May 1, 1951 M. A. GOLDMAN 2,550,686

MANUFACTURE OF PILE FABRICS AND PRODUCTS THEREOF

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FIG. 1.

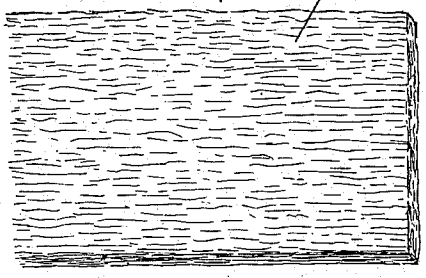


FIG. 2.

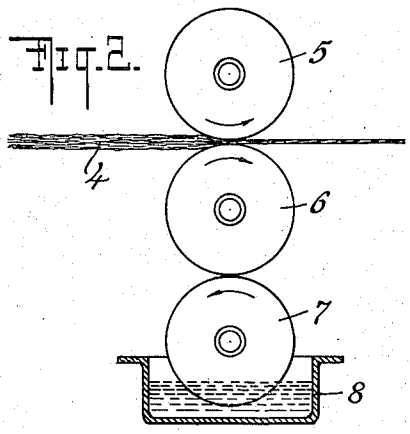


FIG. 3.

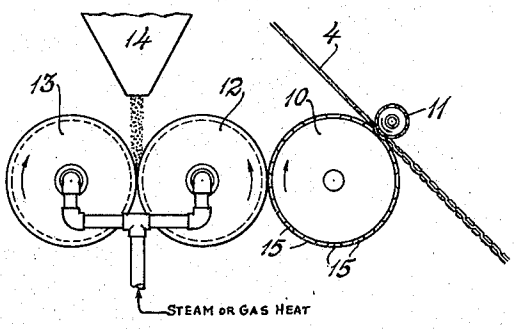


FIG. 4.

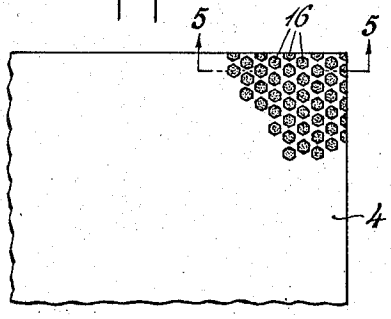
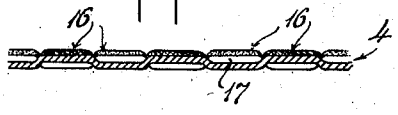


FIG. 5.



WITNESS
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Fig. 6.

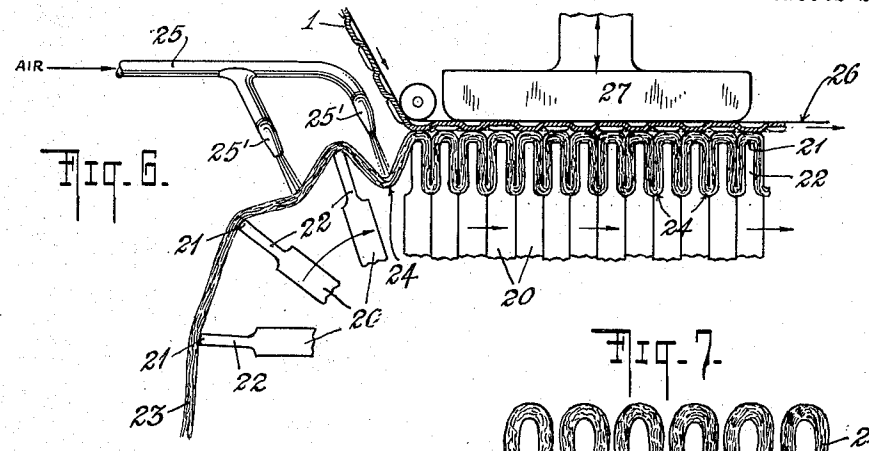


Fig. 7.

