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METHOD AND APPARATUS FOR MANUFACTURING AN ABSORBENT PRODUCT

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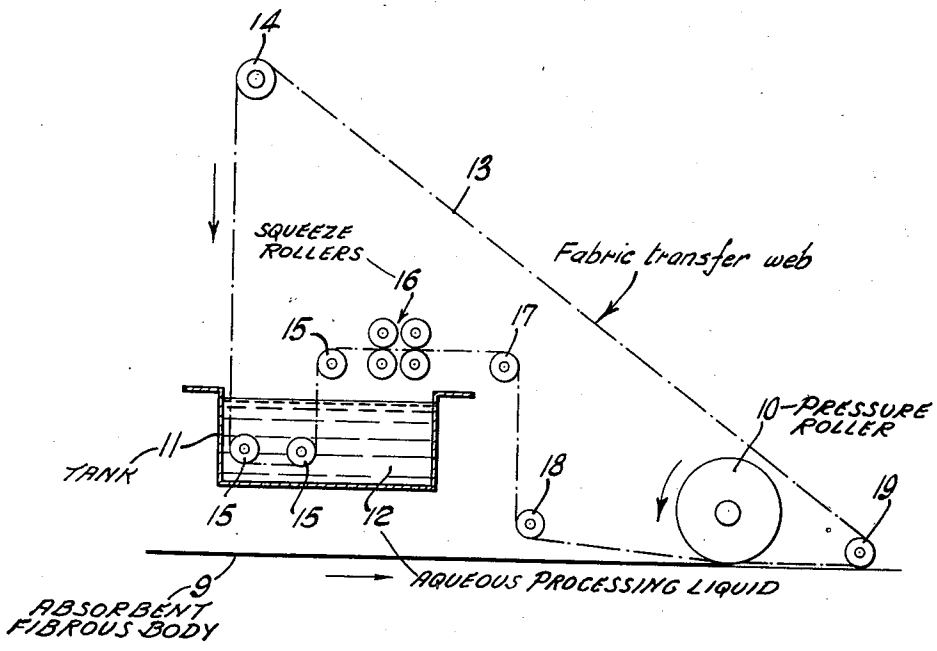

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METHOD AND APPARATUS FOR MANUFACTURING AN ABSORBENT PRODUCT

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6 Claims. (Cl. 117—11)

This invention relates to absorbent fibrous bodies and to methods and apparatus for making them and, more particularly, is concerned with absorbent fibrous bodies which are especially suited for use as absorbent components in sanitary napkins, surgical dressings, compresses, disposable diapers, hospital underpads and other products designed to absorb fluids.

Products designed to absorb fluids generally contain as a principal component thereof an absorbent pad or core to absorb the fluids. These pads or cores are normally made of layers of loosely compacted, absorbent fibers, such as carded cotton webs, air-laid cellulosic fibrous webs, comminuted wood pulp bats, or like materials which are highly absorbent, fluffy and porous. Unfortunately, these loosely compacted, fibrous absorbent bodies posses numerous disadvantages, notably low cohesive strength, poor shape and volume stability, low forces of capillary attraction, low fluid retentivity and low absorptive capacities under conditions of use.

For example, comminuted wood pulp bats which are particularly suitable as absorbent components because of their highly absorbent properties, low cost and commercial availability, are very weak structurally and possess low cohesive stability, whereby they tend to fall apart too readily under stress.

Additionally, these comminuted wood pulp bats, as well as cotton fibrous webs, do not possess shape and volume stability to any marked degree and quickly become deformed and distorted upon the application of slight forces or stresses.

Furthermore, the fluid retentivity of such highly porous, fibrous absorbent bodies is not sufficiently great and, consequently, fluids which should be retained therein are squeezed out relatively easily by the application of pressures arising from normal usage of the article.

Moreover, these fluffy, porous, absorbent fibrous components possess low capillary forces because of their loosely compacted structure and, when a fluid is deposited on its surface, saturation conditions are reached very quickly at the site of immediate application. At the same time, however, the adjacent portions remain relatively unsaturated and in some instances dry due to the low capillary forces of the fibrous body and consequently a highly localized fluid condition is obtained.

