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2,865,783	12/1958	Henderson et al.....	264/284
3,059,644	10/1962	Atkinson	128/290
3,067,747	12/1962	Wolterding et al	128/290
3,369,547	2/1968	Sack et al	128/296
3,395,201	7/1968	Kalwaites	128/290

FOREIGN PATENTS

521,507	8/1953	Belgium	128/284
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[54] **ABSORBENT FIBROUS PRODUCTS**
4 Claims, 7 Drawing Figs.

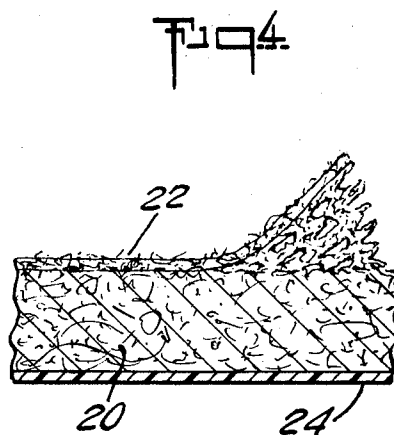
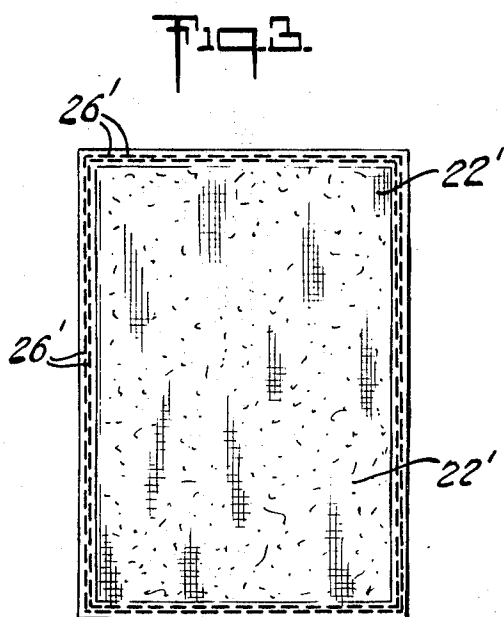
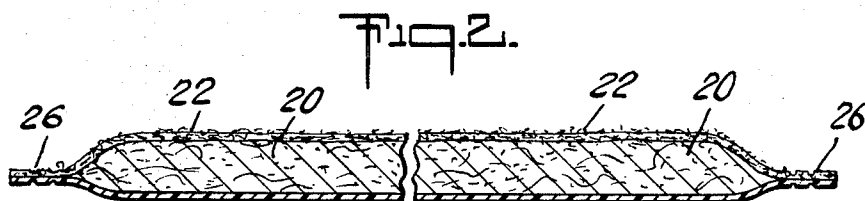
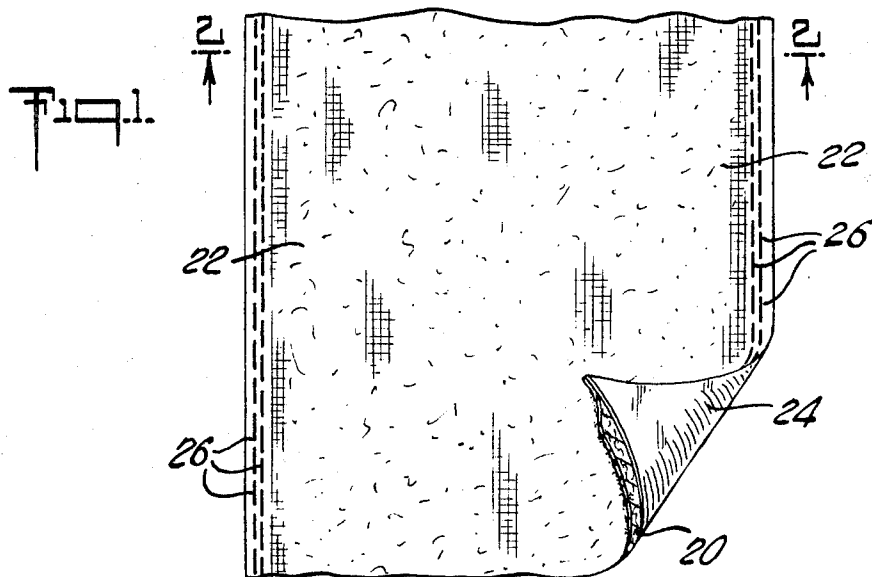
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 293, 319

