

[54] **ANTI-BACTERIAL MENSES ABSORBING PADS**

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[21] Appl. No.: **710,925**

Primary Examiner—Charles F. Rosenbaum
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 [51] Int. Cl. **A61f 13/16**
 [58] Field of Search..... 128/287, 275, 290,
128/296, 156; 106/15; 161/92

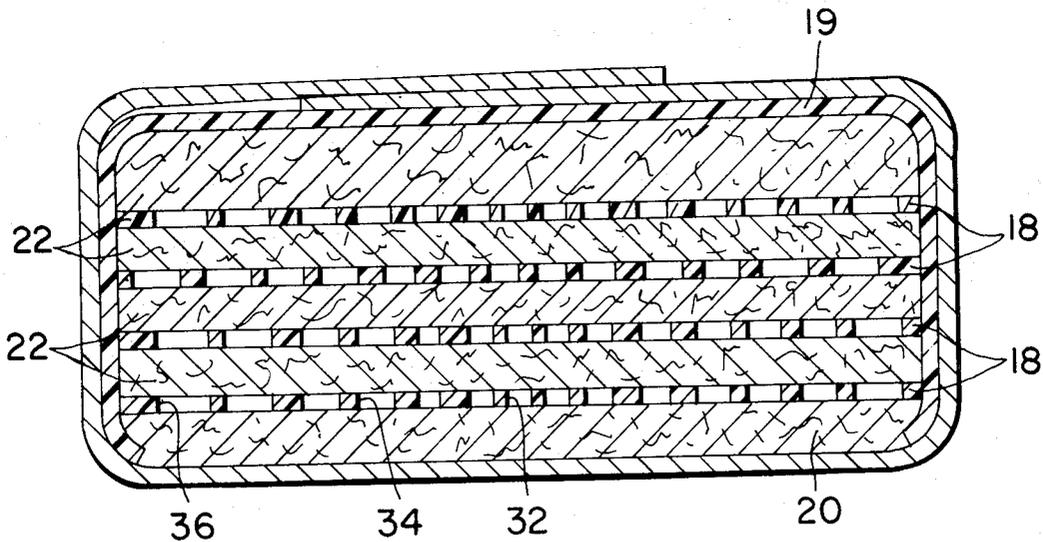
[57] **ABSTRACT**

This invention relates to improved menses absorbing pads wherein a quantity of anti-bacterial material is included in the pad to reduce odor and the possibility of infection.

