

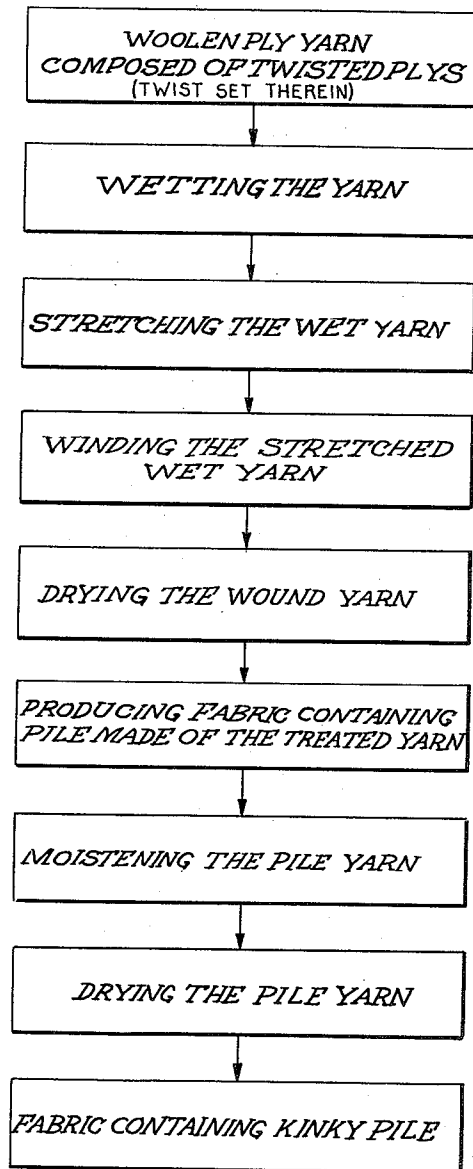
June 10, 1958

F. H. MULLER

2,837,809

PROCESS OF PRODUCING FABRIC CONTAINING KINKY WOOLEN PILE

Filed July 5, 1955



INVENTOR
Ferdinand H. Muller
BY *Ernest R. Joenen*
ATTORNEY

1

2,837,809

PROCESS OF PRODUCING FABRIC CONTAINING KINKY WOOLEN PILE

Ferdinand H. Muller, Roseland, N. J., assignor to Specialties Development Corporation, Belleville, N. J., a corporation of New Jersey

Application July 5, 1955, Serial No. 519,971

1 Claim. (Cl. 28—76)

The present invention relates to a pile fabric and, more particularly, to an improved fabric containing kinky woolen pile and a process of producing the same.

Accordingly, an object of the present invention is to provide a process of the foregoing character which is simple and economical.

Another object is to provide such a process which is applicable to a wide variety of fabrics.

Another object is to provide such a process wherein the pile can be made by weaving, tufting or knitting.

Another object is to provide such a process wherein the yarn is in a condition as the pile is made therefrom which does not interfere with the weaving, tufting or knitting operations.

A further object is to provide such a process which does not require highly specialized twisting of the yarn, complicated apparatus or large quantities of chemicals and the like.

A still further object is to provide a fabric produced by the foregoing process which has a pleasing and attractive appearance and is durable, even if subjected to rough usage.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the invention, the foregoing objects are accomplished by providing a process of producing a fabric containing kinky woolen pile, which process generally comprises wetting woolen ply yarn composed of twisted plies, stretching the yarn while wet at a tension equaling between 25% of its wet breaking strength and almost its wet breaking strength, winding the yarn while in its wet and stretched condition, drying the yarn so wound to set the stretch therein, making the pile contained in the fabric of the so treated yarn, and moistening the pile yarn. The fabric produced by such process contains woolen pile composed of twisted ply yarn which is kinky and resilient.

In the drawing:

The single figure is a flow sheet illustrating the steps in the process.

The present process can be practiced in connection with a wide variety of woolen ply yarns composed of from two to seven twisted plies, although more commonly such yarns are composed of two or three plies. The amount of twist in the yarn usually is varied with the size of the yarn but is within the range of so called hard twisted yarns which are produced by conventional twisters. For example, two ply woolen yarns, from 40 to 100 yards to the ounce, may be composed of plies each having a Z-twist of between about two and about five turns to the inch, and plied up with an S-twist of between about four and about twelve turns to the inch. It is also contemplated that the plies may have an S-twist

2

and be plied up with an S-twist or a Z-twist, and that the plies may have a Z-twist and be plied up with a Z-twist. The foregoing twist is set in the plied yarn in any suitable conventional manner.

Wetting of the yarn may be accomplished in any suitable manner for example by immersing hanks, cakes, cheeses or packages of yarn in an aqueous bath or steaming the same, or by continuously passing one or more lengths of the yarn through the bath or an atmosphere of steam. The bath may have any desired temperature between the freezing point and the boiling point of water, but best results are obtained in thoroughly wetting the yarn by maintaining the temperature of the bath between about 120° F. and just below its boiling point. Also, if desired, the bath may contain any suitable wetting agent which will not degrade the woolen yarn. Under certain conditions of processing, the wetting agent may be a water soluble fatty acid soap or may be any detergent of the type usually employed in scouring wool.

