June 27, 1972 V. P. RIORDAN 3,672,929

FLOCKED OPEN LOOPED PILE FABRIC AND METHOD OF MAKING SAME

Filed Dec. 10, 1970 2 Sheets-Sheet 1

FIG. 1

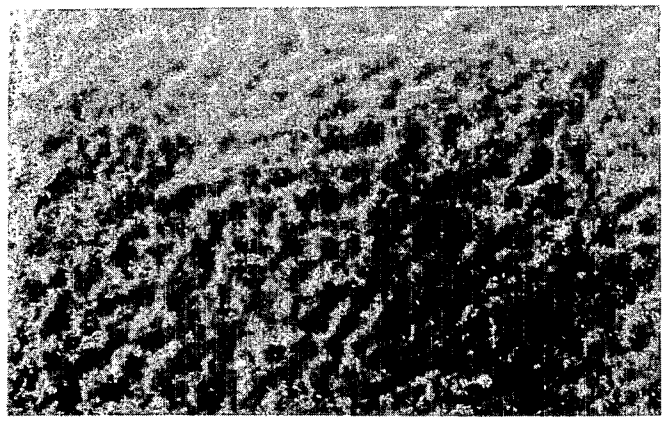
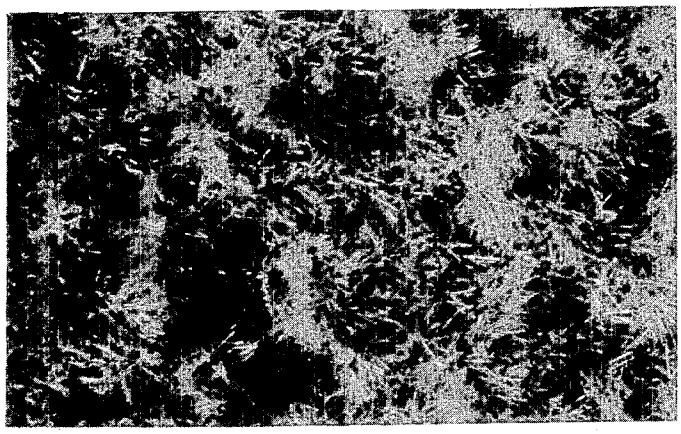


FIG. 2



June 27, 1972 V. P. RIORDAN 3,672,929

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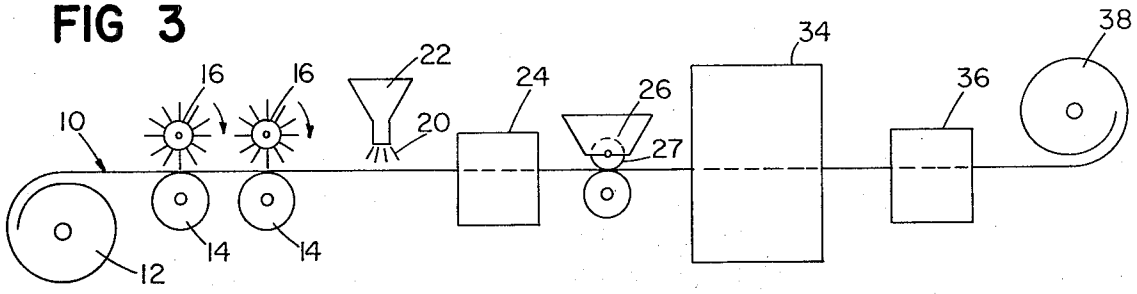
Filed Dec. 10, 1970 2 Sheets-Sheet 2