[56] **References Cited**
UNITED STATES PATENTS

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6 Claims, 8 Drawing Figures



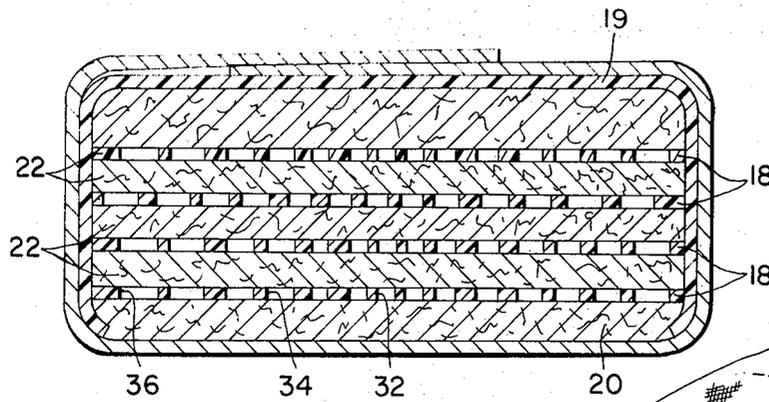


FIG. 2

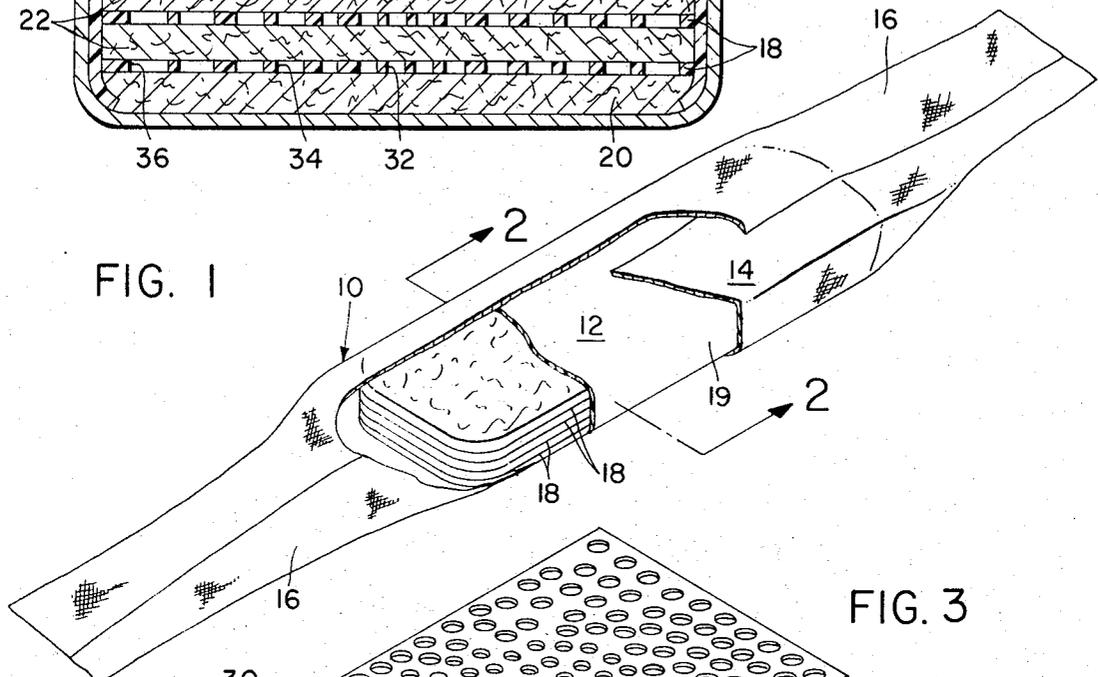


FIG. 1

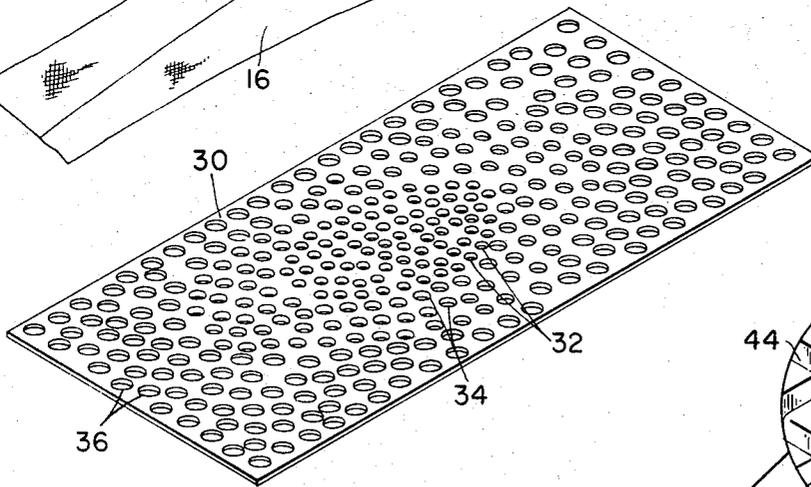


FIG. 3

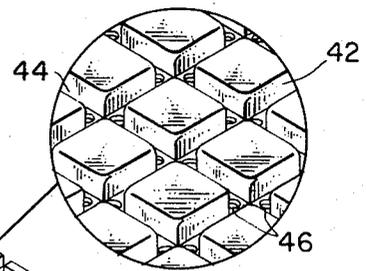


FIG. 4A

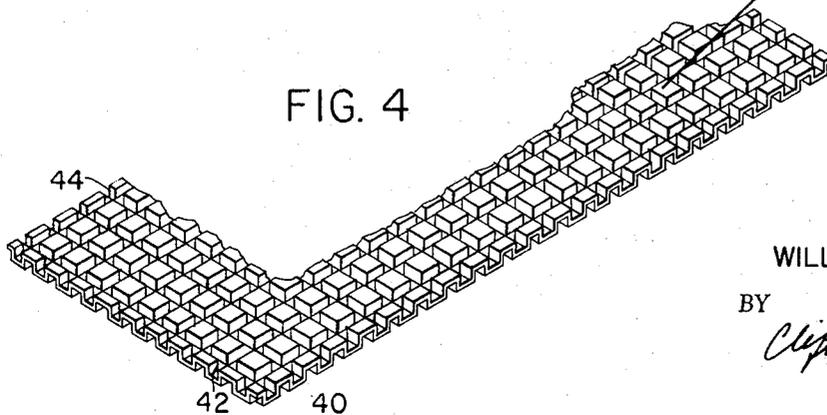


FIG. 4

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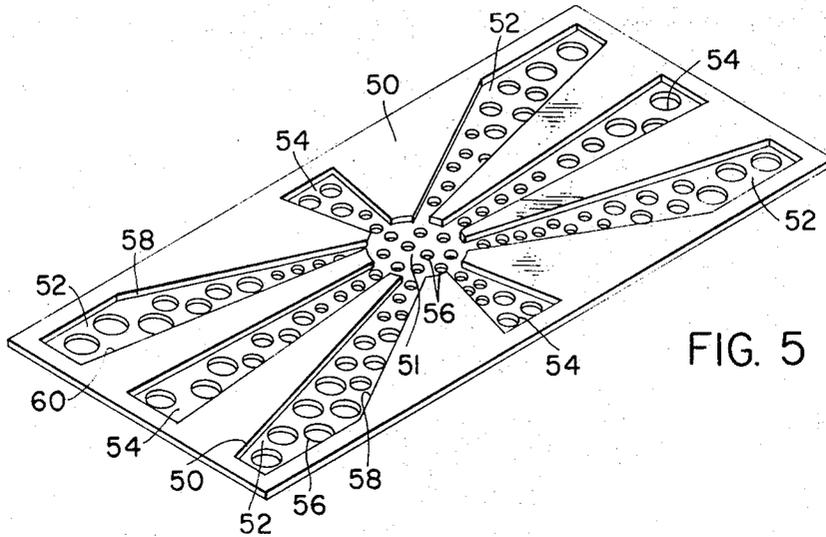


FIG. 5

FIG. 6

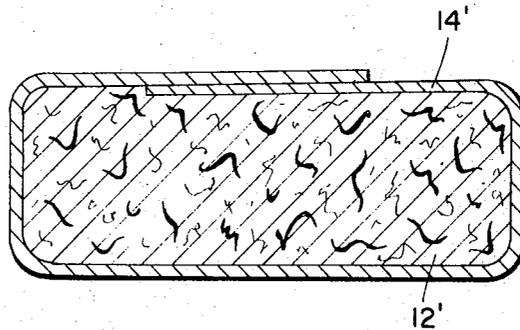
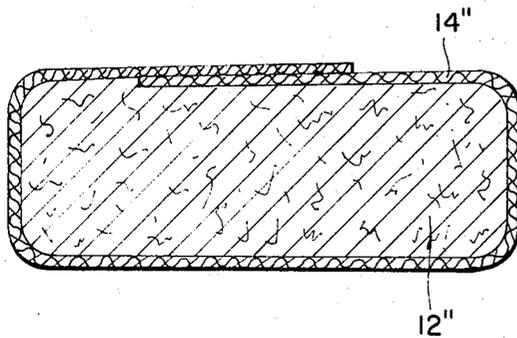


FIG. 7



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ANTI-BACTERIAL MENSES ABSORBING PADS

BACKGROUND OF THE INVENTION

The prior art discloses catamenial bandages comprising a plurality of layers of soft, cottonlike, pliable, fibrous material between which is interposed a mass or layer of deodorizing or antiseptic granules or powder. A specific example of such type of bandage is disclosed in U.S. Pat. No. 1,950,957 to W. F. Wilhelm. However, sanitary napkins of this type have met with little commercial success due to several marked disadvantages. First of all, the Wilhelm patent uses chloramine in a powdered or other granulated form, and the layers of wadding must be fastened together in some suitable way so that the material placed between them cannot accidentally escape or spill. Also, a sanitary napkin treated in such a manner does not aid in evenly distributing the menses throughout the napkin. Moreover, the manufacturing processes for such a product are time consuming and difficult to perform.

As was stated in the disclosure in the United States Letters Patent No. 2,919,200 to Dubin et al, certain compounds including Actamer sold by Monsanto Chemical Company and hexachlorophene such as compound "G-11" manufactured by the Sindar Corporation of New York are compatible with polyolefins or other plastics mentioned in the patent which may be used to make bactericidal and bacteriostatic (hereafter called anti-bacterial) plastics which effectively kill bacteria outright or inhibit their growth. Preferred materials are those requiring little or no plasticizers to attain flexibility. Other satisfactory anti-bacterial materials include, but are not limited to, Corobex "RB" sold by the Royce Chemical Company of Carlton Hill, New Jersey and bacteriostatic organotin compounds selected from the class of bis (tri-n-alkyltin) sulfosalicylates as described in the United States Letters Patent No. 3,279,986 to Hyman. The use of such materials in sanitary napkins according to the invention impedes the growth of medically undesirable fungi, and will also prevent odor.

