

United States Patent

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[72] Inventor **Kenneth S. Merrill**
Wilbraham, Mass.
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[73] Assignee **Tampax Incorporated**
Palmer, Mass.

[56] **References Cited**

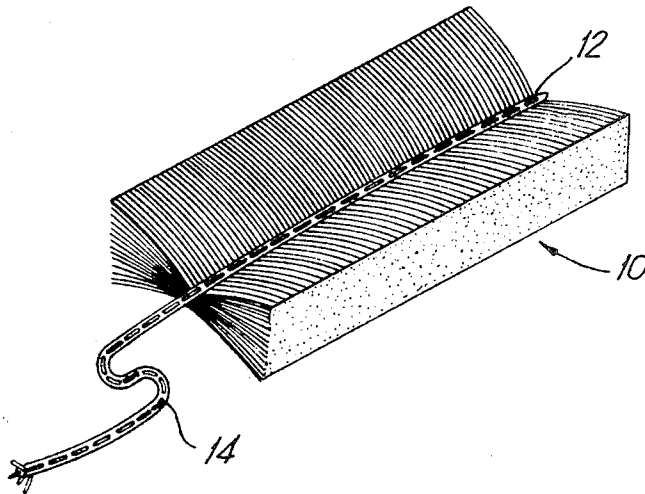
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Primary Examiner—Charles F. Rosenbaum
Attorney—Curtis, Morris & Safford

[54] **TAMPON**
1 Claim, 1 Drawing Fig.

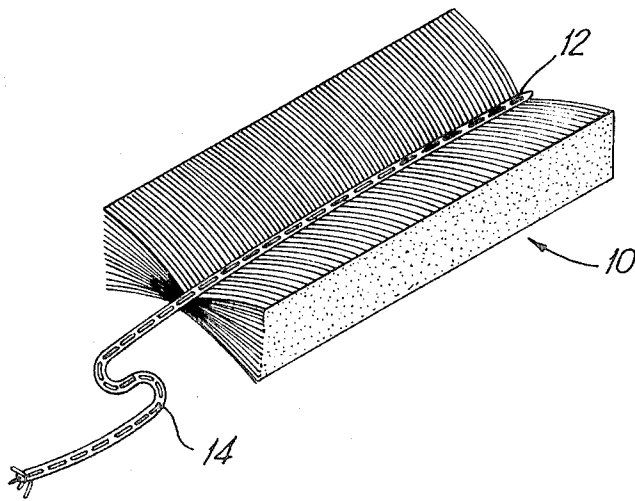
[52] U.S. Cl. **128/285**
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[50] Field of Search **128/263,**
270, 285, 296

ABSTRACT: A compressed absorbent tampon is disclosed characterized by the fact that it is formed from a pad of synthetic organic fiber tow, preferably a bulked and crimped rayon tow, in which the fibers extend in continuous unbroken form from one side edge of the pad to the other side edge thereof. A method of making the tampon is also disclosed.



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INVENTOR
KENNETH S. MERRILL

BY

Curtis, Morris & Safford
ATTORNEYS

TAMPON

This invention relates to devices for fluid absorption and retention and more particularly to liquid-absorbent pads and tampons, especially intracorporeal absorbent devices such as catamenial tampons, dental rolls, surgical pads and the like.

Such devices have been made from high-quality cotton fibers, which have a natural resilience and absorbency that make them well suited for use in compressed tampons. One method of making such tampons is described in Griswold et al. U.S. Pat. No. 3,322,123. As illustratively disclosed in that patent, a band or web of staple cotton about 4 inches wide is cut to form rectangular pads about 2 inches wide by 4 inches long with the cotton fibers oriented substantially perpendicular to the long dimension of the pad. The fibers of the pad are held in place by a chain of stitches extending lengthwise of the pad substantially midway between the side edges thereof. The pad is then compressed to a generally cylindrical shape and packaged for sale, generally with a telescopic applicator.

One problem that has been encountered in the manufacture and use of tampons of this general character arises out of the tendency of the pad to shed, or slough off, short fibers from the compressed mass, especially the tendency of the pad during use to disintegrate after being wetted, but before being withdrawn. This problem can be overcome by encasing the pad, prior to compression, in a liquid-pervious overwrap made, for example, of nonwoven adhesive-bonded fiber. The overwrap is preferably applied prior to stitching to hold the fibers in place and anchor the overwrap on the pad. While such an overwrap overcomes the pad disintegration problem, its use necessitates an additional manufacturing process step and increases the cost of manufacture.

