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(54) **APPLICATOR FOR FLOWABLE SUBSTANCES**

AUSTRAGVORRICHTUNG FÜR PASTÖSE MEDIEN

APPLICATEUR POUR SUBSTANCES PATEUSES

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WO-A-94/13352
WO-A-98/12122
US-A- 4 842 794
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Description

Field of the Invention

[0001] This invention relates to an applicator for semisolid substances such as gels, solutions and emulsions onto a body surface. More particularly this invention relates to an applicator of semisolid substances without the need for any pressure compensating mechanisms.

Background of the Invention

[0002] There is a continual search for better ways to apply a lotion, gel, solution or emulsion to the skin surface. The substance can be a deodorant, antiperspirant, suntan lotion, poison ivy preparation or some other substance which is to be delivered to the skin. Since the substance is only a semisolid, it cannot function as the applicator surface. Solid stick deodorants and antiperspirants function as the applicator surface. No separate applicator surface is needed. However, with semisolid substances a separate applicator surface is needed.

[0003] There are several different types of applicator surfaces that have been and are being used. In U.S. Patent 4,801,052 and U.S. Patent 5,372,285 there is disclosed a rigid applicator section that has a plurality of apertures. The semisolid material flows directly through the holes in the rigid surface and is applied to a body surface. These apertures can be of varying shapes and sizes, and in varying numbers. This is exemplified in the commercial Mennen Speed Stick gel products and the Right Guard gel products.

[0004] Another applicator for semisolid products is to use a Porex applicator surface. Porex is a sintered plastic material that has random, nonlinear, branched pores of varying cross-sectional diameters. Also, the pores are much smaller in cross-section than the apertures of U. S. Patent 4,801,052 or U.S. Patent 5,372,285. In these porous applicators the individual pores will be in a varying diameter of about 150 to 400 microns. This is much smaller than the apertures of the above two U.S. Patents. However, these porous materials pose a post-extrusion problem. Post-extrusion is the continued flow of the semisolid substance after the cessation of the force to push the semisolid substance through the applicator surface. This is a problem since it flows after the application of the product, is wasted product, and is considered as being messy.

[0005] This problem has been addressed by incorporating a pressure relief mechanism into the dispenser. Such pressure relief mechanisms are shown in U.S. Patent 5,540,361 and U.S. Patent 5,547,302. These pressure relief mechanisms allow the elevator to recede away from the applicator surface in a dispensing stroke. This relieves most of the pressure in the applicator that would cause post-extrusion through the applicator surface.

[0006] U.S. Patent 5,547,302 also discloses the use of a mesh as the applicator surface. This mesh is comparatively thin and flexible with a plurality of discrete openings extending through the mesh. This can be from the structure of a screen to a rigid structure. In the Example the mesh thickness is .022 inches. However, regardless of its structure or thickness, the mesh structure has a post-extrusion problem. The dispenser with this mesh applicator surface requires the use of a pressure relief mechanism in conjunction with the elevator of the dispenser. As with the Porex microporous applicator surfaces, there is needed a mechanism to prevent any substantial post-extrusion. However, all of these pressure relief mechanisms add to the complexity and cost of the dispenser.

[0007] PCT WO 94/13352 discloses a liquid applicator to apply surgical scrubs or paints to a person's skin. The applicator surface is a foam sponge that is attached to an applicator which has a flexible porous layer that regulates the flow of liquid to foam sponge. PCT WO 98/12122 discloses an applicator for a shear thinning product. The preferred open celled applicator surface is a hard porous material formed by heating and sintering micromolecular granules of synthetic resin powders. Also open celled material or synthetic foams can be used as can fibers fused together to create liquid flow channels. However, neither of these references provide a solution to the problem of a useful applicator surface for applying products such as liquid, gel or lotion products to a person's skin.

[0008] The present invention solves this problem. Semisolid substances can be delivered through an application surface having pore-like openings without the problem of post-extrusion. This is accomplished by the use of one or more plies of a mesh fabric. The fabric has substantially linear openings through the fabric. Whether there will be one ply or a plurality of plies will depend on many factors including the structure of the fabric. This will depend to a large degree on the fiber denier and the weave of the fabric if it is a woven fabric, the size of the apertures for an extruded nonwoven film fabric, and the porosity of the fabric if it is a nonwoven with random arrayed fibers. One objective is to have fabric of a material that is heat bondable to a peripheral frame edge and through which a product of a rheology of about 10,000 centipoises to about 1,000,000 centipoises can flow without any substantial post extrusion. It is preferred in the present dispenser to use a single ply fabric of a denier and weave that maintains its structural integrity in use to apply a substance to the skin, with or without the use of an underlying support structure. That is, there is no folding or undue distortion of the fabric surface during the application of the semi-solid substance. Some flexing is desired in order to follow the contours of the skin. However, this flexing should not result in any permanent distortion of the fabric surface.

