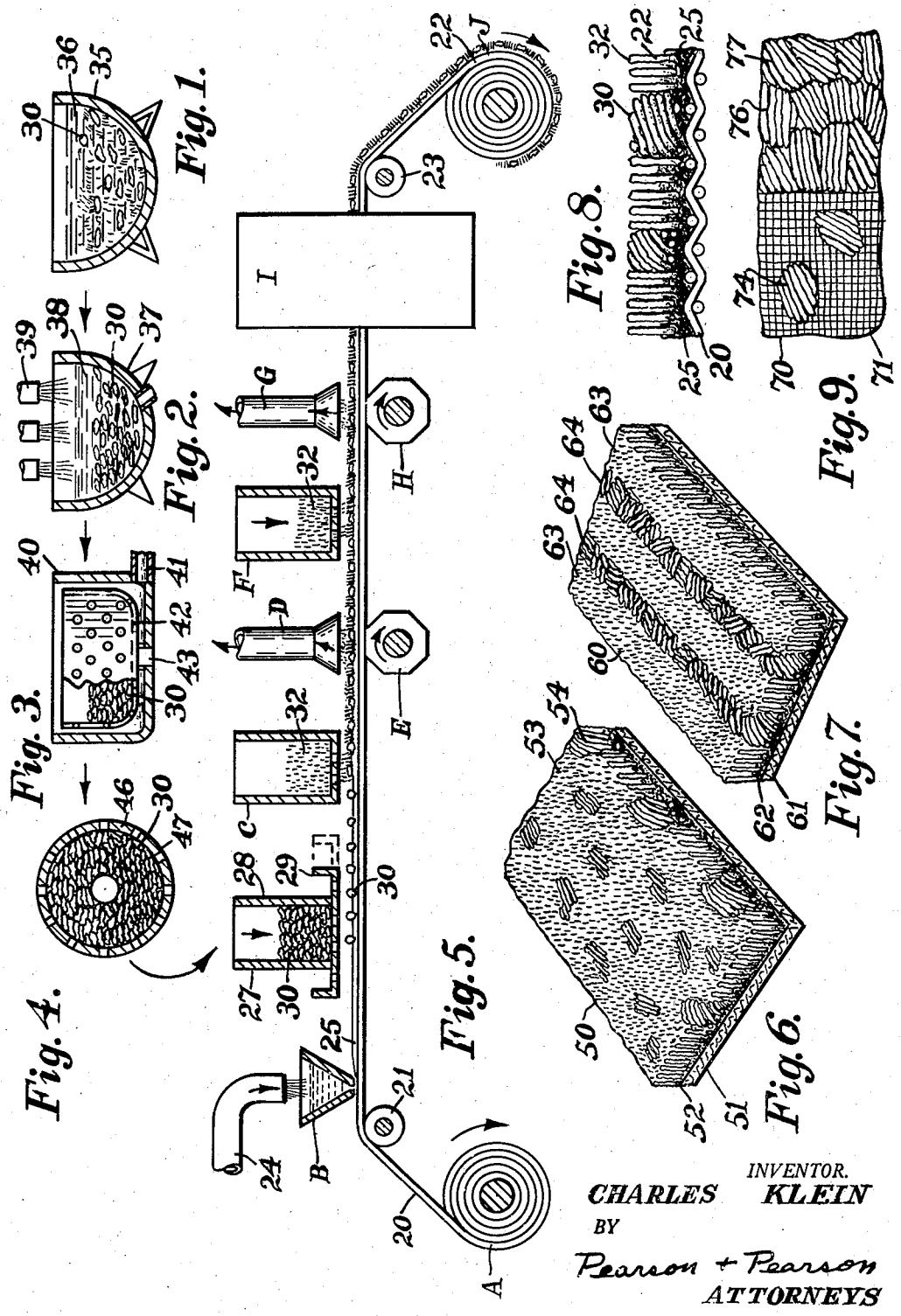
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ORNAMENTAL MATERIAL AND METHOD FOR MAKING SAME

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ORNAMENTAL MATERIAL AND METHOD FOR MAKING SAME

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This invention relates to an improved flocked pile fabric and to the method of making the same.