In the absence of an overwrap the pad disintegration problem can be mitigated by using a long staple cotton, i.e., cotton having an average fiber length of about 1 inch. However, since the fiber length of staple cotton is only about one-half the desired width of the pad, there is still some tendency to slough off fibers even when a long-fibered cotton is used.

It is accordingly an object of the present invention to provide a tampon that overcomes the foregoing disadvantage and has exceptionally good absorbency.

The objects and advantages of the invention are achieved, in general, by using a pad formed of a synthetic organic fiber tow, e.g., a viscose rayon, acetate rayon (cellulose acetate) or polyester fiber tow. As is known in the art, a synthetic organic fiber tow is a ropelike, relatively loose aggregation of essentially parallel continuous filaments commonly formed during the manufacture of synthetic fiber yarns. While any of the known synthetic organic fiber tows can be used in the process of the present invention, rayon tow is the most advantageous material, and the process will be described in relation to such a tow.

Prior to its formation into a tampon pad, the tow is desirably subjected to a crimping and bulking operation, which operations are known per se. Crimping of the tow produces a wavy effect in the fiber and gives the fiber properties which improve its handling and esthetic qualities. The crimp may be applied to the tow fibers either during the fiber-forming stage or at a later stage of the tow-producing process. The degree of crimp may be varied in respect to the amplitude of the wave imparted to the fiber filament and the number of waves per unit length of filament.

"Bulking" or "texturizing" of a rayon tow is an operation in which the filaments are laterally displaced and to some extent

looped or otherwise disoriented to increase the volume occupied by a given weight of the material. In cases where the tow is bulked after crimping, the bulking operation serves to move the crimp waves into different planes, as well as longitudinally into different positions along the tow axis to impart greater bulk to the material. The tow used as a starting material in the present process is preferably both crimped and bulked, since such a crimped and bulked tow has a resilience and absorbency especially suited to the desired properties of a tampon.

In this specification and the accompanying drawing we have shown and described a preferred embodiment of our invention and have suggested various alternatives and modifications thereof; but it is to be understood that these are not intended to be exhaustive, and that many other changes and modifications can be made within the scope of the invention. These suggestions herein disclosed are selected and included for purposes of illustration, in order that others skilled in the art will be able more fully to understand the invention and the principles thereof and will thus be enabled to modify it and embody it in a variety of forms, each as may be best suited to the conditions of a particular case.

In accordance with a preferred embodiment of the present process, a web or band of the rayon tow about 4 inches wide is fed to a cutting machine and cut into rectangular pads about 2 inches wide in which the fibers are essentially perpendicular to the long dimension of the pad, as illustrated in the accompanying drawing.

Referring to the drawing, after the pad 10 has been cut from the web of tow it is stitched perpendicular to the fibers to form a central longitudinal line of stitching 12 located substantially midway between the side edges of the pad and serving to hold the fibers in place. A withdrawal string 14 of the usual type is thus formed or connected to the pad. Advantageously, the stitching of seam 12 and attachment of withdrawal string 14 are carried out as a single operation. After the stitching operation, the pad is compressed into generally cylindrical form under conventional conditions, assembled in the usual applicator tube, and packaged for sale.

From the foregoing description it should be apparent that the present invention provides a tampon capable of achieving superior absorbency at relatively low cost. Since the tampon pad contains no under-sized fibers, the possibility of short fibers becoming disengaged therefrom during manufacture or use is completely eliminated. Thus the time and expense involved in applying an overwrap to the pad is avoided. Moreover, by the present process tampons having acceptable resilience and absorbency can be achieved using a superior, but relatively inexpensive starting material. The construction of the pad is such that in the compressed tampon the ends of the filaments occupy a relatively large proportion of the outer surface area of the tampon. Since induction of liquid occurs more readily endwise of the fibers than crosswise of the fibers, the presence of a large number of filament or fiber ends at the outer surface of the tampon improves its absorption efficiency.

I claim:

1. In a compressed tampon the improvement which comprises a pad consisting essentially of transversely oriented, crimped and bulked fibers of a rayon tow, all of said fibers extending in continuous unbroken form from one side to the other side of said pad, stitches sewed longitudinally along the length of said pad midway between the side edges thereof binding said fibers together and a withdrawal string attached to said pad along the line of said stitches.