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M. J. MEYNIER, JR

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TAMPON AND DEPOSITOR

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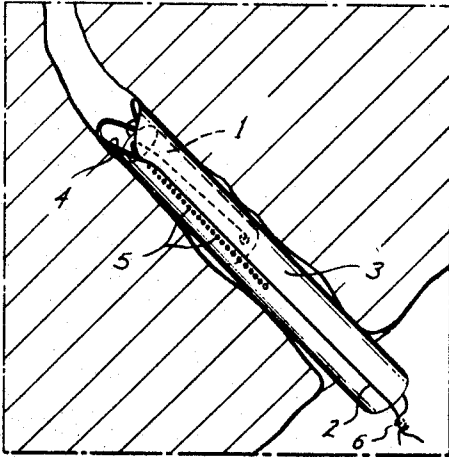


Fig. 1

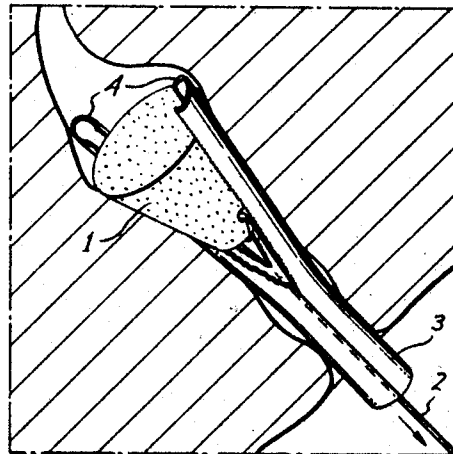


Fig. 2

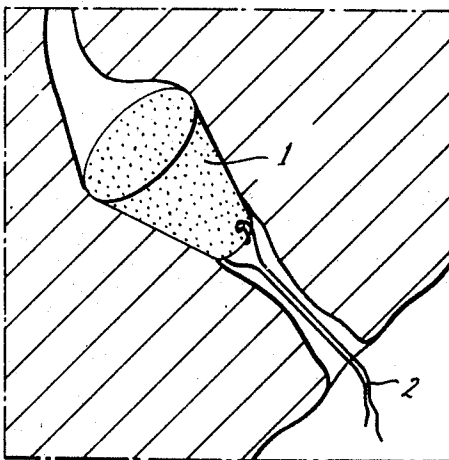


Fig. 3

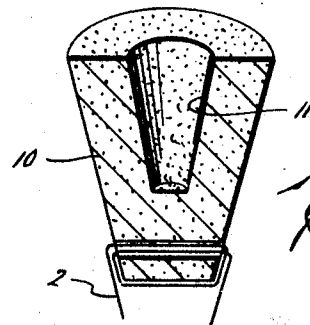


Fig. 4

Maurice J. Meynier, Jr.
INVENTOR.

BY *G. C. Helming*

ATTORNEY

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2,884,925

TAMPON AND DEPOSITOR

Maurice J. Meynier, Jr., Houston, Tex.

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3 Claims. (Cl. 128—270)

This invention relates to tampons and more particularly to an improved tampon and holder therefor, especially adapted, for example, to the placement of the tampon within the vaginal canal for reception and retention of menstrual flows, and which comprises co-operating elements arranged to possess desirable characteristics of convenience, cleanliness, and ease of insertion and removal.

It is among the objects of the invention to provide a tampon formed of light weight and somewhat fluffy deformable material of high capacity porosity and of a size and shape to fit snugly and to be self retained within a body cavity and which for convenience of carrying and handling before use can be crowded into a compact unit generally comparable in size to that of an ordinary cigarette. With these things in mind, it is proposed to form to desired shape a synthetic plastic substance containing a multiplicity of minute air pockets and which in appearance resembles a fine sponge in that its mass consists of spaced apart thin deformable webs having a high degree of mass compressibility for compaction into a small diameter cigarettelike security package which after placement within a body cavity will be self restored in size. Its fine porosity is conducive to maximum moisture absorption or filling of the multiplicity of small pores, and sure moisture retention through capillarity and surface tension. One example of a preferred porous and absorbent material is known in the trade as regenerated cellulose sponge, and another satisfactory plastic material is known as gas expanded polyurethane foam synthetic, which is elastic when dry and does not tend toward a permanent set when compressed but rather has an immediate expansion recovery upon release from compaction restraint without dependence on wetting. The materials referred to are available in different mesh but for tampon purposes the material should have almost microscopic fineness of the pores, particularly in the exterior surface, for affording a smooth and soft skinlike feel free of harsh abrasiveness.

