable. Briefly, this objective is achieved by providing a flexible container for the pharmaceutical formulation that is enclosed except at one point whereat it communicates with an elongated flexible dispensing tube having a discharge opening at its remote end. Prior to use, the tube occupies an infolded or invaginated disposition within the container from which collapsed disposition the tube will unfold and extend itself into a projecting disposition automatically in response to the application of exterior pressure to the flexible and therefore collapsible container. While the end of the tube does have a small dispensing opening through which the fluent pharmaceutical preparation will be extruded upon application of sufficient pressure to provide full projection of the tube, as long as the tube remains fully or even partially in its invaginated disposition, the opening will remain closed, thus in effect, providing an automatic valve mechanism. Furthermore, as will be apparent since the tube remains in its invaginated, inoperative disposition prior to use, it is enclosed from the exterior environment and thus is automatically maintained in a sterile condition.

Preferably, an exterior package surrounds the entire flexible container and invaginated tube in its inoperative disposition and is arranged to provide a means for applying pressure to the container when the dispensing operation is to proceed. The container and the encompassing package can have relatively small dimensions

since the dispensing tube is infolded when the unit is in its collapsed, inoperative disposition, and thus can readily be stored, for example, in a purse, and also can be readily handled when it is to be utilized. During its use, since there is no rigid projecting tube, as in prior art devices, the soft tube can be extended into its full projecting disposition conveniently and without any possibility of pain or injury to the user; and in addition, the dispensing itself will not occur until full extension of the tube has been achieved thus assuring proper placement of the pharmaceutical preparation in the body cavity without the necessity of high pressure injection.

BRIEF DESCRIPTION OF THE DRAWINGS

The stated objective of the invention and the manner in which it is achieved, as summarized hereinabove, will be more readily understood by reference to the following detailed description of the two embodiments of the invention shown in the accompanying drawing wherein:

FIG. 1 is a perspective view of a dispenser embodying the invention in its collapsed, inoperative disposition in which it can be sold and stored prior to use,

FIG. 2 is a central, sectional view taken along line 2—2 of FIG. 1 indicating interior details of the structure,

FIG. 2 a is a central sectional view similar to FIG. 2 illustrating the instigation of the dispensing operation,

FIG. 2 b is another central, sectional view similar to FIGS. 2 and 2 a showing the final dispensing operation,

FIG. 3 is a central, sectional view analogous to FIG. 2 showing details of a modified embodiment of the invention, and

FIG. 3 a is a view of the FIG. 3 structure when dispensing has been actuated.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENTS OF THE INVENTION

With initial reference to FIG. 1, the illustrated dispenser embodying the present invention includes an exterior package 10 in the shape of a tetrahedron whose faces are preferably formed from slightly stiff material such as cardboard so that the package will retain its shape during marketing and subsequent storage, but on the other hand, are sufficiently soft so that finger pressure applied to the upper and lower faces of the tetrahedron provides means for applying pressure to the interior container 12, as will be explained in detail hereinafter, to achieve the actual dispensing operation. To facilitate such collapse of the upper and lower faces, fold lines, such as indicated at 14 in FIG. 1 are formed centrally along the side faces of the tetrahedron. Along the edge of the tetrahedron which joins the apexes of the upper and lower faces thereof, a slit 16 is formed to enable the dispensing operation to proceed, but prior to use of the unit it is preferably covered by a simple tear strip 18 adhesively joined to the package 10.

With additional reference to FIG. 2, the mentioned container 12 preferably in the form of a flexible bag composed of polyethylene plastic film or similar flexible material is disposed assuming the exterior configuration of the package which surrounds the same and is arranged to contain, preferably, a unit dose of a fluent pharmaceutical formulation F which is to be dispensed. Adjacent the slit 16 of the tetrahedron package 10, a tube 20 is joined to the plastic container 12 and prefer-

ably is formed integrally therewith of the same plastic material so as to constitute a single unit which simplifies manufacture. Prior to dispensing use of the unit, the tube 20 is folded into a collapsed disposition within the container 12, as illustrated in FIG. 2, so as to assume an infolded or invaginated disposition there-within. At its extremity, a small opening 22 is provided in the tube 20 which ultimately permits the extruded dispensing of the pharmaceutical substance F.

