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(71) Applicants
The Procter & Gamble Company (USA—Ohio)
301 East Sixth Street, Cincinnati, Ohio 45201, United States of America

(72) Inventors
Daniel Guy Baird
Muir Charles Robertson

(74) Agent and/or Address for Service
Gill Jennings & Every, 53-64 Chancery Lane, London WC2A 1HN

(54) Disposable absorbent article

(57) A disposable absorbent article having the conventional absorbent core encased between a liquid-permeable topsheet and a liquid-impermeable backsheet is provided with thin liquid impermeable upwardly folded side flaps (27) which extend beyond the absorbent core.

The side flaps may be formed by extending the backsheet beyond the absorbent core along at least part of the lateral edges of the core.

Fig. 1

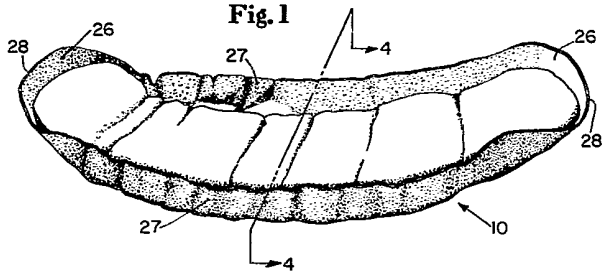

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Fig. 1

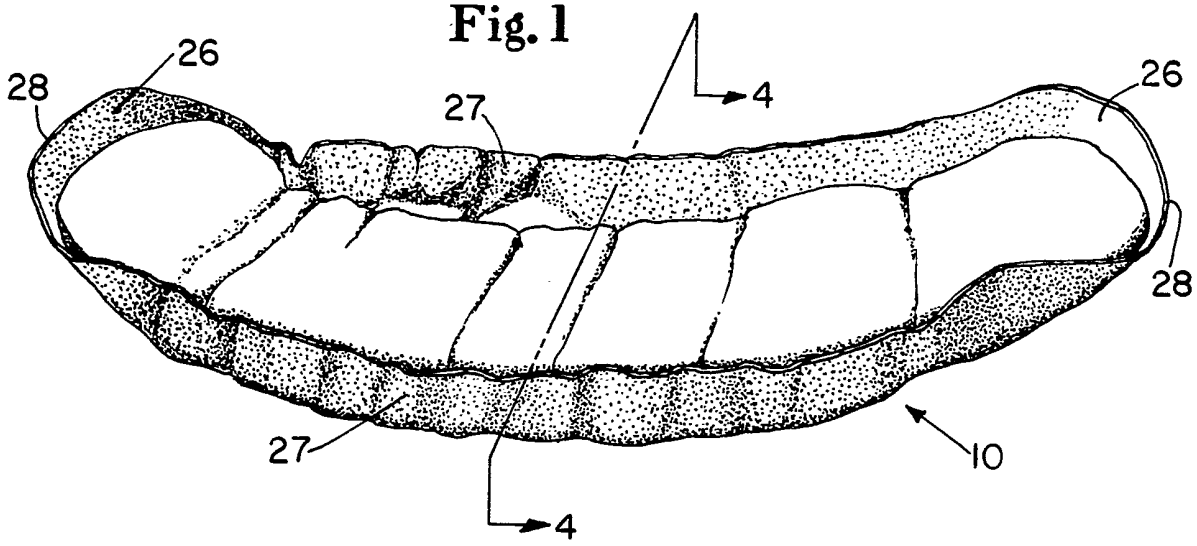


Fig. 2

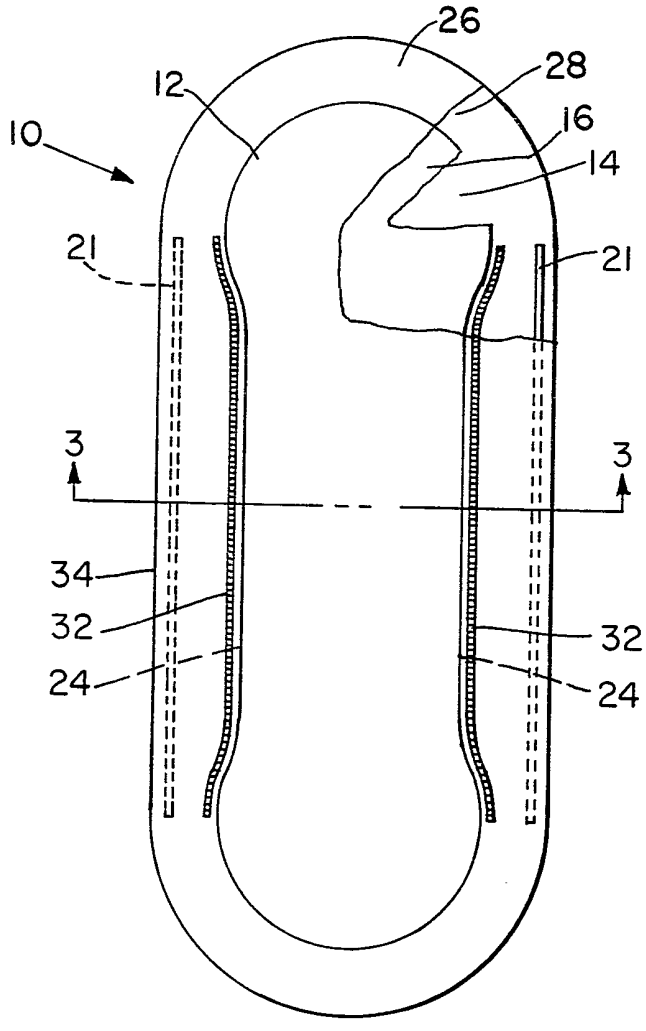


Fig. 3

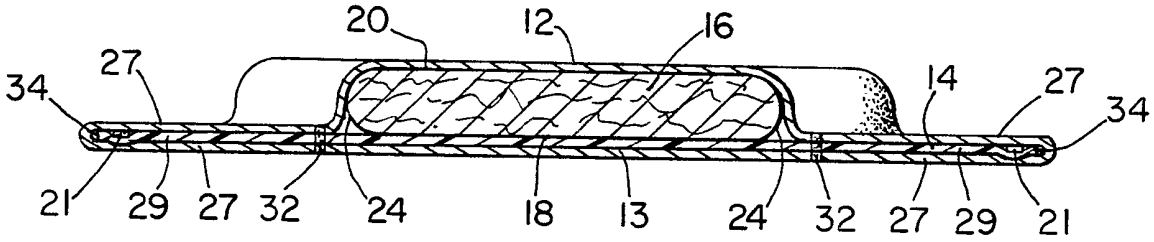


Fig. 4

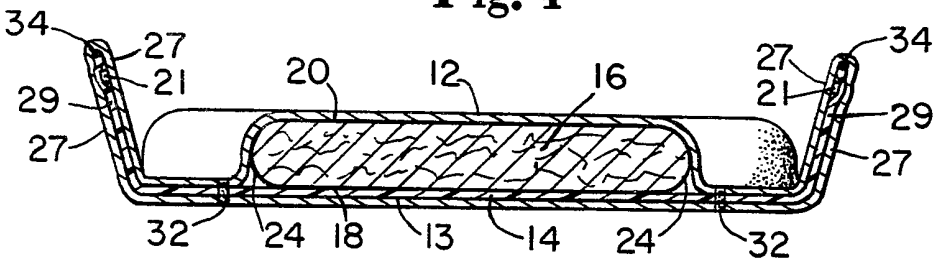
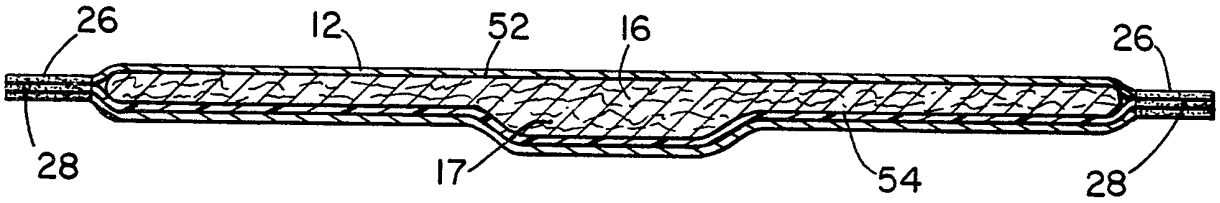