It is a further object of the invention to give to the spongiform material a free shape of substantially conical form or of gradually increasing width in the longitudinal direction so that the widest part can be positioned innermost in the cavity and its outwardly tapered side contacting on the cavity surface with a slight expansive force insufficient for an uncomfortably tight binding pressure but yet co-operatively related to the cavity lining and muscular action for self lodgment against accidental displacement.

Another object of the invention is to package the deformable tampon in a width compacted condition at least half its free state and within one end portion of a soft, pliable and nonabsorbent tubular case, which facilitates handling before use and enables insertion of the compressed tampon, and beyond the tampon position the opposite end of the container projects as a handle portion for convenient holding in the fingers during introduction and release of the expansible plug. It is proposed that the case be formed from thermoplastic materials such as polyethylene or plasticized polyvinyl chloride or the

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like. For tampon release from constricted size as well as for subsequent tampon removal from the cavity, there is contemplated the use of a pair of nonabsorbent flexible pull strings fixedly secured to the tampon near the handle end of the housing tube and with the free ends of the strings extending for distances greater than the combined lengths of the tampon and its tube so that the strings run from their fixed ends forwardly between the tampon and the tube and after being looped back around the front edge of the tube, extend backwardly on the outside to finger access points beyond the handle portion of the tube. And there is further contemplated that the wall of the tube at two circumferentially spaced regions be formed with longitudinally extending lines of weakening formations leading backwardly from the apices of convergent sided notches in the forward tube edge by which the looped portions of the pull strings when placed under tension will be guided to the lines of weakness and then shear through the wall for the length of the tampon. After the tampon is free from confinement, the pull on the strings is ended and the split tube is fully withdrawn, leaving the tampon in place. The natural tendency of the split edges will be to curl inwardly, and there will be an absence of the likelihood of jagged or sharp surfaces to irritate the cavity lining during withdrawal of the separated tube portion.

A still further object of the invention is to provide an improved nonabsorbent or nonwicklike pull string whose elastic limit under tension exceeds the wall shear resistance of the casing tube and which string after performing its tube splitting function remains tied to the tampon as a means for eventual tampon removal and, because of its nonwicklike character, remains dry and avoids drip tendency and moisture saturation commonly experienced with the usual cotton withdrawal cords. Such pull strings may be silk cords having a flexible impervious plastic coating.

Other objects and advantages of the invention will become apparent during the course of the following specification having reference to the drawing, wherein Figure 1 is an isometric view of a packaged tampon as placed within a cavity of a sectioned body part; Figs. 2 and 3 are isometric views respectively showing the casing cigarette split open preparatory to its withdrawal from the cavity and showing a tampon in position in a cavity; and Fig. 4 shows a hollow or cupped tampon in longitudinal section.

In a preferred embodiment of the invention as illustrated, a plug 1 of deformable expansive material, such as porous or spongiform compressible synthetic plastic previously identified, is molded, cut, or otherwise shaped to desired uncompressed form and size in relation to the cavity to which it is to be fitted. For security of placement and to dispose a maximum volume reception innermost of the cavity, a substantially conical shape tampon is proposed, whose wide base can be considered the inner end. For a catamenial tampon such as shown in the Fig. 3 position of use, exemplary tapered cone dimensions initially or before compression can be on the order of a length of approximately one and one-quarter inch, of a base diameter of about one and one-half inch, and of an apex or tip diameter of about one-quarter of an inch. Such free dimensions can be varied, but the width or thickness of a tampon should be selected that upon later expansion in the cavity the space will be filled with the tampon remaining under a slight compressive force to insure a small surface pressure contact throughout the major tapered length but without undue dilation to cause discomfort.