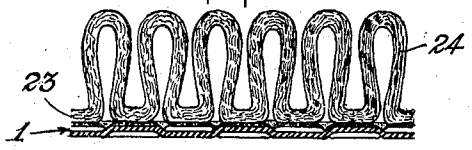


Fig. 8.

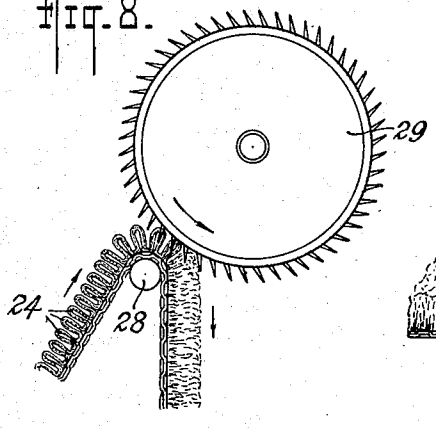


Fig. 9.

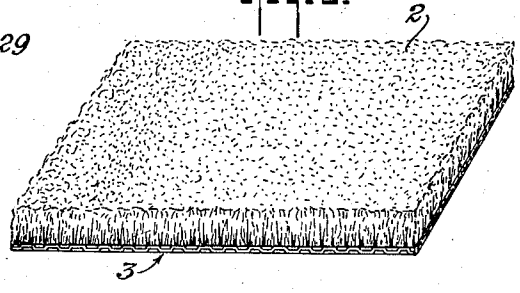


Fig. 11.

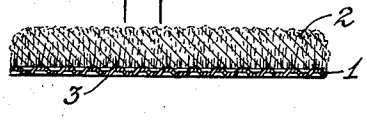


Fig. 10.

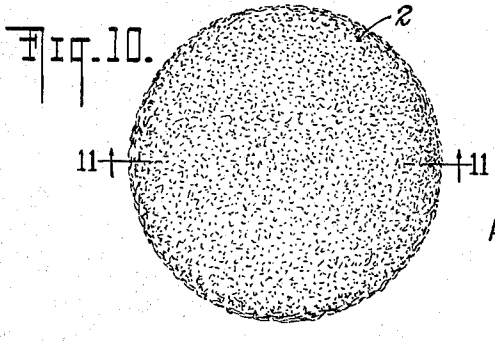
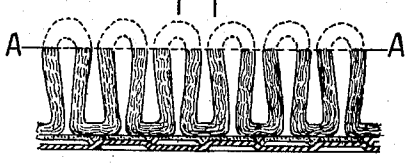


Fig. 12.



WITNESS
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Patented May 1, 1951

2,550,686

UNITED STATES PATENT OFFICE

2,550,686

MANUFACTURE OF PILE FABRICS AND PRODUCTS THEREOF

Maurice A. Goldman, New Brunswick, N. J., assignor, by mesne assignments, to Textron Incorporated, Providence, R. I., a corporation of Rhode Island

Application December 3, 1946, Serial No. 713,689

16 Claims. (Cl. 154—78)

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This invention relates to pile fabrics, and more particularly to the manufacture of an unwoven pile fabric suitable for making cosmetic applicators, blankets and the like.

One of the objects of the invention is to produce a pile fabric which is particularly advantageous for use in powder puffs, and the like, although it will be understood that such material may be utilized to equal advantage in many other products heretofore made of woven pile fabric.

Powder puffs as heretofore constructed, usually have their applicator faces made of soft wool material which is first woven and then brushed to produce the desired pile. The manufacture of such wool applicator faces necessarily involves a number of steps which greatly add to the cost of the finished product. It is one of the purposes of the present invention to produce a pile fabric that is suitable for powder puffs and whose manufacture eliminates many of the steps that have heretofore been employed in the manufacture of powder puffs provided with an applicator surface made of wool.

Another object of the invention is to provide a powder puff whose applicator surface may be made of any type of fibre suitable for the purposes for which such powder puff was designed, such as fibres of wool, cotton, rayon, etc., and which has a predetermined density, softness and uniformity of pile.