Therefore, the present invention is directed to a sanitary napkin or tampon having one or more sheets of such an anti-bacterial plastic material inserted into the core or wadding thereof, or an anti-bacterial agent compounded with a plastic resin and otherwise used in combination with ordinary menses absorbing pads. The plastic sheets are perforated or otherwise treated so as to allow the menses to pass therethrough, however causing the menses to contact the perforated sheets thus killing or inhibiting the growth of the bacteria.

It is therefore an object of this invention to provide an improved sanitary napkin or other menses absorbing pad having associated therewith one or more plastic sheets which are treated with an anti-bacterial agent, said plastic sheets having surface characteristics for allowing the menses to pass through while distributing the menses evenly throughout the napkin.

It is also an object of the invention to provide an improved sanitary napkin or other menses absorbing pad having associated therewith, either in the wadding or in the cover, plastic fibers which include an anti-bacterial agent.

It is another object of the invention to provide a sanitary napkin or other bandage having the properties of retarding or destroying the growth of bacteria, and preventing odor.

Another object of the invention is to provide in combination with a sanitary napkin, anti-bacterial agents having a retarding and destructive effect upon the growth of bacteria.

Having set forth some of the objects of the invention, other objects and a fuller understanding of the invention may be had by referring to the claims and the following description in connection with the drawings wherein:

FIG. 1 is a perspective view with parts broken away of a sanitary napkin including the anti-bacterial sheets according to the invention;

FIG. 2 is an enlarged sectional view taken substantially along the line 2-2 in FIG. 1;

FIG. 3 is a perspective view of one of the anti-bacterial plastic sheets according to one embodiment of the invention;

FIG. 4 is a perspective view with parts broken away of one of the anti-bacterial sheets according to a second embodiment of the invention;

FIG. 4A is an enlarged perspective view showing a portion of the surface of the sheet shown in FIG. 4;

FIG. 5 is a perspective view of one of the anti-bacterial sheets according to a third embodiment of the invention;

FIG. 6 is an enlarged sectional view similar to FIG. 2, showing another embodiment of the invention;

FIG. 7 is an enlarged sectional view similar to FIG. 2, showing still another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawings, FIG. 1 shows a sanitary napkin 10, including a relatively thick, elongated absorbent core 12, comprising primarily a mass of cellulose fibers, enclosed with a liquid pervious wrapper 14 having ends 16 which extend beyond the extremities of the absorbent core, providing the usual attachment means for the napkins.

Within the absorbent core 12, according to one form of the invention, one or more perforate sheets 18 of anti-bacterial treated material, preferably plastic, are inserted into the core 12 and form alternating layers of anti-bacterial material and wadding. The outer layer of the core 12 furthest from the body comprises an imperforate sheet 19 of anti-bacterial treated material to prevent leakage and retain the menses within the napkin. To further prevent edge leakage, imperforate sheet 19 may also be large enough to fold up over the edges of the sides or ends of core 12 as shown in FIG. 2. Therefore, the core 12 will comprise an inner layer 20 of wadding, alternating layers of anti-bacterial treated, perforate, plastic sheets 18 and wadding 22, and an outer layer comprising an anti-bacterial treated, imperforate sheet 19. It is to be recognized that the number of layers 18 of anti-bacterial treated plastic may vary or even comprise a single sheet, and may be inserted either very near the inner surface of the core, or further away, the only limiting factor being that the anti-bacterial treated sheets must be located near enough to the body contacting surface of core 12 to be effective in their bacteria inhibiting characteristics. During experimentation, a single imperforate plastic sheet having anti-bacterial qualities was positioned on the outer surface of the core 12 without any intermediate sheets such as sheet 18. It was discovered that the anti-bacterial effect of a sheet so positioned was too weak

to effectively function as a bacteria retarding or destructive device, the reason being that the sheet was located too far away from the area where the menses entered the pad and the surface area available in the one sheet did not provide sufficient anti-bacterial agent to cope with the odor causing bacteria in the menses.