[56] References Cited
 UNITED STATES PATENTS

2,696,819	12/1954	Lovekin	128/284
2,862,251	12/1958	Kalwaites	128/290X

ABSTRACT: An absorbent fibrous web suitable for use in
diapers, underpads, dressings, cosmetic wipes and the like
composed of predominately short fibers intermixed in a dry
state with long fibers to form a heterogeneous mixture in
which the long fibers serve to stabilize the short fibers, the web
having a covering of liquid pervious material. The long fibers
of the heterogeneous fiber mixture have a length of about
three-quarter inches to about three inches and are present in
an amount of about 1 percent to 20 percent by weight. The
short fibers of the heterogeneous fiber mixture have a length
of three eighths of an inch or less and are present in an amount
of about 99 percent to 80 percent by weight.





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Fig. 5.

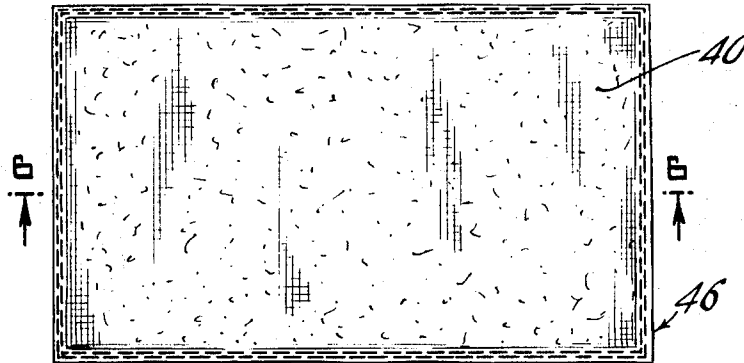


Fig. 6.

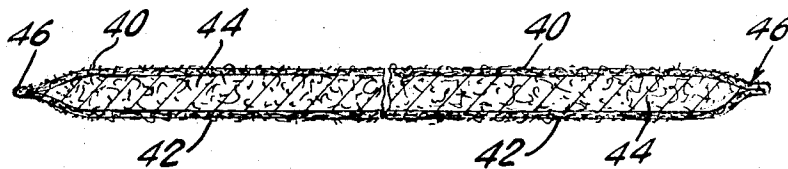
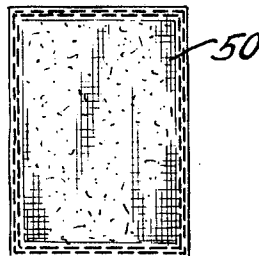


Fig. 7.



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ABSORBENT FIBROUS PRODUCTS

SUMMARY OF INVENTION

This invention relates to absorbent products.

More particularly, this invention relates to disposable absorbent pads, such as disposable diapers, underpads, cosmetic squares and surgical dressings, which have an absorbent core enveloped in liquid permeable coverings.

The above products, i.e. the disposable diapers, underpads, surgical dressings and cosmetic squares, of the prior art normally consist of a batt of pulp fibers or layers of absorbent wadding forming an absorbent core which is enveloped in a plurality of layers of paper or cotton gauze. The gauze is normally bonded at the edges of the core of absorbent material through embossing or other suitable means. A material encountered in the prior art as an absorbent medium is an assemblage of short fibers such as wood pulp fluff, cotton linters or other fibers of a similar nature classified under the term "non-cardable" absorbent fibers. These non-cardable short fibers, although being fluffy and flimsy, have very good absorption characteristics, are generally of a low cost and readily available.

However, one of the major problems with the above type of products is the absorbent core itself. As will be appreciated, an absorbent core formed of bleached, short, wood pulp fluff fibers does not normally have any degree of tensile strength, and very poor cohesive stability. Hence, the prior art has found it necessary, particularly for diapers, to provide a plurality of layers enveloping material to impart some degree of coherency to the article. However, because of the number of layers of covering material required, the resulting product becomes very stiff, and does not have the "hand" of cloth. Further, even with a plurality of layers of covering material, such as cotton gauze, the absorbent core once wet will "mat" or "lump" which causes a further problem. Also, the short fibers such as wood pulp fluff and the like tend to shift their position in the absorbent product. This is due to the nature of the fibers of the absorbent core and to the fact that they are extremely short. Another difficulty is the tendency of the short fibers to shift their position in the absorbent product. It has also been proposed to stabilize the fiber and to increase the strength of webs formed therefrom by impregnating the web with a bonding agent. However, this also has a tendency to stiffen the web and decrease its absorbency.

