Nov. 20, 1951 B. H. FOSTER 2,575,753

METHOD OF PRODUCING CHENILLE-LIKE YARN

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Fig. 1

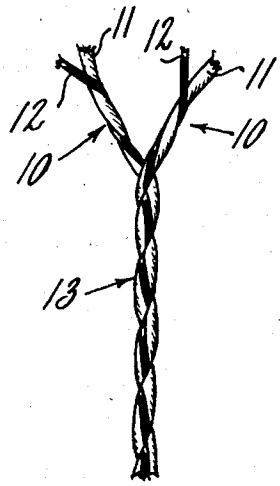


Fig. 2

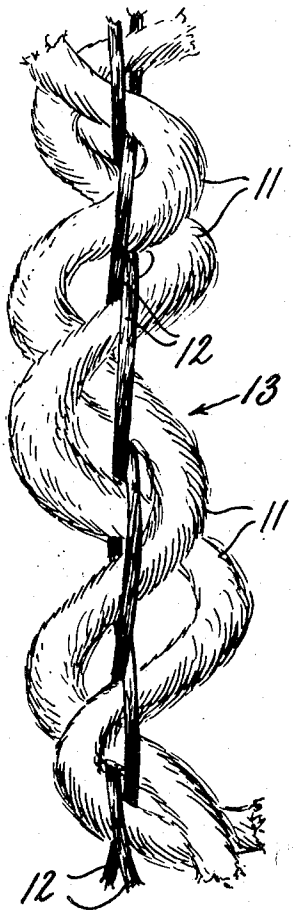
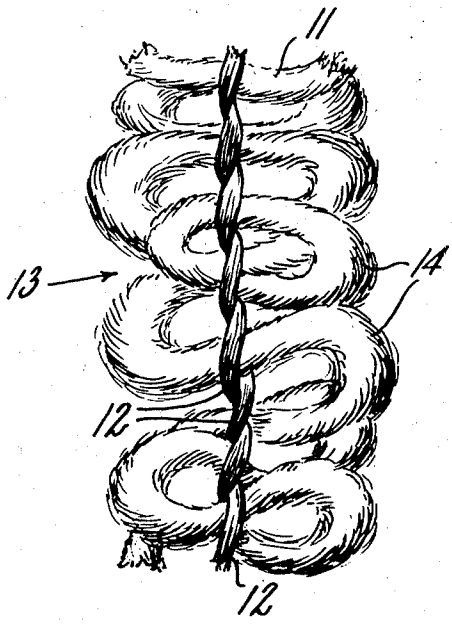


Fig. 3



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METHOD OF PRODUCING CHENILLE-LIKE YARN

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1

This invention relates to a method of producing mock chenille yarn or yarn that resembles chenille in appearance and feel.

Chenille yarn, which is well known, is usually produced on a loom equipped with leno motion. The leno ends or warp yarns are arranged in certain dents of the reed, with a substantial number of the dents left empty therebetween. A coarse soft weft yarn is then interwoven with the warp yarns and, after weaving, the fabric is cut lengthwise in the middle of the space between the adjacent groups of leno warp threads. Each strip thus formed constitutes a chenille yarn consisting of tufts of weft yarns bound in by the leno warp threads.

The mock chenille yarn contemplated by the present method is easier to produce than chenille yarn made in the manner just described.

Such mock chenille yarn is produced by plying together by a twisting operation a textile yarn, and a smaller heat shrinkable filament that is capable of contracting longitudinally to a small fraction of its initial length under the application of heat. Two of these ply yarns each formed of an ordinary textile yarn and a heat-shrinkable filament are plied together by a cabling operation, using a relatively low twist in the ply construction and a still lower twist in the cable construction. The cable construction thus produced is then heated, while under very little tension, to contract the heat-shrinkable filaments so that these filaments, which were twisted together by the cabling operation, will be reduced to a small fraction of their previous length. As these filaments shrink they will cause their associated textile yarns to buckle and form laterally extending loops that are held in spaced relation to each other by the ply twist of the shrunken filaments. In this manner the textile yarns are formed into spaced loops that extend laterally from the shrunken filaments and resemble the projecting tufts of ordinary chenille yarn.

The ply twist used to unite the ordinary yarn and smaller filament is in one direction, and the cabling twist used to unite two of the ply yarns should be in the opposite direction. This causes the heat-shrinkable filaments to cross back and forth over the textile yarns so that when the filaments are shrunken they will grip the buckled textile yarns at spaced points to thereby produce loops that are approximately uniform in size and evenly spaced.

The above and other features of the method of the present invention will be further understood from the following description when read in

2

connection with the accompanying drawing: wherein,

Fig. 1 is a side elevation showing how a textile yarn and heat-shrinkable filament are plied together and then cable twisted in preparing to form the mock chenille of the present invention;

Fig. 2 is an enlarged side view showing the cable construction of Fig. 1 partly shrunken; and

Fig. 3 is a side view showing the construction of Fig. 2 further shrunken to produce the finished mock chenille yarn contemplated by the present invention.

In carrying out the present invention a ply yarn 10 is produced by twisting together a textile yarn 11 and a smaller heat-shrinkable filament 12. The textile yarn 11 may be formed of cotton, rayon, silk, wool, asbestos, glass, nylon, or other yarn. The heat-shrinkable filament 12, which preferably is much smaller than the yarn 11, may be any one of a number of oriented thermoplastic filaments capable of undergoing extensive shrinkage upon the application of heat at a temperature well below its softening or flow temperature.