FIG 3



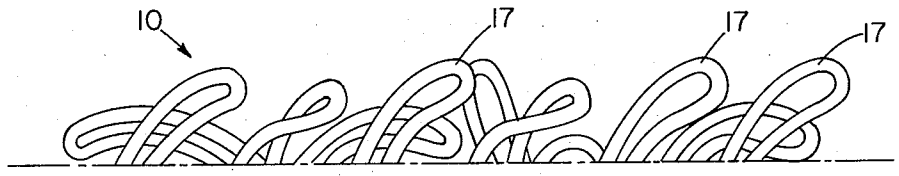


FIG 4

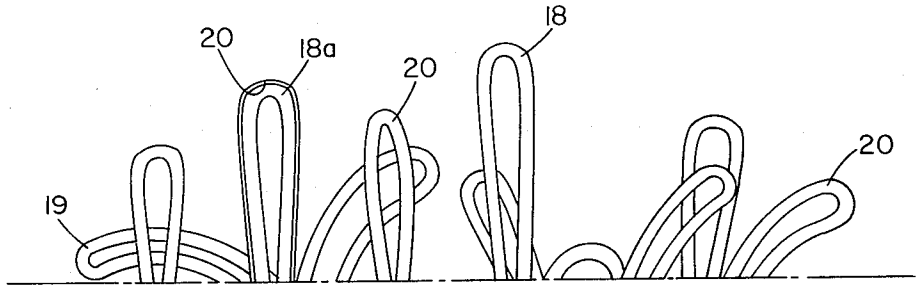


FIG 5

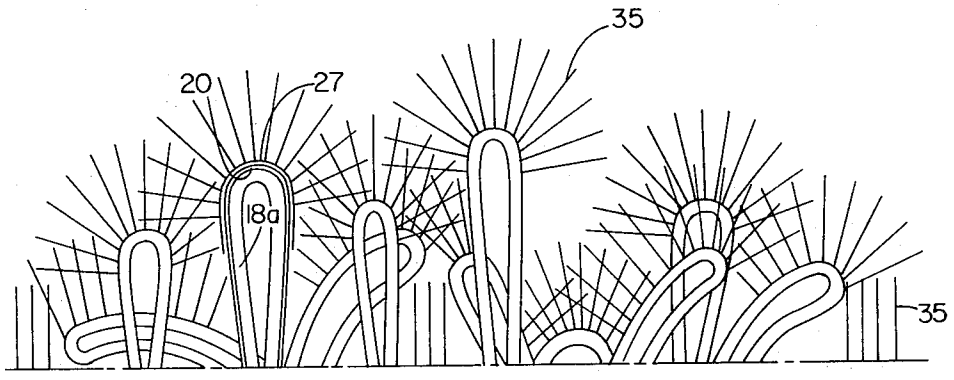


FIG 6

United States Patent Office 3,672,929 Patented June 27, 1972

3,672,929

FLOCKED OPEN LOOPED PILE FABRIC AND METHOD OF MAKING SAME

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Int. Cl. B44c 1/08; D06c 11/00
U.S. Cl. 117—25 8 Claims

ABSTRACT OF THE DISCLOSURE

A flocked fabric comprising an open looped pile fabric base having some loops permanently and substantially raised from the major surface of the base fabric, and flock fibers adhered to this fabric.

This invention relates to flocking.

Conventional flocked fabrics, consisting of tiny fibers adhered to a suitable backing, such as fabric, have usually had a brush-like appearance, attractive and useful for some purposes, but severely limiting the aesthetic possibilities for the fabrics. Applying adhesive in decorative patterns by conventional print rollers allows one to flock a backing in a preselected pattern, but large areas must remain unflocked. By passing the patterned flocked fabric through a flocking system again, one could apply another flock layer and perhaps substantially retain the pattern, but not in an overall flocked fabric. In addition to the additional equipment and time-consuming steps required for such operations, and the potentially unsatisfactory product that results when flocked is layered, the brush-like appearance still remains, however, regularly broken by the pattern.

An object of this invention is to provide novel, plush, decorative, and versatile flocked fabrics.

A further object is to provide novel and improved flocked fabrics particularly useful in carpeting, wall-coverings, upholstery, clothing (e.g., as lining or as simulated fur exterior) and the like, without the necessity of applying adhesive in predetermined patterns or flock in multiple layers.

The invention features a flocked fabric comprising an open looped pile fabric base having some loops permanently and substantially raised from the major surface of the base fabric, and flock fibers adhered to this fabric. The fabric base may be made by teasing an open-looped pile fabric to raise some but not all of the loops above their unteased height, setting the fabric while so teased, and thereafter adhering flock fibers to exposed surfaces of the fabric.

Such a flocked fabric has the plush and unique appearance of a plurality of flock-covered peaks, which may be randomly disposed across the fabric surface as well as of varying height, each peak formed of a fabric base (e.g., a teased, raised loop or loops) to which flock fibers are adhered, with the flock fibers oriented in a multiplicity of directions.

In a preferred embodiment, a terry-cloth fabric is teased to raise the loops; a curable (preferably, resilient) adhesive is sprayed on the fabric to set the fabric in a teased configuration; the fabric, thus set, is coated with a second curable adhesive; flock fibers are deposited onto the second adhesive; and, the adhesives are then cured.

Other objects, features and advantages will be apparent to those skilled in the art from the following description of a preferred embodiment of the invention, taken together with the attached drawings and photograph thereof, in which:

FIG. 1 is a photograph, approximately to scale, of a flocked fabric embodying the present invention;

FIG. 2 is another photograph of the flocked fabric of FIG. 1, at about 5 times magnification;

FIG. 3 is a schematic view of a process for preparing flocked fabrics according to this invention;

FIG. 4 is a schematic view of a portion of a starting fabric material useful for producing such flocked fabrics;

FIG. 5 is a schematic view of the fabric of FIG. 4, with some of its loops raised to a set, teased configuration; and,

FIG. 6 is a schematic view of the final flocked fabric produced from that of FIGS. 4 and 5.