It is therefore seen that, although absorbent fibrous bodies have been manufactured in the past and have met with some commercial success, there still remains a considerable field for improvement toward a superior product.

In copending application Serial Number 587,015, filed on May 24, 1956, there are disclosed methods of manufacturing improved absorbent fibrous bodies with possess relatively high cohesive stability, good shape and volume stability, high forces of capillary attraction, good fluid retentivity and high absorptive capacity under conditions of use and which are especially suited for use as absorbent components in sanitary napkins, surgical dressings, compresses, disposable diapers, hospital underpads and other products designed to absorb fluids.

More specifically, the methods disclosed in said copending application comprise applying controlled amounts of moisture to the surface or surfaces of a loosely compacted, absorbent fibrous body having relatively low cohesive strength, relatively poor shape and volume stability, relatively low limits whereby there is formed, in situ, a paper-like, densified, highly compacted, cellulosic fibrous layer integral with the loosely compacted, fibrous absorbent body and possessing relatively high cohesive strength, relatively good shape and volume stability, relatively high fluid retentivity and relatively high capillary forces.

Such a densified, compacted layer, in addition to improving the cohesive strength, shape and volume stability, fluid retentivity and capillary forces of the absorbent body, also increases its fluid storage capacity during conditions of use, minimizes lateral spreading or vertical draining (strike-through) and, in general, more desirably controls the reception, absorption and retention of fluids deposited thereon.

The methods disclosed in said application for forming such a compacted layer have been found generally satisfactory, but it has been observed that the controlling of the amounts of processing liquid to be applied to the absorbent fibrous body is often quite difficult. This is particularly true when smaller amounts, say, on the order of about 0.0005 cc. of water are applied per square centimeter of web surface. Additional difficulty arises whenever it is desired to control the direction of the supply of liquid so that only specific portions or areas of the absorbent fibrous body are wetted.

It is therefore a principal objective of the present invention to provide methods of forming paper-like, densified, highly compacted, cellulosic fibrous layers integral with loosely compacted, absorbent fibrous bodies in which better control is exercised over the amounts of the processing liquid to be applied and over the direction of the liquid to the specific areas to which the processing liquid is to be applied.

These objectives and others which will become clear hereinafter are obtained by providing a fabricated transfer web which is wetted to a predetermined concentration and is then positioned between the absorbent fibrous body and the pressure-applying means whereby the processing liquid necessary to form the dense compacted layer is transferred from the transfer web to the absorbent fibrous body during the application of pressure.

In the accompanying drawing and the following specification there is illustrated and described a preferred method of carrying out the present invention, but it is to be understood that the inventive concept is not to be construed as limited thereto except as defined by the spirit of the invention and determined by the scope of the appended claims. Referring to the drawing. The figure is a schematic showing of apparatus suitable for carrying out the methods of the present invention.

In the embodiment of the invention shown in the drawing, an absorbent fibrous body **9** is guided so as to pass under a roller **10** which is capable of controllably applying a predetermined pressure thereto to compact and, if desired, emboss the same. A reservoir or tank **11** containing an aqueous processing liquid **12** is positioned adjacent to the roller **10** and a transfer web **13** is guided so as to be dipped into the processing liquid by a driving roller **14** and guide rollers **15**, **15** and **15** so as to pick up the processing liquid. The saturated transfer web **13** is then guided between the rolls of a squeeze roll system **16** wherein the fluid content thereof is adjusted to the desired take-up amount. The transfer web is then guided by rollers **17**, **18** and **19** so as to be inserted between the absorbent fibrous body **9** and the pressure roller **10**. The web travels with the absorbent fibrous body for a short

distance, and then leaves it, preferably at an obtuse angle. No sticking or adhering of the compacted layer to the transfer web is noted and there is no tendency of the lesser compacted portions of the layer to separate from the absorbent fibrous body.

The angle at which the transfer web **13** leaves the treated absorbent fibrous body **9** is important, and although the nature of the transfer web may be such and the conditions of moisture, application of pressure, etc., may be so selected that an acute angle of less than 90° may be employed at roller **19**, an obtuse angle of greater than 90° and up to 180° is customarily used. Substantially the same effect is realized by the use of a roller at roll **19** which possesses a relatively small diameter whereby the transfer web **13** may be removed from the absorbent fibrous body **9** quickly by being "peeled" sharply therefrom in a small radius of curvature.