[0009] As an option a plurality of fabric plies can be used. In such an instance there will be from about 2 to 10 plies, and preferably 2 to 5 plies. By randomly over-

laying plies of the fabric, the openings are partially juxtaposed from ply layer to ply layer. This provides for a modified circuitous path of the substance through the mesh fabric. An additional force is needed to flow the semisolid substance through the multi-ply fabric structure versus a single ply structure, but not a force that would result in any significant post-extrusion or leakage of the semisolid substance. The applicator fabric will be matched to the viscosity of the formulation. The flow through the fabric plies is substantially simultaneous with the application of pressure to the semisolid product with there being no pressure to be dissipated after the use of the dispenser.

[0010] In addition to the advantages of no substantial post-extrusion the use of a mesh fabric provides for an improved product shearing of the semi-solid substance and more uniform application to the contours of the body surface. Improved shearing allows for the application of a thinner continuous layer of the semisolid substances onto the skin.

Brief Description of the Invention

[0011] The present invention is directed to a dispenser with an applicator surface that does not require a pressure relief mechanism to prevent the post-extrusion of the substance being dispensed. The applicator surface is comprised of one or more layers of a mesh fabric. The structure of the fabric will depend on whether the fabric is woven or nonwoven. A nonwoven fabric includes extruded films having apertures and fabrics of a layer of random arrayed fibers. When a plurality of plies are used, the plies can be in a designed array or in a random array. The result in the use of a plurality of plies is a plurality of offset passageways. This arrangement of offset passageways provides for some back pressure in the dispensing of the semisolid substance, but not a pressure that would result in any significant post-extrusion flow. The flow ceases fairly quickly upon the cessation of the application pressure since the application pressure is quickly relieved by the direct flow of the semisolid substance. The fabric can be used with or without an underlying support. Whether in the form of a single or multiple ply, there is provided a surface that will conform to the small undulations in the body surface to which the semisolid is being applied.

[0012] The fabric can be a woven or a nonwoven fabric. If woven it can have a plain twill or satin weave. The weave also can be a tight or a loose weave. Further, the fibers that comprise the fabric can be in a range of deniers. If nonwoven, the fabric can be an extruded film with microporous apertures or can be produced by one or more random layers of fibers that are bonded together. The only requirements are that the fabrics be thermoplastic and be heat bondable to a thermoplastic frame, and that in use as an applicator surface for a viscous semisolid substance that there be no significant post-extrusion of the viscous semisolid after application to a skin surface. If woven, the mesh apertures will be more uniform in structure. Whether woven or nonwoven, the applicator surface will be comprised of about 1 ply to about 10 plies of fabric, preferably about 1 ply to about 5 plies and most preferably about 1 to 3 plies. The mesh openings nominal (average) size will be in the range of about 50 microns to about 1,000 microns, and preferably about 80 microns to about 400 microns. In a multilayer structure the mesh openings in one layer usually will not align with the mesh openings of another layer. However, the mesh openings can be arranged to be aligned from layer to layer. Further, the mesh openings can vary in size from layer to layer. The mesh openings will have a nominal surface area of about 2.5×10^{-3} mm^2 to about 1 mm^2 and preferably about 6.4×10^{-3} mm^2 to about .16mm^2. This variability in alignment and in mesh size can accommodate compositions of different rheologies. The rheology of the composition to be delivered and the mesh opening size or sizes are coordinated in order to deliver a viscous product without the need for a pressure relief mechanism in the dispenser.

[0013] The mesh fabric will have a thickness of about 0.032 centimeters to about 0.30 centimeters and preferably 0.041 centimeters to about 0.15 centimeters. The mesh fabric provides a variation of skin feel in the application of substances. By varying the fabric material and the size of the aperture openings, the skin feel can be changed from soft and smooth to a noticeable skin rubbing. There can be a low to high degree of skin friction. The skin feel also can be changed by calendering the sheet material to change surface characteristics such as the coefficient of friction.

[0014] The applicator support structure can be comprised of a plurality of support ribs across the major axis or minor axis of the dispenser. Such ribs preferably would have a radius of curvature of about 10 centimeters to about 20 centimeters along the major axis and about 2.54 to 7.62 centimeters about the minor axis. These ribs support the fabric in a compound curve structure. They allow some flex in the fabric but do not allow for any permanent distortion of the fabric. Optionally the support structure can be a rigid apertured section. In this embodiment there will be no flex to the fabric surface.