Fig. 5



SPECIFICATION

Absorbent article

BACKGROUND OF THE INVENTION

This invention relates to disposable absorbent articles generally, and more particularly relates to catamenial pads and the like. Still more particularly, this invention relates to catamenial pads having upwardly folded liquid impermeable flaps along at least part of the lateral sides of the pad. In a preferred embodiment the flaps are formed by having the backsheet extend beyond the periphery of the absorbent core. Optionally, the absorbent articles contain folding means which keep the flaps in the required upwardly folded position. Preferably, the folding means also impart a highly desirable longitudinal curvature to the absorbent article.

In general, disposable absorbent articles all have the same basic structure: an absorbent core which is encased between a liquid permeable, user contacting topsheet and a liquid impermeable backsheet. The prior art teaches numerous variations of and elements in addition to the basic topsheet, backsheet, and absorbent core arrangements, with each variation or additional element being directed to improving a specific characteristic of the disposable absorbent article.

Ideally, a disposable article will exhibit good strike-through and rewet characteristics permitting liquid to rapidly penetrate the topsheet and preventing the liquid from flowing back through the topsheet. It is an advantageous characteristic for the disposable absorbent article to present a clean user contacting surface, (i.e., the topsheet does not stain or retain liquid) and for the disposable absorbent article to protect the garments, clothing, bedding, etc. which surround the disposable article in use.

In particular in the case of catamenial pads it is desirable to improve wearing comfort by reducing the lateral dimensions of the pad while preventing increased soiling of the garments surrounding the pad. It is further desirable to provide catamenial pads having soft lateral edges to increase the wearer's comfort.

It is therefore an object of the present invention to provide a disposable absorbent article providing improved protection against soiling of the vicinity surrounding the area of liquid discharge while providing good wearer's comfort and convenience of use.

These and other objects of the invention will be readily apparent when considered in reference to the following description and when taken in connection with the accompanying drawings.

SUMMARY OF THE INVENTION

According to the present invention, a disposable absorbent article such as a catamenial pad is manufactured such that an absorbent core is encased between a liquid permeable topsheet and a liquid impermeable backsheet.

The disposable absorbent article is provided with thin, liquid impermeable side-flaps extending beyond the absorbent core. The side-flaps may be formed by extending the backsheet beyond the absorbent core along at least part of the lateral edge of the core. The side-flaps are folded upwardly.

The term "folded-upwardly" or "folded in the direction of the second opposed face" (of the absorbent core means) as used herein to described the side flaps indicates the fact that, when the absorbent article is placed on a horizontal surface, the side flaps extend from the horizontal plane at a certain angle, theta. Values of theta suitable for the purpose of the present invention are in the range of from 20° to 90°. Preferred are values of theta in the range of from 60° to 90°.

Preferably, the absorbent article is curved into the direction of the second opposed face along the longitudinal axis of the article. Thus, the backsheet material forms a liquid impermeable container of cup-like shape. This container will hold fluid during moments of high liquid discharge, thus allowing for the time needed for complete uptake by the absorbent core.

The degree of longitudinal curvature can conveniently be expressed as a Longitudinal Curvature Factor (LCF), which is defined as

$$LCF = P/C$$

wherein P is the projected length between the longitudinal ends of the absorbent core means of the (curved) absorbent article, and C is the length of the flat core. Hence, the theoretical range of LCF values is from 0 (core ends touching each other) to 1 (completely flat core). Preferred absorbent articles of the present invention have LCF values in the range of from 0.20 to 0.98; more preferred are LCF values in the range of from 0.60 to 0.93.

Preferred embodiments of the present invention are disposable articles as described hereinabove, which further comprise one or a combination of the following features.

