March 15, 1938. E. F. CASTLES 2,110,866

PILE FABRIC AND ITS METHOD OF MANUFACTURE

Filed Aug. 21, 1936

FIG. I.

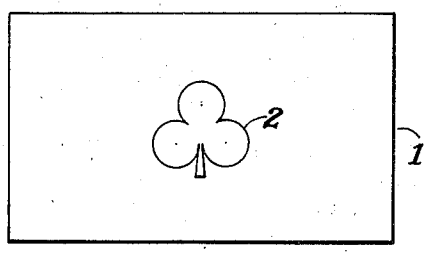


FIG. II.

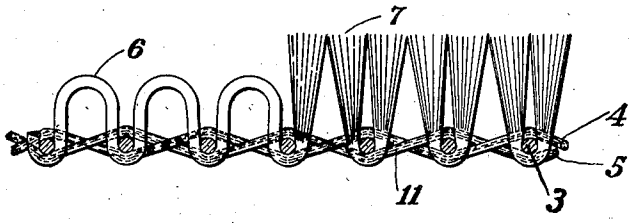


FIG. III.

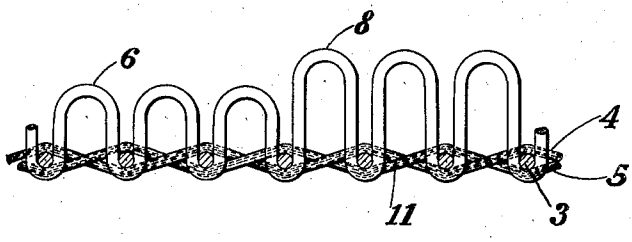
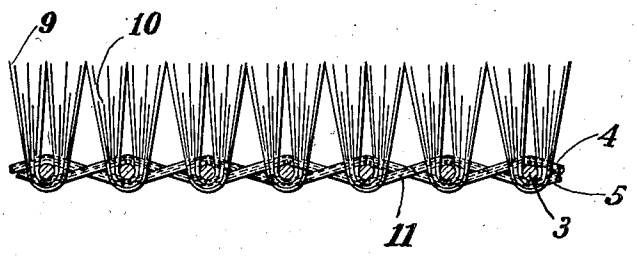


FIG. IV.



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UNITED STATES PATENT OFFICE

2,110,866

PILE FABRIC AND ITS METHOD OF MANUFACTURE

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Application August 21, 1936, Serial No. 97,189

11 Claims. (Cl. 28—1)

My invention is directed to novel textile pile fabrics preferably fabricated by weaving yarns of a single or various textile fibers and to the process for producing the same.

More particularly this invention relates to a method of producing pile fabrics for upholstery and decorative use having pile of a plurality of heights, part or all of which pile may be what is commonly termed "cut pile" in the weaving art. It is sometimes desirable because of visual and wearing characteristics of such fabrics that the height of the cut pile be greater than that of the uncut pile or loops.

I may also produce simulations of natural pelts by the processes hereinafter more fully set forth.

It is within the scope of the present invention to fabricate and process fabrics which comprise pile yarns of a single textile fiber or of blends of textile fibers. These fibers may include wool, mohair, cotton, silk as well as artificial or natural animal or vegetable fibers which have the desired shrinking or dyeing qualities and which may be used to advantage alone or in combination with other fibers.

An object of my invention is to produce a pile fabric having a plurality of heights of pile tufts or fibers in the finished article.

It is a further object of my invention to produce pile fabrics having cut and uncut pile, the cut pile being of greater height than the uncut and to effect such difference in pile height by local treatment of the face side of the fabricated piece.

Further objects and advantages will be manifest from the following description, claims and drawing, wherein;

Fig. I illustrates a top view of a fabric dyed with a single dye solution, and having a design of cut pile therein.

Fig. II illustrates diagrammatically the interlacing of threads in both the figure and field of the fabric shown in Fig. I.

Fig. III illustrates diagrammatically a loop pile fabric produced from a fabric woven with a uniform pile height.

Fig. IV illustrates a simulation of an animal pelt with the backing yarns impregnated to give the fabric qualities closely resembling that of skins of animals.

In carrying my invention into practice, the particular treating agents selected for my process is of course governed by the character of the fabrics and fibers being treated. My preferred practice is to treat a fabricated pile structure but in some instances the yarns or fibers subsequently used for intimately blended yarns may be treated before the blending operation and/or fabrication is complete.

