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3,102,540

MEANS FOR ADMINISTERING MEDICINE

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FIG. 1

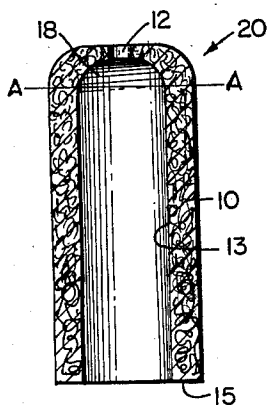


FIG. 2

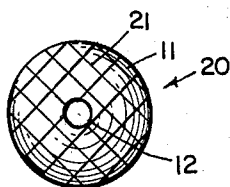


FIG. 3



FIG. 4

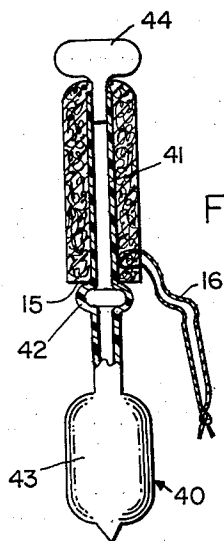


FIG. 5

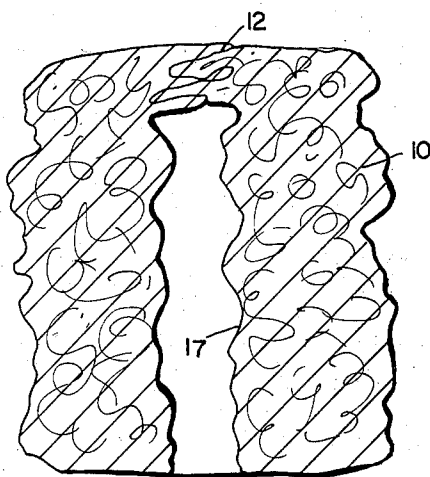


FIG. 7

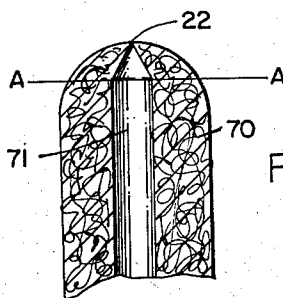
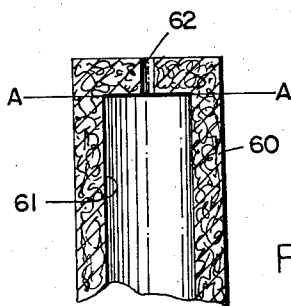


FIG. 6



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MEANS FOR ADMINISTERING MEDICINE

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This invention relates in general to a means for administering medicine to a body canal, and in particular to a tampon which readily permits internal administration of medicine and absorbs body fluids while preventing loss of the administered medicines. The tampon of this invention is highly effective in administering and retaining pain relieving medicaments in the vaginal canal during periods of menstruation.

The female body normally undergoes cyclic periods of menstruation which is sometimes accompanied by severe internal pain. Medicaments have been designed to alleviate the pain. However, simple and effective administration and retention of these medicaments in the vaginal canal is a troublesome problem. Often the administered medicine is either washed out of the body by secreted fluids or absorbed and retained by absorption devices used in conjunction with the medicinal administration.

In many cases a tampon is employed having a drilled passageway extending throughout the length of the device. Medicaments are administered through the passageway into the body cavity and the tampon acts as a liquid absorption means. It has been found that a substantial percentage of the medicaments administered in this manner reenter the passageway and are absorbed by the tampon. Costly medicaments are often lost and improper dosages frequently result.

Accordingly it is an object of this invention to provide a simple and efficient device for administering medicine to a body canal. The device is simple to use and readily permits passage of medication through a passageway, yet minimizes return of the medication through the same passageway.

It is a further object of this invention to provide a device in accordance with the preceding object which is light and compact previous to usage. Nonetheless, the device is capable of absorbing substantial amounts of secreted body fluids.

It is another object of this invention to provide a device in accordance with the preceding object which is inexpensive to manufacture, employing basically conventional manufacturing procedures.

It is still a further object of this invention to provide a device in accordance with the preceding objects having an interengaged dispensing means. The dispensing means facilitates the handling and applications of the device. In addition, the dispensing means permits application of uniform prescribed doses of medication.