[0015] In one mode of use a knob in a lower part of the dispenser will be rotated to move an elevator in the dispenser upward. This will provide for a flow of some of the viscous semisolid substance supported on the elevator through the fabric applicator surface. There is no discernible post-extrusion flow of the semisolid substance after the dispensing of the desired amount of the semisolid substance and the application of this substance to a body surface. The internal pressure in the dispenser is rapidly equilibrated with the exterior pressure upon the movement of the elevator to dispense the semisolid substance. There is no resulting back pressure after the use of the dispenser to cause any significant post-extrusion of the semisolid substance.

Brief Description of the Drawings

[0016]

Figure 1 is a perspective view of the dispenser with a woven fabric applicator surface.

Figure 2 is a is a top plan view of the dispenser of Figure 1.

Figure 3 is a is a side elevational view of the dispensing surface and frame for the dispenser of Figure 1.

Figure 4 is a is a top plan view of a dispenser with an extruded apertured film applicator surface.

Figure 5 is a side cross-sectional view of a multi-ply fabric as the dispensing surface.

Figure 6 is a is a top plan view of the support for the fabric of the applicator surface.

Figure 7 is a is a top plan view of an alternative support for the fabric applicator surface.

Figure 8 is a cross-sectional view of a fabric strand after injection molding.

Detailed Description of the Invention

[0017] The present dispenser will be described with respect to woven and nonwoven fabrics, the use of layers of the fabrics, and the use of both woven and nonwoven fabrics in different combinations. One objective is to deliver a viscous semisolid liquid from a dispenser with no substantial post extrusion. Upon the cessation of pressure on the viscous, semisolid liquid, there is a cessation of extrusion through the fabric dispensing surface. The problem of post extrusion also is alleviated by the low degree of flex in the surface of the fabric.

[0018] Another objective is to provide an applicator where the surface will have sufficient flex to contact the contours of the body surface to which the viscous semisolid material is being applied, but will not be permanently distorted. Yet, another objective is by the range of fabrics available, the structure of these fabrics, and the structure of the fabrics in a single or multi-ply arrangement the skin feel of the applicator can be changed. Some persons want a smooth feel while others want a relatively rough feel. Also, some formulations will have a lubricating effect and consequently, a rougher feel may be desired. In any regards the skin feel of the applicator surface can be changed by changing the mesh fabric.

[0019] Whether woven or nonwoven, the applicator surface will be comprised of about 1 ply to about 10 plies of fabric, preferably about 1 ply to 5 plies, and most preferably about 1 to 3 plies. The mesh openings nominal size will be in the range of about 50 microns to about 1,000 microns, and preferably about 80 microns to 400 microns. In multilayer structures the mesh openings in one layer usually will not align with the mesh openings of another layer. However, the mesh openings can be aligned from layer to layer. Further, the mesh openings can vary in size from layer to layer. The mesh openings will have a nominal (average) surface area of about 2.5 $\times$ 10^{-3} mm^2 to about 1 mm^2 and preferably about 6.4 $\times$ 10^{-3} mm^2 to about .16mm^2.

[0020] If a woven fabric the fabric can be of any of the three basic weaves. These are the plain, twill or satin weaves. If a plain weave this can be a regular plain weave, oxford weave, lousine weave, 2 x 2 basket weave, 3 x 2 basket weave, 3 x 3 basket weave, 4 x 4 basket weave. 4 x 5 basket weave, 3 x 5 basket weave and an 8 x 8 basket weave. In addition the fabric can be of a rip stop parachute type. In this type of weave there is an intermittent weave to stop any rips in the fabric. The twill fabrics can be a 2/1 right hand twill, a 1/2 right hand twill, a 2/2 right hand twill, a 3/1 right hand twill, a 3/1 45° right hand twilL The satin fabrics can be a 4 harness satin (i.e. crowfoot), 5 harness satin, 6 harness satin, a 7 harness satin or an 8 harness satin. These are all forms in which the fibers are interlaced in the warp and fill directions. The warp threads usually are called ends while the filling threads are called picks. The edges of the fabric are the selvage.

[0021] The construction of a woven fabric is given as ends x picks per inch. The weave can be balanced where there is the same number of threads in the warp direction and in the filling direction. In an unbalanced weave there will be more threads either in the warp direction or in the filling direction.

[0022] The tightness for a fabric can be calculated by the formula:

$$\text{Weave Texture} = \frac{\text{ends per repeat}}{\text{Inch per repeat + interlacings}}$$

This same formula can be used to calculate the maximum cover for a fabric.

[0023] Also of importance is the denier of the threads. Denier is the weight in grams for 9000 meters of a thread. A low denier indicates a fine, relatively narrow cross-section thread. A higher specific gravity material at a given denier will have a smaller cross-section than a lower specific gravity material at that same denier.