One method which may be used in the practice of this invention is to weave a uniform uncut pile fabric consisting of mohair or wool pile yarns and a cotton backing and subsequently to impregnate predetermined areas of the pile portion thereof with a paste made by mixing 50 parts of dry calcium thiocyanate with 50 parts of water and 30 of a 2% carob gum aqueous dispersion. The paste may be applied by means of a print roller and after application of the paste, the fabric is steamed for 5 minutes at 212° F., washed and then dried. Altho I have indicated the use of a print roller, I contemplate that screen, stencil or block printing may be used if desired.

The fabric treated in the manner above described will now have uncut pile loops of different heights as indicated in Fig. III of the drawing, as the treatment of the wool or mohair pile will result in a shrinkage of approximately 50% of the height of the pile in the area on which the paste has been applied. The words "substantial shrinkage", as used in the claims, are intended to mean sufficient shrinkage to produce fabric patterns because of the visually apparent differences in the height of the fibers, tufts, or loops. It is to be understood that 50% is not a critical percent of shrinkage for producing these results. If the fabric has been previously dyed, it may be immediately used for furniture or other upholstery use or if the treatment was performed on a fabric in the grey, it will be subsequently dyed before use.

Pile fabrics having both cut and uncut pile (Figs. I and II) on their face may be produced according to this invention in contrasting shades of the same color with a single dye because the visual effect of dyed cut and uncut pile is materially different. This difference is accentuated by having the cut pile of greater height than the uncut. To accomplish this result, it has been a prior practice to weave the pile fabric on a wire loom and to use pile wires of different heights. This prior method is both expensive and restricted in its scope because of the limited number of patterns that can be woven by this method. I overcome the disadvantage of this and other prior practices and produce a fabric of any desired figuration by weaving an uncut pile fabric of uniform pile height, (thus avoiding complicated shedding and wire arrangements) treating the fabric as above described and subsequently shearing the face side of the fabric. The untreated pile area will retain substantially its original

height and the tips of these pile loops can be sheared by a shear or cutter without injuring the shorter pile loops. After shearing, the cut pile tuft will be of greater height than the uncut loop. The fabric may be yarn dyed, yarn printed, dyed in the piece or dyed subsequently to the shrinking or shearing operation. The amount of shrinkage may be varied by modifying the treatment of the pile fibers and a single fabric may comprise the different modifications illustrated.

Simultations of natural animal pelts may be produced by using a yarn blended from two or more fibers, cotton and mohair for example. The fibers of the pile yarns are intimately blended during the yarn preparation and if the fabric be woven on the double plus principle and cut on the loom, a long cut pile fabric of uniform pile height may be woven. The uniform application of a paste prepared as described above and subsequent washing and drying of the fabric or the immersion of the fabric in a suitable bath will result in the production of a cut pile fabric having some of its cut pile fibers shorter in length than others in much the same fashion as certain pelts. Tussah silk and mohair blended together will produce a similar result as the mohair will shrink approximately 50% and the silk will be unaffected. The blending is preferably done in a single soft twisted yarn rather than in a doubling operation. Attractive effects may be produced by union or cross dyeing if desired.

My invention is applicable to fabrics woven with loops, V-pile tufts or with W pile tufts interlaced with three or more backing threads. The backing may consist of cotton wefts **3** and warps **4** and **5**. The short treated loops are designated in the drawing at **6**, the cut pile at **7** and the untreated loops at **8**. The long fibers **9** (Fig. IV) are those unaffected by the shrinkage treatment, whereas short fibers **10** are the affected fibers. The backing threads and that portion of the loops or tufts which lie in the plane of the backing threads may be impregnated with a normally insoluble adhesive material such as latex. The adhesive may be applied to the backing through the back without destroying the textile appearance of the back of the fabric and without filling the interstices between the threads with adhesive material. The application of latex or the like prevents a run or pulling of a thread if a single loop be snagged, keeps the V pile from pushing out the back and gives to the simulated pelt flexing characteristics approaching that of the animal's skin. This latter result is obtained by applying a latex mix having a higher rubber content than is necessary or desirable in the other modifications illustrated. The latex or other adhesive is in all cases confined to the backing portion of the fabric. The adhesive may be applied before or after the shrinking treatment.