1) Folding means. This term as used herein, describes any means which assist in keeping the liquid impermeable flaps in an upwardly folded configuration. Depending on the method chosen, the folding means may additionally assist in maintaining the desired cup shape-like configuration of the absorbent article. Suitable folding means can be provided by the use of a slightly tensile topsheet material which is attached to the backsheet material while the former is slightly stretched; by the use of elastics which are attached to the side-flaps while the former are in their elongated state and the latter in a flattened configuration; by heat-crimping the side flaps so as to reduce their dimension in the longitudinal direction of the absorbent article.

2) Topsheet edges. In a preferred embodiment of the disposable absorbent article of the present invention the topsheet is provided with side-flaps which extend beyond the periphery of the absorbent core means along the lateral edges of the core means. Desirably, the dimensions of these topsheet flaps are such as to permit them to be folded around the liquid impermeable side flaps. Any contact of the wearer's skin with the side flaps is thus with topsheet material, rather than with the liquid impermeable (e.g. backsheet) material, thus improving the wearer's comfort.

3) Liquid impermeable seams. Particularly in executions having the topsheet edges described above it is desirable to provide liquid impermeable seams which run along at least part of the lateral edges of the

absorbent core means. The means are located in the side flaps, one at each side of the absorbent core means. In a highly preferred embodiment the liquid impermeable flaps are formed by extending the backsheet material beyond the periphery of the absorbent core means; the topsheet has topsheet flaps which extend beyond the periphery of the absorbent core means and which are folded around the backsheet flaps; and the topsheet material is affixed to both faces of the backsheet flaps in a manner as to form liquid impermeable seams along at least part of the longitudinal edges of the absorbent core means.

The liquid impermeable seams preferably are positioned as close as possible to the absorbent core means, e.g. at a distance of less than 10 mm, more preferably less than 5 mm, from the lateral edges of the absorbent core means.

In a more highly preferred embodiment the topsheet material is a resilient plastic web exhibiting a fiber-like appearance resulting from its exhibiting a three-dimensional microstructure comprising a regulated continuum of debossed areas of non-uniform cross-section along their length. Web material of this type are described in detail in U.S. Patent 4,342,314, issued August 3, 1982 to Radel et al, the disclosures of which are incorporated herein by reference.

Any of the known techniques for affixing the topsheet flap to the backsheet flap may be used to form the liquid-impermeable seam. For example, various well known heat bonding, ultrasonic bonding, or gluing procedures may be used.

4) Shaped core. This term, as used herein, describes absorbent core means in which at least part of the lateral edges are curved towards the center of the core. Typically, absorbent core means of this type possess a hour glass-like shape, although other shapes having a narrowed crotch area are possible.

5) Reverse core-profiling. It is desirable to use an absorbent core means having its maximum absorbent capacity (on a per unit of surface area basis) in the area of liquid discharge, typically the crotch area. This can be achieved by providing additional absorbent material in the area of liquid discharge. This results in an absorbent core means having a non-uniform thickness; such core means will be referred to herein as "profiled cores". In art-disclosed absorbent articles the additional absorbent material is located in between the main body of the absorbent core means and the topsheet, i.e. the core "profile" points away from the backsheet, or "upwards". It has been discovered that, in the absorbent articles of the present invention, it is desirable to place any additional absorbent material between the main body of the absorbent core means and the backsheet. This facilitates keeping the side flaps in the required upwardly folded configuration, and also assists in obtaining the desired curved configuration of the absorbent core means.

Since this way of "core-profiling" is opposite to the art-disclosed methods, it will be referred to herein as "reverse core-profiling".

Side flaps at the preferred angle combined with the pad having a preferred LCF value facilitate maintenance of a wide liquid impermeable barrier even if the core bunches during use, thus reducing soiling incidence due to lateral bunching.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. *1* is a perspective view of a catamenial pad according to the present invention.

Fig. *2* is a plan view of the catamenial pad of Fig. *1* in a flattened configuration, with portions of its components cut away.

Fig. *3* is a section view taken along section *3-3* of Fig. *2*.