[0024] There are many variables in the selection of a woven fabric. By the selection of the weave style, fabric tightness, fiber material, fiber structure and fiber denier, the texture of the fabric can be changed. The skin feel can range from smooth to tough By calendering or similarly treating the fabric, the surface of the fabric can be modified to produce a smoother texture and skin feel. The skin feel and the application also can be adjusted by the tension on the fabric in its attachment to the ap-

plicator frame. The flexibility of the fabric can be modified. Also, the fabric can be supported or unsupported. If supported, it can be supported along the major axis and/or along the minor axis, assuming the usual oval shape of an applicator surface. If the applicator is round, it can be supported by means of one or more diametric supports.

[0025] If the fabric is nonwoven, it can be an extruded film that by its structure is porous, or is a solid film which is perforated to make it porous. In addition, a nonwoven fabric can be comprised of a plurality of short length fibers that are layed down in a random array and then selectively bonded together adhesively or by heat bonding. The former extruded apertured films can be produced by the processes disclosed in U.S. Patent 4,842,794 or U.S. Patent 5,207,962. In U.S. Patent 4,842,794 a sheet of thermoplastic film is extruded to a thickness of about 0.5 to 20 mils. One side of the film is provided with about 4 to 60 grooves per centimeter and the other side a set of grooves at an acute angle of 15° and 75°. The embossing rolls that have the patterns are at a pressure of about 18 N to 534 N (4 to 120 pounds) per linear centimeter. The result is a film with oval apertures. The film then can be uniaxially oriented in the machine or cross direction from about 50% to 500%, or sequentially biaxially oriented in the machine direction and cross direction up to about 600%. In the alternative the extruded and apertured film can be heat treated to increase the size of the apertures.

[0026] In the processes of U.S. Patent 5,207,962 a thermoplastic film is extruded with the extruded film passed between a patterned nip roll and a smooth roll. The patterned nip roll has a plurality of raised projections with a sharp distal end. These sharp raised projections from the apertures in the film. The apertured film then can be uniaxially oriented in the machine or cross direction or biaxially oriented in both the machine direction and cross direction. The apertures will be of the shape and size of the distal end of the raised projections. The apertures also will be in a consistent repeating pattern. These extruded films are a class of nonwoven fabrics for the purposes of this invention.

[0027] The extruded film also can be produced in the form of a sheet or in a plurality of strands. When extruded in the form of strands, these strands are in a sheet in a helical type of pattern. This also is known as a biplanar netting. The film that is produced in the form of helical strands can have 7 to 50 strands or more per 2.54 cm, be in a width of about 30 cm to 152 cm and a thickness of .033 cm to .30 cm, and preferably about .05 to about .15 cm. The apertures can be in a size range of 100 to 500 micron and larger. The open area of the extruded strand type film can range from about 4% to 25% or more. Larger openings will provide a greater open area. Useful nonwoven netting products are the Naltex® products of Nalle Plastics, Inc.

[0028] Preferred extruded films have about 20 to about 50, and preferably about 30 to about 40, strands per 2.54 cm and have nominal openings of about 125 microns to about 225 microns. A nominal opening is the average size of a square opening with the length and width being about these dimensions. This translates to a nominal mesh area opening of about .015 mm^2 to about .05 mm^2. The shape of the opening can vary from triangular to polygonal to circular or elliptical. However, the area of the mesh opening will be within the above range. The mesh openings will be within a given range, however, there will be a range of shapes and sizes with the average mesh opening size being the given range.

[0029] In Figure 1 there is shown a dispenser for an antiperspirant or deodorant. The container (10) has an upper portion (12), a barrel body portion (14) and a knob (16) for raising an elevator in the container. The upper portion (12) is comprised of insert (20) which is comprised of support frame (18) and fabric applicator surface (26). The support frame (18) is in a liquid tight contact with the barrel body portion (14). The insert can be mechanically attached to the barrel or it can be thermally or adhesively bonded to the barrel.

[0030] Essentially any barrel portion, elevator and knob can be used with the dispensers of the present invention. The key feature is the insert through which the viscous semisolid is dispensed. The insert 20 is comprised of support frame 18 and fabric 26 with applicator surface 24. The fabric 26 insert molded to the support frame during the molding of the support frame.

[0031] In a preferred embodiment the fabric is insert injection molded to the fabric support frame during the formation of the support frame and the fabric is simultaneously surface modified during this process. The surface of the fabric is modified by the substantially round fabric fibers being modified to flat upper and lowed surfaces. The substantially circular fiber 32 is modified to have the shape of a chord of a circle 34 on its upper and 36 lower surfaces and forms an oval-like shape as shown in Figure 8. This flat upper surface tends to decrease the coefficient of friction of the fabric surface and results in a smooth skin feel in use. That is, the applicator surface moves over the skin with less friction. The thickness of the fiber from upper surface to lower surface is decreased about 5% to about 25%, and preferably about 8% to 15% during the insert injection molding process.