The particular liquids which are applied in the tank **11** are characterized by their ability to produce or contribute to a permanent set of the deformation achieved in compressing and/or embossing the absorbent body. The object of the liquid setting agent is to stabilize the compressive deformation and to improve the coherence of the absorbent body. In the absence of such liquid setting agents, it is necessary to apply much higher pressures to set the compressed absorbent body. Moreover, dry compressed absorbent bodies remain substantially non-coherent and the set is largely lost in subsequent contact with water or other swelling agents.

The setting mechanism in the described operation is that of forming bonds between the wetted and compressed fibers which is a well-known and fundamental reaction in the process of paper making. Water is the most convenient and economical bonding fluid for cellulosic absorbent bodies but it may be partially or completely replaced by other strongly polar fluids. If desired, the stabilizing effect of the water bond can be enhanced by well-known textile sizing and finishing agents, such as natural and synthetic gums including starches, dextrins, casein, methyl cellulose, carboxymethyl cellulose, etc., thermoplastic and thermo-setting resins including polyvinyl acetate, polyvinyl chloride, copolymers thereof, etc., waxes, etc. These auxiliary processing agents are preferably used in aqueous solution, suspension or dispersion.

The transfer webs may be woven, knitted, braided or felted fabricated materials made from natural and/or synthetic fibers, monofilaments, multifilaments and staple yarn and even of glass or metallic wires in conjunction with water absorbable materials. Fabrics of high mechanical resistance made from nylon, "Orlon," saran, saponified acetate rayon, and other flex- and abrasion-resistant synthetic materials may be used. Alternatively, such synthetic materials may be used in blends with naturally occurring yarns. For example, in the case of a woven fabric, the warp threads may be cotton and the filling or weft threads may be nylon, such as when longitudinal lines are to be embossed into the absorbent body.

If increased stretchability is desired in the transfer web, it may be of knitted or specially woven construction such as an elastic "Helenca" woven fabric. The transfer web may contain rubber threads, such as "Lastex," or the like. A fair degree of stretchability may also be obtained with mercerized-shrunk, natural cellulosic fabrics or by bias cutting of woven cloth.

It is not essential that the transfer web have the same width as the absorbent fibrous body. For example, if it is desired that a narrow, dense, compacted skin be formed on the absorbent fibrous body, then a transfer web of such narrower width is satisfactorily employed. In the same way, if a striped effect is desired, then a plurality of narrow transfer webs is used. In the same way, any desired arcuate or angular effect may be obtained by forming the transfer web in the size and shape desired. These effects may be further enhanced by using different processing liquids on a plurality of transfer webs. For example, three narrow transfer webs may be used with the outer transfer webs containing water repellent sizes and the inner transfer web containing a reinforcing, hydrophilic size. Similarly, various colored effects may be obtained by the use of different dyes in the several transfer webs.

It is also to be appreciated that the transfer web itself is capable of embossing the absorbent fibrous body. For example, a ribbed effect may be obtained by using a twill cloth for the transfer web. Actually, any type of fabricated material having a pronounced contoured surface can be used to create a complementary effect in the absorbent fibrous body. Wire screening of a size about 14–18 mesh per inch, when combined with aqueous absorbent material, provides an excellent embossing means, either used warpwise or on the bias to create better flexibility.

The absorbent fibrous bodies of this invention contain cellulosic fibers, such as comminuted wood pulp fibers, cotton linters, or the like, which have a fiber length less than one-quarter of an inch and which, in the presence of moisture and pressure, are capable of forming a relatively dense, more or less coherent, relatively stable structure formed as a result of interfiber bonds between the moistened and compressed fibers similar to the bonds between fibers in paper. Cellulosic fibers, such as wood pulp fibers and cotton linters, are preferred in making the fibrous bodies of this invention because they readily form such interfiber bonds, when moistened and compressed. Such fibers are additionally commercially desirable inasmuch as they are inexpensive, readily available and highly absorbent. Other fibers capable of developing interfiber bonds, similar to the bonds between fibers in paper in the presence of moisture and pressure may also be used. In addition, blends of natural or synthetic fibers, such as silk, wool, linen, nylon and cellulose acetate fibers, may be used in combination with the fibers capable of forming interfiber bonds in the presence of moisture and pressure.

