Dec. 19, 1961 A. F. McNALLY ET AL 3,013,325

FUR-EFFECT FABRIC AND METHOD OF MAKING SAME

Filed May 22, 1958 2 Sheets-Sheet 1

FIG. 1.

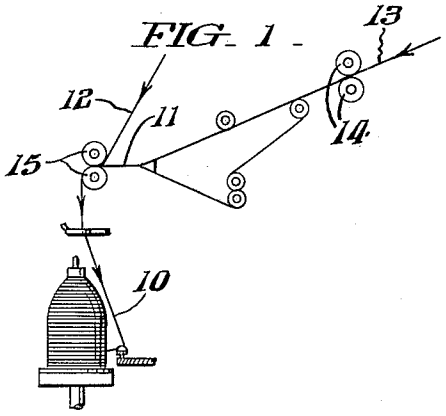


FIG. 3.

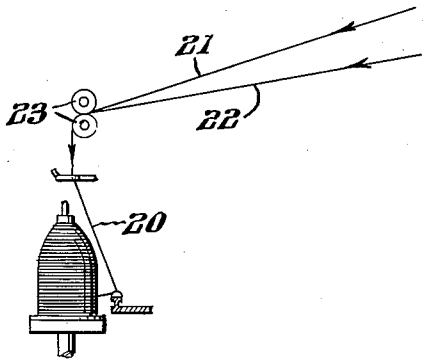


FIG. 2.



FIG. 4.



FIG. 5.

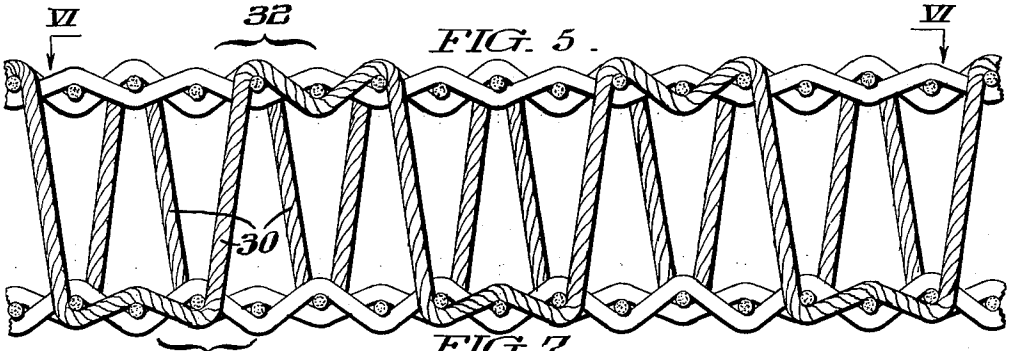


FIG. 7.

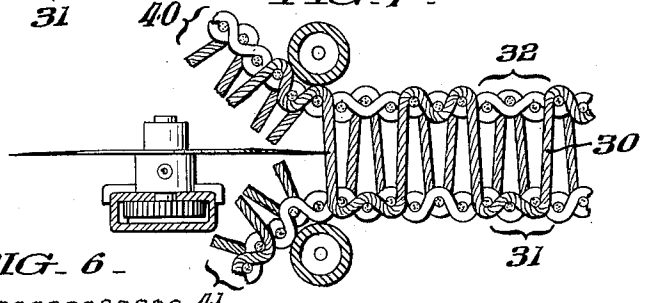
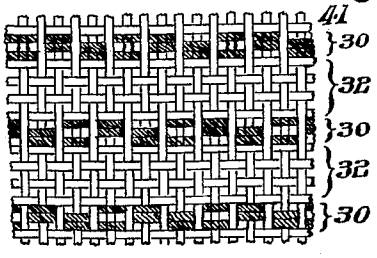


FIG. 6.



INVENTORS.
Arthur F. McNally &
BY William L. White,
Paul & Paul
ATTORNEYS.

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FIG. 8.

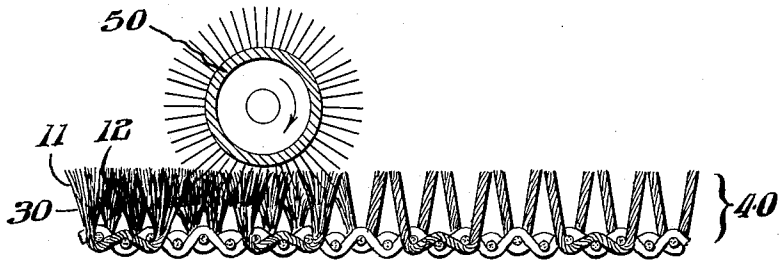


FIG. 9.