A further object is to provide an unwoven pile fabric material for powder puffs, whose cost of manufacture is substantially less than that of woven goods, and which can be manufactured at a greater speed than woven goods.

Other objects of the invention, as well as the advantages and features of novelty thereof, will become apparent after a perusal of the following description when read in connection with the accompanying drawings, in which Fig. 1 illustrates the product of an initial step in the manufacture of a powder puff embodying the invention; Fig. 2 is a schematic elevational view of a step in the manufacture of the backing for the pile material; Fig. 3 is a schematic elevational view of the apparatus employed in applying the pile securing material to the backing; Fig. 4 is a plan view of a portion of the step product produced by the apparatus of Fig. 3; Fig. 5 is a sectional view, on an enlarged scale, of the product shown in Fig. 4, the sectional view being taken along the line 5—5 of Fig. 4; Fig. 6 is a fragmentary schematic view of the type of apparatus which may be employed in applying the pile material to the backing; Fig. 7 is a sectional view, on an enlarged scale, of a

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portion of the product produced by the apparatus of Fig. 6; Fig. 8 is a diagrammatic view of apparatus which may be employed to produce the finished pile on the material; Fig. 9 is a perspective view illustrating the construction of a portion of the completed material; Fig. 10 is a plan view of a powder puff made from the material of Fig. 9; Fig. 11 is a vertical sectional view taken along the line 11—11 of Fig. 10, and Fig. 12 is a view similar to Fig. 7 illustrating how the looped pile may be cut prior to the brushing operation illustrated in Fig. 8 of the drawings.

As is illustrated in Figs. 10 and 11 of the drawings, the powder puff of this invention basically includes a cosmetic applicator or distributing layer composed of a backing 1 to which is adhered the pile material 2. In order to enhance the appearance or construction of the powder puff, the backing 1 may be attached to one or more layers of felted or attractively colored or designed material, such as, the covering layer 3 of fabric material.

The backing 1 of the applicator surface is preferably composed of a layer of unwoven fibres united by an agglutinant and its thickness, weight and flexibility will depend upon the character of the desired end product and the purposes for which such product was designed. The backing 1 may be formed by arranging loose animal, artificial, mineral or vegetable fibres, such as wool, cotton, rayon, etc., to provide a loosely matted layer 4 of such fibres, as is shown in Fig. 1 of the drawings. The formation of such layer 4 may be accomplished by the aid of a carding or other suitable machine. As an example of the construction of layer 4, this layer may have a weight of approximately five hundred grains to the square yard. With such a weight, the fibres of the layer which extend in large proportion substantially longitudinally of the layer, will be so loosely or thinly associated, that the layer 4 will be of very flimsy construction. In accordance with the invention, the thus formed layer 4 may be first subjected to a resinous printing operation which shall be explained hereinafter, but for the formation of powder puffs, it is preferably first subjected to an impregnating step whereby the loosely matted fibres in such layer are united by a suitable agglutinant. This impregnating step may be accomplished, as is illustrated in Fig. 2 of the drawings, by passing the layer 4 between a pair of heated rollers 5 and 6, the latter of which is in surface engagement with a roller 7 partially submerged in a hot bath 8 of the agglutinant. The agglutinant may be any

suitable binder material, but preferably is a flexible, thermoplastic resin, such as, methacrylate resin. In the carrying out of this step, the rollers 5, 6 and 7 are so adjusted that the agglutinant is applied to the layer 4 in an amount determined by the flexibility and porosity to be desired in the finished backing 1. For example, it has been found that a backing 1 satisfactory for the manufacture of powder puffs, will be obtained when the layer 4 is impregnated with an amount of agglutinant approximately equal in weight to one-quarter the weight of such layer. It will of course be understood also, that the flexibility and porosity of the finished backing can be controlled by varying the number of fibres in the layer 4 and the density of the agglutinant.