[0032] The mesh size also is changed during insert injection molding. The mesh aperture opening size will be reduced about 5% to about 25%. Consequently, the initial fabric mesh size will have to be sized to take into consideration the decrease in mesh size during insert molding. In the insert injection molding process the mesh fabric is placed in the mold cavity. The cavity is shaped to accept the fabric with the edges of the fabric being in a border area. The border area is where the support frame of the insert is to be formed. A mating mold section is inserted into the cavity and a pressure applied to the mold in this process the pressure of the mold pieces against each other will change the shape

of the fabric fibers from round to a chordal shape and impart a compound curve shape to the fabric portion.

[0033] In insert molding the frame will have an upper rim (30) to which the fabric is attached. In a preferred mode the upper rim (30) will be at an angle of about 5° to about 50° to a horizontal plane through the insert support frame (18). This upward extending angle from the outer edge 22 of rim (30) to the inner edge (28) of rim (30) aids in providing a compound curve to the fabric as shown in Figure 5.

[0034] A woven fabric injection molded to an insert is shown in a top plan view in Figure 2 and in a side elevation view in Figure 3. In Figure 2 the woven fabric (26) is shown injection molded to the rim (30) of the insert support (18). In this injection molding, usually the fabric (26) and the insert support will be constructed of the same plastic. However, this is not required. Usually these will be polyenes such as polyethylenes, polypropylenes, polybutadienes and copolymers and polymers. However, other thermoplastics such as polyesters can be used. In Figure 3, the insert (18) is shown in a form for mechanical attachment to upper portion of the barrel (12). Recess (28) locks into a complimentary rib on the upper portion. The fabric (26) can be held in a compound curve shape by structural supports Located below the fabric. These structural supports are shown in more detail in Figure 6 and Figure 7.

[0035] Figure 4 shows an insert support frame with a nonwoven fabric heat bonded to the rim (30). The structure of the insert support frame is the same as in Figure 2 and Figure 3. The difference is the use of a fabric that has random sized openings within a particular range. As in the embodiment of Figure 2, in the embodiment of Figure 4 the fabric can be in multiple layers. This usually would be in about 1 to about 5 layers, and most preferably about 1 to about 3 layers. Figure 5 shows a fabric structure in a three-layer arrangement.

[0036] As previously noted, Figure 6 and Figure 7 show support structures for the fabric. These support structures will maintain the fabric in a compound curve structure. The fabric can be maintained in a single curved surface. However, in most uses the preference will be to maintain the fabric in a compound curve structure. In Figure 6 there are shown supports (40) and (42) which support the fabric in a compound curve. A different arrangement of supports is shown in Figure 7. Here supports (44), (46), and (48) maintain the fabric in a compound curve structure.

[0037] The mesh fabric can be comprised of essentially any material in which these fabrics are constructed, however, thermoplastic fabrics are preferred since they can more easily be bonded to a support frame. Preferred mesh fabrics are polyene fabrics, polyester fabrics, nylon fabrics, and polyester-elastomer fabrics. The polyene fabrics comprise a class of polyethylene, polypropylene, polybutadiene polymer fabrics and fabrics that include copolymers of these polyenes. The mesh fabrics have mesh openings of about 50 microns to about 1,000 microns, and preferably about 80 microns to about 400 microns. The open area will be from about 4% to about 25%. The thickness of the mesh fabric will be about .02 centimeters to about .35 centimeters. Preferably the mesh fabric and the support frame are constructed of the same thermoplastic material in order to facilitate the bonding of the mesh fabric onto the support frame.

[0038] The other parts of the dispenser are constructed of the materials commonly used for such dispenser. These are moldable thermoplastics. Most, if not all, of the parts of the dispenser will be injection molded.

Claims

1. An applicator for applying a semisolid substance to a body surface comprising a barrel (14) dosed at one end by an elevator adapted to move axially within said barrel, and closed at another end by an applicator surface (26), **characterized in that** said applicator surface (26) comprised of at least one of a woven and a nonwoven fabric, said fabric being insert injection molded to a support frame (18) said fabric having nominal mesh apertures of about 50 microns to about 1,000 microns in cross-section, a thickness of about .032 cm to about 0.3 cm and a fabric surface modified by calendering to improve the feel at such body surface.

2. An applicator as in claim 1 wherein said applicator surface (26) is comprised of 1 to 10 plies of fabric.

3. An applicator as in claim 2 wherein said applicator surface (26) is comprised of 1 to 5 plies.

4. An applicator as in claim 1 wherein said fabric is a woven fabric.

5. An applicator as in claim 1 wherein said applicator surface (26) is a woven fabric selected from the group consisting of plain weaves, twill weaves and satin weaves.