Applicant has discovered that the above disadvantages associated with forming absorbent cores from short fibers, such as wood pulp fluff, cotton linters, and the like, can be overcome without stiffening the product or overly reducing its absorbing qualities by blending with the short fibers a relatively small amount of longer fibers having a length of about three-quarter inches.

The absorbent core, when made in accordance with applicant's invention, consists of heterogeneous fibrous material composed from about 1% to about 20% by weight, preferably from 5% to 15% and most desirably from 8% to 12% by weight, of hydrophilic fibers having a length of about three-quarter inches to about three inches (normally one inch to one and five-eighth inches) interengaged and intermingled with from about 99% to about 80% by weight, preferably 85% to 95% and most desirably 88% to 92% by weight of non-cardable, short fibers normally having a length of three-eighth inches or less. The absorbent core or body of heterogeneous fibrous material is provided with a liquid permeable covering.

The term heterogeneous as used throughout the disclosure and claims is in the sense that one can distinguish, under a microscope, between the hydrophilic long fibers and the non-cardable short fibers.

The hydrophilic fibers, which are relatively long in length, are either regenerated cellulose fibers or natural cellulose fibers. Particularly preferred regenerated cellulose fibers are rayon or modified rayon. Thus, it is possible to use surgical or "mill-run" fibers in this invention. These fibers are normally

marketed in many different grades, depending on the quality desired; the fiber will vary accordingly. It is thought that the long fibers form a structural skeleton for the short fibers so that when the long and short fibers are mixed, the long fibers serve to "hold" the short fibers thereby forming a stable cohesive structure. Note Murin patent No. 2,788,003 and Hansen patent No. 2,916,037 for showing other ways of stabilizing the short fibers.

The short fibers used in this invention normally have a length of about one-sixteenth inch or less and are generally referred to as non-cardable fibers. These short fibers are those which have the ability to absorb moisture in the fibers, i.e., hydrophilic fibers. The non-cardable fibers may come from various types of wood pulp such as mechanical wood pulp, reclaimed paper pulps; etc. Alternately, they may be cotton linters, jute, linen, hemp, manila, bamboo, eucalyptus, bagasse, straw, esparte or similar non-cardable fibers.

Wood pulp fibers, which are those preferred for use in the present invention, are normally manufactured from any of the various coniferous or deciduous trees such as hardwood, hemlock, fir, pine, poplar and the like. The reasons the cellulosic fibers (wood pulp fluff) are preferred is due to their inexpensiveness, high absorbency and availability characteristics. Other non-cardable short fibers or blends of short fibers may also be used, such as wool, etc. Generally, the non-cardable short fibers used in this invention vary downwardly from one-quarter inch to a few hundredths of a millimeter or less. The most common wood pulp fibers have a length ranging from about 0.5 mm to 6 mm, with the norm being from about 1 mm to about 3 mm.

The liquid pervious surface coverings which may be used are the materials known in this art suitable for this purpose. The materials used are those having good wet abrasion resistance characteristics, good flexibility and softness, a good "hand" and they should be capable of passing liquid to the absorbent core as fast as possible. The materials must have sufficient tensile strength characteristics to withstand normal manufacturing, handling and use without being destroyed. If desired, they should also be capable of being sterilized and having a cloth-like appearance. Typical materials include, for example, gauze, non-woven fabrics, tissue paper, etc. These are the materials which have the characteristics of softness, nonirritation to the body, flexibility, etc. Particularly preferred for this purpose are the non-woven fabrics, such as is exemplified, for example, in U.S. Patent 2,902,038. It will be understood that, if desired, the liquid pervious surface coverings may be colored.

The thickness of the surface covering may vary according to factors well known in this art. For example, in using non-woven fabric the cover may be from 150 to 300 grains per square yard. If gauze is used, the thread count may be from 32 by 28 to 10 by 14.

For some applications, such as for underpads and the like, a liquid impervious backing layer may also be employed.

The liquid-impervious backing layer may be made of any suitable material having the necessary qualifications of flexibility and strength characteristics sufficient to withstand normal manufacturing and handling stresses without tearing, etc.