The thus impregnated layer 4 is next subjected to a printing step whereby dots of binder material are applied to a surface thereof. In the carrying out of this step, the impregnated layer or sheet 4 may be passed between a printing roller 10 provided on its exterior surface with a multiplicity of wells 15 and a smooth surfaced roller 11 having a diameter substantially smaller than the diameter of the roller 10. The wells 15 of roller 10 carry the binder which is preferably a suitable thermoplastic material. As is shown in Fig. 3 of the drawings, the thermoplastic material reaching the printing roller 10 may be fed in dry, powdered form from a feed control, such as, the hopper 14, to a pair of milling rolls 12 and 13 which are heated in any suitable fashion, as by steam or gas heat. The melted thermoplastic material is then fed by roll 12, as a film, to the pockets or wells 15 provided on the printing roller 10. The feed of the film is controlled so that each of the wells 15 in the roller 10 successively receive predetermined amounts of the thermoplastic material. The roller 11 is of such diameter and so positioned with relation to the printing roller 10 that as the layer 4 is fed therebetween, a surface of the strip comes into contact with successive portions of the thermoplastic material contained in the printing roller wells 15 and due in part to the porosity of the layer, picks or pulls such thermoplastic portions out of the wells. The thermoplastic portions immediately solidify in the form of dots upon the surface of the layer. As has been previously indicated, the layer 4 in its unimpregnated form may first be subjected to this printing step in the manufacture of a desired product.

The thermoplastic material employed in the above described printing operation preferably has a lower melting point than the thermoplastic material impregnating the layer 4 in order that its application will disturb the latter as little as possible during the printing operation and during the hereinafter described pile applying step. Thus, for example, if a methacrylate resin is employed as the impregnating medium, it would be preferable to use a polyvinyl ester and ether of lower melting point in the printing operation. The arrangement of the wells 15 on roller 10 is such that the resinous portions are applied to the layer 4 in the form of a series of independent dots which are spaced, but are closely adjacent to one another, so that they cover a major portion of the area of the layer. The dots may each have an area of at least .004 square inch and be spaced apart a distance of from 0.01 to 0.06 inch. The dots may have the hexagonal configuration of the dots 16 shown in Fig. 4 of the drawings, or any other suitable configuration. The purpose of thus applying the printed resin in the form of dots

is to retain as much as possible the flexibleness of the layer 4 for it will be understood that even though the dots 16 may be rigid and cover a substantial area of the layer, the layer 4 can be readily bent or folded in any one of a number of directions by reason of the more flexible portions 17 of such layer, intermediate such dots. It is true that the rigidity of layer 4 has been increased to some extent by the impregnating step, but by employing a flexible resin and controlling the amount thereof added to layer 4, as has been explained, the layer 4 still has a flexibleness which compares favorably with many woven materials. This flexibility may also be enhanced by making the dots of flexible material. It is also believed to be evident that by controlling the size, number and arrangement or pattern of the dots 16, the flexibility of strip 4 can be controlled and likewise its porosity and weight. In this latter connection the thickness of the dots is also important because it will determine the thickness of the pile which may be applied to the strip. In the manufacture of this material for powder puffs, it has been found that dots of one-thousandth of an inch in thickness and one-sixteenth of an inch average diameter or width, provide a satisfactory applicator layer.

It will be noted from a comparison of Figs. 4 and 5 of the drawings that the impregnated and printed layer 4, as a result of the printing step, may be deformed laterally so that the portions thereof bearing the dots 16 are slightly offset or raised from the imprinted or hinging portions 17, thus giving to the layer, an embossed effect. In such layer, while the resinous material of the dots 16 has a lower melting point than the melting point of the resinous material impregnating the layer, the dots 16 will be firmly and permanently bonded to the impregnated material and to the fibres of such layer. The layer 4 as thus formed, and which in the finished powder puff may constitute the backing 1 of the composite material forming the applicator face of such powder puff, may then be passed through mechanism for affixing the pile material thereto. In the event that the character of the desired product makes it desirable that a thicker backing sheet having greater density or strength be employed, a plurality of superimposed layers 4 may be fed to the pile applying mechanism where, under the heat and pressure employed in the use of such mechanism, the plurality of layers will be united by the thermoplastic material into a unitary whole. Where also the layer 4 is made of a material such as wool fibres and a relatively stronger backing is desired, two layers thereof may be superimposed with the printed dots in opposed relation and with a layer of cotton fibres therebetween. This composite sheet may be first passed between a pair of heated rollers to unite the several layers and then subjected to a second printing step to provide a second series on dots 16 on the other surface of one of the layers 4 before feeding the composite sheet to the pile applying mechanism.