The anti-bacterial plastic sheet **18** is preferably made from a water-impervious film of polyolefin, or other plastics such as acrylic, acrylonitrile-butadiene-styrene, ethylene vinyl acetate, and other plastics and copolymers, which have incorporated or dispersed therein any suitable anti-bacterial agent such as, without limitation, hexachlorophene or Actamer in the manner taught by U.S. Pat. No. 2,919,200; Corobex "RB" which includes as active ingredients about 0.1 percent of 2 Ethylhexanol, about 16.0 percent Diisobutyl Phenoxyethoxy ethyldimethylbenzyl Ammonium chloride, and about 14.0 percent Alkyl (C₁₄ to C₁₈) Dimethylbenzyl Ammonium Chloride; or a bacteriostatic organotin compound selected from the class of bis (tri-n-alkyltin) sulfosalicylates as taught by the Hyman U.S. Pat. No. 3,279,986. More particularly, the anti-bacterial agent is preferably premixed in concentrated form with a certain amount of specified resin which will provide sufficient anti-bacterial agent, so that when the pre-mix is added to a base resin, the final result will contain anti-bacterial agent preferably in the range of 0.01 to 1.0 percent, however usable materials have been made containing percentages as high as 30 percent of anti-bacterial agent. The mixture may then be heated and extruded, injection molded, or blown as a thin film, or alternatively extruded as a rod which is subsequently particulated, melted, and re-extruded as a thin film in a manner well known in the plastic art. As used herein the term "molded" is used to define a plastic part or article shaped by heat and pressure. The result is a mixture of anti-bacterial chemical agent and plastic with the former uniformly dispersed throughout matrix of the latter. During the heating of the plastic the anti-bacterial chemical melts and blends with the plastic but upon cooling the former recrystallizes in the form of a spicular crystal which interlaces the molecular structure of the plastic.

The film may be extruded and/or calendared to any desired thickness, preferably 0.0005 to 0.005. If the film is to be later embossed, a preferred thickness might be in the range of 0.001 to 0.003 inches. The film may then be fed to a pair of embossing and/or perforating rolls which either impart to the film a desired hole pattern and/or a textured surface having a channelling effect to be hereinafter described. Embossed sheets may be cut from the roll stock by passing between cutting rolls of the proper circumference with cutting bars properly spaced to register the cuts with the embossed pattern. The completed sheet thickness ranges from 0.002 to 0.006 inches or from 0.003 to 0.008 inches.

In use, the anti-bacterial agent applied according to U.S. Pat. No. 2,919,200 tends to migrate to both the front and back surfaces of the plastic sheets and, upon contact with any bacteria adjacent thereto, either kills outright or greatly inhibits their growth. The plastic sheets act as a reservoir for the hexachlorophene or Actamer, so that when the surfaces of the plastic sheet become deficient in the amount of anti-bacterial agent thereon, the reservoir of anti-bacterial agent releases a sufficient amount of the agent to replenish the surface.

The bacteria retarding or destructive effect of the improved napkin occurs simultaneously in two ways. First, menses flows along the surface of the plastic sheet contacting the anti-bacterial agent, then down through the perforations to the wadding below, where it may contact other treated plastic sheets. Secondly, as the wadding or core becomes moist from normal body perspiration or the menses, the soluble anti-bacterial agent in the presence of moisture is drawn by hygroscopic action up into the wadding itself, providing a further surface area of anti-bacterial agent for contact with the menses.

The anti-bacterial plastic sheet, as stated above, is perforated to allow the menses to pass therethrough, although contacting it sufficiently to effectively inhibit the growth of bacteria. Plastic sheets **18** may be in the form of a perforated sheet having a regular hole pattern therein, or they may preferably take the form of plastic sheets **30**, each having perforations **32**, **34** and **36** of varying sizes. In such a case, the smaller perforations **32** are located near the central area of the sheet and gradually increase in size nearer the edge and ends of the sheet.

The perforations **32**, **34**, and **36** in the otherwise impervious sheet effectively cause the menses to spread toward the edges of sheet **30** rather than allowing it to collect near the center as is the usual case. Since the holes are larger near the edge, more of the menses will pass through in the edge area than in the central area in contrast to a napkin or pad of standard construction having no distributory characteristics.

The same effect might be achieved by using perforations of the same size and by providing fewer perforations near the central area of the sheet and more perforations near the edges. Both of the methods described above will distribute the menses more evenly throughout the napkin than is the usual case in ordinary sanitary napkins.