The backing layer also preferably has good wet abrasion resistance characteristics and a good "hand". In some cases, it may be desirable to have a backing layer capable of being sterilized and also capable of being colored. The material should also be of a low cost.

Particularly preferred for the backing layer are the synthetic resin films, or repellent papers. Typical synthetic resin films are polyethylene, polypropylene, polyvinyl copolymers triacetate or acetate films, polyesters, such as "Mylar," polyvinyl chloride, polyvinyl acetate, etc. Representative of the repellent papers, latex treated papers, wax, polyethylene or polypropylene papers, etc.

The thickness of the liquid-impervious backing layer may vary according to the different characteristics of the material being used, and to accepted procedures in this art. In the case

of the resins, a typical thickness of a backing layer might be from 1/2 to 1 mil., and in some cases going from 1-1/2 to 3 mils. In using the repellent papers, the thickness will likewise vary with a suitable range being from 12 to 20 pounds per ream.

According to this invention, it is most preferable that the liquid pervious covering material and the liquid impervious backing material, where employed, be adhesively bonded to the absorbent core. In this respect, it is highly desirable that the degree to which the liquid pervious cover material and the liquid impervious backing material is bonded to the core be sufficient only to provide surface adhesion between the cover and the core so as to prevent the adhesive from interfering with the absorption characteristics of the core, and the covering material which is liquid pervious and overly stiffening the core. Bonding may, in this respect, be on an intermittent basis so that there are areas of non-bonding and bonding. In bonding, a certain portion of the adhesive may penetrate down into the central areas of the core which will further add to the unitary characteristics of the product. However, in using the heterogeneous absorbent core, the surface adhesive of the liquid pervious covering material to the absorbent core has been found to provide the product with unexpected stability. It is believed that the longer hydrophilic fibers, which interengage and intermingle with the wood pulp fluff fibers, retain the latter so that they are sufficiently stabilized. Furthermore, the adhesive seals in the dust normally experienced with fluff or pulp webs.

According to one aspect of this invention, applicant has developed an improved disposable diaper which overcomes the disadvantages of the prior art products. A diaper according to this invention comprises an absorbent core or body of a heterogeneous fibrous material having a liquid permeable covering.

In a further preferred embodiment of this invention, the absorbent core preferably has a substantially rectangular shape with two major faces. The liquid pervious covering and the liquid impervious backing, where used, desirably are substantially coextensive therewith.

According to a further embodiment this invention also contemplates a surgical dressing including a moisture pervious covering and a heterogeneous absorbent core of the above defined type. The surgical dressing may vary in size and shape, with the larger dressings normally being of a rectangular outline. The smaller dressings may also be rectangular, but other geometrical shapes are common to the art.

In the surgical dressing, the liquid pervious covering is normally of a type which can be sterilized, and preferably includes all of the other characteristics previously mentioned for the liquid pervious surface coverings. The desirability of this invention preferably has the covering layer bonded to the core of the absorbent material, similar to that described with respect to the disposable diaper.

In a still further aspect of this invention a product suitable for use as a cosmetic square is also provided. These products include a heterogeneous absorbent core of the previously defined type and composition which is enveloped in a liquid pervious covering. Cosmetic squares have many applications, namely in the field of applying cosmetics or other toiletry applications.

In the embodiments described above, the covering material, as well as the backing material is preferably embossed about the edges of the absorbent core. This will be illustrated in greater detail by reference to the drawings. However, where the product is an underpad only two opposed sides of the underpad product may be so embossed if desired.

The thickness of the absorbent core used in products of this invention will vary considerably. In a typical diaper, the thickness will be between one-quarter inches to one-half inch, and normally will range between one-sixteenth inch to three-quarter inches. The thickness of the surgical dressing will likewise vary, the most common thickness being from about one-quarter inches to about one-half inches. With the

cosmetic square a thickness of from about one-eighth inches to about one-quarter inches is also common. The absorbent core density used in such products will normally range from about .01 to about .09 grams/cc, with the preferred product of this invention being approximately .02 to .03 grams/cc.

Products of this invention possess many advantageous characteristics over and above the prior art products. For example, applicant's product is very soft, is not rigid but readily flexible, will not "mat" or "lump" to the same extent as the prior art products do, etc. Applicant's product will retain approximately 15 times its own weight in water, and has the absorbent core density range from .01 to .09 grams/cc. Typical products of this invention have a core density of approximately .02 grams per cc.