In accordance with the invention, the tampon has an elongated core composed of a fluid absorbent material capable of automatically expanding upon absorption of a liquid. An elongated passageway extends throughout the core and opens at either end of the core. The passageway comprises a first portion formed either by removing the material from the elongated core or by molding the core around a mandrel, and a second portion formed by parting or deflecting a portion of the core. The second portion of the passageway is blocked when the core absorbs fluid and the parted or deflected materials expand and return to the original position. In a preferred form, the core is composed of a fibrous material having properties of "elastic memory." The passageway is axially located within the core and adapted to receive a tubular portion of a dispensing means.

Numerous other features, objects and advantages of the

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present invention will become apparent from the following specification when read in connection with the accompanying drawings, in which:

FIG. 1 is a cross sectional view of a preferred embodiment of this invention;

FIG. 2 is a top plan view thereof;

FIG. 3 is a fragmentary side view of a forming tool useful in constructing the tampons of this invention;

FIG. 4 is a side view of an assembled device of this invention showing portions in cross section;

FIG. 5 is a cross sectional view through the center of an expanded form of the device as shown in FIG. 1;

FIG. 6 is a side cross sectional view of a modified form of this invention; and,

FIG. 7 is a side cross sectional view of still another modification of this invention.

According to the invention, the tampon indicated generally at 20, has a generally cylindrical core 10, formed of an absorbent material. A head 11 of the core 10 is preferably tapered for ease of insertion of the tampon.

The core 10 is composed of conventional compressible and expansive material known to the art. Absorbent cotton is a preferred material due to its highly absorbent nature and ease of shaping and forming. Cotton is also preferred since it is relatively inexpensive, light in weight and generally non-irritating. The core 10 may be made into any desired shape having necessary dimensions suited to the particular body cavity in which the tampon is to be employed. For vaginal application a length of approximately 1 3/4 inches and a diameter of 1/2 inch is preferred.

A passageway 11 extends axially of the cylindrical core 10 from the lower portion 15 through the upper portion or tapered end 11. The lower portion of the passageway 13 comprises a cylindrical bore 17, as best shown in FIG. 1, below line A—A. The cylindrical bore 17 is formed by removing material from a compressed cylindrical core 10 or by molding the core around a mandrel as will be more fully described hereinafter. An upper portion of the passageway 13 comprises a deflected or spread apart passageway having an opening passageway 12, as best shown in FIG. 1, above line A—A. The passageway portions 18 and 12 are preferably formed by deflecting or spreading apart fibers of a compressed cotton core 10. Although an actual opening is provided, it should be understood that the material spread apart or deflected has an "elastic memory" and tends to return to its original position when the core 10 is impregnated with a liquid as will be more fully described hereinafter.

Preferably a cotton netting 21 extends entirely about the cylindrical core 10. Attached to the lower end of the netting 21 and the core 10 is a conventional pull string 16. The netting 21 acts as a support structure to prevent disintegration of the tampon when it is exposed to a liquid.

As best seen in FIG. 4, passageway 13 snugly and slidably receives a tubular portion 41 of a medicament dispenser designated generally at 40. Preferably, a bulb shape enlarged portion 42 is provided adjoining tubular portion 41. A medicine containing resilient receptacle 43 forms a lower end of the dispenser 40. The upper portion of the tubular portion 41 has a plug or stopper 44 force fit to seal the end of the tubular member 41. While many types of medicament dispensing devices may be employed with the cylindrical core 10, the above described dispenser 40 is preferred. This dispenser provides a means for accurately measuring and administering a preselected dosage of medicine to a body canal.

Normally the dispenser is filled completely to the stop 44 with the desired medicament. The medicament may comprise any one of a number of therapeutic formulations such as pain relieving jellies, antiseptic compounds, testing dyes, etc.

Preferably the dispenser 40 is composed of a plastic material such as polyethylene having sufficient rigidity to allow manipulation of the tampon into the desired location. Polyethylene plastics are particularly desirable since they are relatively inexpensive and may be easily formed. Alternatively plastics such as polystyrene and vinyl plastics may be employed if desired.