In general, barium, lithium and ammonium thiocyanates may be substituted for calcium thiocyanate and used in the same manner with substantially the same results. Shrinking agents such as sodium and potassium hydroxide in a 15% solution may in some cases be used and the fabric or yarn subsequently rinsed in dilute acetic acid. Caution must be exercised if the latter two shrinking agents be employed, or injury to the pile fiber, particularly if it be wool or mohair, will result.

The above description is illustrative of applications of my invention which is restricted only by the scope of the claims.

Having described my invention, I claim:

1. The method of producing a pile fabric which comprises interlacing threads to form an uncut loop pile fabric, treating the fabric to effect shrinkage of some of the loops forming the pile portion of the fabric, and shearing off the tips of the unshrunk loops to form a fabric having cut pile tufts higher than the uncut loops.

2. The method of producing a pile fabric which comprises interlacing threads to form an uncut loop pile fabric, treating the fabric to effect shrinkage of some of the loops forming the pile portion of the fabric, shearing off the tips of the unshrunk loops to form a fabric having cut pile tufts higher than the uncut loops and impregnating an inner portion of the fabric without obliterating the textile appearance of either face of the fabric.

3. The method of producing a pile fabric containing mohair which comprises weaving threads to form an uncut loop pile fabric having a pile area of uniform fiber texture, locally treating the pile area to effect shrinkage of some of the loops forming the pile portion of the fabric and shearing off the tips of the unshrunk loops to form a fabric having cut tufts higher than the uncut loops.

4. The method of producing a pile fabric having a pile area of uniform fiber texture, which comprises weaving threads to form a loop pile fabric, locally treating the pile area to effect shrinkage of some of the loops forming the pile portion of the fabric and shearing off the tips of the unshrunk loops to form a fabric having cut tufts higher than the uncut loops.

5. The method of producing a pile fabric having a pile area of uniform fiber texture which comprises weaving threads to form an uncut loop pile fabric, locally treating the pile area to effect shrinkage of some of the loops forming the pile portion of the fabric, shearing off the tips of the unshrunk loops to form a fabric having cut tufts higher than the uncut loops and impregnating the fabric without obliterating the textile appearance of either face.

6. The method of producing a pile fabric having a pile area made with the same type of pile yarn throughout, which comprises interlacing threads to form a pile fabric and treating the pile area with a shrinking agent in a particular area to effect substantial shrinkage of pile fibers in the particular area treated.

7. The method of producing pile fabric having a pile area made with the same type of pile yarn throughout, which comprises interlacing pile threads with backing threads to form a pile fabric, treating the pile area with a shrinking agent in a particular area to effect substantial shrinkage of the pile fibers in the particular area, and impregnating the back of the fabric with an adhesive to secure the pile fibers in position.

8. The method of producing a pile fabric having a pile area made with the same type of pile yarn throughout, which comprises weaving threads to form a pile fabric and treating the pile area with a shrinking agent in a particular area to effect shrinkage of the pile fibers in the particular area treated.

9. The method of producing a pile fabric having a pile area made with the same type of pile yarn throughout, which comprises weaving pile threads with backing threads to form a pile fabric, treating the pile area with a shrinkage agent in a particular area to effect substantial shrinkage of the pile fibers in the particular area,

and impregnating the backing threads with an adhesive to secure the pile fibers in position.

10. The method of producing a pile fabric having a loop pile area made with the same type of pile yarn throughout, which comprises weaving threads to form an uncut pile loop area and treating said uncut loop area with a shrinking agent in a particular area to effect substantial shrinkage of the pile loops in the particular area treated.

11. The method of producing a pile fabric having a loop pile area made with the same type of blended pile yarn throughout, which comprises weaving threads to form an uncut pile loop area and treating said uncut loop area with a shrinking agent in a particular area to effect substantial shrinking of the pile loops in the particular area treated.

EUGENE F. CASTLES.

DISCLAIMER

2,110,866.—*Eugene F. Castles*, Glen Ridge, N. J. PILE FABRIC AND ITS METHOD OF MANUFACTURE. Patent dated March 15, 1938. Disclaimer filed June 15, 1938, by the assignee, *Collins & Aikman Corporation.*

Hereby enters this disclaimer to claims 6, 7, 8, 9, 10, and 11 in said specification.

[*Official Gazette July 5, 1938.*]