It has long been customary to make flock pile fabric by adhesively coating a base fabric, depositing pile forming flock fibres thereon, causing the flock fibres to stand erectly on end by static electricity whereby their adjacent lower ends are firmly secured in the adhesive coating and then to set the adhesive by heat or otherwise, whereby the finished fabric has an upstanding pile and a suede or velvet-like texture. It has heretofore been proposed to secure ornamentation on such a fabric by depositing a mixture of colored flock fibres on the adhesive coating or by coating the adhesive in a pattern and depositing different colored flock fibres on various portions of the patterned adhesive coating. As far as I am aware, however, ornamentation by varying the texture of the pile fabric as well as varying the color of the flock has not been previously accomplished, or if accomplished has produced an unsuccessful and commercially unacceptable fabric.

It is the object of this invention to produce a new ornamented flock type fabric wherein the texture includes a plurality of clumps of intermingled fibres firmly secured in the adhesive layer and having an unnapped, smooth texture as contrasted to the suede or velvet texture of ordinary flock pile fabric.

Another object of the invention is to produce a new ornamented flock-type fabric wherein ornamentation is secured by a predetermined surface design primarily formed by areas of upstanding fibres and secondarily formed by areas of intermingled clumps of recumbent fibres.

A further object of the invention is to produce a flock-type fabric having design portions formed by clumps of recumbent, unidirectional, colored fibres so firmly secured and bonded to the base fabric that they cannot be pulled off and will not drop off even after prolonged use and unusual stress and strain.

Still another object of the invention is to provide a method for making the above mentioned flock type fabric which is simple, inexpensive and usable on present flocking machines without requiring additional coating, exhaust or heat setting apparatus.

A still further object of the invention is to provide a method of making flock fabric wherein, instead of seeking to avoid the balling, matting, felting, clumping or bundling of the fibres on the fabric, such a condition of the fibres is deliberately produced and the clumps of fibres are applied in recumbent position to the fabric to create a desirable design.

Another object of the iinvention is to provide a method of making flock fibres wherein, instead of seeking to thoroughly dry the fibres prior to depositing them on the adhesive coating, clumps of intermingled fibres of a predetermined moisture content, preferably about fifty per cent, are intentionally deposited on the adhesive coating, with the liquid serving to bond the fibres together in the clumps.

A further object of the invention is to provide clumps of fibres firmly secured and bonded to a backing sheet or base fabric, wherein the clumps are made up of randomly intermingled fibres rather than uniformly twisted fibres as in yarn or thread and wherein the clump is lying down flatwise on the adhesive coating rather than standing on end in the manner of a pile fibre.

In the drawing:

Figures 1 to 5 are diagrammatic representations of the preferred steps of the process of this invention.

Fig. 1 illustrates the wet or liquid dyeing of the flock fibres in a dye kettle.

Fig. 2 illustrates the rinsing of the dyed fibre clumps.

Fig. 3 illustrates the drying of the dyed and rinsed fibre clumps to a predetermined moisture content in a centrifuge.

Fig. 4 illustrates the screening of the wet clumps to secure a predetermined size or range of sizes thereof.

Fig. 5 illustrates diagrammatically a typical flocking machine with mechanism added thereto for depositing the wet fibre clumps on the adhesive coating prior to depositing the dry flock fibres thereon.

Fig. 6 is a diagrammatic perspective view greatly enlarged showing one form of the improved flock fabric of this invention.

Fig. 7 is a view similar to Fig. 6 of another fabric design achieved by the invention.

Fig. 8 is an enlarged fragmentary diagramatic sectional view showing the bonding of the clumps and flock fibres.

Fig. 9 is a fragmentary plan view of another fabric design wherein clumps partially or entirely cover the base sheet or web.

In the drawing a typical flock coating machine, well known in the trade, is diagrammatically shown to indicate the present method of flocking and the additional steps of this invention. As indicated in Fig. 5 a flock coating machine usually includes a supply A of a base fabric in roll form, the web of base fabric being designated **20**. Web **20** passes over suitable idler rolls such as **21** and is advanced under or through the apparatus shown, by any suitable means, to become the finished flocked fabric **22** shown passing over idler roll **23** and wound on roll J.

A suitable coating device B which may be a trough, doctor blade or applicator roll is fed with a settable adhesive, in liquid or tacky form, from a source **24** and applies a layer of adhesive coating **25** on the upper face of the base fabric web **20**. The clump depositing apparatus **27** required by the novel method of this invention is positioned in rear of the adhesive coating device B and in advance of the usual flock pile depositing apparatus C. Any suitable adhesive, well known in the flock coating trade may be used, for example, rubber, as suggested in U.S. Patent 2,128,811 to Foster of August 30, 1938.