The bulb shaped enlargement 42 has a dual function in that it acts as an enlarged strengthening member for the tubular portion of the dispenser 40 and in addition selectively determines the length of travel of the tube 41 into the passageway 13. In effect enlargement 42 provides a stop for the dispenser 40. Preferably the upper edge of the tubular portion 41 is located adjacent opening passageway 12 and does not extend completely to the outer surface of the tapered head 11.

The manufacture of tampons according to this invention is basically similar to conventional manufacturing procedures used for tampons such as "Meds" tampons produced by Kimberly Clark. Absorbent material such as cotton is highly compressed to form a solid cylindrical core 10 of the type described above. Any means such as a drill or hollow core tubular punch is then employed to remove material below the line A—A starting from end 15 of the core 10.

In an alternate procedure the core 10 is molded and compressed about a central mandrel which forms passageways 17 below line A—A. Since no cotton material ever occupies passageway 17, throughout the specification and claims, this molded passageway is considered to be equivalent to one formed by removing material as above described. The upper portion of the passageway comprises a basic feature of this invention and must be formed by resiliently deforming or spreading apart the material of the upper end of the cylindrical core 10. Preferably a forming tool of the type shown in FIG. 3 is employed. After the portion 17 is bored, the forming tool 50 is inserted in the bore and compressed against the upper portion of the core 10 thereby forming opening 12 and portion 18. In the embodiment shown in FIG. 1, the forming tool 50 has a piercing point 33 which actually passes through and beyond the tapered head 11. It is sometimes desirable to place a mold on the outside of and in facing relation to the tapered head 11 when employing the tool 50. This expedient positively prevents distortion of the tapered head 11, during the hole forming operation.

It is a key feature of this invention that the portion of the passageway above line A—A, has had fibers deflected or spread apart rather than removed as is the case with portion 17. In fact the fibers in a neck portion surrounding the passageway above line A—A are in fact more highly compressed than are the fibers of the remaining core 10. Thus, upon wetting of the tampon 20, the compressed fibers of the cotton material tend to expand and assume their original shapes. This feature enables the opening 12 and passageway portion 18 to be closed. In effect, the cotton fibers have been elastically deformed and compressed in a neck section surrounding opening 12 and passageway portion 18, in such a manner that closing of the passageway occurs upon expansion of the material. An example of the expansion of the fibers and closing of opening 12 is shown in FIG. 5. Effectively the opening is closed and the tampon swelled to several times its original dimensions.

The portion of the passageway 13 below line A—A also swells upon impregnation. However, since material has been removed frequently, the portion 17 contracts, but does not close completely thereby providing a passageway along which fluids may flow and/or be internally absorbed by the core 10.

After manufacture of the cylindrical core 10, the medicament dispenser may be fitted loosely along the passageway 13 as shown in FIG. 4. Preferably the tip of tubular member 41 does not extend entirely through

the core. This feature tends to prevent undue spreading of the opening 12. The dispenser 40 may be filled previous to or after insertion into the core 10. In either case the plug 44 is assembled after the core and dispenser are assembled.

In use the plug 44 is removed and the tampon inserted into a body canal. Medication is then dispensed by compressing the elastic or resilient receptacle 43. The entire dispenser 40 may then be removed by sliding of the shaft 41 axially of passageway 13 out of the cylindrical core 10. Contact of the tapered head 11 with body fluids tends to automatically close the opening 12 and prevents return of the dispensed medicants along the passageway 13.

An alternate embodiment of the invention is shown in FIG. 6 wherein a cylindrical core 60 has a bored out passageway 61 connecting a spread apart or resiliently compressed opening passageway 62. Still another modification is shown in FIG. 7, wherein a cylindrical core 70 has a bored out cylindrical portion 71 with a spread apart or resiliently compressed cone shaped opening 72 coaxially adjoining the opening 71. In all modifications it is important that the end openings 12, 62 and 72 are not formed by cutting out or removing material of the core portion.

