

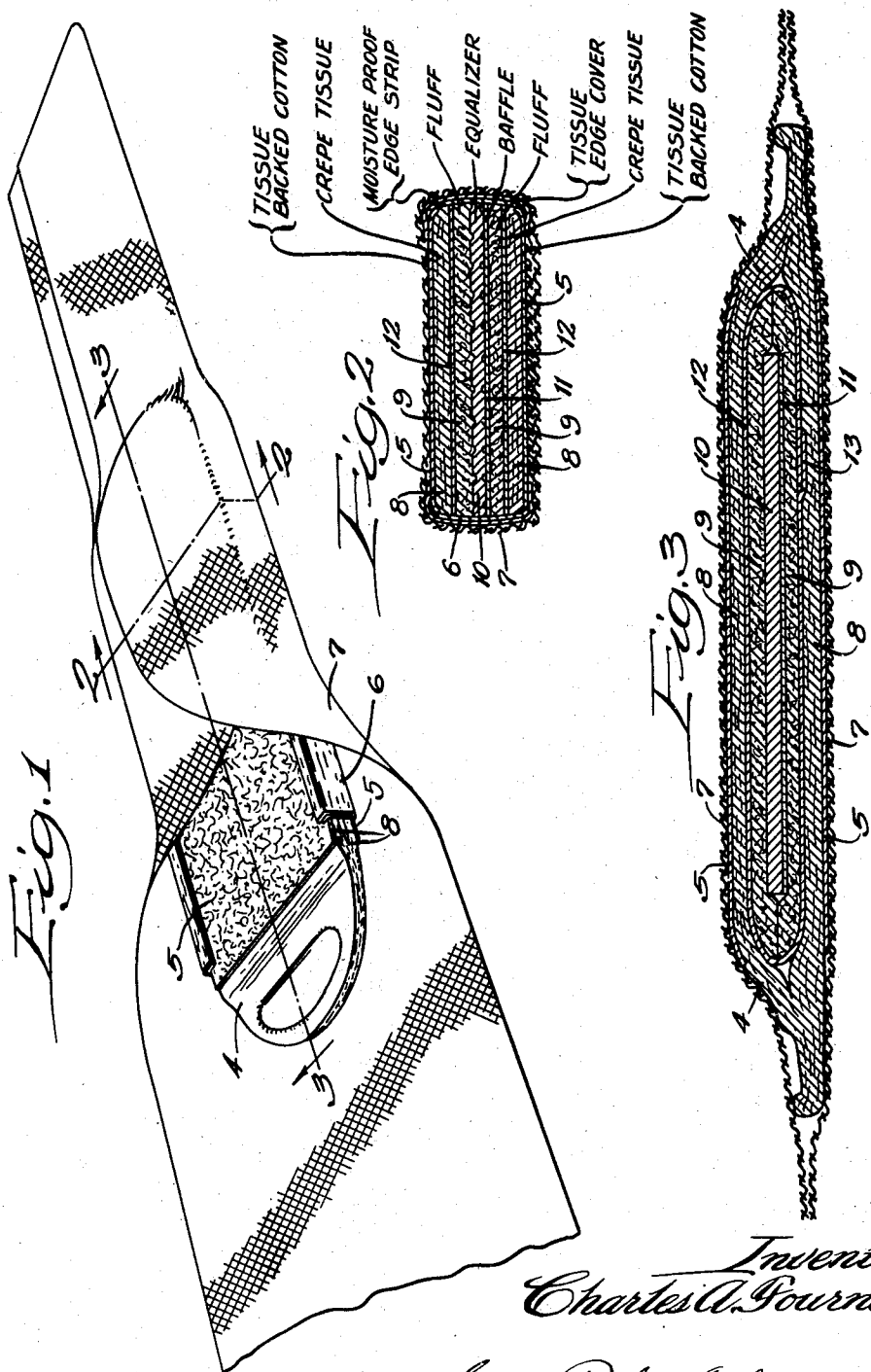
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SANITARY NAPKIN

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SANITARY NAPKIN

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The main object of the invention is to provide a sanitary napkin in which a major portion of its capacity for fluid absorption will be effectively utilized. Other objects are to provide effective control of penetration and direction of fluid absorption in a sanitary napkin; to provide a sanitary napkin with improved softness and comfort characteristics, and adequate and effective clothing protection features; and to provide a sanitary napkin structure of the character indicated which may be economically produced by fast operating automatic machinery.