Apparatus **27** preferably comprises a hopper **28** having an apertured or screened bottom member **29**, the member **29** being mounted for translatory or rotary movement whereby the wet clumps of fibre **30** in the hopper are distributed according to a predetermined pattern on the adhesive coating layer **25**. The clumps **30** are wet preferably to about a fifty percent moisture content when deposited by dropping on coating **25** and the lower portion of each clump tends to embed itself well into the viscous or tacky coating to secure a firm grip thereon. It is possible that the weight added to the clumps by reason of their wetness is responsible for their remaining tightly adhered in the adhesive or that the liquidity of the clumps enables the adhesive to better bond with the fibres thereof. In any case, the wet clumps not only become firmly secured but, because they are intermingled and interlocked to each other and to the

fibres embedded in the coating, have no substantial tendency to loosen into a napped texture or to become erect under the influence of the vertical pile forming apparatus of the machine.

The vertical pile forming apparatus of the machine is well known and includes the flock pile depositing apparatus C which drops a multiplicity of short, individual, thoroughly dried, flock fibres **32** on the adhesive coating **25**. The fibres **32** are caused to stand erect on end by a polygonal roll E which creates static electricity by vibrating the web **20** or by other electrostatic mechanism equally well known and not shown. Most of the fibres **32** thus have their lower ends firmly secured in the adhesive **25** and form an erect pile entirely covering the web **20** except in the areas occupied by the wet clumps **30**. The surplus fibres **32** are drawn off by a suitable suction mouth and duct D whereby the ornamentation on the web **20** comprises the suede or velvet-like texture of the pile fibres **32** and the unnapped, smooth texture of the clumps **30** the latter usually being somewhat lustrous.

An additional pile fibre depositing apparatus F, static producing polygonal roll H and suction mouth G is usually provided to assure that the web **20** is thoroughly covered with pile fibres **32**. The web **20** with its adhesive coating **25**, its preferably predominate background or base texture of vertical pile fibres **32** and its preferably subordinate contrasting texture of clumps **30** then passes through an oven I wherein the adhesive is set by heat. The finished goods **22** are then continuously wound on the roll J and constitute the improved flocked pile fabric of the invention.

Figs. 1–4 have been arranged in the drawing to show the steps in the method of forming the wet clumps **30** prior to depositing the same in the hopper **28**. The figures are diagrammatic and it will be understood that the preparation of the fibrous clumps may take place in only one or two containers rather than the four shown.

In Fig. 1 a typical dye kettle **35** is shown in which the step of dyeing the fibres **32** takes place in a suitable liquid dye **36** whereby any desired color may be achieved to contrast with the color of the pile forming flock fibres **32**. Fig. 2 illustrates the rinsing step wherein the dyed clumps **30** are suported in a suitable container **37** while rinsing liquid **38** is applied from sources such as the liquid conduits **39**. If the clumps **30** are not to be dyed, the dyeing and rinsing steps above mentioned are supplanted by a liquid saturation step wherein the clumps are immersed in liquid such as water until one hundred percent wet. Any suitable dyes well known in the flock coating trade may be used, the particular dye not being a part of this invention so long as it is applied in solution to render the fibres wet. Examples of dyes for various types of fibres may be found on pages 464 to 507 of America's Fabrics by Bendure and Pfeiffer published in 1946 by MacMillan Company of New York, N.Y.

In Fig. 3 the important step of producing about a fifty percent moisture content in clumps **30** is portrayed. A typical centrifuge **40** is shown having a drain **41**, a perforated basket **42** and an axis of rotation **43** for the basket. The rate of revolution of the clumps **30** in basket **42** controls the moisture content thereof and best results have been secured with a predetermined moisture content of about fifty percent. Thus the clumps **30** are all in a half dry, half wet state and are thereafter maintained in that state until deposited on the coating **25**.

The clumps **30**, however, are of many different sizes as they emerge from the dye kettle **35** and it is preferred to screen the same to secure a predetermined uniform size or a predetermined range of sizes. A typical rotating screen **46** is provided having mesh **47** of any desired size for segregating the smaller clumps from the larger clumps or passing only clumps of less than the area of each mesh **47** in the screen. The screening operation takes place while the clumps are still wet and is followed by the introduction of a plurality of the screened clumps of the desired size into hopper **28**.