The particular configuration and dimensions of the opening passageway may vary consistently with the overall size of the tampon and the relative expansion and return of materials to close the opening. Preferably when cotton materials are employed having long elastic fibers of a conventional nature, the spread apart passageways extend above line A—A for at least $\frac{1}{2}$ inch. Preferably the diameter of the passageways are made as small as possible consistent with ease of dispensing fluids from the dispenser employed with the tampon. In the specific embodiments illustrated in FIGS. 1-5, passageway 17 has a diameter of $\frac{3}{32}$ inch, while passageway 12 is formed with a diameter of $\frac{1}{8}$ inch. The diameter of passageway 17 is exaggerated in FIG. 1 in order to simplify understanding of the invention. In some embodiments of the invention portions 12, 17 and 18 have equal diameters. As shown in the embodiment of FIGS. 6 and 7, the outer configuration and dimensions of the core 10 may vary considerably depending upon the body opening in which the tampon is to be inserted.

The specific embodiments of this invention described above are by way of example only. Those skilled in the art may now make numerous variations. Therefore, while there has been described what are at present considered to be preferred embodiments of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the spirit and scope of the invention, and it is therefore aimed in the appended claims to cover all such changes and modifications as are inherent in the true spirit and scope of this invention.

What is claimed is:

1. A device for administering medicine and absorbing fluids,

said device comprising,

an elongated core of a fluid absorbing expansible material,

said elongated core having a first end portion and a second end portion,

a passageway defined by said core and extending between and having openings on said first and second end portions,

said passageway being adapted to receive an elongated medicine dispensing means for dispensing medicine outwardly of said first end portion, and,

said first end portion comprising means for automatically closing said opening on said first end portion when said first end portion contacts a liquid.

2. A device for administering medicine and absorbing body liquids,

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said device comprising,

an elongated core of compressed, fibrous, fluid absorbing material capable of automatically expanding upon contacting a liquid,

said elongated core having a first end portion and a second end portion,

a passageway defined by said core and extending between and having openings on said first and second end portions,

said passageway being adapted to slidably receive an elongated dispensing means for dispensing medicine outwardly of said first end portion,

(2) said opening on said first end portion having a surrounding neck section formed by elastically spreading apart and compressing fibers of said neck section,

said neck section being capable of expanding to close said opening when said neck section absorbs a liquid.

3. A tampon comprising,

an elongated core of fibrous fluid absorbing material, capable of automatically expanding upon absorption of a liquid,

said elongated core comprising a first tapered end portion and a second end portion,

an elongated passageway defined by said core and extending axially of said core between said first and second end portion,

said passageway comprising a first portion formed by removing material from said elongated core and a neck section formed by spreading apart and elastically deflecting material of said elongated core.

4. A tampon in accordance with claim 3 wherein said passageway first portion has a larger cross sectional area than said second passageway portion.

5. In a tampon comprising,

a core of fibrous, fluid absorbent material capable of expanding upon contact with a liquid a first passageway defined by said core for receiving a medicament,

the improvement comprising a neck section defining a second passageway opening on a surface of said core and being formed by spreading apart and elastically deflecting material of said core,

said second passageway being interconnected with said first passageway,

said neck portion being capable of expanding to close said opening when said neck section absorbs a liquid.

6. A device for administering medicine and absorbing fluids in a body canal,

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said device comprising,

an elongated core of a fluid absorbing material capable of expanding upon contact with a liquid,

said elongated core having first and second end portions, a passageway defined by said core and extending between and having openings on said first and second end portions,

said first end portion comprising means for automatically closing said opening on said first end portion when said first end portion contacts a liquid,

a medicament dispenser having a tubular portion located in said passageway and means closing on opened end of said tubular portion positioned adjacent said first end.

7. A device in accordance with claim 6 wherein said medicament dispenser further comprises,

an enlargement means located adjacent said core second end portion adapted to limit the travel of the tubular portion within said passageway,

and a medicament containing resilient receptacle adjoining said enlargement means providing a means for manipulating said core and for injecting a measured medicament dosage through said tubular portion.

8. A device in accordance with claim 6 wherein said first end portion comprises a neck section which forms said first mentioned means and surrounds said first end passageway opening.

said neck section being formed by elastically deforming and compressing material thereof and being capable of expanding to close said first end opening upon contact with a liquid.

9. A device in accordance with claim 6 wherein said means closing the opened end is a removable plug extending outwardly of said first end portion.

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