

Dec. 19, 1961

C. W. LEUPOLD

3,013,558

TAMPON

Filed Aug. 11, 1958

2 Sheets-Sheet 1

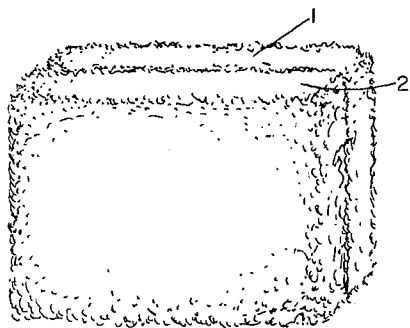


Fig. 1

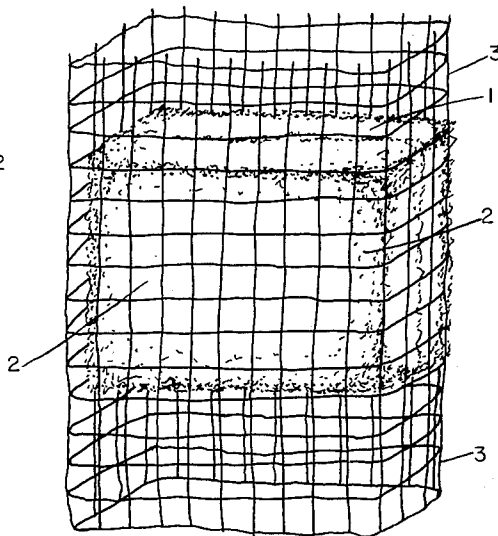


Fig. 2

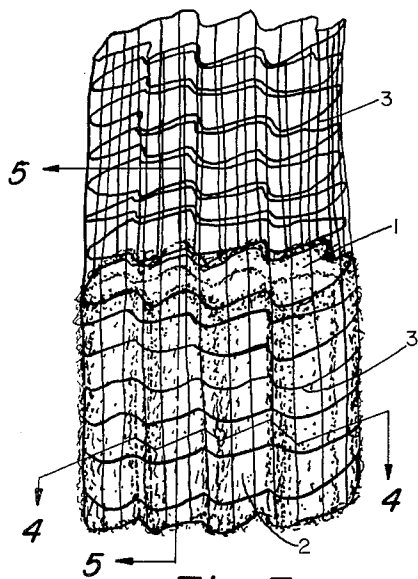


Fig. 3

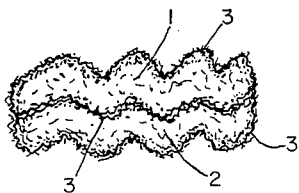


Fig. 4

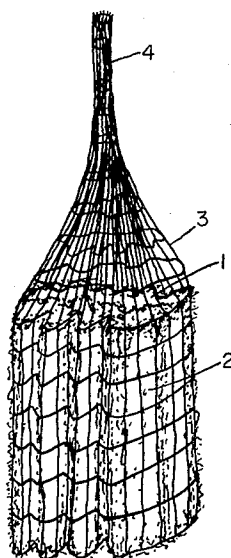


Fig. 6

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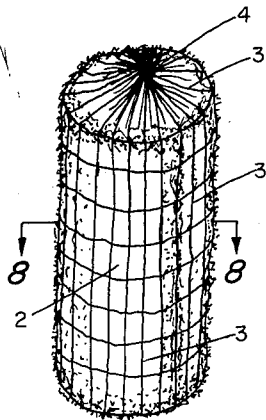


Fig. 7

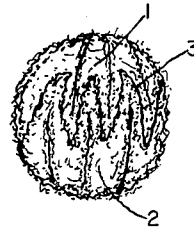


Fig. 8

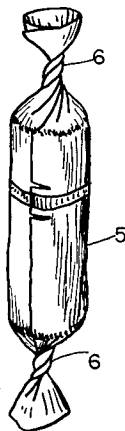


Fig. 9

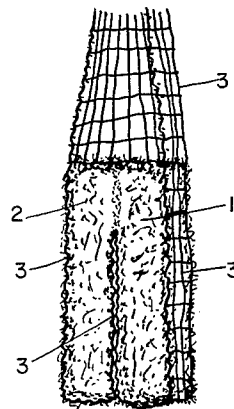


Fig. 5

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TAMPON

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5 Claims. (Cl. 128—285)

This invention relates generally to tampons for insertion into cavities of the human and animal body, but has reference more particularly to tampons of the type used for feminine hygiene during menstrual periods.