As stated above, ornamentation by variation of texture is achieved by the method of this invention even if the fibre clumps **30** and pile fibres **32** are the same color. The clumps **30** may be all the same size and dropped fairly uniformly over the area of web **20** or may be of various sizes and dropped by scattering at random over the area of web **20**. In either case, the suede or velvet-like appearance of the pile, formed by the upstanding tips of the erect flock fibres **32** will contrast with the appearance of the clumps **30** in which the recumbent fibres are bunched, matted, felted or otherwise laid substantially horizontally rather than vertically.

Unlike the appearance and feel of an article such as a tufted bedspread or the like, it should be noted that the article produced by this invention is not only predominately pile and subordinately clump, but the clumps are formed of interlocked, intermingled short flock fibres. Such fibres are often microscopic in length for example, one thirty-second of an inch or smaller and resemble powder when dry. When partially embedded in a heat set adhesive, and after passing through the heat setting temperatures, the clumps **30** have a smooth, unnapped feel difficult to describe but not resembling the feel and appearance of ordinary fabrics known heretofore. They also have a lustre, especially when dyed, which differs from the lustre of the pile in that the fibres of the clumps are smoothed down and reflect light differently than do the close packed tips of the pile fibres.

As shown in Fig. 6 one embodiment of the product of this invention comprises the flocked fabric **50**, having a base fabric **51**, an adhesive coating or layer **52** which has been permanently set by heat, a multiplicity of erect flock fibres **53** forming a short pile over most of the area of the coating **52** and a plurality of areas of intermingled and interlocked fibrous clumps **54**. The fabric **50** not only presents a different appearance and texture from known fabrics, but is characterized by the fact that the clumps **54** will not fall out and are so firmly secured that they will remain on the fabric as long as the pile **53** so remains. In the embodiment shown, the clumps **54** vary in size, are scattered more or less at random and are preferably in a color contrasting to the color of the background formed by the fibres **53**.

Another embodiment of the product of the invention is shown in Fig. 7 wherein the fabric **60** includes a base fabric **61**, a heat set adhesive layer **62**, flock fibres **63** forming a strip of pile and clumps **64** forming a contrasting strip. Such a pattern may be obtained by providing spaced apertures in the screen **29**, across the web **20**, whereby aligned rows of closely spaced clumps are deposited and pile is formed only in the space between such rows.

In Fig. 8 an enlarged cross sectional view of a preferred type of fabric of this invention is shown. The clumps **30** are embedded in the adhesive coating **25** as far as, and usually further than, the lower tips of the pile fibres and the adhesive has set in and around the lower portions of the clumps to secure a tight hold on the clump. It is possible that the heat setting oven I bakes the fibres in the clump into a closely bonded mass, because they are wet upon entering the oven, but in any case there is little nap to the finished clumps and water does not tend to loosen the fibres of the clump or loosen the clump from the fabric.

It will be apparent that there are many other ornamental designs that can be achieved by various patterns of deposits of the uncolored or colored clumps such as **30** with relation to the pile fibres **32**. In fact it is possible to wholly cover a base fabric with such clumps or to permit areas of the base fabric to remain uncovered to add a third design element to the design.

For example, in Fig. 9, a material **70** is shown in which a lace like base fabric **71** is partially covered with spots

of adhesive according to a predetermined pattern and clumps **74** with a predetermined moisture content of about fifty percent are deposited on the spots of adhesive. As also shown in Fig. 9, the lace like fabric **71**, or any other sheet, web or article face, may be entirely covered with clumps of variegated colors such as at **76** and **77** to form a novel variegated design. No pile texture at all is used in the design of Fig. 9 and it will be obvious that the sheet or web such as at **71** may be flexible or of rigid material inasmuch as any suitable face or surface may be decorated in accordance with the invention by depositing wet clumps of flock fibres on an adhesive coating and then setting the adhesive.

The fibres in the clumps such as **30** tend to be initially parallel to each other since they are usually cut from multiple parallel strands of filament. When half wet the fibres may continue to be somewhat parallel and upon being deposited on the adhesive coating, tend to make a depression therein with the adhesive mushrooming up all around the base of the clump. In addition there is a wick-like action or capillary action whereby the adhesive is drawn up between and around the fibres of the clump as it is also drawn up and around each vertical flock fibre. This action is depicted in Fig. 8 to illustrate that the recumbent fibres which remain in the clumps after the heat setting operation are either firmly interlocked under other fibres of the clump, or have some portion thereof firmly bonded to the adhesive. The appearance and feel of the clumps is somewhat similar to the appearance and feel of brocade in that the upper face of the clump is slightly harsh or hard due to the embedding of some part of the upper fibres in the set adhesive.

