Jan. 7, 1969 C. HARMON 3,420,235

INTERLABIAL PAD

Filed July 13, 1966 Sheet 1 of 2

Fig. 1.

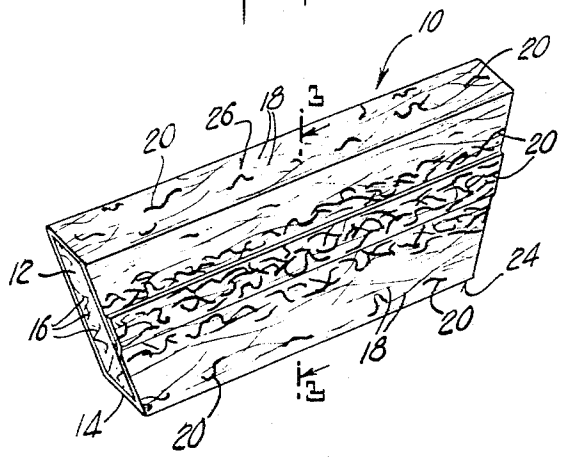
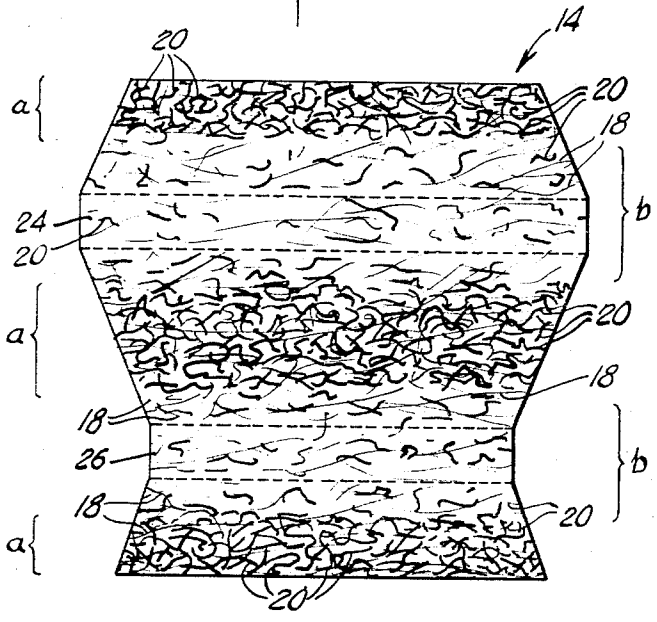



Fig. 2




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Fig. 3.

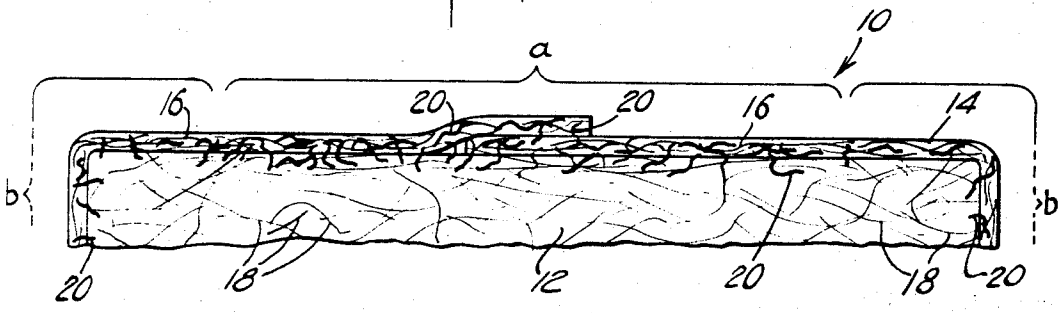
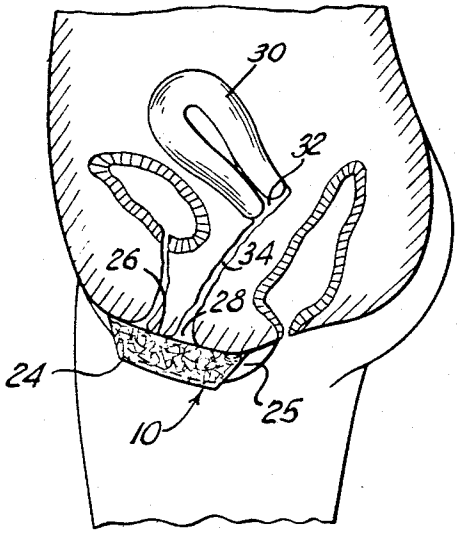



Fig. 4.