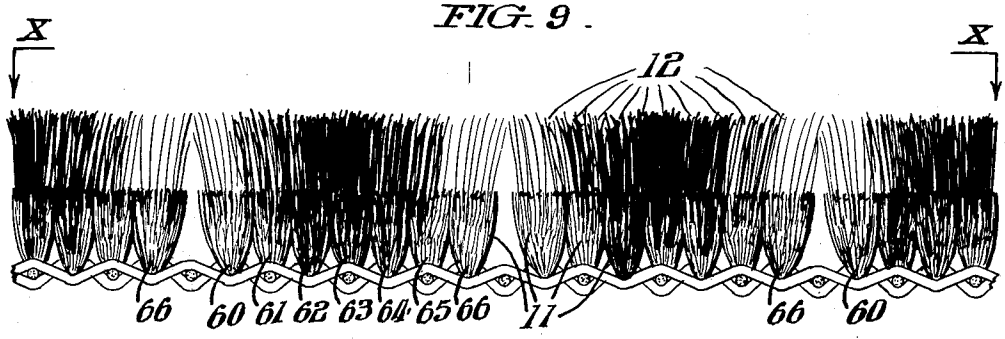
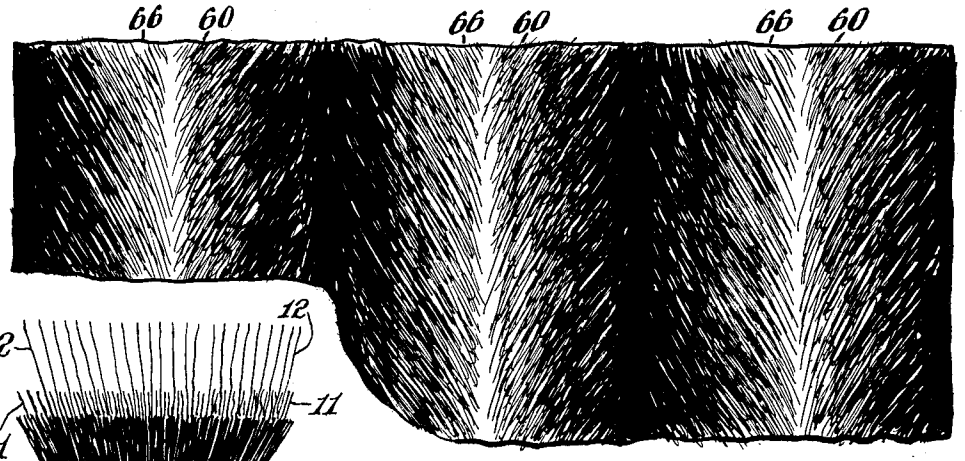


FIG. 10.



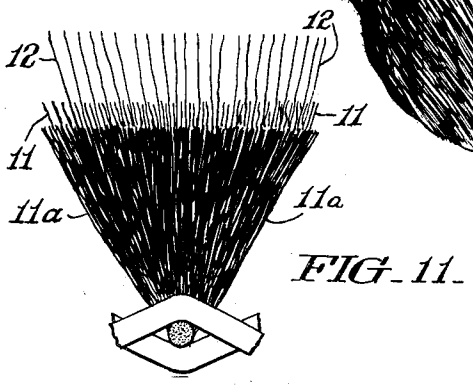


FIG. 11.

INVENTORS.
Arthur F. McNally &
BY William L. White,
Paul & Paul
ATTORNEYS.

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FUR-EFFECT FABRIC AND METHOD OF MAKING SAME

Arthur F. McNally, Larchmont, N.Y., and William L. White, Wynnewood, Pa.

Filed May 22, 1958, Ser. No. 737,097
9 Claims. (Cl. 28—72)

This invention relates to fur-effect fabrics made from textile yarns, and more particularly to fabrics which simulate natural furs and to a method for making such fabrics. Fabrics have been heretofore produced having a soft furry pile surface, which fabrics may be considered a substitute for natural furs. Such fabrics, however, have failed to simulate many natural furs, since they have normally provided only one face surface of substantially equal length pile fibers. It is the primary object of this invention to provide a woven fur-effect fabric from textile yarns which closely simulates natural furs by having a furry under-coating of fine fibers and coarser fibers extending beyond the under-coating in the manner of the beard hairs of a natural fur.

Many difficulties have been encountered in attempting to provide simulated beard hairs in a fur-effect fabric. In natural furs there are substantially two face surface levels. One is the lower level of the furry under-coat hairs and the other is the outer or upper level of the extended beard hairs. Great difficulty has been encountered in endeavoring to provide these two levels in fur-effect fabrics due to the impossibility of shearing the under-coat yarns to form one level without at the same time cutting the simulated beard hairs to the same length. It is accordingly a principal object of the present invention to provide a method of producing two substantially clearly defined levels of pile yarns in a fur-effect fabric.