The half wet, half dry clumps themselves are an article of manufacture which may be shipped in suitable humidity controlled containers for application to adhesive coated surfaces at remote points by converters.

I use the term "recumbent" to describe the position of the flock fibres in the above described clumps after the clumps have been deposited on the adhesive coating, binder material or the like, meaning thereby that the fibres are lying down rather than vertical and upstanding.

I use the term "half wet, half dry" to mean that the clumps are about midway between oven dry and 100% saturated, the moisture content thus being about fifty percent of the wet weight.

I claim:

1. A method of producing an improved flocked pile fabric which includes the steps of depositing a plurality of individual clumps of fibres, while wet, on a heat settable adhesively coated base fabric so that the lower portion of each said wet clump is firmly secured to the adhesive coating, with the fibres thereof adhered to each other solely by moisture and all substantially recumbent, then depositing pile forming flock fibres upon said adhesively coated and clump-carrying base fabric and causing said pile fibres to stand erectly on end in the areas thereof surrounding said wet clumps with said ends firmly secured to said adhesive coating and then removing any unsecured pile forming fibres from, and heat setting, said adhesive.

2. The method of making a patterned flocked pile fabric which comprises the steps of first forming a plurality of separate clumps, or bundles, of flock fibres of a predetermined range of sizes and a predetermined degree of bond; then depositing said clumps, or bundles, with the bonded flock fibres thereof in recumbent position and firmly secured lengthwise on a heat settable, adhesively coated base fabric in a predetermined pattern and then depositing pile forming fibres on said base fabric to complete said pattern prior to the distributing, erection and heat setting of said pile forming fibres thereon.

3. A method as specified in claim 2 wherein the step of forming said clumps, or bundles of fibres, includes the steps of first liquid dyeing said clumps to a color contrasting with the color of said pile forming fibres and then only about half drying said clumps to a predetermined moisture content of about fifty percent, said moisture providing said bond.

4. A method for ornamenting fabric with contrasting textured pattern portions which method comprises the steps of depositing a plurality of individual wet clumps of intermingled fibres in accordance with a predetermined design pattern on a heat settable, adhesively coated base fabric to secure a firm grip thereon with said fibres bonded to each other solely by moisture and position, then depositing a plurality of individual pile forming fibres on said base fabric; then causing the lower ends of said pile fibres to secure a firm grip on said adhesively coated fabric with the fibres erect thereabove in pile formation between and around said clumps and in accordance with said predetermined design pattern and then heat setting said adhesive to permanently bond said clumps and fibres to said fabric.

5. A continuous method for ornamenting fabric with designs of contrasting color and texture which method comprises the steps of depositing wet clumps of intermingled fibres on a moving web of heat settable, adhesively coated base fabric, in accordance with an ornamental pattern and with the fibres of the clump recumbent, then depositing pile forming flock fibres in a color contrasting to the color of said clumps, on said moving web of fabric to complete said ornamental pattern and then erecting said flock pile fibres to vertical pile position and heat setting said adhesive while on said moving web.

6. As a new article of manufacture, a fabric comprising a base material with a layer of binder material thereon and ornamented by a firmly secured design having contrasting portions, one portion of said design being formed by the tips of a multiplicity of upstanding, closely spaced flock fibres of suede or velvet-like texture, each having one end embedded in said binder material, and the remaining portion of said design being formed by a plurality of clumps of intermingled and interlocked recumbent fibres of smooth, unnapped brocade-like texture, each clump having its under fibres embedded lengthwise in said binder material.

7. An article of manufacture as specified in claim 6 wherein the said flock fibres predominate as to area in said design and are in a base color while said clumps of fibres are subordinate in said design and are in a color contrasting to said base color.

8. An article of manufacture as specified in claim 6 wherein said clumps of fibres are of various sizes and colors and scattered across the area occupied by said flock fibres to produce a random, variegated design.

9. An article of manufacture as specified in claim 6 wherein said clumps of fibres are closely spaced to each other in a stripe across said fabric and said clumps are of various colors to variegate said stripe.

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