Fig. *4* is a section view taken along section *4-4* of Fig. *1*.

Fig. *5* is a section view, as Fig. *3*, of a catamenial pad having reverse core profiling.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings, there is shown a preferred embodiment of the present invention as it would be used in a disposable absorbent article and, in particular, in a catamenial pad. It should be understood, however, that the present invention is also applicable for use in other disposable articles such as diapers, bandages and the like. As used herein, the term "disposable article" refers to articles which are intended to absorb and contain liquids such as those discharged from the human body (e.g., blood, menses, urine), and further articles which are intended to be discarded after a single use (i.e., they are not intended to be laundered or otherwise restored and then reused). A catamenial pad is a disposable absorbent article which is worn by females external to the urogenital region and which is intended to absorb and contain menstrual fluids and other vaginal discharges.

Fig. 1 is a perspective view of a catamenial pad *10* incorporating the present invention. As best seen in Fig. *3*, however, the catamenial pad *10* basically comprises a liquid permeable topsheet *12*, a liquid impermeable backsheet *14*, and an absorbent core *16*. The absorbent core *16* has first and second opposed faces, *18* and *20*, respectively. The backsheet *14* overlays first opposed face *18* and is in contact with the user's undergarments when the catamenial pad *10* is worn. The topsheet *12* overlays second opposed face *20* and is placed against the user's body when the catamenial pad *10* is worn.

The topsheet *12* and the backsheet *14* have a topsheet flap *26* and a backsheet flap *28*, respectively, extending outward from the lateral edges *24* of absorbent core *16*. Topsheet flap *26* is preferably affixed to backsheet flap *28* in any manner and in any configuration as is well known in the catamenial pad art, such as heat crimping, thermomechanical crimping or by using a hot melt adhesive. Importantly, topsheet flap *26* and backsheet flap *28* are not essential elements of the absorbent article of the present invention. Rather, these flaps are desirable for affixing the topsheet to the backsheet, thus increasing the integrity and strength of the article. Embodiments having such flaps are therefore preferred.

The backsheet *14* is impervious to liquid and prevents liquid absorbed by the absorbent core *16* from soiling the undergarments of the wearer of catamenial pad *10*. Preferably, backsheet *14* is a polyethylene film of from 0.012 to 0.051 mm thick, although other flexible, liquid impervious materials may also be used. As used herein, the term "flexible

refers to materials which are compliant and which readily conform to the shape and contours of the human body.

Referring again to Fig. *3*, it can be seen that absorbent core *16* is positioned between and encased by the topsheet *12* and the backsheet *14*. Absorbent core *16* is generally compressible and comformable to body shape. The absorbent core *16* may be manufactured in a wide variety of sizes and from a wide variety of absorbent materials such as absorbent fibrous web or absorbent foams, which are commonly used in disposable absorbent articles and which are capable of absorbing and retaining liquids. Other materials can also be used for the absorbent core *16* such as a multiplicity of plies of creped cellulose wadding or any equivalent material. The absorbent capacity of the material used, however, must be sufficient to absorb and retain the expected liquid loading in the intended use of the absorbent article. In a preferred embodiment of a catamenial pad *10* intended to receive heavy menstrual discharges of approximately 5-10ml., about 6gms. of comminuted wood pulp, generally referred to as airfelt, was used with good results.

The shape and dimensions of the absorbent core *16* are selected to fit the urogenital region of wearers of the catamenial pad *10*. While the shape and dimensions may be varied, it has been found that a generally dumbell shaped absorbent core *16* having a length of about 19.2 cm a maximum width of about 6.4 cm and a minimum width at the midpoint of about 5.1 cm provides good results. However, other dimensions and even other shapes (e.g. rectangular) may also be used for absorbent core *16*.

The topsheet *12* is liquid permeable and contacts the skin of the catamenial pad 10 wearer. The topsheet *12* is compliant, soft feeling and non-irritating to the wearer's skin. Further, the topsheet *12* is preferably manufactured from hydrophobic materials using any of the well known processes for manufacturing a liquid permeable web. Accordingly, the topsheet *12*, for example, be carded, spunbonded, melt blown or airlaid and may be fibrous or may be continuous film which is either apertured or embossed and apertured.