In tests carried out with applicant's products and in which the absorbent core consists of 85% by weight of wood pulp fluff, it has been demonstrated that there is an unexpected increase in strength obtained over and above that which would normally be expected. In some cases, an increase of more than 33% in tensile strength of the product was obtained in the longitudinal direction and more than 25% in the cross-sectional strength. This vastly increased the stability of the applicant's products in the wet as well as dry states.

Having thus generally described the invention, reference will now be made to the accompanying drawing, illustrating several products according to preferred embodiments. It will be understood that the drawings are for the purpose of illustration only and that the invention is not limited thereto.

In the drawings:

FIGURE 1 is a plan view of an underpad according to the invention with one corner portion upturned to show the bottom of the article;

FIGURE 2 is a vertical cross-section of the underpad of **FIGURE 1**;

FIGURE 3 is a plan view of a diaper according to this invention;

FIGURE 4 is a partial vertical section of a product according to this invention showing the adhesion between the liquid pervious surface layer and the absorbent core;

FIGURE 5 illustrates a surgical dressing according to this invention;

FIGURE 6 is a cross-section taken along the line 8-8 of **FIGURE 7**;

FIGURE 7 is a top plan view of a cosmetic square according to this invention.

FIGURES 1 and 2 of the drawings illustrate a portion of an underpad, which briefly summarized, consists of an absorbent core indicated by reference numeral 20, covering liquid pervious layer of non-woven fabric indicated by reference numeral 22, and a bottom liquid impervious of a flexible resinous material indicated by reference numeral 24.

In greater detail, the absorbent core 20 is composed of a heterogeneous mixture of regenerated cellulose fibers (rayon) having a length of from about 1 to about 1-5/8 inch and wood pulp fluff fibers having an average length of about 6 mm. The absorbent core contains approximately 15% by weight of the regenerated cellulose fibers, with the balance or 85% by weight, being composed of the wood pulp fluff fibers. The absorbent core 20 is produced by blending together the regenerated cellulose fibers and the bleached wood pulp fluff fibers and then depositing the same in a web by a conventional fiber blender and laying apparatus such as a "Rando Feeder" to produce a core having a uniform density, the blended fibers being formed into an air-laid web having a thickness of about 1/2 inch with a weight of approximately 350 grains per square inch.

The non-woven fabric covering layer 22 is similar to that shown in U.S. patent 2,902,038.

The liquid impervious backing layer 24 consists of a thin colored flexible film of polyethylene.

To produce the underpad shown in **FIGURES 1 and 2**, the air-laid web which forms the absorbent core 20 is treated with

an acrylic polymer adhesive in an amount just sufficient to provide a thin coating of the adhesive on both sides of the core 20. In the present instance, the core is treated with 1-1/4% by weight of the acrylic polymer adhesive, per side, based on the total weight. Subsequently, the non-woven fabric, having a substantially co-extensive shape and size to that of the absorbent core 20, and the resinous film 24, having a similar co-extensive size and shape to the absorbent core 20, are placed in juxtaposition with the absorbent core and the adhesive is permitted to dry.

The underpad is then sealed about its periphery by means of heat embossing elements which form the pattern intermittent compressed lines indicated by reference number 26 about the borders of two sides of the product. The compression bonding along the edge, that is the embossing 26, consists of a pair of spaced apart parallel intermittent lines with the spaces between the points of embossing in each line being "backed-up" by the intermittent embossing of the other of the pair of lines.

Referring now to FIGURE 3, a diaper according to this invention is illustrated and consists of the same components as the underpad of FIGURES 1 and 2. The difference between the underpad and the diaper is that the latter, as shown in FIGURE 3, is sealed about all edges of its periphery, rather than two sides of the underpad. In this respect, the diaper includes a liquid pervious covering layer 22 consisting of non-woven fabric, a polyethylene backing layer (not shown) and embossing 26, about the peripheral edges.

The diaper of FIGURE 3 is constructed in identical manner to that of the underpad illustrated in FIGURE 1, differing only in that the heat embossing is continued about all peripheral sides.