Tampons of this type have been used to a certain extent, and various patents have been issued, dealing with the size and shape of the tampons, their structure and wrapping, the nature of the pull-out means, and other characteristics.

However, virtually all previous embodiments of such tampons suffer from defects or disadvantages due to the materials used or their construction, and expressed principally in unsatisfactory swelling, and absorbing or liquid-containing capacity.

Since the most essential requirement of a tampon is its capacity to absorb or contain liquid, a primary object of the present invention is to construct a tampon in such a manner that as it absorbs increasing amounts of secretions, moisture, water and the like, in use, it unfolds or opens out into a form of approximately funnel shape, as the result of which there is obtained maximum absorption speed and maximum swelling of the tampon.

Another object of the invention is to provide a tampon of the character described, which is adaptable for use under varied anatomical differences.

A further object of the invention is to provide a tampon of the character described, in which additives, such as medicaments and drugs, may be easily incorporated in the tampon, in such a manner as to become immediately effective as the tampon opens under the influence of the swelling.

Other objects and advantages of the invention will become apparent during the course of the following description, taken in connection with the accompanying drawings, in which—

FIG. 1 is a perspective view, showing an initial step in the manufacture of the tampon;

FIG. 2 is a view similar to FIG. 1, but showing the second step in the manufacture of the tampon;

FIGS. 3, 6, 7 and 9 show subsequent steps in the manufacture of the tampon;

FIG. 4 is a cross-sectional view, taken on the line 4—4 of FIG. 3;

FIG. 5 is a cross-sectional view, taken on the line 5—5 of FIG. 3; and

FIG. 8 is a cross-sectional view, taken on the line 8—8 of FIG. 7.

Referring more particularly to the drawings, two layers of absorbent cotton, of rectangular form, indicated by reference numerals 1 and 2, and disposed adjacent each other, as shown in FIG. 1, are used to form the body of the tampon, which has the general shape of a parallelepiped having a narrow rectangular base and narrow rectangular ends.

The body of the tampon, as shown in FIG. 1, is then enclosed in a tube 3, of netting, as shown in FIG. 2. One end of this tubular netting, the upper end, as viewed in FIG. 2, projects sufficiently above the tampon body to serve as a means for pulling out the tampon after use, while the other end of the tubular netting, the lower end, as shown in FIG. 2, is turned inwardly and projected upwardly into the space between the cotton layers, as shown in FIGS. 3, 4 and 5. This penetration of the body of the tampon by the netting 3 may be accomplished

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during the manufacture of the tampon, and either by suitable mechanical means, not shown, or by means of compressed air. It is essential, in this connection, that the lower end of the tubular netting to be inserted into the mass of cotton and penetrate the mass, so that the length of the netting within the mass of cotton constitutes a substantial percentage of the total length of the tampon, as indicated in FIG. 5. The use of compressed air for this purpose, is preferred, since compressed air is effective to perform a funnel in the layers of cotton. Moreover, by using compressed air, it becomes possible to introduce into the body of the tampon, along with the compressed air, additions, such as medicaments, drugs, bactericides, deodorants, etc. These may be applied or introduced either in dry powder form, or in the form of a liquid spray.

The tampon body, enclosed in its tubular netting, is then subjected to compression, as by means of reciprocable dies movable towards each other and against the narrow rectangular ends of the tampon body. These dies have working faces of concave semi-circular cross-section, so that the dies conjointly form a cylinder of a diameter substantially that of the finished tampon. These die faces are of a length corresponding to the desired length of the finished tampon, which is usually the height of the narrow rectangular ends of the tampon body.

As the die faces move toward each other, they compress the body of the tampon and impart to it a pleated shape, with rounded ends, as clearly depicted in FIGS. 3 and 4. In other words, the cotton body is folded into a zig-zag cross-section, the folds of which may be regarded as waves, running parallel to the die faces, with the wave lengths decreasing as the dies come closer together.