Some fur effect fabrics having both the fine underbody and the high extending beard hairs have been produced by knitting, whereby a small card is attached to the knitting machine and fibers of different fineness and length are carded and engaged by the knitting needles and knitted into the backing yarns as the pile. This method produces essentially the beard hair effect of furs in this fabric. However, the inherent characteristics of a knitted fabric are such that these fibers are not adequately anchored in the backing and the fabric therefore has a very pronounced tendency to shed in normal wear. Principally, they do not have the fabric stability of a woven pile fabric.

Accordingly, it is another object of this invention to provide a woven fur-effect fabric and a method of making such a fabric.

The above objects and others, which will be apparent from the following description, are achieved by weaving a pile fabric in which the pile yarns are made up of combined shrinkable and non-shrinkable materials in such a way that the non-shrinkable material appears in the ultimate fur-effect fabric as beard hairs and the shrinkable materials corresponding to underpelt fur. The present invention is an improvement over the methods and fabrics disclosed in our pending patent application for Fur-Effect Fabrics and Method of Making Same, Serial No. 607,777 filed September 4, 1956, now Patent No. 2,857,652 which discloses certain applications of shrinkable and non-shrinkable yarns in a fur-effect fabric. In the present invention the pile yarns are formed by twisting or wrapping non-shrinkable filaments with high shrinkable yarns wherein the highly shrinkable yarns are formed of blends of fibers which will be hereinafter more fully described.

Throughout this specification the terms non-shrinkable and highly shrinkable will be used to describe the various yarns and materials employed. It is to be understood that the use of the term non-shrinkable does not imply that there is no shrinkage whatever in the materials used but rather that there is inconsiderable shrinkage in comparision to the shrinkage characteristics of the highly shrinkable materials.

In describing the preferred embodiment of the invention illustrated in the drawing, specific terminology will be resorted to for the sake of clarity. However, it is not the intention to be limited to the specific terms so selected.

The invention is illustrated in the drawings of which

FIGURE 1 is a diagrammatic view showing the formation of a pile yarn made according to the invention by wrapping highly shrinkable yarns about a core yarn of non-shrinkable material;

FIGURE 2 is a side view partially cut away and greatly enlarged of a pile yarn produced by the wrapping method of FIGURE 1;

FIGURE 3 is a diagrammatic view illustrating the formation of a pile yarn according to the invention made by twisting;

FIGURE 4 is a side view partially cut away and greatly enlarged showing the yarn made by the method of FIGURE 3;

FIGURE 5 is a schematic view showing a double woven fabric using the pile yarn of FIGURE 2;

FIGURE 6 is a partial plan view along the line VI—VI of FIGURE 5;

FIGURE 7 is a schematic view showing the double woven fabric of FIGURE 5 being cut to form two pile fabrics;

FIGURE 8 is a side elevational view in section showing the cut pile fabric of FIGURE 7 being treated in a finishing operation to open the pile yarns;

FIGURE 9 is a side elevational view of the fabric of FIGURE 8 after it has been subjected to a shrinking treatment;

FIGURE 10 is a plan view of the fabric of FIGURE 9 along the line X—X; and

FIG. 11 is an enlarged view of a portion of the fabric of FIG. 9 illustrating two types of shrinkable fibres in the underpelt simulating yarns.

The pile yarn **10** shown in FIGURE 2 is formed by wrapping yarn **11** formed of a blend of highly shrinkable fibers, about one or more core monofilaments **12**. As shown in FIGURE 1, a roving **13** of highly shrinkable fibers is fed to back rolls **14** and thence to front rolls **15** being drafted between the back and front rolls. The core filament **12** is fed to the front rolls **15** and is covered with the high shrinking yarn **11** to form pile yarn **10**. The resultant yarn **10** thus comprises a core of monofilament non-shrinkable yarns substantially surrounded by highly shrinkable yarns **11**.

FIGURE 4 illustrates a pile yarn **20** made according to the invention by twisting a highly shrinkable yarn **21** with one or more monofilaments **22**. As shown in FIGURE 3 the highly shrinkable yarn **21** and monofilaments **22** are spun together in rolls **23** to form pile yarn **20**.