6. An applicator as in claim 1 wherein applicator surface (26) is a nonwoven fabric.

7. An applicator as in claim 6 wherein said nonwoven fabric is an extruded film having a plurality of apertures.

8. An applicator as in claim 6 wherein said nonwoven fabric is a plurality of random fibers in a random array.

9. An applicator as in claim 1 wherein there is at least one support (40), (42), (44), (46), (48) beneath said applicator surface (26).

10. An applicator as in claim 9 wherein said applicator has a major axis and a minor axis, said support (48) extending across said major axis.

11. An applicator as in claim 10 wherein said support forms (44), (48) said applicator surface (26) into a compound curve.

12. An applicator as in claim 1 wherein said applicator surface (26) is one of a polyene and a polyester.

13. An applicator as in claim 1 wherein said fabric has apertures of about 75 microns to about 350 microns.

14. An applicator as in claim 13 wherein said fabric has apertures of about 100 microns to about 250 microns.

15. An applicator as in claim 1 wherein said applictor surface (26) is an extruded material.

16. A method of forming an applicator surface (26) for the application of flowable substances to a body surface comprising:

providing at least one of a woven and a nonwoven fabric, said fabric having an initial thickness of about 0,032 cm to about 0,3 cm and mesh apertures of about 50 microns to about 1,000 microns
calendering said fabric to modify a top surface thereof;
inserting said fabric into a first section of an injection mold, the fabric extending substantially across a cavity of said first section of said mold and closing said mold with a second mold section;
injecting a hot thermoplastic plastic into at least one of said first and second mold sections to simultaneously form a support frame (18) for said fabric and to bond said fabric to said support frame (18).

17. A method as in claim 16 wherein said fabric is shaped into a compound curve.

18. A method as in claim 16 wherein said fabric is a woven fabric.

19. A method as in claim 16 wherein said fabric is a nonwoven fabric.

20. A method as in claim 16 wherein said fabric is an extruded fabric.

Patentansprüche

1. Applikator zum Aufbringen einer halbfesten Substanz auf eine Körperoberfläche, der einen Zylinder (14) aufweist, der an einem Ende durch eine Hebeeinrichtung geschlossen ist, die angepaßt ist, um sich axial in dem Zylinder zu bewegen, und an einem anderen Ende durch eine Applikatoroberfläche (26) geschlossen ist, **dadurch gekennzeichnet, daß** die Applikatoroberfläche (26) zumindest einen gewebten oder nicht gewebten Stoff aufweist, wobei der Stoff durch Einsatzspritzgießen an einem Tragrahmen (18) befestigt ist und der Stoff Nennmaschenweiten von ungefähr 50 µm bis ungefähr 1000 µm im Querschnitt, eine Dicke von ungefähr 0,032 cm bis ungefähr 0,3 cm und eine Stoffoberfläche hat, die durch Kalandrieren modifiziert ist, um das Gefühl an einer solchen Körperoberfläche zu verbessern.

2. Applikator nach Anspruch 1, bei welchem die Applikatoroberfläche (26) 1 bis 10 Stofflagen aufweist.

3. Applikator nach Anspruch 2, bei welchem die Applikatoroberfläche (26) 1 bis 5 Lagen aufweist.

4. Applikator nach Anspruch 1, bei welchem der Stoff ein Gewebe ist.

5. Applikator nach Anspruch 1, bei welchem die Applikatoroberfläche (26) ein Gewebe ist, das aus der aus Leinengeweben, Köpergeweben und Satingeweben bestehenden Gruppe ausgewählt wurde.

6. Applikator nach Anspruch 1, bei welchem die Applikatoroberfläche (26) ein Vliesstoff ist.

7. Applikator nach Anspruch 6, bei welchem der Vliesstoff eine extrudierte Folie ist, die eine Vielzahl von Öffnungen aufweist.

8. Applikator nach Anspruch 6, bei welchem der Vliesstoff eine Vielzahl ungeordneter Fasern in einer zufälligen Anordnung ist.

9. Applikator nach Anspruch 1, bei welchem mindestens eine Trägereinrichtung (40, 42, 44, 46, 48) unter der Applikatoroberfläche (26) vorhanden ist.

10. Applikator nach Anspruch 9, bei welchem der Applikator eine Hauptachse und eine Nebenachse hat, wobei sich die Trägereinrichtung (48) über die Hauptachse erstreckt.

11. Applikator nach Anspruch 10, bei welchem die Trägereinrichtung (44, 48) die Applikatoroberfläche (26) in eine dreidimensionale Krümmung formt.