As is shown in Fig. 6 of the drawings, the pile applying mechanism may include a plurality of blades 20 mounted on an endless conveyor so that during their travel around the ends of such conveyor, the blades 20 are spaced apart at a predetermined angle to each other, while when the blades 20 are traveling along the conveyor, intermediate the latter's ends, the opposing faces of such blades are in substantial engagement and form a substantially solid block.

The end portions 22 of the blades 20 are reduced in thickness so as to provide relatively narrow, elongated end supporting surfaces 21 and to permit folded portions of the layer 23 to be contained therebetween. The layer 23 may be composed of combed, loosely, matted fibres of suitable material and similar to the unimpregnated layer 4 shown in Fig. 1 of the drawings. As the thickness of layer 23 controls the density or thickness of the pile to be made, either one or a plurality of layers of loosely, matted fibres may be used, depending upon the thickness of the pile desired in the finished article. In an actual practical case in the manufacture of powder puffs, four superimposed layers of unimpregnated carded material, such as shown in Fig. 1 of the drawings were compressed between cold pressure rollers to provide a composite layer 23 having a thickness of approximately one-sixteenth of an inch. Prior to being fed to the machine, the composite layer 23 may be wetted to facilitate the loop-forming operation. The layer 23 is fed into one end of the machine, the left-hand end as viewed in Fig. 6 of the drawings, so that it spans and is supported by the surfaces 21 of the blades 20. In this portion of the travel of the blades 20, the latter are disposed at such angle to each other that the space between adjacent end surfaces 21 thereof is equal to the length of a loop 24 to to be formed. As the blades 20, with the layer 23 laid thereon, travel upwardly and to the right, as viewed in Fig. 6 of the drawings, jets of air from the nozzles 25', 25' connected to a source of supply 25 cause folds to be formed in the layer portions spanning adjacent blades. The folds in the layer close as the blades travel toward their uppermost position and are fully closed when the blades start their travel in a horizontal direction with their opposed faces in substantial engagement. The lengths of the reduced end portions 22 of the blades 20 are such that the folded portions 24 of the layer 23 are contained in substantially narrow, rectangularly-shaped recesses or grooves formed intermediate such reduced portions 24 when the opposed faces of the body portions of the blades 20 are in engagement. It will thus be seen that when the blades 20 are traveling in a horizontal line across the top of the conveyor, the layer 23 will be snugly arranged around the outer ends thereof and contained in substantially loop-shaped portions 24 between the ends of such blades.

During the above described travel of the blades 20, the impregnated and printed layer or backing 1 is fed along the line of travel of the closed blades 20 with the surface thereof provided with the printed resin dots 16, opposing the end surfaces 21 of the blades 20. Preferably also the backing 1 underlies a sheet of material 26 capable of preventing adherence of such layer 4 to the presser member 27 when the latter comes into action. It has been found that a sheet of smooth, metallic material, such as, tinfoil is suitable for this purpose. The feed of both the blades 20, the backing 1 and the sheet 26 is so controlled that at the end of a predetermined period of travel of such members, their feed comes to rest and the presser member 27 is actuated to press the sheet 26, backing 1 and layer 23 between its working face and the end surfaces 21 of the blades 20, such pressure lasting for a predetermined interval. The blades 20 are maintained in a heated condition at a temperature sufficiently high to melt the resinous material