Through the small or outermost end portion of the tampon, there is threaded a flexible pull-out cord 2

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through either a preformed transverse hole or a hole made at the time the cord is threaded through the tampon. As illustrated by the drawing, an intermediate portion of the pull cord 2 is wrapped over the end of the tampon and doubled back in both directions through the hole, and its opposite separate lengths extend from diametrically opposite sides of the tampon and are long enough to extend to the outside of the cavity, and for convenience the free ends are knotted together, as at 6. To prevent wicking, the cord should be nonabsorbent in character, and for a sharp cutting action, as will be later explained, the cords should be tough and of relatively small diameter, and such purposes will be obtained by employing flexible narrow silk thread whose surface has been coated with impermeable flexible plastic, such as polyethylene.

After affixing the cord 2 to the tampon small end, the opposite cord lengths are brought back along both sides and beyond the large inner end of the tampon, and the tampon is decreased in thickness as by use of a suitable compression die, into a cylindrical core of uniform diameter, whereupon the contracted core is introduced into an end portion of a tubular cigarette or cylindrical casing 3. For use with tampons of dimensions previously discussed, a container tube should have an internal diameter of approximately one-quarter of an inch and a length of about double or more that of the tampon. Thus the whole of the tampon is housed and held in compression within substantially one-half of the container tube, with the outer or smaller end of the tampon near the axial center of the tube and the innermost or larger tampon end immediately adjacent one end of the encasing tube. The opposite tube end portion beyond the tampon affords a handle by which the assembly can be held and manipulated in the fingers of the user. As so compacted, the assembly compares in size with a conventional tobacco filled cigarette and can conveniently be carried as a dainty pocket piece. With the casing sheath 3 formed of soft, smooth and pliable polyethylene, it has a warm feel and a neat appearance, and additionally as a matter of appearance choice, the casing wall may be either transparent or opaque and of any selected color for added sales appeal.

The wall of the tubing 3 will be fairly thin and may be on the order of one-thirty-second of an inch, and its inner or cavity entering end, as seen in Fig. 1, is formed in circularly spaced regions with re-entrant or V-shaped notches 4. In longitudinal alignment with the apex or point of convergence of each V-shaped side opening 4, the tube wall is weakened on a straight line, as shown at 5, by scoring, indenting, or through perforations extending for a distance equal to or slightly greater than the length of the encased tampon 1.

Prior to the insertion within a cavity, the two pull strings 2, whose lengths exceed the combined lengths of the tampon and case, extend outwardly from the innermost end of the casing and they can be brought back outside the casing so that the return loops between the inside and outside parts fit into the space between the convergent edges of the side notches. By holding the handle end of the holder or case 3, the opposite end of the compacted assembly can be conveniently and easily inserted in the cavity to substantially the position illustrated in Fig. 1, and the soft pliable wall will bend and glide along smoothly, whatever the form of the cavity. The entire length of the finger-held tubing need not be inserted in order to bring the tampon into proper position, but when the position is reached, then a pull or tension exerted on the outside free ends of the pull strings 2 will cause their loops to ride on the side edges of the notches 4 and then rip or cut through the weakened line in the thin wall of the tube and whose resistance to the shear force is less than the elastic limit of the narrow pull strings. As the cutting action takes place, the tendency for the cut edges will be to curl inwardly, as seen

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in Fig. 2, as to eliminate projecting rough edges which would bear or drag against the cavity wall. Any elastic force previously stored in the compressed tampon will be exerted radially on the tubing wall to assist the shearing of the wall and the spreading apart of the split wall portions, but in any event the opening of the tampon confining tube will release the tampon for a cavity filling expansion, and after tube release has been completed the pull on the strings is arrested and the split tube can be withdrawn and discarded, leaving the tampon and its pull strings in place without the hands having been soiled. Similarly and inasmuch as the nonabsorbent coating on the pull strings will tend to remain clean, no soiling is likely at the subsequent removal of the tampon in response to tension applied on the projected free ends of the cords and by which the tampon is pulled out of the cavity.