Referring first to FIGS. 3–6, a base closed loop pile fabric **10**, such as terry-cloth, is fed a supply roll **12** over idle rollers **14** past a pair of reversely rotating stiff brushes **16**, the bristles of which "tease" the fabric **10** by engaging its loops **17** and raising some loops **18** off the surface, while leaving other loops **19** untouched, all in a random manner. Other loops, not shown, may tend to lie even flatter along the surface, as in conventional towel grade terry-cloth. A curable adhesive **20** (e.g., a conventional flocking adhesive such as the water base acrylic adhesive "Rohm & Haas E–269") by sprayer **22** onto the teased fabric clinging to and even somewhat impregnating the loops. The clinging adhesive is shown in exaggerated fashion in FIG. 5 on fiber **18***a* (it being understood that all fibers **18** are similarly coated). When the teased, adhesive coated fabric is then passed to drying oven **24**, the adhesive **20** is dried so as to set the fabric as shown in FIG. 5, with the teased loops **18** permanently set in the teased configuration.

The fabric is then passed under adhesive applicator roller **26**, which applies a second curable conventional flocking adhesive **27** (which may be identical to adhesive **20**, except more viscous), preferably in a "broken" form onto the surface of the teased, set fabric, i.e., onto substantially all the exposed surfaces of both the raised loops and the base of the fabric (again, only fiber **18***a* being illustratively shown with an adhesive layer **27**). The adhesive **27** should not contain any solvents for the cured adhesive **20**. The fabric, coated with discrete, closely spaced amounts of adhesive (so as to retain flexibility in the ultimate flocked fabric while achieving overall flock coverage) is then directed into a conventional electrostatic flocking apparatus **34**, such as of the type described in U.S. Pat. No. 2,992,126, "Flocking Machine and Method." In such a device, flock fibers are deposited from a supply above the fabric, onto the fabric, all the while applying an electrostatic field across the fabric (with lines of force generally in the direction of flock travel to the fabric). Flock fibers **35** (e.g., of nylon) will be secured in apparatus **34** to the adhesive, as shown in FIG. 6. The flocked fabric is then passed to oven **36**, wherein the adhesives **20** and **27** are cured, and may be recovered on take-up roller **38**.

The resultant flocked fabric, as shown schematically in FIG. 6, and photographically in FIGS. 1 and 2, has a plush, irregular surface having randomly located peaks or ridges, of varying heights, all flock covered, with the lower fabric areas between the peaks also covered with flock fibers. Thus the flock fibers not only terminate at various heights above the bare fabric, but are oriented in substantially all possible directions (shown particularly in FIG. 2), in marked contrast to the stiff, brush-like appearance of conventional flocked fabrics. The looped fabric having been preset in the teased conformation, the resultant flocked fabric will retain the plush surface, resiliently returning to the preset shape whenever a temporarily flattening pressure (e.g., such as may be applied during application of adhesive **27**) is removed.

Any conventional flocking adhesives may be used for both adhesive coatings, including acrylic, vinyl, and urethane adhesives. An adhesive combination in which the first applied adhesive is merely a diluted version of the

later applied adhesive is particularly preferred. Similarly, any pile fabric having closed loops is useful, so long as it is sufficiently loosely woven so as to allow some loops to be raised from the base fabric surface when the fabric is teased, as by beating or brushing, without damaging the integrity of the base fabric or breaking a great number of the loops. The adhesive applied may be chosen to stiffen the limp base fabric as desired, in accordance with the ultimate use to be made of the fabric, and, as well, will tend to strengthen the fabric. Towel-grade terry-cloth provides an inexpensive, teasable fabric base for a variety of flocked fabrics, and may be resiliently set in teased conformation to provide a soft, comfortable lining-type fabric, or more rigidly set to provide wall covering-type fabrics. The flocked fabric may also be laminated or otherwise secured on its non-flocked side, in the conventional manner, to suitable reinforcing substrates such as textiles, paper, synthetic foam (polyurethane, e.g.) and the like.

Both natural and synthetic flock fibers may be used, depending on the effect desired, the denier, length, and thickness being similarly dependent.

Other embodiments will occur to those skilled in the art and are within the following claims.

What is claimed is:

1. A method for making a flocked fabric comprising the steps of teasing an open-looped pile fabric to raise some but not all of the loops above their unteased height,

setting said fabric while so teased,

and thereafter adhering flock fibers to exposed surfaces of said fabric.

2. The method of claim 1 wherein said fabric is set by spraying a curable adhesive onto said fabric, while so teased.

3. The method of claim 2 wherein said set fabric is coated with a second curable adhesive, said flock fibers are deposited onto said coated fabric, and said second adhesive is cured to adhere said flock fibers.

4. The method of claim 2 wherein said adhesive is resilient.

5. The method of claim 1 wherein said pile fabric is terry-cloth.

6. A flocked fabric comprising an open looped pile fabric base having some loops permanently and substantially raised from the major surface of said base fabric, and flock fibers adhered to the loops of said fabric.

7. The flocked fabric of claim 6 wherein said fabric base is terry-cloth.

8. The flocked fabric of claim 6 wherein said loops are coated with cured adhesive to permanently set said loops in a raised position.

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U.S. Cl. X.R.

117—29, 33; 156—279; 161—64