A preferred topsheet *12* is a resilient plastic web exhibiting a fiber-like appearance resulting from its having a three-dimensional microstructure comprising a regulated continuum of debossed areas of non-uniform cross-section along their length. Plastic webs of this kind, as well as their manufacture, are disclosed in U.S. Patent 4,342,314 to Radel et al, the disclosures of which are incorporated herein by reference.

Referring now to both Figs. *2* and *3*, the backsheet *14* has sideflaps *29* extending beyond the longitudinal edges *24* of absorbent core *16*. The width of the sideflaps at their narrowest point *29* is preferably from 1 to 6, more preferably from 3 to 4 times the caliper of the absorbent core, as measured at the center of the core.

As can be seen from Fig. 3, the topsheet *12* is wrapped all round the combined structure formed by the absorbent core *16*, the backsheet sideflaps *29* and the backsheet *14*, resulting in a catamenial pad of a structure commonly referred to in the industry as "tubular". Sandwich-like structures are also suitable for the absorbent articles of the present invention. However, when sandwich-like structures are used, it is desirable to provide topsheet sideflaps *27* which are wide enough to be folded around the backsheet sideflaps *29* and to be affixed to the lower or outer face *13* of backsheet *14* at impermeable seams *32*. In this manner, the edges *34* of the backsheet sideflaps *29* are covered with a layer of topsheet material, thus minimizing discomfort to the wearer of the absorbent article.

In the embodiment of Fig. *4* the topsheet *12* is folded around the absorbent core means *16* to touch the backsheet *14* right next to the lateral edge *24* of said absorbent core means *16*. At this point the liquid impermeable seam *32* is formed. It is also possible to fold the backsheet *14* around the absorbent core means *16*, such as to have the backsheet *14* touch the topsheet *12* in the plane of the topsheet face *20* of absorbent core means *16*.

The impermeable seams *32* run alongside part of the lateral edges *24* of the absorbent core *16*. The impermeable seam is formed by affixing the topsheet *12* to the backsheet sideflaps *29*. Preferably, the topsheet *12* is folded all around the structure, or at least around the backsheet flaps *29*, as described hereinabove for tubular structures and sandwich-like structures, respectively. This permits the topsheet to be affixed to the lower (outer) face *13* of backsheet *14* as well, thus ensuring that the edges *34* of the backsheet sideflaps *29* remain covered with topsheet material. Most preferably, the topsheet material covers the strips of elastic material *21* as well. Any of the well-known techniques for affixing the topsheet *12* to the backsheet *14* may be used to form the liquid impermeable seams *32*. For example, various well-known heat bonding or gluing procedures may be used.

The strips of elastic material *21* are affixed to the backsheet material. Prior to affixing, the strips are stretched to 150-300%, preferably about 200%, their original length. The strips are preferably placed at a distance of 1 to 5 mm from the outer edge of the side flaps. The elastics act as folding means, that is, they keep the backsheet sideflaps *29* in a upwardly folded configuration. At the same time, the strips of elastic material impart a curvature to the absorbent core, as shown in Fig. *1*. Instead of elastic strips, other elastic means, like heat shrinkable tape or elastic glue, may be used. The backsheet *14* has a cup-like configuration, thus providing a reservoir capable of holding menstrual fluid at incidents of large flow and allowing the time necessary for complete uptake by the absorbent core *16*.

Referring now to Fig. *5*, the preferred embodiment shown in a flattened configuration, has a reversely profiled core, that is, in the crotch area the absorbent core *16* has an amount of additional absorbent material *17* placed between the main body of the absorbent core *16* and the backsheet *14*. As a result, the absorbent core has a non-uniform thickness, the core being thicker in the crotch area. The core has a smooth face *52* facing the topsheet *12*, and a contoured face *54*, facing the backsheet *14*. This configuration, referred to herein as reverse core profiling, facilitates obtaining a cup-like configuration

of the backsheet *14;* it further facilitates bending the absorbent core *16* along the contours of the wearer's body. It has also been found that reverse core profiling reduces the incidence of topsheet wrinking during use of the absorbent article.