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# INTERLABIAL PAD

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Int. Cl. A611 *15/00;* D04h *1/04*

This invention relates to catamenial pads and more particularly, is directed to catamenial pads adapted to be worn interlabially during the menses for the absorption of menstrual fluids.

Interlabial catamenial pads are those which are inserted between the labia overlying the vaginal orifice. They rely solely upon the pressures exerted by the labia for maintaining them in position. Generally, such pads are about 3½ inches long, 1½ inches high and ½ inch thick.

Interlabial catamenial pads used heretofore, have not been entirely successful primarily for two interrelated reasons. First, was early failure i.e., leakage of menstrual fluids past the interlabial pad prior to its absorbing fluids to its total absorbing capacity and second, was the tendency of interlabial pads to shift out of position and even in some instances, in falling out of its position between the labia. It is believed that both of these conditions exist as a result of menstrual fluids building up at the surface of interlabial pads preventing further absorption of fluids into the center of the pad and also forming, in essence, a lubricant between the outer surface of the pad and the surfaces af the labia reducing the frictional contact therebetween.

Further, as a result of the build up of menstrual fluids on the side surfaces of the interlabial pads, there has been the tendency for the fibrous material forming the cover of the interlabial pad to become weakened and sloughed therefrom. With such sloughing the absorbent core of the interlabial pad breaks up and ceases to function as an absorbent.

I have now found a novel structure for interlabial catamenial pads which is inexpensive to make, reduces the incidence of early failure and provides surface characteristics which, when wetted with menstrual fluids, obtain increased wet strengths thereby reducing the tendency to slough and breakdown while at the same time retaining sufficient frictional forces to remain fixed in position when worn.

According to the present invention, an interlabial catamenial pad is provided which comprises generally, an elongated, trapezoidally shaped core of absorbent fibrous material and a non-woven fabric cover around the sides, top and bottom of said core, said farbic cover comprising from about 25% to 75% by weight of the fabric of cellulose fibers and from about 25% to 75% by weight of the fabric of polypropylene fibers uniformly distributed throughout the cellulose fibers and in partial bonding relationship therewith and with the fibers in said core, said fabric having from about 30% to70% of its total area free of partially fused polypropylene fibers.

My interlabial pad having the above structure can be made by forming a web of cellulose fibers, preferably of bleached absorbent cotton staple or comber noil, compressing this first web and depositing the compressed strip upon a wider web formed from a blended mixture of polypropylene fibers and cellulose fibers, preferably rayon. The compressed strip and second web are formed and joined continuously and the second web is folded upwardly and over the top surface of the compressed strip in overlapping relationship and thereafter the strip and web, so combined, are passed between heated rolls under



pressure to soften the polypropylene in the outer web to bond together the cellulose fibers in the outer web and the cellulose fibers in the inner compressed strip adjacent to the interface between the two. After such bonding, the strip thus formed is cut transversely into individual trapezoidally shaped pads and stacked for packaging, etc.

The degree of bonding between the cellulose fibers of the inner web and the cellulose fibers of the outer web will depend for the most part on the amount of polypropylene fibers used in the web forming the cover and the amount of fusion imparted to the polypropylene fibers therein. If a relatively small number of polypropylene fibers are present in the cover material, higher temperatures and greater pressures applied over a longer period of time are used to fuse the polypropylene fibers so that substantially all of them are fused forming a bond between the cellulose fibers of the cover material and the cellulose fibers of the core. If substantially larger numbers of polypropylene fibers are present in the cover material, however, the combined core and cover can be subjected to lower temperatures, lighter pressures and shorter periods of time such that the polypropylene fibers present will be fused to a lesser degree forming a greater number of lighter bonds between the polypropylene fibers and the cellulose fibers of the cover and the cellulose fibers of the core.