The underpad of FIGURES 1 and 2, and the diaper of FIGURE 3, form unitary cohesive structures, and, as shown in FIGURE 4, a non-woven fabric covering layer 22, when lifted from the absorbent core 20, does not come apart per se, but will also lift a certain amount of the fibers of the absorbent core, too. Similarly, if the polyethylene backing layer 24 is removed, a portion of the fibers of the absorbent core will likewise be removed.

The products of FIGURES 1 to 4 have been proven to possess many advantageous characteristics over and above products of the prior art, as demonstrated by tests carried out. In these tests, using an absorbent core consisting of 85% of wood pulp fluff fibers and 15% of regenerated cellulose fibers, it has been shown that increased strength characteristics obtained over and above those which would be normally expected from a mere combination of components.

Tests carried out with diapers made in accordance with the present invention using a liquid pervious covering both on the top and on the bottom of the diaper have also shown good strength. Thus, for example, with a diaper in which the absorbent core consists of 85% of wood pulp fluff fibers and 15% of rayon fibers, it has been shown that there is an increased strength obtained over and above that which would normally be expected. It has been shown that utilizing an absorbent core which has a strength of .16 pounds in the longitudinal direction and is covered with top and bottom sheets of non-woven fabric each possessing a strength of 2.50 pounds in the longitudinal direction, a combined strength of 6.9 pounds is achieved. In other words, an increase of more than 33 percent in the tensile strength of the product is obtained. Similar tests conducted on the cross-sectional strength of applicant's product yielded more than 25 percent increase over the strength which would normally be expected from the product.

Referring now to FIGURES 5 and 6, there is illustrated a surgical dressing according to this invention consisting of a liquid pervious covering layer 40, a liquid pervious backing layer 42 and an absorbent core 44. The surgical dressing has a substantially rectangular outline, and the product is bonded about its periphery, indicated by numeral 46, in the same

manner as described with reference to the underpad and diaper of FIGURES 1 to 4.

The liquid pervious coverings 40 and 42, in the present instance, are composed of non-woven fabric. The absorbent core of the dressing consists of approximately 15% by weight of regenerated cellulose fibers having a length of from about 1 to about 1 5/8 inches, the balance of approximately 85% being composed of bleach wood pulp fluff fibers having a length of approximately 6 mm.

The absorbent core 44 is produced in a manner similar to that described with reference to the underpad and diaper of FIGURES 1 to 4, and in addition, is treated on both sides with an acrylic polymer adhesive in an amount of approximately 1 1/4 percent by weight based on the weight of the absorbent core 44. Following this, the non-woven coverings 40 and 42 are placed in juxtaposition to the core 44 and the latter sealed about its periphery.

Referring to FIGURE 7, there is illustrated a cosmetic pad similar in constructive features to the surgical dressing of FIGURES 5 and 6. This cosmetic pad includes a top and bottom layer of non-woven fabric 50 bonded to an absorbent core in a manner identical to that just described. The non-woven fabric top and bottom layers of material are sealed about the periphery to the absorbent core by embossing means, resulting in a periphery having a similar pattern to that of the diaper of FIGURE 3 and the surgical dressing of FIGURE 5. The cosmetic pad of FIGURE 7 may vary in size, and will normally have measurements of two inches by two and one-quarter inches.

The size of the products of FIGURES 1 to 7 of this invention will vary according to standards well known in this art. For example, diapers are normally rectangular in outline, and may vary from about 8 to 14 inches in width, and 12 or more inches in length.

In applying the covering materials, both the liquid pervious and the liquid impervious, to the absorbent core, different methods known in the prior art may be used. However, as will be understood, the method employed must not be one which will distort the absorbent core to such an extent that the bulk is reduced, or a saturating amount of binder is added, thus diminishing its absorbency. Applicant prefers to apply the covering and backing layer by one of two processes, which briefly summarized, are:

- (1) A bonding agent is sprayed on the surface of the absorbent core and the covering material is subsequently placed in juxtaposition with the core and the laminate dried together; or
- (2) a bonding agent may be foamed on the surface of the absorbent core and the covering material subsequently placed in juxtaposition therewith, with the bonding agent being cured in situ.