12. Applikator nach Anspruch 1, bei welchem die Applikatoroberfläche (26) ein Polyen oder ein Polyester ist.

13. Applikator nach Anspruch 1, bei welchem der Stoff Öffnungen von ungefähr 75 μm bis ungefähr 350 μm hat.

14. Applikator nach Anspruch 13, bei welchem der Stoff Öffnungen von ungefähr 100 μm bis ungefähr 250 μm hat.

15. Applikator nach Anspruch 1, bei welchem die Applikatoroberfläche (26) ein extrudiertes Material ist.

16. Verfahren zum Bilden einer Applikatoroberfläche (26) für das Aufbringen fließfähiger Substanzen auf eine Körperoberfläche, welches umfaßt:

Bereitstellen von zumindest einem gewebten oder Vliesstoff, wobei der Stoff eine anfängliche Dikke von ungefähr 0,032 cm bis ungefähr 0,3 cm und Maschenweiten von ungefähr 50 μm bis ungefähr 1000 μm hat;
Kalandrieren des Stoffes, um eine obere Oberfläche von ihm zu modifizieren;
Einsetzen des Stoffes in einen ersten Abschnitt einer Spritzgießform, wobei sich der Stoff im wesentlichen über einen Hohlraum des ersten Abschnittes der Gießform erstreckt, und Schließen der Gießform mit einem zweiten Gießform-Abschnitt;
Einspritzen eines warmen thermoplastischen Kunststoffes in zumindest den ersten oder zweiten Gießform-Abschnitt, um gleichzeitig einen Tragrahmen (18) für den Stoff zu bilden und den Stoff mit dem Tragrahmen (18) zu verbinden.

17. Verfahren nach Anspruch 16, bei welchem der Stoff in eine dreidimensionale Krümmung geformt wird.

18. Verfahren nach Anspruch 16, bei welchem der Stoff ein Gewebe ist.

19. Verfahren nach Anspruch 16, bei welchem der Stoff ein Vliesstoff ist.

20. Verfahren nach Anspruch 16, bei welchem der Stoff ein extrudierter Stoff ist.

Revendications

1. Un applicateur pour appliquer une substance semi-solide sur une surface de corps comprenant un fût (14) fermé à une extrémité par un élévateur adapté pour se déplacer dans le sens axial à l'intérieur dudit fût, et fermé à l'autre extrémité par une surface d'applicateur (26) **caractérisée en ce que** ladite surface d'applicateur (26) est constituée d'au moins un tissu tissé et un tissu non tissé, ledit tissu étant une injection moulée inséré dans une structure de support (18), ledit tissu ayant des ouvertures de mailles nominales d'environ 50 microns à 1000 microns en coupe, une épaisseur d'environ 0,032 cm à 0,3 cm et la surface de tissu étant modifiée par calandrage pour améliorer le toucher sur cette surface de corps.

2. Un applicateur selon la revendication 1 dans lequel ladite surface d'applicateur (26) est constituée d'1 à 10 couches de tissu.

3. Un applicateur selon la revendication 2 dans lequel ladite surface d'applicateur (26) est constituée d' 1 à 5 couches.

4. Un applicateur selon la revendication 1 dans lequel ledit tissu est un tissu tissé.

5. Un applicateur selon la revendication 1 dans lequel ladite surface d'applicateur (26) est un tissu tissé sélectionné dans un groupe composé d'armures unies, d'armures sergées et d'armures satin.

6. Un applicateur selon la revendication 1 dans lequel ladite surface d'applicateur (26) est un tissu non tissé.

7. Un applicateur selon la revendication 6 dans lequel ledit tissu non tissé est une feuille extrudée comportant plusieurs ouvertures.

8. Un applicateur selon la revendication 6 dans lequel ledit tissu non tissé est un ensemble de plusieurs fibres aléatoires en matrices aléatoires.

9. Un applicateur selon la revendication 1 dans lequel il y a au moins un support (40), (42), (44), (46) et (48) en-dessous de ladite surface d'applicateur (26).

10. Un applicateur selon la revendication 9 dans lequel ledit applicateur a un axe majeur et un axe mineur, ledit support (48) s'étendant à travers ledit axe majeur.

11. Un applicateur selon la revendication 10 dans lequel ledit support (44), (48) forme ladite surface d'applicateur (26) en une courbe composée.

12. Un applicateur selon la revendication 1 dans lequel la surface d'applicateur (26) est une surface en polyène et une en polyester.

13. Un applicateur selon la revendication 1 dans lequel ledit tissu possède des ouvertures d'environ 75 microns à 350 microns.

14. Un applicateur selon la revendication 13 dans lequel ledit tissu possède des ouvertures d'environ 100 microns à 250 microns.