The invention will be more fully understood from the description hereinafter contained in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of the interlabial catamenial pad of the present invention;

FIGURE 2 is a plan view of the non-woven fabric cover of the interlabial catamenial pad of the present invention which has been removed therefrom and spread open into a flat plan;

FIGURE 3 is a partial cross sectional view through one side and the top and bottom of the interlabial catamenial pad of the present invention which is taken approximately along lines **3—3** of FIGURE 1 and which is greatly enlarged for clarity, and

FIGURE 4 is a partial cross sectional view of the vulva and surrounding structures showing the interlabial catamenial pad in position during use.

Referring now first to FIGURE 1, there is shown an interlabial catamenial pad **10** having a fibrous core **12** encased in a non-woven fabric cover **14**. The core **12** is formed from cotton fibers **16** and the non-woven fabric cover **14** consists of a blend of rayon fibers **18** and polypropylene fibers **20**. The polypropylene fibers have been partially fused with heat and pressure to bond the rayon fibers together in the cover **14** and also to bond the rayon fibers in the cover **14** to the cotton fibers **18** in the core **12**.

The pad **10** is produced from webs of cellulose fibers which form the core **12** and the non-woven fabric cover **14**. The webs can have an orientation, that is, have a majority of the fibers aligned in either the long or cross direction of the webs, or they may be iso-oriented, that is, have no predominant fiber direction. While in the preferred embodiment the web forming the core **12** of the catamenial pad **10** consists of cotton fibers **16** and the web or webs forming the non-woven fabric cover **14** consist of rayon fibers **18** having polypropylene fibers **20** dispersed therein, either the web forming the core or the web or webs forming the non-woven fabric cover can consist of natural fibers such as cotton fibers or artificial fibers such as rayon fibers.

If cotton fibers are used, they are bleached and can be fine or coarse, mature or immature. Generally the length of the cotton fibers will be from about 1⅛ inches down to ⅛ inch or less.

If rayon fibers are used, they generally will have a

length of from about ¼ inch to 2 inches or longer and have a denier from about 1 to 5.

The polypropylene fibers dispersed in the cellulose fibers of the web or webs forming the non-woven fabric cover vary in length from about ½ inch or lower up to 1½ or 2 inches and even longer. Generally, the denier of the polypropylene fibers will be in the range of from about 1 to 5, though higher denier fibers may be used.

In order to form the essential bonding of the cellulose fibers **18** in the web forming the non-woven fabric cover **14** of the catamenial pad **10** to one another and to the cellulose fibers **16** in the core **12**, the web or webs forming the non-woven fabric cover **14** have dispersed therein an amount of polypropylene fibers **20** varying from about 25% to 75% or even higher of the total weight of the final non-woven fabric **14** and preferably from about 45% to 55% of the total weight of the fabric **14**. If less than about 25% by weight of polypropylene fiber **20** is used in the non-woven fabric cover **14**, it has insufficient wet strength and accordingly, the cover **14** has a tendency to slough and break up upon being wetted with menstrual fluids when worn as an interlabial catamenial pad **10**. If more than about 75% polypropylene fiber **20** by weight is used and also dependent on the degree of bonding attained, the non-woven fabric cover **14** looses the desirable characteristics as a cover for a catamenial pad such as absorbency, softness and loft.

In order to form the catamenial interlabial pad **10** of the present invention having all the desirable advantages thereof, it is essential that the cellulose fibers **18** in the web forming the non-woven fabric cover **14** be bonded to one another in an intermittent pattern of fused bonding areas leaving considerable portions of the web unbonded and further that the cellulose fibers **18** in the nonwoven fabric web be intermittently bonded to the cellulose fibers **16** in the web forming the absorbent core **12**. To this end the partially fused polypropylene fibers **20** in the nonwoven fabric cover **14** form no less than about 30% of the total surface of the fabric cover **14** and no more than about 70% of the total surface of the non-woven fabric cover **14**. It is most preferred that the partially fused polypropylene fibers **20** be present in the non-woven fabric cover **14** in an amont equal to about 50% of the total surface of the cover.