In FIG. 6, the dies have compressed the body of the tampon to an extent greater than in FIG. 3, and the upper end of the tubular netting 3 has been gathered together for a purpose to be presently described.

In FIGS. 7 and 8, the dies have completed their work of forming the tampon into finished cylindrical form, and in this connection, it may be noted that for the sake of clarity of illustration, the tampon is shown in FIG. 7 on a scale in which it is of approximately the proper length, but is of approximately twice the proper diameter, the approximate full-size of the finished tampon being shown in FIG. 9. In FIG. 7, the gathered upper end of the tubular netting 3 has been flattened against the upper end of the tampon body, and it is desirable, in this connection, to apply a colored dye or ink to the upper end of the gathered netting, as at 4, to serve as a means of identifying this end of the tampon, to facilitate proper insertion of the tampon in the body cavity.

In FIG. 9, the finished tampon of FIGS. 7 and 8, has been wrapped in a cellophane wrapper, the ends of which are closed, as at 6, the tampons being usually sold or merchandised in this form.

As soon as a tampon of this nature comes into contact with a swelling agent, liquid, water, or the like, it absorbs this material very rapidly, beginning with the inner end, and opens out, starting with the inner end of the tampon, while at the same time, increasing in volume. Due to the fact that the netting at the inner end of the tampon does not confine or restrict this end of the tampon, while the gathered outer end of the netting does confine or restrict the outer end of the tampon to a great extent, the tendency of the tampon to expand or swell decreases progressively from the inner end of the tampon to the outer end, so that the tampon assumes a more or less cone-shape or funnel shape, with the apex of the cone or funnel at the outer end of the tampon. This can be readily demonstrated by suspending the tampon by its outer end (the marked end) in a glass of water,

and the extent to which the tampon opens out and swells, during such a demonstration, is very striking. The tendency of the tampon to swell in this manner is a highly desirable feature, since it is effective to completely close or stop up the body cavity in which the tampon is inserted.

It is thus seen that I have provided a tampon which has maximum absorption speed and achieves a maximum swelling, which is adaptable for use under varied anatomical differences, and which has incorporated therein additives which become effective as soon as the tampon opens out under the influence of swelling.

It is to be understood that various changes may be made in the tampon and in its method of manufacture, without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, I claim:

1. A multi-layered tampon of absorbent cotton compressed into a cylindrical body, the material of the several layers having plural interfolded pleats extending longitudinally of the tampon with adjacent inner faces of said layers arranged in generally zig-zag formation transversely of the axis of the tampon, a tubular netting surrounding the cylindrical body and having one end thereof extended into the body of the tampon between the adjacent inner faces of the interfolded layers at one end of the tampon and extending a substantial distance along said inner faces, the opposite end of said tubular netting extending beyond the other end of the tampon and twisted about a longitudinal axis to confine the absorbent cotton at said other end thereby to restrict expansion of the compressed absorbent cotton adjacent said other end when said cotton becomes wetted.

2. A tampon as defined in claim 1 in which the several layers are formed by at least two separate, adjacent, parallelepiped shaped absorbent cotton members.

3. A method of manufacturing a multi-layered tampon which comprises providing a pair of similar, paral-

lelepiped shaped absorbent pads each having a relatively wide rectangular face and narrow rectangular ends, bringing the rectangular faces of said pads together and enclosing the pads in a tubular netting with the axis of said netting substantially parallel to the major axis of the rectangular ends and with the opposite ends of the tubular netting extending beyond the pair of pads, turning one end of the tubular netting inwardly between the adjacent rectangular faces of said pair of pads to extend a substantial distance therealong in a direction generally parallel to said major axis of the narrow rectangular ends of the pads, compressing the pair of pads in a direction normal to the respective planes of the narrow rectangular ends of the pads until the pads collapse and the adjacent rectangular faces thereof are folded into a pleated or zig-zag configuration in transverse cross section with the netting confined therebetween and conforming to such zig-zag configuration.

4. The method as defined in claim 3 in which said one end of the tubular netting is blown inwardly between the adjacent rectangular faces of said pair of pads.

5. The method as defined in claim 3 in which additives are blown inwardly between the adjacent rectangular faces of said pair of pads.

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