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W. THAL
PILE FABRICS

3,171,484

Original Filed Nov. 18, 1959

FIG. 1

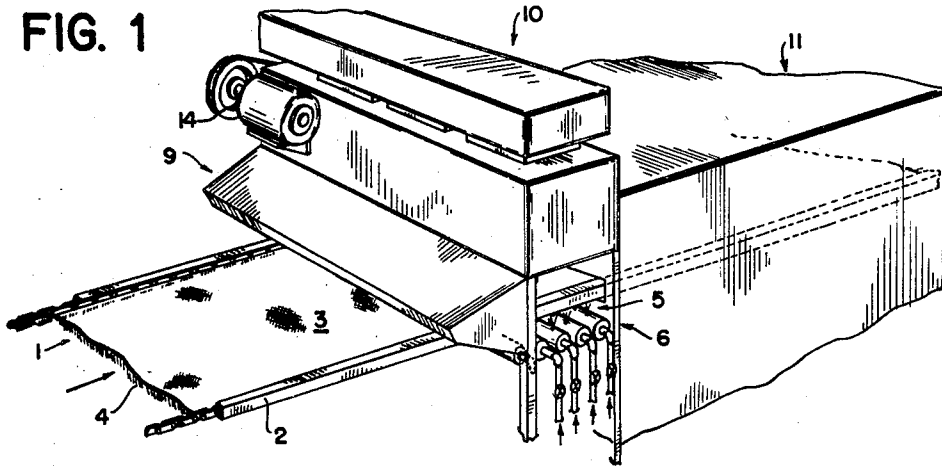


FIG. 2



FIG. 3

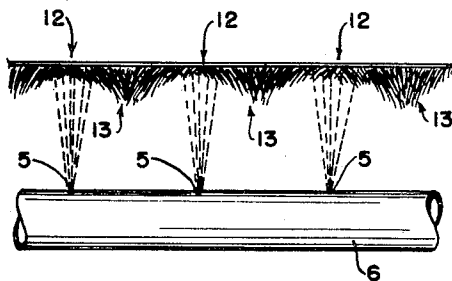
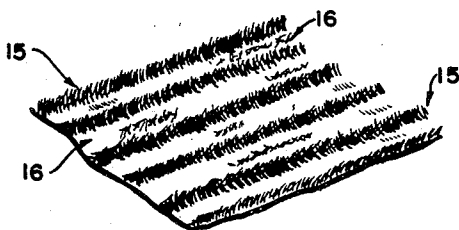


FIG. 4



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PILE FABRICS

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Original application Nov. 18, 1959, Ser. No. 853,947, now
Patent No. 3,010,179, dated Nov. 28, 1961. Divided
and this application Nov. 16, 1961, Ser. No. 152,870
3 Claims. (Cl. 161—63)

This invention relates to improvements in pile fabrics.

More particularly stated, the invention relates not only to the random dispersion throughout the pile of the fabric of synthetic fibers having differing denier and deorientation characteristics, but also relates to the use of fluids to deflect and deorient pile fibers in preselected patterns.

It is the object of this invention to provide a pile fabric having novel characteristics as to appearance and durability.

A special feature of the invention is the production of an artificial fur that has fibers whose characteristics as to position, deorientation, length and color resemble those of natural fur and attached patterns of natural pelts.

This application is a division of my co-pending application Serial No. 853,947, filed November 18, 1959 now Patent No. 3,010,179, dated November 28, 1961.

It is well-known that pile fibers simulating natural fur can be produced through the use of fibers having different deniers, lengths and shrinkage characteristics. The use of heat treating chambers to deorient and shrink synthetic fibers is also old. One example of such a heat chamber is disclosed in U.S. Patent No. 2,815,558 to Bartovics et al., issued December 10, 1957.

The production of an artificial fur pile fabric having the highest commercial value requires that the fabric have a pattern simulating the hair arrangement on a natural pelt and specifically simulating the darker color and convergent deflection of the hairs that grow along the back bone of the fur bearing animal (known as the "grutzen") and simulating the lighter color hairs that grow on the under side of the animal (known as the "bellies" or "sides" of the pelt). It also must have a pattern simulating an arrangement of attached natural pelts as used for example in the making of fur garments. Prior to my invention, this much sought-after patterned effect was produced by printing or hand dyeing of the fibers. Fabrics so produced have obvious drawbacks, such as non-permanence of the dyes and poor lustre qualities. In addition, these fabrics do not have the proper fiber deflection necessary accurately to simulate the pattern of attached natural pelts.

I have discovered a new and useful pile fabric, which simulates the arrangement of natural pelts thus having characteristics of fiber deflection and color heretofore unknown in the pile fabric art. My novel fabric and a preferred method of producing it is illustrated in the drawings.

FIG. 1 shows a diagrammatic view of the heat treatment apparatus known as high-low unit used in the manufacture of pile fabrics in accordance with this invention;

FIG. 2 is a sectional view of the to-be-treated pile fabric as it appeared before treatment;

FIG. 3 is a sectional view of the pile fabric during heat treatment in accordance with this invention; and

FIG. 4 shows a finished pile fabric having a pattern which resembles attached natural pelts.

These objects and others are achieved, as will be apparent from the following description as read with the accompanying drawings, by weaving or knitting synthetic or other fibers to form a pile fabric. When synthetic fibers are used in accord with this invention they are manufactured with a molecular arrangement such that subsequent heat treatment causes substantial shrinkage

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and curling. Fibers of the varying denier and shrinkage quality are woven or knitted into a fabric in a random manner. Fibers that shrink in proportion to the intensity and the amount of heat to which they are subjected are also used. It is contemplated that fibers of various colors will be used.