It is believed that the formation of the densified skin is due to the formation of bonds between contacting moistened fibers, which bonds are similar to the bonds between the fibers in paper. By the proper selection of the amount of moisture applied to the fibers and by the proper selection of the degree of compression imposed, the properties of the densified skin may be varied, as desired or required. The thickness, density, strength and other characteristics of the densified skin also depend upon the uniformity by which the moisture is applied, the depth to which it penetrates and the degree to which the fibers are compressed.

The amount of moisture used may vary from about 0.0005 to about 0.03 cc. of water or aqueous liquid per square centimeter of surface depending upon the thickness of the absorbent fibrous body, the thickness of the paper-like dense compacted skin desired, with the lesser amounts of moisture being used for thinner webs and yielding extremely thin papery skins and the greater amounts of moisture being used for thicker fibrous bodies and yielding skins of a greater thickness.

Within the more commercial aspects of the present invention, however, it has been found that a range of from about 0.001 to about 0.004 cc. of water per square centimeter of fibrous body surface has been found economically desirable for fibrous bodies having a thickness of from about ½ to about 1 centimeter.

The upper limits of these ranges are not critical and greater amounts of moisture may be used whenever thicker fibrous bodies are employed or when thicker skins are desired. As a matter of fact, sufficient moisture may be applied to completely penetrate the fibrous body whereby it may be compacted and densified throughout its complete volume.

The amounts of pressure to be applied to the absorbent fibrous bodies through the transfer webs may be varied from as little as about 5 to about 1000 or more pounds per square inch with the commercially preferable range extending from about 10 to about 100 pounds per square inch for fibrous bodies having a thickness of from about ½ to about 1 centimeter.

The invention will be further illustrated in greater detail by the following specific examples. It should be understood, however, that although these examples may describe in particular detail some of the more specific features of the invention, they are given primarily for purposes of illustration and the invention in its broader aspects is not to be construed as limited thereto.

Example I

An endless belt or transfer web 70 mm. wide of bleached cotton print cloth weighing 125 grams per square meter is impregnated with an aqueous non-ionic dispersion containing 5.7% by weight of any acrylic copolymer. This dispersion is made up by diluting a commercial product comprising an emulsion of polymerized acrylic acid ester sold under the trade-mark "RHoplex FRN."

The impregnated transfer web is squeezed out to adjust its fluid take-up to about 88%, based on the weight of the dry fabric, and it is then superimposed on an absorbent fibrous body of distintegrated wood pulp having short fibers less than ¼ inch in length. This absorbent body is 68 mm. wide, 5.9 mm. thick, weighs 0.031 gram per cubic centimeter and is loosely compacted, non-coherent and extremely porous.

The absorbent fibrous body with the resin impregnated cotton transfer web covering its upper face is passed through the nip of an embossing device consisting of two steel rolls. The pressure in the embossing device is set to cause a transfer of processing liquid from the transfer web into the absorbent fibrous body amounting to about 0.0059 gram per square centimeter based on the area of the absorbent fibrous body prior to embossing. The transfer of processing liquid based on the weight of the absorbent fibrous body is 31% and the transfer of the resin solids is 1.8%.

After emerging from the embossing device, the transfer web is pulled away from the absorbent fibrous body over a small roller at an obtuse angle of about 150°. The separation is satisfactory and the absorbent fibrous body does not tear and the fiber alignment is not disarranged.

The dried web shows a sharp but shallow imprint of the embossing pattern. The treated face is covered with a thin, coherent, paper-like skin of excellent abrasion resistance and strength which stabilizes the absorbent fibrous body. The structure of the absorbent body on the other side away from the transfer web remains substantially loosely compacted, non-coherent and highly porous.

Example II

The procedures set forth in Example I are carried out substantially as set forth therein except that a "Helenca" elastic nylon fabric is used as the transfer web instead of the cotton print cloth. The impregnated fabric is squeezed out to adjust the take-up to 108% and is then superimposed on an absorbent fibrous body having the same bulk weight, width and thickness as that of Example I.

