United States Patent Office 2,777,277 Patented Jan. 15, 1957

2,777,277

METHOD FOR PRODUCING CRIMPED SUPERPOLYAMIDIC THREADS AND NOVEL THREADS OBTAINED

Philip Charlois, Lyon, France, assignor to Vaucanson Silk Mills, Inc., New York, N. Y.

No Drawing. Application August 4, 1951, Serial No. 240,440

Claims priority, application France December 12, 1950

7 Claims. (Cl. 57—140)

Numerous textile articles are already known wherein the warp and/or the weft is constituted by threads having a superpolyamidic or similar base and that have been submitted to a previous overtwist and then, before the actual weaving, to treatments that neutralize their mechanical reactions and allow the weaving of the thread in the usual manner, the creped structure of the fabric being obtained only after release of the stored twisting stresses of the threads, said creped effect appearing in the actual fabric which crepes because of the action of subsequently shrinking of each of the threads forming it.

In practice, the crepe forming superpolyamidic threads obtained through the conventional methods are stretchy, brittle and kinky. It is, therefore, difficult to weave them and they produce a flat fabric the creped effect in which is very reduced and that is more similar to canvas than to a crepe fabric.

In order to overcome these drawbacks, my invention has for its object a high twist superpolyamidic crepe thread obtained, starting from a superpolyamidic low twist thread of known type that is submitted to the following treatment: sizing, drying in a conditioned atmosphere, twisting so as to impart to it either a high right hand twist or a high left hand twist in one or more stages, a kiln drying, a steaming and a further sizing for fixing said twist and after a period of rest, the thread is wound over a tube or similar carrier preparatory to the weaving of the thread.

As used in this specification, the expression "high twist" is intended to define a twist suitable for the weaving of crepe fabrics. Such a twist is within the conventional range from 600 to 5,000 turns to the meter, i. e. 15 to 125 turns to the inch, depending upon the number of component filaments and their weight per unit length. By way of example, it is contemplated in practice that a twist of the order of 3,500 turns to the meter or 90 turns to the inch will ordinarily be used for the production of a thread of about 45 deniers having suitable creping properties.

The successive steps of this method may be performed in the following manner: the raw superpolyamidic thread as it comes from the spinning plant, generally with a low twist, is rewound on large cylinders and is sized thread by thread by engagement with a rotating roller which has its lower portion immersed in a trough containing a sizing solution.

After this sizing, which takes place in an air-conditioned room, the temperature being in the range between 28 and 30° C., and the relative humidity being about 50%, the thread is allowed to rest so as to dry perfectly. This drying requires a period of 18 to 24 hours within an air-conditioned room the temperature in which is within the range between 28 and 30° C. while the relative humidity is about 50%. After drying, the sized thread which up to this point has been wound upon large cylinders, is subjected to a twisting

operation and, for this purpose, it is rewound upon flanged reels or spools after which it is placed in the twisting mill in which either a left hand or a right hand twist is imparted to the thread, either in a single operation or a plurality of twisting operations.

In order to fix the high degree of twist imparted to the thread in the twisting mill, the thread is submitted to kiln drying at a temperature approximating 80 to 120° C. during a period ranging between 1½ hours and 2 hours. It is then submitted to steaming or extremely high humidity for 2 to 3 hours at a temperature within the range between 90 and 120° C. Lastly, it is subjected to a second sizing operation similar to the preliminary sizing, which has for its object merely to further the setting of the twist of the thread, and this second sizing is heavier than the preliminary sizing, i. e. the amount of sizing taken on by the twisted thread is higher than in the case of the first or preliminary sizing.

When the twist has thus been fixed, the thread requires a second period of rest which allows it to dry perfectly; said drying lasts about 18 to 24 hours and takes place within an air-conditioned room similar to that previously referred to, i. e. its temperature being between 28 and 30° C. and its relative humidity being about 50%. When the thread is thoroughly dry, it is then wound upon tubular supports or similar devices for shipment to the weaving plant.

The high twist thread thus obtained is a crepe thread that may be woven in the usual manner as in the case of any crepe thread, of whatever type it may be, with a view to producing a crepe textile fabric, knitted fabric or the like.