The yarn is stretched while wet by passing strands thereof about the rolls or like elements of any conventional yarn stretching apparatus, and is elongated and so put under a tension equaling between about 25% of its wet breaking strength and almost its wet breaking strength. It has been found that the yarns stretched the greatest ultimately produce the most pronounced kinky effect in the pile contained in the fabric.

The yarn is then wound on bobbins, cones, spools, tubes or the like in its wet, stretched condition by conventional winding apparatus to provide yarn packages of any desired size.

The wound yarn is next dried to set the stretch therein by placing the yarn packages in an atmosphere of dry hot air or superheated steam for a sufficient duration to remove practically the entire moisture content of the yarn. If desired, the bobbins or the like may be of the perforated type such as used in yarn dyeing to facilitate the circulation of drying medium through the wound layers of yarn.

The yarn is now ready to be made into the pile contained in the fabric and this can be accomplished in any known manner, for example, by knitting, tufting or weaving operations. The yarn in being made into the pile runs smoothly through the machine employed and does not exhibit any tendency to curl, shrink or otherwise become distorted in a manner to interfere with the machine elements handling the yarn during such operations. Also, by processing the yarn in the aforementioned manner, the tensile strength of the yarn is increased up to 50%, and loose yarn fibers are laid down making the yarn surface smoother, whereby the yarn handles better and is less likely to break in being made into the pile.

The pile yarn in the fabric is then moistened with water or wet steam in any suitable manner, or such moistening may be effected in the washing of the fabric or other treatment thereof involving the use of liquids. Such moistening relaxes the stretch in the pile yarn and causes the pile yarn to assume its original length and be rendered kinky.

The pile yarn is then dried or is permitted to dry whereby the natural resiliency of the yarn is restored.

The fabric produced by the process of the present invention is primarily adapted for use as floor covering although it is obvious that fabrics suitable for other uses may be produced by such process. Also, the present process is adapted for producing fabric wherein the entire pile is kinky, or fabric of the two tone type wherein only a portion of the pile is kinky and the remainder of the pile is composed of yarn which has not been treated to render the same kinky. Apparatus for producing

such two tone fabrics is well known in the art. The processed yarn can be used for Axminster, velvet or tufted rugs and the like.

To illustrate a practical application of the present process, 50 yards to the ounce of plied woolen rug yarn, composed of two plies each having a Z-twist of 4.3 turns to the inch and plied up with an S-twist of 8.5 turns to the inch set therein, was wetted by passing the yarn through an aqueous bath, heated to 200° F. and containing about 2% of an alkylated aromatic sulfonate type wetting agent, at a lineal speed to retain the yarn in the bath for a sufficient duration to wet the same throughout.

The wet yarn was stretched at a tension equalling about 50% of its wet breaking strength and was wound on bobbins while wet and so stretched. The bobbins were placed in a chamber and subjected to an atmosphere of hot air at about 212° F. for about six hours to dry the layers of yarn on the bobbin throughout.

The so processed yarn was woven into rug fabric in the customary manner as the pile thereof, and the pile of the fabric was moistened with wet steam. The woolen pile yarn returned to about its original length and was rendered kinky, whereby a very close pile fabric of pleasing and attractive appearance was produced.

By employing the foregoing process a fabric is produced which contains woolen pile composed of twisted ply yarn, characterized in that it has assumed about the same length as that of an equivalent linear section of the same yarn not so processed, that it is kinky and that its resiliency is about the same as that prior to being so processed.

From the foregoing description, it will be seen that the present invention provides a simple, practical and economical process for producing fabrics containing an at-

tractive kinky or crimped pile. Such pile is durable and can withstand rough usage.

It will be understood that the details and examples hereinbefore set forth are illustrative only and that the invention as broadly described and claimed is in no way limited thereby.

I claim:

The process of producing a fabric containing kinky woolen pile which process comprises first wetting plied woolen yarn having a weight of one ounce for from 40 to 100 yards thereof composed of from two to seven plies each having a Z-twist of between about two and about five turns to the inch and plied up with an S-twist of between about four and about twelve turns to the inch by passing the yarn through an aqueous bath heated to about 200° F. at a lineal speed to retain the yarn in the bath for a sufficient duration to wet the same throughout, stretching the wet yarn at a tension equalling between about 25% of its wet breaking strength and almost its wet breaking strength, winding and drying the stretched yarn and maintaining the wound yarn in stretched condition, making the pile contained in the fabric of the so treated yarn, applying wet steam to the pile yarn to render the same kinky, and drying the pile yarn to restore the natural resiliency thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

346,673	Mitchell	Aug. 3, 1886
1,511,212	Bliss	Oct. 14, 1924
2,509,351	Reinhardt et al.	May 30, 1950
2,662,560	Jackson	Dec. 15, 1953
2,676,384	Reinhardt et al.	Apr. 27, 1954