In general, it is the object of the invention to provide an improved sanitary napkin, and other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawing wherein there is illustrated a sanitary napkin embodying a selected form of the invention.

In the drawing

Fig. 1 is a perspective of the improved sanitary napkin partially opened up to illustrate its construction;

Fig. 2 is a cross section on the line 2—2 of Fig. 1, the wrapper being shown in the normal fully closed position; and

Fig. 3 is a longitudinal section of the line 3—3 of Fig. 1, the wrapper being however shown in its normal closed condition.

The improved napkin structure herein illustrated embodies an absorbent pad body 4 covered on its opposite faces with a creped tissue paper backed thin layer of cotton 5. The opposite side edges of the pad are embraced by strips 6 which may include several plies of tissue paper of which at least one ply, usually the innermost ply, i. e. the ply next to the edge of the pad 4, is waterproofed. The outer surfaces of the edge covering strip 6 may, if desired, be covered with a thin film of cotton fibers (not shown). The pad structure is enclosed in the usual gauze wrapper 7 which has end extensions forming attachment tabs in the usual manner.

The absorbent pad body 4 comprises outer sections 8, 8 which are formed of a plurality of plies of absorbent creped tissue paper. Inwardly of the creped tissue paper sections 8, 8 are sections 9, 9 of very loosely felted fibrated wood pulp material which is commonly known as fluff material. The thickness of the fluff layers 9 may approximate the thickness of the creped tissue layers 8 although these thicknesses may vary considerably.

Intermediate the fluff layers 9, 9 there is provided means for substantially delaying the pas-

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sage of fluid from one side of the absorbent pad body to the other side thereof. Such means consists in this instance of a so-called equalizer element 10 which may be of the construction shown in Heitmeyer Patent No. 1,863,333. That construction consists of a plurality of plies of creped tissue paper pressed together in transversely spaced longitudinally extending narrow zones which produce capillary tracks for guiding the direction of fluid absorption. In association with the equalizer element 10 there is provided in this instance a baffle strip 11 which may consist of one or more tissue paper plies sized with paraffin or other material to render it resistant to the passage of fluid therethrough. In some instances the "equalizer" element 10 may itself be sized or formed of waterproof or water resistant paper so as to constitute a baffle rather than an equalizer, the baffle strip 11 being then omitted.

The outer sections 8, 8 are somewhat longer than the inner sections as best shown in Fig. 3 and the end portions of said section beyond the ends of the intermediate sections 9, 9, are pressed together to unite said end portions substantially as explained in Glomstead Patent No. Re. 21,076. The inner sections of the pad are thereby clamped together and frictionally held in place and the pad provided with thinned, flat, body-hugging end portions.

In fabricating the structure, the fluff sections 9, 9 together with the intervening equalizer and baffle element 10 and 11 may be formed into a unitary structure by depositing air suspended fluff or fiber on traveling wire screens to form the required fluff layers, the equalizer, baffle, and tissue wrapper strips being drawn from supply rolls and combined with the fluff layers by guiding the traveling layers and said strips into the desired relationship. The wrapper strip would, of course, be folded around the width of the overlapped fluff layers and baffle and equalizer strips, margins of the wrapper being preferably overlapped as shown at 13.

The wrapped fluff, baffle and equalizer web structure thus formed is then fed between wider supply strips of absorbent creped tissue paper and between tissue backed cotton covering strips. End portions of the assembled strips corresponding to the width of the sanitary napkin are then cut from the assemblage and the cut off units enclosed in the edge strips 6, 6 and gauze wrapper 7 by suitable mechanism.

The mechanism for making the pads forms no part of the present invention and is, therefore, not shown or described.

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In the described napkin structure there is a considerable improvement over prior pad structures in that a much larger portion of the absorbent pad body is actually caused to absorb fluid which is delivered to a localized area at one side of the napkin.

This improvement appears to be due to different absorption characteristics of the outer creped tissue paper layers of the pad and the adjacent inwardly disposed fluff layers of the pad. The creped tissue outer layers have a pronounced tendency to quickly absorb fluid deposited thereon in a localized area and to quickly spread the absorbed fluid lengthwise of the creped tissue layer. This is probably due to the multiplicity of capillary tubes formed by the creping of the tissue paper plies. It will of course be understood that in accordance with more or less common practice, the direction of creping in the creped tissue paper sections is such that the capillary tubes extend lengthwise of the pad. Thus the intermittently deposited fluids encountered in menstruation are quickly spread along the length of the napkin so as to avoid a tendency to the formation of an over-wet localized area of fluid application.