The embossing operation is carried out and causes a transfer of 32% processing liquid from the transfer web to the absorbent fibrous body, based on the dry weight of the latter. The transfer web separates from the embossed fibrous body without tearing or disrupting the fiber alignment of the latter. The dried absorbent body resembles the product of Example I except that the grooves are considerably deeper. The treated side shows the characteristic formation of a dense, coherent, paper-like, compacted skin which stabilizes the absorbent fibrous body.

Example III

Two transfer webs referred to below as A and B are employed in the following process in which an embossing hydrophilic skin and a substantially smooth, water-repellent skin are developed simultaneously on the opposite faces of a non-coherent, absorbent fibrous body. This body comprises bleached cotton linters having an average fiber length less than ¼ inch, is 10.7 mm. thick and has a bulk density of 0.034 gram per centimeter.

Transfer web A is a coarse leno netting weighing 224 grams per square meter. Transfer web B is a smooth, densely woven twill fabric made from a mixture of nylon, rayon and cellulose acetate and weighs 305 grams per square meter. Transfer web A is impregnated with water and squeezed out to a take-up of about 141%. Transfer web B is impregnated with a commercial water-repellent wax dispersion and squeezed out to a take-up of about 82.6%.

The absorbent fibrous body is sandwiched between transfer web A on the top face and transfer web B on the bottom face and is run through a compression mangle consisting of two rubber covered steel rolls whose nip is set to cause a transfer of 52% processing liquid from the transfer webs to the absorbent fibrous body. This value, based on the dry weight of the absorbent fibrous body, represents the combined fluid transfer of 32% (0.01 gram per square centimeter) and 20% (0.005 gram per square centimeter) from transfer webs A and B respectively.

The dried web is 7 mm. thick. It is covered on both sides with a dense, coherent, compacted skin, one being hydrophilic and rapidly absorbent and the other being hydrophobic and water-repellent. Between these skins is a highly porous layer of substantially unbonded fibers accounting for 90–95% of the total thickness of the product.

Example IV

Two endless transfer webs of bleached cotton gauze having 44 x 36 strands of 60's yarn per square inch are moistened with water by spraying. The take-up is about 81% based on the dry weight of the gauze. One of these transfer webs is placed on top and the other placed underneath an absorbent fibrous body of disintegrated wood pulp 7.8 mm. thick and having a bulk density of 0.031 gram per cubic centimeter. The absorbent wood pulp body is sandwiched between the wetted gauze strips and then is compressed in a mangle containing two rubberized steel rolls. In this compression, 10% moisture, based on the dry weight of the absorbent fibrous wood pulp body, is taken up by the latter. The transfer webs separate from the compressed product without disrupting the alignment of fibers therein. The dried product is covered on both sides with a thin skin which, owing to the imprint of the gauze, is fabric-like in appearance. These skins greatly improve the textile strength and abrasion resistance of the product and prevent the shedding of fibers in the handling thereof.

Example V

A longitudinal channel provided with laterally spaced peaks and valleys is embossed into an absorbent fibrous body of disintegrated wood pulp. The processing conditions are as follows: the absorbent fibrous body is 68 mm. wide, 5.9 mm. thick and weighs 0.031 gram per cubic centimeter; the transfer web is cotton tricot weighing 214 grams per square meter and a width of 26 mm.; the embossing roll is a spur gear to form the laterally spaced peaks and valleys; and the setting solution is an aqueous commercial dextrin suspension of approximately 6.7% solids.

The transfer web is impregnated with the processing liquid and squeezed out to a take-up of about 123% based on the dry weight of the web. The absorbent fibrous body, with the narrower transfer web covering only the center portion of the fibrous body surface, is

passed through the embossing device. The pressure exerted by the latter is adjusted to transfer about 0.005 gram of liquid per square centimeter of the embossed channel.

The dried product contains an embossing channel of bonded fibers. This bonded effect is particularly distinct in the areas of the lateral grooves created by the teeth of the embossing spur gear. Outside the channel boundaries and in the spaced peaks between the valleys, the structure of the product changes abruptly into that of a non-coherent, loosely compacted fiber mass in which the high porosity and softness of the original absorbent fibrous body is fully preserved.