The pile yarn of either FIGURE 2 or FIGURE 4 may be employed as a pile yarn in a woven fabric as shown in FIGURE 5. There the pile yarn **30** is shown woven in a W-weave. The pile yarn **30** is woven in a double woven fabric with backings **31** and **32**. In FIGURE 6 the positioning of the pile yarns **30** in the backing **32** is illustrated. It will be noted that the pile yarns **30** are spaced at substantial intervals within the backing **32** and are thus anchored and held in place. FIGURE 7 shows the double woven fabric of FIGURE 5 being cut through the pile yarns **30** to form two separate cut pile fabrics **40** and **41**.

In FIGURE 8 a fabric **40** is shown being subjected to a "tigering" operation to open up the pile yarns **30**. As the fabric **40** passes under the tiger **50** the component yarns **11** and filaments **12** are separated. Then the fabric **40** is subjected to a shrinking treatment causing the highly shrinkable yarns **11** to shrink thereby forming two distinct fur layers in the pile as shown in FIGURE 9. The monofilaments **12** being substantially non-shrinkable remain at their original length. The highly shrinkable yarns **11**, having the same shrinkage characteristics throughout, shrink to a substantially uniform level forming an underpelt layer.

Following the shrinking treatment the fabric **40** is given a special fur-finishing treatment to produce a furry effect. This may be accomplished with fur-finishing machines such as are shown in U.S. Letters Patent Nos. 1,604,523, M. H. Kronson, October 26, 1926 and 1,771,144, P. P. Ruhe et al., July 22, 1930, or the like. The effect of the finishing operation is shown in FIGURES 9 and 10.

The appearance of natural furs is simulated by the use of underpelt yarns **11** and beard hairs **12**. The effect is further heightened by simulating the pelt effect of a natural fur article. This is achieved by the elimination of pile ends at fixed spaced apart points in the fabric corresponding to the lines along which natural pelts are joined. The concentration of beard hairs is further varied by providing a higher number of filaments **12** per pile yarn **10** between the spaced apart lines simulating the pelt joints. Thus pile yarn **60** may have three or four filaments **12**, yarns **61** may have four or five, yarns **62** and **63** as many as ten monofilaments per yarn. The concentration of monofilaments in yarns **64** and **65** is progressively decreased until yarn **66** which corresponds to yarn **60**. The visual effect and the feel of the fabric thus produced which is shown in FIGURE 10 very nearly simulates natural fur fabrics. In the yarns **10** or **20** described above, the monofilaments may vary from one to ten per yarn. The monofilaments themselves may vary between 15 and 80 denier. Where the pile yarns are omitted in the weave a braided twill weave is used in the backing.

In accordance with this invention the underpelt yarns may be composed of a blend of normally shrinking fibers and high-shrinking fibers. A typical preferred material is dynel. The high-shrinking fibers may be Type 63 dynel which is a synthetic textile material manufactured by Union Carbide and Carbon Chemicals Company having the following shrinkage characteristics when exposed for three minutes under slight tension at each of the temperatures listed:

Temperature, ° F.:	Shrinkage, percent
240	23
260	29
280	44
300	58

Both of the fibers used in the underpelt yarn must, of course, be shrinkable to a much higher degree than the monofilaments used in the beard hairs. However, within this category of shrinkable fibers are the normally shrinkable fibers of regular dynel and the exceptionally high shrinking fibers of Type 63 dynel. It will be understood that what we here refer to as normally shrinkable fibers of regular dynel have much higher shrinkage characteristics than the known shrinkable monofilaments.

The normally shrinkable fibers may be of regular dynel having the following shrinkage characteristics when exposed for three minutes under slight tension at each of the temperatures listed:

Temperature, ° F.:	Shrinkage, percent
240	1
260	3
280	18
300	35

The beard hair simulating filament may be of nylon. Where the nylon filament is pre-dyed the normal shrinkage is reduced and the difference in pile height between the beard hair simulating filaments and the underpelt yarns is increased.

The following are specific examples of yarns which have been made in accordance with the invention:

(1) A 2/51 WC yarn composed of one end of 1/30 WC underpelt yarn spun from a 2 hank roving of regular dynel and Type 63 dynel wrapped around one end of 40 denier nylon monofilament.

(2) A 3/66 WC yarn composed of one end of 1/30 WC underpelt yarn spun from a 2 hank roving of regular dynel and Type 63 dynel wrapped around two ends of 40 denier nylon monofilament.

(3) A 4/77 WC yarn composed of one end of 1/30 WC underpelt yarn spun from a 2 hank roving of regular dynel and Type 63 dynel wrapped around three ends of 40 denier nylon monofilament.

(4) A 2/51 WC yarn composed of one end of 1/30 WC underpelt yarn spun from a 2 hank roving of regular dynel and Type 63 dynel twisted with one end of 40 denier nylon monofilament.