The fluff layers have a very high capacity for fluid absorption but they have a less pronounced tendency to spread the area of absorption in any specific direction. Absorption generally spreads more or less uniformly in all directions from any given point of fluid application, this being probably due to the haphazard arrangement of the fibers forming the fluff material. Also it appears that the fluff material requires a somewhat longer time period for the absorption of a given quantity of fluid than does the creped tissue material so that absorption progresses more slowly in the fluff material than in the creped material.

The fluid deposited on the surface of the pad first spreads laterally, predominantly lengthwise, in the creped tissue section of the pad on which the fluid was deposited, and gradually penetrates said section to reach the adjacent fluff section. When the tissue section of the pad is filled and penetrated by the absorbed fluid, the fluid will be transferred to the adjacent fluff layer over most of the area of the latter rather than to any small localized area corresponding to the localized area in which fluid is deposited on the outer creped tissue sections.

The fluff section, although being somewhat slower than the creped tissue section to absorb fluid, acts to absorb fluid over a well spread area so that it is not required to absorb fluid at the same rate of speed as the creped tissue section in order to prevent the accumulation of free fluid in the tissue section. This wide spread area of absorption results in effective utilization of most of the area of both the tissue and the fluff section so that most of the absorbing capacity of the said sections is utilized with the result that penetration of the entire thickness of the said sections requires an extended period of time under average conditions of menstruation.

The centrally disposed equalizer and baffle elements serve to effect internal spreading of the area of absorption throughout the length of the fluff layer on one side of the equalizer and baffle before fluid can penetrate through the equalizer and baffle elements to enter the fluff layer on the other side thereof.

The baffle element 11 is so formed that it will strongly resist the passage of fluid through it until such time that the absorbent material on

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one side thereof is so loaded with fluid that the fluid exerts such pressure as to wet and penetrate the baffle element. The equalizer element 10 may serve its usual internal absorption distributing function and should of course be located on the side of the pad (with reference to the baffle element) which is worn next to the body.

The equalizer and baffle elements are desirable as a safety measure against the passage of fluid from any localized area on one side of the pad directly through the pad to the other side thereof. This precaution is not essential in the employment of the invention but it is desirable because the repeated, localized application of fluid on one side of the napkin necessarily has a tendency to produce excessive wetness in one area which correspondingly tends to cause penetration of the pad in such localized area. Also, the folding of the napkin and shaping thereof to the body and perhaps other causes, sometimes produce localized areas of accelerated penetration. Also, the provision of the equalizer element, whether or not sized so as to resist absorption, is desirable although not necessary, because of its body giving effect in the pad.

Because of the increased utilization of the absorptive capacities of the absorbent pad, and because of the fact that absorption is drawn inwardly from the outer layers over most of the area of the pad, it is found that the napkin has an improved tendency to maintain its outer surfaces dry to add to the comfort characteristic of the napkin. The napkin may therefore be worn for a much longer period than has been practicable with constructions heretofore available.

The described pad structure is also advantageous in that it provides a pad which has a much softer cross feel than is usually obtainable in an all-creped tissue paper pad, while at the same time providing a pad with sufficient body to hold its size and form, thereby avoiding the usual criticism against pads made entirely of fluff material. The increased cross softness is probably due to the elimination of resistance to bending which is inherent in a multiple-ply all-laminated structure. In the described structure, the multiple-ply laminated outer sections 3, 8 are separated from each other so that they offer much less resistance to bending than would the same number of plies laminated together in a single unit.

Another important advantage of the described construction is that it results in a napkin having exceptionally soft, non-chafing edges. The softness occurs because of the fact that the crepe tissue and equalizer layers of the pad are elastic and under some tension at the time that the pad unit is cut from the web of material which is formed as above explained. The fluff layers are, however, relatively inelastic. When the pad unit is cut from the web of material, the tissue and equalizer layers, being under some tension, shrink back somewhat into the pad after the shearing while the fluff layers, being relatively inelastic, are left extending sufficiently to provide the desired soft edge.

In the described arrangement, the pad is reversible; that is to say, the pad may be worn with either side next to the body. This eliminates the necessity of supplying instructions as to the proper wearing of the pad together with the necessity for marking the pad to indicate which side should be worn next to or away from the body. Such instructions and markings are often completely overlooked, or misunderstood with re-

sulting complications. Nevertheless, because of the effective use made of most of the area of the pad, and the delayed penetration of the equalizer and baffle strips, there is a negligible danger of strike-through in the described composite pad construction. Thus full absorbing capacity of the absorbent material is employed while at the same time attaining substantial prevention of complete penetration of the pad.