An alternate embodiment of one of the plastic sheets is shown in FIGS. 4 and 4A, wherein the anti-bacterial sheet **40** is embossed to provide longitudinal channels **42** and transverse channels **44**. Channels **42** and **44** include perforations **46** which allow the menses to pass through sheet **40**, and channels **42** and **44** urge the menses outwardly toward the edges of sheet **40** for a more even distribution. Perforations **46** may also preferably increase in size toward the edges of the plastic sheet. In addition to improving menses distribution, the embossing makes the sheet more flexible and thus, more comfortable.

Another embodiment of the plastic sheets is shown in FIG. 5, wherein the anti-bacterial sheet **50** is embossed to provide a central area **51** having channels **52** extending toward the corners and channels **54** extending toward the edges of sheets **50**. The central area **51** and channels **52** and **54** include perforations **56**, which also may increase in size and/or numbers toward the corners and edges of sheet **50**. For an even better distribution of the menses flow, the side walls **58** and **60** of channels **52** and **54** may diverge as they approach the corners and edges.

Another possible embodiment using the anti-bacterial agent is to combine the bacterial agent in a crystalline form with polyolefin or other plastic resins. The mixture is then heated and extruded as a fiber which may be interspersed in the wadding **12'** as shown in FIG. 6. The anti-bacterial fibers may alternatively be

spun into yarn for making a fabric as a textile for use as a napkin cover 14'' as shown in FIG. 7. In either case, it might not be necessary to insert the anti-bacterial plastic sheets 18 within the wadding or core 12 of the napkin. In cases where the anti-bacterial agent is incorporated into a fiber or yarn, the entire surface area is available for anti-bacterial action.

Although the description above has been directed toward the type of sanitary napkin adapted to be worn externally, it is to be recognized that the invention is equally useful in the internal or tampon type sanitary napkin.

There is thus provided an improved, anti-bacterial menses absorbing pad which is capable of greatly reducing the spread of infection and odor.

In the drawings and specification there have been set forth preferred embodiments of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for the purposes of limitation, the scope of the invention being defined in the claims.

What is claimed is:

1. In a menses absorbing pad comprising an absorbent core surrounded by liquid pervious cover, the improvement comprising:

a bacteriostatic material forming a portion of the absorbing pad contacting the menses to kill or inhibit the growth of bacteria, said bacteriostatic material comprising an organic plastic carrier and a bacteriostatic agent molded together, said bacteriostatic agent interlacing the molecular structure of the plastic, and said plastic comprising one material of the group consisting of: acrylic, acrylonitrile-butaden-styrene, and ethylene vinyl acetate.

2. The menses absorbing pad as claimed in claim 1, wherein said bacteriostatic agent comprises hexachlorophene.

3. The menses absorbing pad as claimed in claim 1, wherein said bacteriostatic agent comprises Actamer.

4. In a menses absorbing pad comprising an absorbent core surrounded by a liquid pervious cover, the improvement comprising:

a bacteriostatic material forming a portion of the absorbing pad contacting the menses to kill or inhibit the growth of bacteria, said bacteriostatic material

comprising an organic plastic carrier and a bacteriostatic agent molded together, said bacteriostatic agent interlacing the molecular structure of the plastic, said bacteriostatic material comprising at least one sheet inserted into the core and forming a layer thereof, said sheet including perforations of varying sizes including smaller perforations being located near the central area of the sheet and larger perforations being located near the edge of said sheet; whereby, the varying size of the perforations will cause the menses to be distributed more evenly throughout the core of said pad.

5. In a menses absorbing pad comprising an absorbent core surrounded by a liquid pervious cover, the improvement comprising:

a bacteriostatic material forming a portion of the absorbing pad contacting the menses to kill or inhibit the growth of bacteria, said bacteriostatic material comprising an organic plastic carrier and a bacteriostatic agent molded together, said bacteriostatic agent interlacing the molecular structure of the plastic, said bacteriostatic material comprising at least one sheet inserted into said core and forming a layer thereof, said sheet comprising perforations with the number of perforations near the edge of the sheet being greater than the number of perforations near the central area of said sheet.

6. In a menses absorbing pad comprising an absorbent core surrounded by a liquid pervious core, the improvement comprising:

a bacteriostatic material forming a portion of the absorbing pad contacting the menses to kill or inhibit the growth of bacteria, said bacteriostatic material comprising an organic plastic carrier and a bacteriostatic agent molded together, said bacteriostatic agent interlacing the molecular structure of the plastic, said bacteriostatic material comprising at least one sheet inserted into said core and forming a layer thereof, said sheet being perforated and said sheet having a plurality of embossed channels extending from the center thereof toward the corners and edges to form means for channeling the menses towards the edges and the corners of said sheet.

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