(5) A 3/66 WC yarn composed of one end of 1/30 WC underpelt yarn spun from a 2 hank roving of regular dynel and Type 63 dynel twisted with two ends of 40 denier nylon monofilament.

(6) A 4/77 WC yarn composed of one end of 1/30 WC underpelt yarn spun from a 2 hank roving of regular dynel and Type 63 dynel twisted with three ends of 40 denier nylon monofilament.

In the underpelt yarns the blend of high shrinking and normally shrinking yarns may vary from 50% of each to 100% of either depending upon the effect desired in the finished fabric. The denier of the fibers in the underpelt yarns preferably is within the range of one to three denier. The utilization of both high shrinking and normally shrinking yarns in the underpelt yarns is illustrated in FIG. 11 wherein the beard hairs **12** are shown extended above the underpelt formed of normally shrinking yarns **11** and high shrinking yarns **11***a*.

The result obtained herein by the use of a double woven pile fabric may be substantially achieved by weaving a looped pile fabric and cutting the loops in a conventional manner. However, when a single woven fabric is used the pile surface should be sheared to insure a completely uniform pile surface before shrinking.

While in accordance with the provisions of the statutes, we have illustrated and described the best form of embodiment of our invention now known to us it will be apparent to those skilled in the art that changes may be made in the form described without departing from the spirit and scope of the invention, as set forth in the appended claims, and that in some cases certain features of our invention may be used to advantage without a corresponding use of other features.

What is claimed is:

1. A method of making a fur-effect fabric comprising forming shrinkable yarns by spinning together highly shrinkable and normally shrinkable fibers, wrapping the said shrinkable yarns about non-shrinkable filaments, weaving the resultant yarn as the pile yarn in a woven fabric, cutting the pile yarns to form a substantially uniform cut pile surface, opening the pile yarns, subjecting the fabric to a shrinking treatment to shrink the shrinkable yarns thereby forming two substantially uniform pile surfaces and then subjecting the pile surface to a fur-finishing operation to produce a furry appearance in the pile.

2. A method of making a fur-effect fabric comprising forming shrinkable yarns by spinning together highly shrinkable and normally shrinkable fibers, twisting the said shrinkable yarns with non-shrinkable filaments, weaving the resultant yarn as the pile yarn in a woven fabric, cutting the pile yarns to form a substantially uniform

cut pile surface, opening the pile yarns, subjecting the fabric to a shrinking treatment to shrink the shrinkable yarns thereby forming two substantially uniform pile surfaces and then subjecting the pile surface to a fur-finishing operation to produce a furry appearance in the pile.

3. In a woven fur-effect fabric pile yarns each comprising one end of yarn spun from regular dynel and Type 63 dynel twisted with at least one end of nylon monofilament of between 15 and 80 denier.

4. The invention of claim 3 wherein the proportions of regular dynel and Type 63 dynel are beween 50% of each and 100% of either.

5. In a woven fur-effect fabric pile yarns each comprising one end of yarn spun from a two hank roving of regular dynel and Type 63 dynel wrapped around at least one end of nylon monofilament of between 15 and 80 denier.

6. The invention of claim 5 wherein the proportions of regular dynel and Type 63 dynel are between 50% of each and 100% of either.

7. A woven fur effect fabric comprising pile yarns, each of said pile yarns being formed of non-shrinkable filaments and shrinkable fibers wrapped about said filaments wherein the number of filaments per yarn varies from 1 to 10 within said fabric.

8. A method of making a fur effect fabric comprising weaving a yarn composed of shrinkable fibers and non-shrinkable filaments as the pile yarn in a pile fabric, said pile yarn being woven into the fabric at predetermined spaced-apart points in the fabric, opening the pile

yarns, shrinking the shrinkable fibers in the pile yarns and finishing the pile yarns to produce a furry effect in the pile face, the number of non-shrinkable filaments in each of the pile yarns being varied in the following manner: a small number of filaments per yarn in the pile yarn nearest said spaced-apart points and a large number of filaments per yarn in the places remote from said spaced-apart points.

9. A method of making a fur effect fabric comprising weaving a yarn composed of shrinkable fibers and non-shrinkable filaments as the pile yarn in a pile fabric, said pile yarns being woven into the fabric at predetermined spaced-apart points in the fabric, said pile yarns being spaced at intervals corresponding to the width of a natural fur pelt and a braided twill weave being woven into the fabric at said spaced apart points, opening the pile yarns, shrinking the shrinkable fibers in the pile yarns and finishing the pile yarns to produce a furry effect in the pile face.

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