Example VI

A non-woven fabric consisting of a fiber blend of 75% rayon and 25% cotton is made as follows: four layers of card web, each weighing 175 grains per square yard, are sandwiched between two "Helenca" woven nylon fabrics constituting the transfer webs. These transfer webs are impregnated with an aqueous dispersion of 20% polyvinylacetate and 2.5% dibutoxyethyl phthalate and then are squeezed out to a take-up of about 100% based on the dry weight of the transfer webs. The card web, with the transfer webs covering its top and bottom faces is then run between nip rolls wherein the pressure of the rolls transfers 120% fluid, based on the dry weight of the card web. The resulting non-woven fabric is bonded substantially throughout its total thickness.

It is to be noted that two separate circuits are required by the two transfer webs. This is accomplished by merely duplicating apparatus, treating tanks and pressure rollers on opposite sides of the absorbent fibrous body being treated.

Example VII

The procedures set forth in Example VI are carried out substantially as set forth therein with the exception that cotton twill fabrics are used instead of "Helenca" fabrics. The embossed imprint of the twill construction enhances the fabric-like appearance of the bonded absorbent fibrous body.

Example VIII

The procedures set forth in Example VI are repeated substantially as set forth therein with the exception that only one transfer web is used to apply the resin dispersion. The opposite face of the absorbent fibrous body is left untreated. The resulting non-woven fabric possesses one bonded surface and one unbonded surface which possesses a distinct nap consisting of partially unbonded fibers. The presence of this nap imparts a degree of heat insulation and softness normally not associated with woven fabrics.

From the above, it is seen that loosely compacted absorbent fibrous bodies, which possess relatively low cohesive strength, relatively poor shape and volume stability, relatively low fluid retentivity, and relatively low capillarity are converted to bodies possessing a relatively dense, compacted, coherent skin which creates sufficient strength, shape and volume stability, fluid retentivity, and capillarity as to render the resulting structure especially suited and highly desirable for use as absorbent components in surgical dressings, sanitary napkins, compresses, disposable diapers, hospital underpads, and other products designed to absorb fluids.

It is, of course, realized that various modifications and changes may be made within the spirit of the invention. For example, various materials such as bactericides, fungicides, dyestuffs, softening agents, sizing materials, adhesives, and the like, may be included in the water used for moistening the surfaces of the webs. These processes reflect the well-known possibilities of mechanically modifying paper to obtain desired results or effects.

While I have shown and described what I believe to be preferred embodiments of my invention in the matter of simplicity and durability of construction, it will be appreciated that the details of such construction may be more or less modified within the scope of the claims without departure from the principles of construction or material sacrifice of the advantages of the preferred designs.

I claim:

1. A method of producing an absorbent fibrous body suitable for use as an absorbent component in absorbent products which comprises moistening a transfer web with an aqueous processing liquid; positioning said moistened transfer web on a highly porous, loosely compacted, cellulosic absorbent fibrous body having relatively low cohesive strength, relatively low capillary forces, relatively poor shape and volume stability, and relatively low fluid retentivity; applying a deformation producing pressure to said absorbent fibrous body through said transfer web thereby transferring aqueous processing liquid from said transfer web to said highly porous, loosely compacted, cellulosic absorbent fibrous body; and simultaneously compressing the same in the presence of the aqueous processing liquid to produce a permanent set of the deformation resulting from the application of pressure whereby there is formed in situ therefrom and integral therewith, a paper-like densified, compacted cellulosic fibrous layer having relatively high cohesive strength, relatively good capillary forces, relatively good shape and volume stability and relatively high fluid retentivity.

2. A method of producing an absorbent fibrous body suitable for use as an absorbent component in absorbent products which comprises moistening a transfer web with an aqueous processing liquid, said web having a patterned surface, positioning said moistened transfer web on a highly porous, loosely compacted, cellulosic absorbent fibrous body having relatively low cohesive strength, relatively low capillary forces, relatively poor shape and volume stability, and relatively low fluid retentivity; applying a deformation-producing pressure to said absorbent fibrous body through said transfer web thereby transferring aqueous processing liquid from said transfer web to said highly porous, loosely compacted, cellulosic absorbent fibrous body; and compressing the same in the presence of the aqueous processing liquid to produce a permanent set of the deformation resulting from the application of pressure whereby there is formed in situ therefrom and integral therewith, a paper-like densified, compacted cellulosic fibrous layer having surface characteristics similar to the patterned surface of said transfer web and having relatively high cohesive strength, relatively good capillary forces, relatively good shape and volume stability and relatively high fluid retentivity.