15. Un applicateur selon la revendication 1 dans lequel ladite surface d'applicateur (26) est un matériau extrudé.

16. Procédé consistant à former une surface d'applicateur (26) pour l'application de substances liquides sur une surface de corps comprenant les étapes consistant à :

fournir au moins un tissu tissé et un non tissé, ledit tissu ayant une épaisseur initiale d'environ 0,032 cm à 0,3 cm et des ouvertures de mailles d'environ 50 microns à 1000 microns ;
calandrer ledit tissu pour modifier sa surface supérieure ;
insérer ledit tissu dans une première section d'un moule d'injection, le tissu s'étendant sensiblement à travers la cavité de ladite première section dudit moule et fermant ledit moule avec une seconde section de moule ;
injecter un thermoplastique chaud dans au moins l'une des deux sections de moule pour former simultanément une structure de support (18) pour ledit tissu et coller ledit tissu à la structure de support (18).

17. Procédé selon la revendication 16 dans lequel ledit tissu est formé en courbe composée.

18. Procédé selon la revendication 16 dans lequel ledit tissu est un tissu tissé.

19. Procédé selon la revendication 16 dans lequel ledit tissu est un tissu non tissé.

20. Procédé selon la revendication 16 dans lequel ledit tissu est un tissu extrudé.

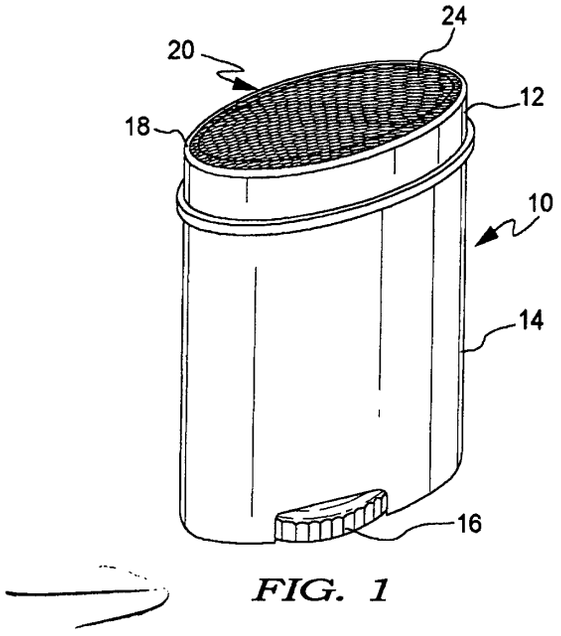

FIG. 1

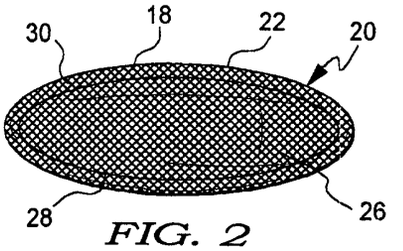

FIG. 2

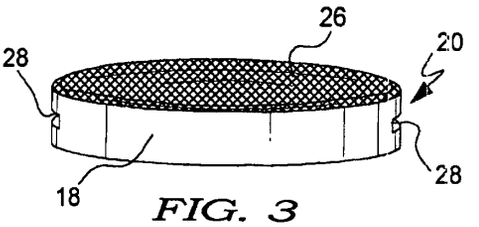

FIG. 3

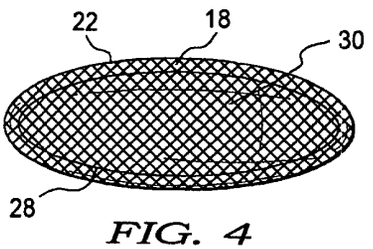

FIG. 4

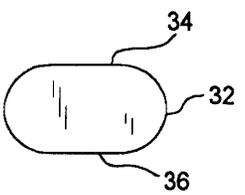

FIG. 8

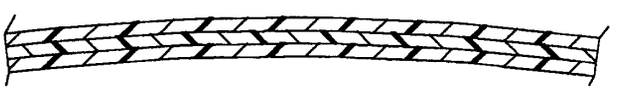

FIG. 5

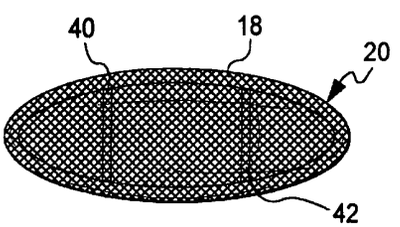

FIG. 6

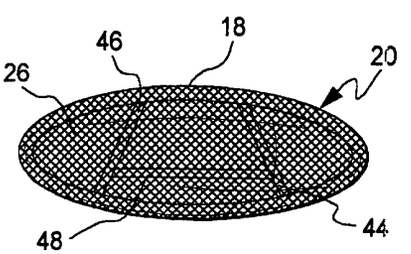

FIG. 7