forming the dots 16 in backing 1, but not high enough to substantially effect the resinous material impregnating such backing. As an example of the carrying out of this step, the blades 20 were maintained at a temperature of 170° F. and the pressure was maintained by the pressure member 27 for approximately fifteen seconds. During this period, the melted resinous material of the dots 16 flowed into and impregnated the portions of layer 23 overlying the end surfaces 21 of the blades 20. Inasmuch as the end portions of the blades 20 are so dimensioned that the widths of the surfaces 21 are approximately sixty thousandths of an inch, while the space between such end surfaces is about one-sixteenth of an inch, it will be seen that portions of substantially all of the fibres in the regions of such surfaces 21 will be contacted by the melted resin of the dots 16. The presser member 27 is then lifted and the feed of backing 1 and layer 23 continued for another predetermined interval. This intermittent feed of the several layers and the blades 20 continues throughout the operation of the apparatus, the interval of feed depending upon the rate of feed of such layers and blades, and the length of the presser member 27 so that all bases of the loops formed by the blades are adhered to the backing 1. When the blades 20 reach the other end of the conveyor they are again separated, thus enabling the looped layer 23 to be removed with the backing 1, the resulting composite sheet having the form shown in Fig. 7 of the drawings. As the composite sheet is discharged from the apparatus, the strip 26 is separated therefrom, before the melted resinous material hardens.

The composite sheet comprising the backing layer 1 and the looped layer 23 is then subjected to a brushing operation to transform the loops 24 of loosely felted fibres into the desired pile. In this operation, the composite sheet is preferably passed over a roller 28 of relatively small diameter so that the transverse loops 24 are opened out and only a few rows of such loops are subjected at one time to the action of the brushing wheel 29, as is shown in Fig. 8 of the drawings. At the end of this brushing operation, the resulting product has the form shown in Fig. 9 of the drawings. A powder puff may then be formed by cutting circular blanks from the brushed composite sheet and these blanks may have a covering layer 3 attached thereto to obtain the powder puff structure shown in Figs. 10 and 11 of the drawings, or two such blanks may be placed back-to-back with their backings 1 adhered together to produce a powder puff having a pile on both faces.

It will be understood from the foregoing description, that in the formation of the product of this invention, no weaving or spinning operations are involved. Furthermore, the product does not require that the fibres be initially spun into thread as the loose fibres themselves are formed by simple rolling and pressing operations into the desired product. The fibres as has been pointed out, may be of any material which is suitable or desirable in the ultimate product and may be of a plurality of types. Thus, the backing 1 may be constituted of cotton fibres while the pile 2 may be made of wool fibres. Many other combinations and mixtures of fibres may be utilized. As has been explained, the porosity and weight of the finished product may be accurately controlled by controlling the amount of thermoplastic material provided in the backing

and the denseness of the pile attached to such backing. In this connection, it has been indicated that the initial impregnating step may be eliminated in order to obtain an extremely light porous material. In such a material, the printed dots 16 of thermoplastic material will themselves form an adequate bond for the fibres in both the backing and the pile to insure a reliable and relatively sturdy material as the spots of material will impregnate the backing and the spaces therebetween being small, will bridge the fibres of the backing. It will also be evident that in the product of this invention, the density, softness and uniformity of the pile can be controlled at will, due to choice of texture and length of the fibres which go make up the pile layer 23 and to the control of the length of the loops which may be formed from such layer. In this connection, also, a more uniform effect may be obtained by either shearing the resulting product shown in Fig. 9 of the drawings, or by first shearing off the closed ends of the loops along the line A—A shown in Fig. 12 of the drawings and then subjecting the thus sheared loops to a brushing operation.