While particular embodiments of the present invention have been illustrated and described, it will be obvious that modifications can be made without departing from the spirit and scope of the invention.

CLAIMS

1. A disposable absorbent article comprising:

a) an absorbent core means for absorbing liquid, said absorbent core means having a first and a second opposed face and two lateral sides;

b) a liquid-impermeable backsheet overlaying said first opposed face of said absorbent core means, said backsheet having an inner face and an outer face, said inner face facing said absorbent core means; and

c) a liquid-permeable topsheet overlaying said second opposed face of said absorbent core means;

characterized in having side-flaps extending beyond the periphery of said first opposed face at the lateral sides of said absorbent core means, over from 1 to 6 times the caliper of the absorbent core means, said side flaps being folded in the direction of said second opposed face.

2. A disposable absorbent article according to Claim 1, characterized in that it further comprises a folding means for keeping the side flaps folded in the direction of said second opposed face.

3. A disposable absorbent article according to Claim 2, characterized in that the folding means is formed by elastic strips longitudinally attached to the side flaps.

4. A disposable absorbent article according to Claim 2 or 3, characterized in that the folding means is formed at least in part in that the topsheet is of a tensile material which is stretched and attached to the side flaps.

5. A disposable absorbent article according to any of claims 1 through 4, characterized in that the topsheet has topsheet flaps which are folded around the side flaps.

6. A disposable absorbent article according to any of claims 1 through 5 characterized in that the side flaps are formed by extending the backsheet beyond the absorbent core means along at least part of the lateral edges of the core means.

7. A disposable absorbent article according to any of Claim 6 further characterized in that the topsheet flaps are affixed to the backsheet flaps at both the inner face and the outer face of the backsheet in a manner as to form liquid impermeable seams along at least part of the lateral sides of the absorbent core.

8. A disposable absorbent article according to any of Claims 1 through 7, characterized in that at least part of the lateral edges of said absorbent core means are curved towards the center of said absorbent core means.

9. A disposable absorbent article according to any of Claims 1 through 8, characterized in that the absorbent core means is profiled in the direction of the backsheet.

10. A disposable absorbent article according to any of claims 1 through 9, characterized in that the backsheet flaps are folded upwardly at an angle of from 60° to 90°.

11. A disposable absorbent article according to any of Claims 1 through 10 characterized in that the article is longitudinally curved and has a longitudinal curvature factor (LCF) of from 0.20 to 0.98.

12. A disposable absorbent article according to Claim 11 characterized in that it has a longitudinal curvature factor (LCF) of from 0.60 to 0.93.

13. A catamenial pad comprising:

a) an absorbent core means for absorbing liquid, said absorbent core means having a first and a second opposed face and two lateral sides;

b) a liquid-impermeable backsheet overlaying said first opposed face of said absorbent core means, said backsheet having an inner face and an outer face, said inner face facing said absorbent core means; and

c) a liquid-permeable topsheet overlaying said second opposed face of said absorbent core means;

characterized in that the backsheet has backsheet flaps extending beyond the periphery of said first opposed face at the lateral sides of said absorbent core over from 1 to 6 times the caliper of said absrbent core means, said backsheet flaps being folded in the direction of said second opposed face; in that the topsheet has topsheet flaps extending beyond the periphery of the absorbent core means at the lateral sides, said topsheet flaps being folded around the backsheet flaps and affixed to the backsheet flaps at both the inner face and the outer face of the backsheet, in a manner as to form liquid-impermeable seams; and in that it has a strip of elastic material affixed to the either backsheet flap along at least part of the lateral sides of the absorbent core means, said elastic strips acting as a folding means for keeping the backsheet flaps folded in the direction of said second opposed face.

14. A catamenial pad according to Claim 13 further characterized in that at least part of the lateral sides of said absorbent core means are curved toward the center of said absorbent core means and in that the absorbent core means is profiled in the direction of the backsheet.

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