A free tampon shape whose external dimension is wider at the inner end is usually preferred, although other shapes may be selected. Also, the inner end may be formed with a re-entrant or hollow cavity so that the tampon will be substantially cup shape. Thus Figure 4 illustrates a tampon body 10 whose uncompressed form tapers in thickness and contains an open well or pocket 11 projecting interiorly thereof from the wide end face to a depth of a little more than half the over-all length of the body. This central pocket 11 as shown has its greatest diameter at its mouth, from which its longitudinal wall surface converges inwardly in substantial correspondence with the external plug taper so as to form an annular wall of uniform mass thickness. A wall having a considerable mass of moisture retention material with a large surface exposure will be insured by dimensioning the terminal mouth or portion of widest internal diameter at approximately one-third the external diameter of the plug innermost end portion. When packaged into a compacted cylinder, the side wall will be crowded into the central gap and only a small variation in compression stress on the material will occur throughout the tapered length.

When the surface pores of the material employed approach microscopic fineness, a re-entrant pocket as described will increase the area directly exposed to the outflow of moisture to be collected and better assure quicker take-up with less leak-by tendency. The arrangement will make more feasible the use of air cell materials of elastic synthetic substance whose degree of absorbency is low but whose skeletal membrane content is small in relation to the total of its minute cellular tube spaces to receive and store much moisture through capillarity and surface tension and whose elastic recovery as distinguished from cellulose sponge, is not dependent on wetting and makes it well suited for packaging and use insertion in a compacted state with immediate growth recovery upon package release. For some purposes, the outermost end and external side surfaces of the tampon body may be sheathed or coated with a flexible sealing compound or a mucus repellent grease film such as will serve either or both as a lubricant and as resistance to seepage of moisture from within the porous body after reception through the uncoated innermost perforate surface.

From the foregoing, it will be apparent that there are provided disposable parts which can be readily manufactured at low cost and which, as an assembly, are characterized by convenience and cleanliness of handling insertion and removal. While only a preferred embodiment has been described in detail, the invention is capable of modifications and adaptations such as come within the scope of the appended claims.

What is claimed is:

1. A tampon holder comprising a thin-walled tube having at substantially diametrically opposite places in the tube wall and at one end of the tube, a pair of pull string guide notches, each having convergent edges meet-

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ing at a point, and said wall having lines of weakness extending longitudinally of the tube from the meeting points of the convergent edges of said notches.

2. In a tampon and container therefor, said container comprising a tube of soft pliable thermoplastic material having substantially diametrically opposed V-shaped openings in the wall thereof near one end and having weakening formations in the wall extending on longitudinal lines from the apices of both V-shaped openings, said tampon comprising a substantially conical shaped plug of deformable spongiform material whose initial thickness exceeds the internal diameter of said tube and a pair of pull strings secured to the small end of said plug and projected therefrom a distance greater than the combined lengths of said plug and said container, said plug being housed in width-contracted form inside said tube with the conical base end of the plug adjacent said tube end containing said V-shaped openings and said pull strings being looped backwardly and extended outside the tube beyond the opposite end thereof, said V-shaped openings serving to guide the loops in the pull strings under pull force to have shearing passage through said lines of wall weakening formations and thereby release the confined expansive plug.

3. In a tampon and container therefor, an encasing

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tube having a convergent edged notch in the tube wall near one end and a weakened wall portion extending on a longitudinal line from the point of edge convergence, a tampon contained within the tube, a pull string secured at one end to a portion of the tampon spaced from said tube end and projected to said end and then looped back toward the opposite tube end, said pull string being arranged to receive a manipulative pull on the free end thereof and to be guided by said convergent edged notch for drawing the loop thereof through the weakened wall portion to sever the container for its withdrawal from the tampon.

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