With additional reference to FIGS. 2 a and 2 b, the dispensing operation occurs in response to the application of pressure to the upper and lower faces of the tetrahedron package 10. Initially, when the package 10 is squeezed, the side faces of the tetrahedron fold slightly along the lines 14 thus causing the edge slit 16 to open. As the package 10 is squeezed, the pharmaceutical substance F is exposed to pressure and since the container 12 is confined, the tube 20 itself will start to unfold outwardly through the opened slit 16 towards the intermediate position shown in FIG. 2 a, but during this operation since pressure is also applied to the exterior of the partially invaginated tube section, no material may seek its way through the tube to the discharge opening 22 at the extremity thereof. Only when the package has been sufficiently squeezed to provide full projection of the tube 20, as shown in FIG. 2 b, will the opening permit the extrusion of the fluent pharmaceutical formulation therefrom, as indicated in the latter figure. As will be obvious, in practical use of the structure, the entire package 10, after removal of the tear strip 18, is positioned with the slit 16 of the package adjacent the body cavity which is to be medicated and finger pressure is then applied to the package to cause the projection of the tube 20 into the body cavity and continued pressure will then extrude the material F from the opening 22 at the end of the projecting tube 20 at the desired depth in the body cavity. It is to be noted that by lesser or greater use of finger pressure, the tube 20 may be extended either slowly or more rapidly so that no discomfort will be caused during the dispensing operation, and in addition, it is to be particularly noted that the tube can flex during extension to further avoid pain or discomfort. Since the tube, prior to use, is in its infolded position, it will remain sterile up to the very time of application of the pharmaceutical formulation F. Additionally, because of such infolded configuration, the container 12 and tube 20 can be formed by heat sealing the edges of two pieces of plastic but the rough edges can be arranged interiorly so as not to contact any tender areas of the body cavity thus further to alleviate any

pain or injury.

Quite obviously, the structure, as described hereinabove, can be modified in many ways and yet utilize the same advantageous concepts, and as one example, reference is made to FIGS. 3 and 3 a wherein the container 24 takes the form of a generally cylindrical structure that is enclosed by two telescoping cups 26, 28 that form the exterior package, one of the cups 26 having a central opening adjacent the point where an infolded tube 30 extends interiorly of the container 24. When the unit is to be used, the smaller cup 28 is merely withdrawn from the larger and reversed in its disposition so that pressure can be applied to collapse the container 24 and unfold the tube 30 to its projecting disposition so that the pharmaceutical formulation F can be extruded therefrom as clearly illustrated in FIG. 3 a.

Yet many other modifications of the arrangement can be visualized without departing from the spirit of the invention; and the foregoing description of two embodiments is accordingly to be considered as only exemplary and not in a limiting sense and the actual scope of the invention is to be indicated only by reference to the appended claims.

What is claimed is:

1. A dispenser adapted for the injection of fluent pharmaceutical formulations into body cavities which comprises

a flexible container for the pharmaceutical formulation and

a flexible dispensing tube joined to and communicating at one end with said container and having a discharge opening at its remote end, said tube collapsed and invaginated within said container and being sufficiently flexible at its juncture with said container to move from a collapsed, folded, inoperative disposition to a projecting, operative, dispensing disposition in response to application of pressure to the exterior of said container, and a collapsible package encompassing said container and collapsed tube and having an opening adjacent the point of juncture of said container and tube.

2. A dispenser according to claim 1 wherein said package is in the form of a tetrahedron with a slit at one edge thereof to form said opening.

3. A dispenser according to claim 1 wherein said package is in the form of a pair of telescopically joined cups, one of which contains said opening.

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