Various changes in the described structure may be made without departing from the principles of the invention.

I claim:

1. A sanitary napkin embodying an elongated absorbent pad and a pervious wrapper enclosing the same, said pad comprising a layer of fluff, and a layer of relatively superposed plies of creped tissue paper disposed in overlying relation to said fluff layer on the body side of the pad, said tissue and fluff layers each representing a substantial portion of the thickness of the pad and said tissue layer having a fluid absorbing rate and, as an incident to its thickness, a fluid absorbing capacity, which enable the tissue layer to retain a considerable volume of absorbed fluid and to rapidly diffuse fluid absorbed from a localized area of fluid application on said layer, whereby the pad is given the characteristic of initial fluid absorption mainly in said tissue layer and delayed transmission of fluid from said tissue layer to said fluff layer, absorption strike-through being thereby delayed.

2. A sanitary napkin embodying an elongated absorbent pad and a pervious wrapper enclosing the same, said pad comprising a layer of fluff, and a layer of relatively superposed plies of creped tissue paper of a width no greater than the width of said fluff layer, said tissue layer being disposed in overlying relation to said fluff layer on the body side of the pad with the side edges of said tissue layer located within the width of said fluff layer, said tissue layer representing a substantial portion of the thickness of the pad and having a fluid absorbing rate and, as an incident to its thickness, a fluid absorbing capacity, which enable the tissue layer to retain a considerable volume of absorbed fluid and to rapidly diffuse fluid absorbed from a localized area of fluid application on said layer whereby the pad is given the characteristic of initial fluid absorption mainly in said tissue layer and delayed transmission of fluid from said tissue layer to said fluff layer, absorption strike-through being thereby delayed.

3. A sanitary napkin embodying an elongated absorbent pad and a pervious wrapper enclosing the same, said pad comprising a layer of relatively superposed plies of creped tissue paper on the body face of the pad, and a layer of fluff underlying said tissue layer, said tissue layer and said layer of fluff representing about equal fractions of the thickness of the pad, the fluid absorbing rate of said tissue layer and the fluid absorbing capacity thereof incident to its thickness, being such as to enable the tissue layer to retain a considerable volume of absorbed fluid and to rapidly diffuse fluid absorbed from a localized area of fluid application thereon, whereby the pad is given the characteristic of initial fluid absorption mainly in said tissue layer and delayed transmission of fluid from the same to said fluff

layer, absorption strike-through being thereby greatly delayed.

4. A reversible sanitary napkin comprising an elongated absorbent pad and a pervious wrapper enclosing said pad, said pad being of laminated construction having a pair of outer layers each consisting of a plurality of plies of creped tissue paper, and a filler comprising a layer of fluff intermediate said tissue layers, said tissue layers being of a width no greater than the width of said fluff layer and being disposed within the width of said fluff layer, said tissue layers being of approximately equal thickness and the total thickness of said tissue layers and the thickness of said filler representing approximately equal fractions of the thickness of the pad, the fluid absorbing rate of each of said tissue layers and its fluid absorbing capacity incident to its thickness being such as to enable each tissue layer to retain a considerable volume of absorbed fluid and to rapidly diffuse fluid absorbed from a localized area of fluid application thereon, whereby the pad is given the characteristic of initial fluid absorption mainly in a tissue layer and delayed transmission of fluid from the same to said filler, absorption strike-through being thereby greatly delayed.

5. A reversible sanitary napkin comprising an elongated absorbent pad and a pervious wrapper enclosing said pad, said pad being of laminated construction, and having a pair of outer layers each consisting of a plurality of plies of creped tissue paper, a pair of inner layers of fluff respectively disposed in face-to-face contact with the inner faces of said outer layers, and fluid penetration resistant means intermediate said inner layers, said tissue layers and said fluff layers being of substantially like thickness, the fluid absorbing rate of each of said tissue layers and the fluid absorbing capacity thereof incident to its thickness being such as to enable each tissue layer to retain a considerable volume of absorbed fluid and to rapidly diffuse fluid absorbed from a localized area of fluid application on the outer face thereof, whereby the pad is given the characteristic of initial fluid absorption mainly in a tissue layer and delayed transmission of fluid from the same to the adjacent fluff layer, said fluid penetration resistant means serving to resist the transfer of absorbed fluid from one fluff layer to the other, absorption strike-through being thereby greatly delayed.

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