By way of an example and by no means in a limiting sense, I set forth the following embodiment of my invention involving a batch of superpolyamidic crepe thread having the following properties: numerometric count 200 (45 denier), comprising 13 filaments, a twist of 3500 turns to the meter (90 turns to the inch), one half of the batch having a twist to the right and the other half having a twist to the left, may be obtained starting from a superpolyamidic thread having the usual low twist characteristics, that is given a preliminary sizing in the manner described hereinabove with a conventional sizing solution having as a principal ingredient a polyvinylic alcohol and that is wound after it has passed over the sizing roller on to large cylinders having a diameter of 155 mm. and a length of 178 mm.; the drying of the preliminarily sized thread then takes place in a room at a temperature of 29° C. with a relative humidity of 50%; this drying operation requiring 18 to 24 hours. When dry, the thread is unwound from the large cylinders on to the flanged reels or spools for use by the twisting mill. In the latter, ½ of the total amount of thread is twisted towards the right to the extent of 3500 turns to the meter while the other half is twisted towards the left to the same extent of 3500 turns to the meter. This twist is then fixed by kiln drying of the twisted thread at 90° C. for 90 to 120 minutes. This kiln-drying is followed by steaming or an equivalent high humidity treatment at 95° C. for 120 to 190 minutes immediately following the kiln drying and this may take place in the same treatment chamber without moving the thread out of the latter. The twisted thread is then gradually cooled to a temperature of 28 to 30° C. and dried at a relative humidity of 50% which prevails in the sizing room wherein a thread-by-thread sizing is then applied which, except for a heavier thickness of coating, is identical with the preliminary sizing; after this second or final sizing, the thread is dried in a similarly air-conditioned room for 18 to 24 hours and may thereafter be wound

upon tubular, conical or similar thread supporting carriers.

The invention is not limited to each of the individual steps of the method hereinabove set forth by way of example, but includes all of the various modifications thereof falling within the scope of the accompanying claims. The sequence of operations: kiln drying, steaming and sizing, may be modified, and the temperatures and duration of each step may be somewhat different from those that have been disclosed hereinabove.

What I claim is:

1. The method of producing a high twist superpolyamidic crepe thread, comprising the steps of: sizing a standard low twist superpolyamidic thread; drying said sized thread in a conditioned atmosphere; twisting said dried sized thread for imparting a high twist thereto; kiln drying said high twist thread; steaming said kiln dried thread at a temperature at least as high as the temperature of said kiln drying; allowing said steamed thread to cool; and further sizing said cooled thread for fixing said high twist.

2. The method according to claim 1, in which said kiln drying step is followed immediately by said steaming step.

3. The method according to claim 1, in which said thread, after said first-named sizing step, is wound upon a supporting member of relatively large diameter, said method comprising the further step of allowing said thread to rest for a minimum period of from 18 to 24 hours upon said supporting member after said further sizing step prior to utilization of said thread.

4. The method according to claim 1, wherein said kiln drying takes place at a temperature of substantially 90° C., and in which said steaming takes place at a temperature of substantially 95° C., said steamed thread being allowed to cool gradually to a temperature of approximately 28° to 30° C. prior to said further sizing step.

5. The method of producing a high twist superpolyamidic thread for creping, comprising the steps of: sizing a standard low twist superpolyamidic thread; drying said sized thread in a conditioned atmosphere, twisting said dried sized thread for imparting a high twist thereto; kiln drying said high twist thread at a temperature of about 80° C. to about 120° C. for about 1½ hours to about 2 hours; steaming said kiln dried thread at a temperature of about 90° C. to about 120° C. for about 2 hours to about 3 hours; allowing said steamed thread to cool; and further sizing said cooled thread for fixing said high twist.

6. A high twist superpolyamide thread for creping, comprising a highly twisted yarn of said superpolyamide, a correspondingly highly twisted layer of sizing intertwisted with said yarn, and a second non-twisted layer of sizing encircling said yarn and said first layer of sizing, said second layer of sizing retaining said high twist of said first layer of sizing and of said yarn.

7. A high twist superpolyamide thread for creping, comprising a highly twisted yarn of said superpolyamide, a highly twisted layer of sizing intertwisted with said yarn, said yarn being composed of a plurality of filaments carrying said sizing and having a differential twist with respect to said sizing, and a second non-twisted layer of sizing encircling said yarn and said first layer of sizing for retaining said high twists thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 20,417	Hood	June 22, 1937
408,247	Lyall	Aug. 6, 1889
1,614,832	Dreyfus	Jan. 18, 1927
2,133,071	Anderson et al.	Oct. 11, 1938
2,207,229	Sherman	July 9, 1940
2,300,074	Strain	Oct. 27, 1942
2,340,051	Goodings et al.	Jan. 25, 1944
2,564,245	Billion	Aug. 14, 1951

OTHER REFERENCES

"Webster's New International Dictionary," 2nd Ed. unabridged, 1939 printing.

"Callaway Textile Dictionary," 1st Ed. Copyright 1937, Callaway Mills, La Grange, Georgia.