3. A method of producing an absorbent fibrous body suitable for use as an absorbent component in absorbent products which comprises moistening two transfer webs with an aqueous processing liquid; positioning one of said moistened transfer webs on the top surface and the other transfer web on the bottom surface of a highly porous, loosely compacted, cellulosic absorbent fibrous body having relatively low cohesive strength, relatively low capillary forces, relatively poor shape and volume stability, and relatively low fluid retentivity; applying a deformation-producing pressure to said absorbent fibrous body through said transfer webs thereby transferring aqueous processing liquid from said transfer webs to said highly porous, loosely compacted, cellulosic absorbent fibrous body; and compressing the same in the presence of the aqueous processing liquid to produce a permanent set of the deformation resulting from the application of pressure whereby there is formed in situ therefrom and integral therewith on the top and bottom surfaces of said absorbent, fibrous body a paper-like densified, compacted cellulosic fibrous layer having relatively high cohesive strength, relatively good capillary forces, relatively good shape and volume stability and relatively high fluid retentivity.

4. A method of producing an absorbent fibrous body suitable for use as an absorbent component in absorbent products which comprises moistening first a transfer web with an aqueous hydrophobic processing liquid; moistening a second transfer web with an aqueous hydrophilic processing liquid, positioning said first transfer web on one surface of and said second transfer web on the opposite surface of a highly porous, loosely compacted, cellulosic absorbent fibrous body having relatively low cohesive strength, relatively low capillary forces, relatively poor shape and volume stability, and relatively low fluid retentivity; applying a deformation-producing pressure to said absorbent fibrous body through said transfer webs thereby transferring aqueous processing liquids from said transfer webs to said highly porous, loosely compacted, cellulosic absorbent fibrous body; and compressing the same in the presence of the processing liquids to produce a permanent set of the deformation resulting from the application of pressure whereby there is formed in situ therefrom and integral therewith on one surface of said fibrous body a hydrophobic and on the other surface a hydrophilic paper-like densified, compacted cellulosic fibrous layer having relatively high cohesive strength, relatively good capillary forces, relatively good shape and volume stability and relatively high fluid retentivity.

5. Apparatus for producing an absorbent fibrous body suitable for use as an absorbent component in absorbent products which comprises means for moistening a transfer web with an aqueous processing liquid; means for positioning said moistened transfer web on a highly porous, loosely compacted, cellulosic absorbent fibrous body having relatively low cohesive strength, relatively low capillary forces, relatively poor shape and volume stability, and relatively low fluid retentivity; compression means for applying a deformation producing pressure to a portion of the area of said absorbent fibrous body through said transfer web sufficient to cause the transfer of aqueous processing liquid from said web to said body and to form in situ in said area an integral paper-like, densified, compacted cellulosic fibrous layer having relatively high cohesive strength, relatively good capillary forces, relatively good shape and volume stability and relatively high fluid retentivity, and means for separating said transfer web from said absorbent fibrous body.

6. Apparatus for producing an absorbent fibrous body suitable for use as an absorbent component in absorbent products which comprises means for moistening a transfer web with an aqueous processing liquid; means for positioning said moistened transfer web on a highly porous, loosely compacted, cellulosic absorbent fibrous body having relatively low cohesive strength, relatively low capillary forces, relatively poor shape and volume stability, and relatively low fluid retentivity; compression means for applying a deformation producing pressure to a portion of the area of said absorbent fibrous body through said transfer web sufficient to cause the transfer of aqueous processing liquid from said web to said body and to simultaneously form in situ in said area an integral, paper-like, densified, compacted cellulosic fibrous layer having relatively high cohesive strength, relatively good capillary forces, relatively good shape and volume stability and relatively high fluid retentivity, and means for separating said transfer web from said absorbent fibrous body.

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