It will be evident to those skilled in the art, that other modifications and changes may be made in the hereinabove described procedure and product, without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. The method of making a fibre product which comprises taking a layer of combed, unwoven fibres which preponderantly extend substantially longitudinally of the layer, applying to a surface of said layer a series of closely spaced apart, relatively thin and flat dots of thermoplastic material, and then anchoring to said dots along closely spaced parallel lines of attachment and with the aid of heat and pressure, spaced portions of a second layer of combed, unwoven fibres, the spacing between said parallel lines of attachment being substantially less than the width of the layer portions intermediate said lines.

2. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a sheet of combed, unwoven, loosely matted fibers preponderantly extending substantially longitudinally of the sheet and said pile being composed of a separate layer of combed, unwoven, loosely matted fibers arranged on said backing in a plurality of sections, each of which includes an intermediate portion adhered to said backing and portions projecting outwardly from said backing, and thermoplastic material uniting the fibers of said backing into sheet form and the intermediate portions of said pile sections to said backing.

3. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a sheet of combed, unwoven, loosely matted fibers preponderantly extending substantially longitudinally of the sheet and united by a thermoplastic material, and said pile being composed of a separate layer of combed, unwoven, loosely matted fibers arranged on said backing in a plurality of sections which are united intermediate their ends to said backing by thermoplastic material, the portions of said layer sections adjacent the intermediate portions thereof, projecting outwardly from said backing.

4. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a sheet of combed, unwoven, loosely matted fibers preponderantly extending substantially longitudinally of the sheet, a thermoplastic material impregnating said backing and uniting the fibers of said backing into sheet form, thermoplastic material provided on the surface of said backing in a series of spaced apart portions, and said pile being composed of a separate layer of combed, unwoven, loosely matted fibers arranged on said backing in a plurality of sections which are united intermediate their ends to said backing by said thermoplastic portions, the portions of said layer sections adjacent the intermediate portions thereof projecting outwardly from said backing.

5. A fiber product comprising a composite layer having a backing and a pile surface, said backing being composed of a sheet of combed, unwoven, loosely matted fibers preponderantly extending in one direction and united by a thermoplastic material, and said pile being composed of a separate layer of combed, unwoven, loosely matted fibers arranged on said backing in a plurality of sections each of which includes an intermediate portion adhered to said backing and end portions projecting outwardly from said backing, the intermediate portions of said layer sections being united to said backing by thermoplastic material and the end portions of said sections being free.

6. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a sheet of combed, unwoven, loosely matted fibers preponderantly extending in one direction and having on one surface thereof a series of predeterminedly arranged rows of predeterminedly formed spaced dots of thermoplastic material located in close relation, and said pile being composed of a separate layer of combed, unwoven, loosely matted fibers arranged on said backing in a plurality of sections, which are united intermediate their ends to said backing by said dots of thermoplastic material, the end portions of said sections projecting outwardly from said backing.

7. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a sheet of combed, unwoven, loosely matted fibers preponderantly extending in one direction and having on one surface thereof a series of spaced dots of thermoplastic material, and said pile being composed of a separate layer of combed, unwoven, loosely matted fibers, said layer being arranged in loops with the bases of said loops closely adjacent each other and being united to said backing by said dots of thermoplastic material and the fibers at the outer ends of said loops being loosened from said layer to produce a pile effect.

8. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a sheet of unwoven, loosely matted fibers preponderantly extending in one direction, a thermoplastic material impregnating said backing and uniting the fibers of said backing into sheet form, and thermoplastic material having a lower melting point temperature than said first mentioned thermoplastic material distributed on a surface of said backing in spaced apart portions, and said pile being composed of loose unwoven fibers contained in a plurality of sections, which are secured intermediate their ends to said backing along prede-

termined rows of attachment by said surface portions of thermoplastic material.

9. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a sheet of combed, unwoven, loosely matted fibers preponderantly extending in one direction and united by and impregnated with a thermoplastic material, the amount of thermoplastic material in said sheet being such that said sheet is porous and flexible, a multiplicity of spaced, printed dots of thermoplastic material disposed upon a surface of said backing sheet in a predetermined definite relation to control the porosity and flexibility of the product and the density of the pile, and a pile composed of combed, loose, unwoven fibers contained in a plurality of sections which are secured intermediate their ends to said backing along predetermined rows of attachment by said spaced dots of thermoplastic material.