After the fabric has been woven or knitted it is subjected to heat treating to "set" the back; it is napped and polished and then sheared. It is then heat treated to form a dual pile fabric or guard hair fabric having short fibers 7 and long fibers 8 which resemble the underfur and the guard hairs of natural fur.

This guard hair fabric is then carried into the high-low unit for the further treatment which produces the novel effect which is the essential part of my invention.

FIG. 1 shows diagrammatically the fabric 1 horizontally mounted on a material carrying or "tenter" frame 2 with the base or mat of the fabric 3 facing upward and the face or pile 4 facing downward. The material carrying frame is then passed over a plurality of rows of jets 5 located in cylindrical headers 6 whose axes are perpendicular to the direction of passage of the frame.

A hot fluid such as dry steam is introduced by pressure into the cylindrical headers 6 and flows through the jets and impinges on the pile 4 of the passing fabric. The jets are designed and arranged in the headers in such a manner that the impingement of the fluid on the fabric is substantially limited to a plurality of rows running parallel with a direction of passage of the frame.

It will be understood that dry steam is merely one of the acceptable fluids for use in the described heat treatment. Temperatures of about 335° F. are contemplated when dry steam is used. Temperatures and the rate of heating may be controlled by ventilation of the hood 9 through the use of the ventilator duct system 10, and the exhaust blower motor 14 as shown in FIG. 1.

After the fabric passes out of the fluid treatment area it enters a heated chamber 11 where it is dried and set.

FIG. 3 shows a section cut perpendicular to the direction of a passage of the frame during the fluid treatment and illustrates the additional shrinkage and deorientation of the fibers during this final treatment as caused by the heat, rate of temperature change, and other influences to which the fabric is subjected during the treatment and drying. It further illustrates the deflection of the fibers due to the kinetic forces. The rows of fibers 12 that are subjected to the direct flow of fluid from the jet shrink to a greater degree than the adjacent fibers. The long fibers in these adjacent areas are deflected as shown at 13.

FIG. 4 shows a plan view of a preferred embodiment of my invention which is an artificial fur which has a pattern that resembles attached natural pelts. The "grutzen" 15 and the "sides" or "bellies" 16 are shown.

One method of producing the fabric of my present invention is described in the following example.

Example

A sliver consisting of 65% of a high shrinkage 3-denier Orlon or dynel and 35% of 16-denier non-crimp verel is used to make up the pile of a pile fiber having a knitted base comprised approximately of one half 16/1 dynel and one half 16/1 cotton. The verel is a dark shade of brown while the Orlon or dynel is a lighter shade of brown.

The base or back of this pile fiber is then subjected to temperatures of about 280° F. to "set" the back and give it more rigidity and strength.

The face of the fabric is brushed or napped and then sheared. The face is then heat treated at about 270°–280° F. During this heat treatment the Orlon or dynel fiber shrink to form the short pile hairs while the verel fibers do not shrink thus forming the guard hairs. At

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this stage of the process, the fabric is known as a guard hair fabric or dual pile fabric. A section of the fabric at this stage is shown in FIG. 2.

The succeeding steps in the process convert the guard hair fabric into a new and useful fabric heretofore unknown to the art.

The guard hair fabric is carried through a high-low unit (FIG. 1) on a tenter frame 2. Dry steam under about 100 p.s.i. escapes through steam holes 5 in the headers 6 and impinges on the face of the fabric. The steam is essentially dry, however some water condensation occurs on the fabric especially in the areas directly opposite the steam holes. This limited condensation along with the higher temperatures causes additional deorientation and shrinkage of the fibers. The kinetic impingement of the steam causes a patterned deflection of the fibers.

The tenter frame then carries the fabric on into a drying chamber in tandem with stream-jet section of the high-low unit where the fibers are "set" and dried.

The pile fabric is then finished by polishing. This finished product has a remarkable fur-like appearance. When the Orlon or dynel and the verel of proper colors are used the fabric has the appearance of attached natural pelts of mink. The darker color of the "grutzen" and the lighter color of the "bellies" or "sides" that is characteristic of a natural mink pelt are closely simulated. This fabric is particularly suited for use in making garments.

It is understood that the fabric of this invention may be produced by other methods which would occur to one skilled in the pile fabric art. Variations in my novel pile fabric that would be obvious to the skilled artisan may be made without departing from the scope and spirit of my invention as defined by the following claims.

I claim:

1. A pile fabric simulating the appearance and texture of attached fur pelts comprising a base and pile fibers protruding therefrom, the pile fibers differing in length, denier, color and curl, said pile fibers being

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randomly dispersed throughout said fabric, localized areas of the pile having the pile fibers inclined towards one another in opposite directions forming distinct lineal rows in the pile, the height of the pile in said localized linear rows being greater than the height of the pile in areas intermediate said localized lineal rows.

2. A pile fabric simulating a plurality of rows of attached natural fur pelts which pelts include both the backs and the sides comprising a pile face consisting of guard hair fibers and underfur fibers uniformly dispersed throughout the fabric, said face including a plurality of alternative long-fiber and short-fiber rows, said long-fiber rows having relatively longer guard hair fibers and relatively longer underfur fibers than said short-fiber rows, said fibers in each of said long-fiber rows being deflected and inclined toward the center of said rows whereby the back of the natural pelts are simulated, said short-fiber rows having relatively shorter guard hair fibers and relatively shorter underfur fibers than said long-fiber rows, and said fibers in each of said short-fiber rows being deflected and inclined away from the center portion of said rows whereby the sides of the natural fur pelts are simulated.

3. The fabric of claim 2 in which the guard hair fibers and the underfur fibers have different colors.

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