According to the method of (2) above, adhesively bonding the liquid pervious covering material to the absorbent core, the bonding agents are normally dispersions or solutions of polymers, co-polymers and other chemicals suitable for the purpose. The adhesive used must be of the flexible type, wet resistant but not necessarily waterproof and must be capable of being applied so that fluid may readily pass through it. The adhesive should also be non-irritating and desirably thermoplastic. Typical bonding agents are the acrylic resins, such as the polymers and copolymers of the lower alkyl esters or acrylic acid, for example, ethyl acrylate, and the like; the formaldehyde condensation products such as urea-formaldehyde, melamine-formaldehyde, phenol-formaldehyde, and the like; the vinyl resins such as vinyl acetate, vinyl chloride, and the like; the polyolefins such as polyethylene, polypropylene, polyisobutylene and the like; the styrene resins, the polyurethane resins; the synthetic and natural rubbers; the cellulosic materials such as viscose, and the like. The preferred bonding materials are the acrylic resins, such as that marketed under the trade-mark "RHOPLEX HA 8".

The amount of adhesive used will vary according to different factors. However, the range which may be broadly stated is from 1/2 to 4 or 5%, based on the weight of the absor-

bent core. The foams used (2) are applied only in an amount sufficient to bond the liquid permeable covering material to the surface of the absorbent core. This may be accomplished by providing a foam with a high concentration and with a small penetration into the absorbent core. Alternately, a small concentration of the foam may be used with a higher penetration. Desirably, the foams do not penetrate the core to a great extent, but contrarywise, remain at the surface of the individual fibers.

According to process (1), a suitable adhesive possessing the characteristics of being wet-resistant, soft, nonirritating, specific compatibility with regard to the absorbent core and the liquid pervious covering material, is applied in the form of a spray to the surface of the absorbent core and the liquid pervious covering material then placed in juxtaposition therewith. Suitable adhesives are those mentioned with respect to process (2); the preferred adhesive being an acrylic polymer and more particularly that marketed under the trade mark "RHOPLEX HA 8".

Method (1) uses an adhesive applied by means of a solvent solution or still further as an aqueous dispersion.

It will be understood by those skilled in the art that various ways of sealing the covering layer and the backing layer to the absorbent core may be used, within the scope of this invention. Further, it will be understood that the products of this invention may assume different shapes and sizes, according to accepted practices in this art.

The thickness of the absorbent core used in the products of this invention may likewise vary according to the type of product desired. Generally, the thickness will be between 1/16 inch to 3/4 inch, with 1/4 inch to 1/2 inch being preferred.

The products of this invention possess many advantageous characteristics over and above the prior art products. For example, applicant's product is very soft, is not rigid but readily flexible, will not "mat" or "lump" to the same extent as the prior art products do, etc. Applicant's products will retain approximately fifteen times its own weight in water, and has the absorbent core density range from .01 to .09 grams/cc. Typical products of this invention have a core density of approximately .02 grams per cc.

In some instances, it may be desirable to incorporate a moisture backing on the cosmetic square, although this is not essential.

I claim:

1. An absorbent pad comprising an absorbent core composed substantially of unbonded fibers, said core being formed of a heterogeneous fibrous material consisting of from about 1% to about 20% by weight of hydrophilic fibrous material selected from the group consisting of regenerated cellulose fibers or natural cellulose fibers and from about 99% to about 80% by weight of a non-cardable short absorbent fibers interengaged and intermingled together, and a covering material adhesively secured to the surfaces of said core to form an integral unit, the covering material on at least one surface being liquid pervious, the periphery of said pad being compressed and its elements secured together along its edges by a series of spaced embossings consisting of a plurality of spaced apart intermittent lines with the spaces between the points of embossing in each line being backed up by intermittent embossings on an adjacent line.

2. The absorbent pad of Claim 1 in which the covering material secured to the surface of said absorbent core opposite said liquid pervious covering material is liquid impervious.

3. The absorbent pad of Claim 2 in which said fibrous material comprises from about 5% to about 15% by weight of hydrophilic fibers selected from the group consisting of regenerated cellulose fibers and natural cellulose fibers interengaged and intermingled with about 95% to about 85% by weight of non-cardable short absorbent cellulose fibers, and said core having a density within the range of about 0.01 to 0.09 grams/cc.

4. The absorbent pad of Claim 3 in which said fibrous material comprises a mixture of from 8% to 12% by weight of regenerated cellulose fibers having a length of from about three-quarter inches to about three inches interengaged and intermingled with from about 92% to about 88% of non-cardable short wood pulp fluff fibers having a length of three-eighths of an inch or less, said fiber core having a density within the range of about 0.01 to 0.09 grams/cc.

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