10. The method of making a fiber product which comprises forming by a carding step a matted layer of loose fibers which preponderantly extend substantially longitudinally of the layer, applying to such layer a series of closely spaced apart portions of thermoplastic material, anchoring to said spaced portions of thermoplastic material along closely spaced predetermined rows of attachment and with the aid of heat and pressure spaced portions of a layer of combed, loose, unwoven fibers, and then brushing the fibers in the unattached portions of such layer.

11. The method of making a fiber product which comprises forming by a carding step a matted layer of loose fibers which preponderantly extend substantially longitudinally of the layer, applying to such layer a series of closely spaced apart, relatively flat and thin portions of thermoplastic material, anchoring to said portions of thermoplastic material spaced portions of a layer of combed, loose, unwoven fibers, said anchoring step being carried out with the aid of heat and pressure and by securing spaced portions of said layer to said thermoplastic material along rows of attachment spaced apart a distance less than the distance between such layer portions in the flat form of such layer, and then brushing the fibers in the unattached portions of such layer.

12. The method of making a fiber product which comprises taking a layer of combed, loose, unwoven fibers which preponderantly extend substantially longitudinally of the layer, impregnating said layer with a thermoplastic material to unite the fibers in sheet form, applying to a surface of said sheet of united fibers a series of closely spaced apart portions of thermoplastic material, anchoring a layer of combed, unwoven, loose fibers to said surface portions of thermoplastic material along closely spaced, substantially parallel rows of attachment with the aid of heat and pressure, and then brushing the fibers in the unattached portions of the thus anchored layer.

13. The method of making a fiber product which comprises taking a layer of loose, unwoven fibers which preponderantly extend substantially longitudinally of the layer, impregnating said layer with a thermoplastic material to unite the fibers into sheet form, applying to the surface of said sheet of united fibers a series of closely spaced dots of thermoplastic material having a lower melting point temperature than that of the impregnating thermoplastic material, anchoring to said dots of thermoplastic material along closely spaced substantially parallel rows of attachment and with the aid of heat and pressure, spaced portions of a layer of loose, unwoven fibers, and then brushing the unattached portions of such fibers.

14. The method of making a fiber product which comprises forming by a carding step a layer of unwoven fibers in which the fibers preponderantly extend substantially longitudinally of the layer, applying to such layer a series of closely spaced apart dots of thermoplastic material, successively anchoring to the spaced dots of thermoplastic material along closely spaced predetermined rows of attachment running transversely of the length of said layer and with the aid of heat and pressure spaced portions of a second layer of loose, unwoven fibers, and then successively brushing the fibers in the unattached portions of such layer intermediate said lines of attachment.

15. The method of making a fiber product which comprises forming by a carding step a layer of unwoven fibers in which the fibers preponderantly extend substantially longitudinally of the layer, applying to such layer a series of closely spaced apart portions of thermoplastic material, anchoring to said spaced portions of thermoplastic material along closely spaced predetermined spaced rows of attachment and with the aid of heat and pressure, spaced portions of a layer of combed, loose, unwoven fibers so that the portions of such layer intermediate said closely spaced rows of attachment form rows of loops, and then subjecting the free ends of the loops, a few rows at a time, to a brushing step while feeding the pile strip with a substantial bend at the region of the brushing operation.

16. A fiber product comprising a composite layer including a backing and a pile surface, said backing being composed of a combed layer of unwoven fibers in which the fibers preponderantly extend substantially longitudinally thereof and said backing having a series of closely spaced dots of thermoplastic material on a surface thereof, and said pile being composed of a combed layer of loose, unwoven fibers, said last mentioned layer being united to said dots along predetermined spaced lines of attachment with the intermediate unattached portions thereof being in the form of loops, said lines of attachment being closely spaced so that said loops are substantially closed.

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