Further to the above end, it is essential in forming the interlabial catamenial pad **10** of the present invention that the cellulose fibers **18** in the non-woven fabric cover **14** and the cellulose fibers **16** in the absorbent core **12** be bonded to one another by a partial fusion of the polypropylene fibers **20** present in the non-woven fabric cover **14**. This is best accomplished by encasing the web of cellulose fibers **16** forming the absorbent core **12** of the interlabial pad **10** within the fibrous web forming the outer cover **14** which consists of cellulose fibers **18** and polypropylene fibers **20** as described above and thence subjecting the webs so combined to heat and pressure as by a heated calendar. That is to say, it is essential that the polypropylene fibers existent in the non-woven fabric cover be partially fused "in situ" by the application of heat and pressure thereto when the non-woven fabric cover is in position around the cellulose fibers forming the absorbent core of the interlabial pad. By so doing, it is assured that some of the polypropylene fibers **20** in the non-woven fabric cover **14** become partially fused while adjacent to the cellulose fibers **16** in the absorbent core **12** causing the latter to become bonded to the cellulose fibers **18** existent in the non-woven fabric cover **14**. The heat and pressure are applied simultaneously to assure that the polypropylene fibers **20** in the non-woven fabric cover **14** are in the softened state during the application of pressure.

Referring now more particularly to FIGURES 2 and 3, there is shown the non-woven fabric cover **14** which has been removed from the interlabial pad **10**, which cover consists of the cellulose fibers **18** throughout which there is dispersed the heat fusible fibers **20** and the way in which the polypropylene fibers **20** upon partial fusion serve to bond the cellulose fibers **18** in the fabric cover **14** one to another and to the cellulose fibers **16** in the core **12**. It is seen that the polypropylene fibers **20** in the non-woven fabric cover **14** are more heavily fused in the areas overlying the sides *a*, of the catamenial pad **10**. The portion *b* of the cover **14** overlying the top **26**, and bottom **24** of the catamenial pad **10** is relatively free of partially fused polypropylene fibers **20**. While the polypropylene fibers **20** generally are uniformly distributed throughout the non-woven fabric cover **14**, even including that portion *b*, overlying the top **26** and bottom **24** of the catamenial pad, the catamenial pad, when subjected to heat and pressure to soften the polypropylene fibers, as described in greater detail hereafter, obtains a greater degree of partial fusion of the polypropylene fibers **20** in the areas *a*, overlying the sides of the catamenial pad **10**. This is particularly advantageous because the non-woven fabric cover obtains its greatest wet strength in the areas overlying the side of the catamenial pad where the greatest wet strength is required while the top and bottom of the pad remain softer and more open thereby offering less resistance to the interception of menstrual fluids and a more ready path for the menstrual fluids to pass through the non-woven fabric cover into the absorbent cellulose fibers in the core. Additionally, the softer portion of the non-woven fabric cover overlying the top and bottom of the catamenial pad is less irritating to the sensitive inner labial region (FIGURE 4).

Now, to describe in somewhat greater detail the making of a specific embodiment of the present invention, the absorbent core of the interlabial pad is formed from bleached absorbent cotton fibers ranging from ½ to 1⅛ inches in length on a card machine into a card web (fleece) weighing about 570 grains per running yard. This fleece is then narrowed into a strip about 1½ inches in width and condensed on compression rollers to a density of about 21 grains per cubic inch.

The non-woven fabric cover is produced on a card from a blend of fibers consisting of 50% by weight of polypropylene fibers and 50% by weight of rayon fibers into three card webs (fleece) each weighing about 50 grains per square yard and then the three webs are superimposed on one another into a three-ply web having a weight of about 150 grains per square yard.