The pronounced contractile property of a thermoplastic filament depends on what is known as "elastic memory," that is, the property by virtue of which many high molecular weight synthetic polymers in the form of cold-drawn and oriented filaments retract, when heated, to about the length which they had before being cold-drawn. Examples of such filaments that may be used are: Vinyon, an oriented copolymer of vinyl chloride with a small proportion of vinyl acetate; Polythene, an oriented polymerized ethylene (polyethylene); saran, an oriented copolymer of vinylidene chloride with a small proportion of vinyl chloride; Terylene, an oriented polyester of terephthalic acid with ethylene glycol.

The temperature range over which this pronounced shrinkage occurs will vary with the particular variety of thermoplastic filament used, and is a well-known characteristic of each type of filament. The temperatures used in the present invention may conveniently be a few degrees above the temperature at which shrinkage of the filament will begin, but below that at which the filament will melt or otherwise be deleteriously affected.

The yarn 11 and filament 12 are twisted together, as shown in Fig. 1 of the drawing, with relatively few twists per inch, since the low twist used will give the textile yarn a better opportunity

to bow outwardly from the textile filament as the latter shrinks.

In carrying out the present invention two plied yarns 10, each formed of a textile yarn 11 and a heat-shrinkable filament 12 that were first twisted together in one direction, are cabled together in the opposite direction, as shown in Fig. 1 to produce the cord 13. That is, if the yarns 10 are formed with what is known as an S twist, then the cord 13 which they form should have a Z twist, and the twist per inch of the cord 13 should preferably be only about half that of the twist per inch of the yarns 10.

Having produced the construction shown in Fig. 1 as above described, all that is necessary to produce the mock chenille yarn contemplated by the present invention is to heat the construction of Fig. 1 to a temperature at which the filaments 12 will undergo extreme longitudinal contraction, or shrinkage. As these filaments shrink they will behave as shown successively in Figs. 2 and 3, the shrinking operation being partially performed in Fig. 2 and completed in Fig. 3. By observing Fig. 2 it will be seen that the filaments 12 which were plied together by the cabling operation above described, tend to assume a straight line position as they are shrunk, whereas the textile yarns 11 are buckled by the shrinking action of the filaments 12. Since the textile yarns 11 extend back and forth between the twisted filaments 12 the loops which the yarns 11 form will be held accurately spaced by the successive twists or crossings of the filaments 12. This is well illustrated in Fig. 3 in which the yarn loops 14 project a substantial distance from the opposite sides of the twisted or crossed filaments 12 to produce the mock chenille contemplated by the present invention. This mock chenille closely resembles ordinary chenille in appearance except that in this mock chenille the loops are not cut, whereas in ordinary chenille the ends of the projecting tufts are cut.

The mock chenille contemplated by the present invention may be used in various fields where ordinary chenille has been used heretofore, as well as in new fields. For example it may be woven as weft into rugs, or it may be woven as weft into a toweling fabric so that it will closely resemble a Terry fabric. It may also be used as warp or weft for decorative purposes and in novelty or fancy strands to decorate wearing apparel or other woven fabrics, and due to the simplicity of the method employed to make this mock chenille, it may be produced at low cost.

In order further to disclose the present invention the properties of one example of mock chenille constructed as herein contemplated are given in the following table.

Table

1. Yarn 11—3 ends of 36's yarn (warp twisted).
2. Filament 12—80 denier Vinyon.
3. Ply yarn 10—12 T. P. I. (S twist).
4. Cord 13—6 T. P. I. (Z twist).
5. Cord 13 (unshrunken)—4080 yards per lb.
6. Cord 13 (shrunken)—1710 yards per lb.

Various means may be employed to shrink the cord 13. This may be done by exposing it to hot water, hot air or to contact with a hot surface while it is approximately free from tension. Preferably the unshrunken cord 13 shown in Fig.

1 is drawn forward by feed rolls or the like from a source of supply such as a supply package to the heating area, it is passed slowly through this area and may then pass downwardly under its own weight into a receptacle that collects the finished mock chenille yarn.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. The method of producing a chenille-like yarn, which includes the steps of twisting together a relatively non-shrinkable textile yarn and a heat-shrinkable thermoplastic filament that will shrink to a pronounced degree under the action of heat, twisting together in the opposite direction two of the composite yarns thus formed, and heating to shrink the heat-shrinkable filaments and cause the textile yarns to buckle so as to form successive loops projecting laterally from the filaments.

2. The method of producing a chenille-like yarn, which includes the steps of twisting together a relatively non-shrinkable textile yarn and a heat-shrinkable thermoplastic filament that will shrink to a pronounced degree under the action of heat, twisting together in the opposite direction two of the composite yarns thus formed, and then heating until the heat-shrinkable filaments shrink to a small fraction of their original length and cause the textile yarns to buckle at frequent intervals so as to form protruding loops that are held regularly spaced apart by the ply twist of said filaments.

3. The method of producing a chenille-like yarn, which includes the steps of twisting together in one direction a relatively non-shrinkable textile yarn and a finer heat-shrinkable thermoplastic filament that will shrink to a pronounced degree under the action of heat, twisting together in the opposite direction two of the composite yarns thus formed, and then heating until the heat-shrinkable filaments shrink to a small fraction of their original length and thereby cause the textile yarns to buckle at frequent intervals so as to form protruding loops at the opposite sides of the contracted filaments.

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