The core strip and cover web are then joined by the cotton fiber strip being placed medially as formed on the non-woven fabric cover web. The cover web is then folded upwardly and over into overlapping relationship on the upper side surface of the absorbent core. The core-strip-cover web assemblage is then fed at a speed of about 3 feet per minute between the nip of two hot calendar rolls which are heated to a temperature of about 350° F. The space between the hot calendar rolls defines a gap of about ¼ of an inch such that the core and cover assemblage having a thickness of about ½ inch is subjected to slight pressure while passing between the heated rolls. In this manner the polypropylene fibers existent in the non-woven fabric cover are partially fused thereby bonding the cellulose fibers in the non-woven fabric cover to one another and to the cellulose fibers of the absorbent core. The partial fusion occurs and is more abundant in the areas of the fabric cover overlying the sides of the pads than that overlying the top and bottom of the pad.

From the calendar rolls the composite bonded webs are passed through a cut-off mechanism which cuts the web transversely at an angle into individual trapezoidally shaped pads which are approximately 3¾ inches on the top edge **26**, 3 inches on the bottom edge **24**, 1½ inches in height and from about ⅜ to ½ inch in thickness. About 60% of the total surface of the fabric cover is found to consist of the partially fused polypropylene fibers bonding together the rayon fibers and similarly, the

rayon fibers of the fabric cover are found to be bonded to the cotton fibers of the core by the partially fused polypropylene fibers in the cover, particularly in the areas forming the sides of the interlabial pad.

Referring lastly to FIGURE 4, the manner in which the interlabial pad of the present invention is to be worn will be readily apparent. The pad **10** is inserted between the inner surfaces of the labia **25** with the top (longer) edge **26** placed over the vaginal orifice **28**. Alternately, the pad **10** can be worn interlabially with the shorter edge **24** placed against the vaginal orifice **28** with the longer edge **26** extending outwardly. As menstrual fluids are discharged from the uterus **30** through the os **32** into the vagina **34**, they flow by gravity through the vaginal orifice **28** where they are immediately intercepted by either the top edge **26** or the bottom edge **24** of the interlabial pad **10**, depending upon which way the pad is worn. Because of the construction of the interlabial pad **10** as herein described, the discharged menstrual fluids are readily drawn into the interior of the pad and retained therein, and the pad maintains its structural integrity and proper position throughout the time required to absorb the menses to its fluid capacity.

While I have described the present invention with particular reference to a specific embodiment thereof, such embodiment is purely illustrative and it wil lbe apparent to those skilled in the art that many variations, changes and modifications ca nbe made therein without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

**1.** An interlabial catamenial pad comprising an elongated, trapezoidally shaped core of cellulose fibers and a non-woven fabric cover around the sides, top and bottom of said core, said fabric cover comprising from about 25% to 75% by weight of the fabric of cellulose fibers and from about 75% to 25% by weight of the fabric of polypropylene fibers uniformly distributed throughout the cellulose fibers and in partial bonding relationship therewith and with the cellulose fibers in said core, said cover having from about 30% to 70% of its total area free of partially fused polypropylene fibers.

**2.** The catamenial pad of claim **1** wherein the cellulosic fibers of said core are cotton having a length from about ⅛ inch to about 1⅛ inches, and the cellulosic fibers of said cover are rayon having a length from about ¼ inch to about 2 inches and a denier from about 1 to about 5.

**3.** The catamenial pad of claim **1** wherein the portions of the surface area of said non-woven fabric cover overlying the sides of said pad have a greater percentage of partially fused polypropylene fibers than the portions of said non-woven fabric cover overlying the top and bottom edges of said pad.

**4.** The catamenial pad of claim **1** wherein said fabric cover comprises about 50% by weight of the fabric of rayon fibers and about 50% by weight of polypropylene fibers.

**5.** The catamenial pad of claim **4** wherein the cellulosic fibers of said core are cotton having a length from about ⅛ inch to about 1⅛ inches, the rayon fibers of said fabric cover have a length from about ¼ to about 2 inches and a denier from about 1 to about 5, and the polypropylene fibers of said fabric cover have a length from about ½ inch to about 2 inches and a denier from about 1 to about 5.

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U.S. Cl. X.R.

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