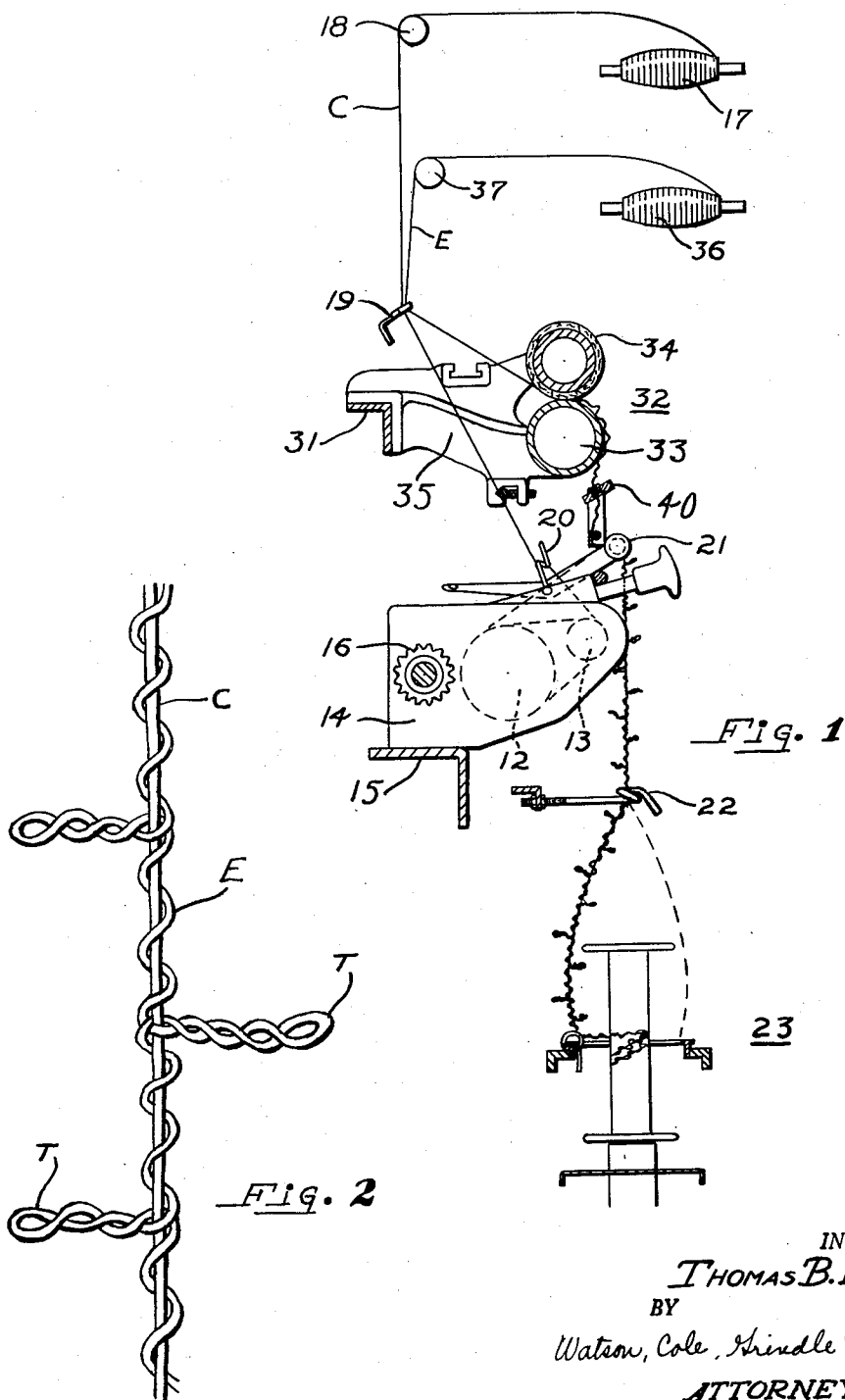


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T. B. MOORE, JR
METHOD OF MAKING NOVELTY YARN
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INVENTOR.
THOMAS B. MOORE, JR.
BY
Watson, Cole, Rhind & Watson
ATTORNEYS

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METHOD OF MAKING NOVELTY YARN

Thomas B. Moore, Jr., Laurens, S. C., assignor to Deering Milliken Research Corporation, Pendleton, S. C., a corporation of Delaware

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This invention relates to the art of novelty yarns and has for its object the production of a novelty yarn having twisted loops or kinked tails projecting from the yarn at spaced intervals therealong.

The formation of novelty yarns by plying a strand of effect yarn with a strand of core or carrier yarn is a procedure well known in the textile industry and many systems have been proposed for forming various types of novelty yarn, such as slub or nub yarn, bouclé yarn, and ratiné yarn. In all of the processes hitherto advanced by workers in the art, in so far as I am aware, the degree or extent of twist which was initially inserted in the two strands was generally considered of little or no consequence, being of a normal or average value, say five to ten turns per inch and certainly no more than 20 turns per inch, and selected only with the idea in mind that the final yarn should be a balanced one, which is to say that it should not be lively and difficult to manage.

I have now found that by employing an effect yarn which prior to its combination with the carrier strand has been twisted to a much higher value than that usually employed in similar processes, I am able to produce an improved novelty yarn which is radically different in appearance from the yarns heretofore obtained by the art.

A further object of the present invention is therefore to associate a highly twisted effect strand with a carrier strand in such a manner as to form a novelty yarn having at random spaced points along its length tightly twisted tails or kinked protuberances of yarn extending in a general radial direction therefrom.

Other and further objects and advantages will appear as the detailed description proceeds when read in connection with the accompanying drawings in which

Figure 1 is a view, somewhat diagrammatic, of one arrangement by which the present invention may be practiced; and

Figure 2 is a view, greatly enlarged, of a short section of the improved novelty yarn.

In Figure 1 the numeral 11 designates the conventional feed-roll assembly of an Atwood 10-B down-twister, which assembly consists of a pair of spaced parallel feed-rolls 12 and 13, one large and one small, journaled in a bracket 14 which is supported by an angle bar 15, the latter being secured to the frame of the twister in any desired manner. As is well known in the art, the feed-rolls 12 and 13 are coupled together for the same peripheral rate of rotation, being driven by means well known in the art and not shown. A strand of core or carrier yarn C is withdrawn from any desired source 17, such as a cake, pirn, bobbin or the like, through a tension device 18, through a drop wire eye 19 of a suitable stop motion and pigtail guide 20 to a feed roll assembly 11, making one or more turns or convolutions around rolls 12 and 13 so that it is in frictional contact with these rolls and capable of being advanced thereby. From feed-roll assembly 11, yarn C moves over and around a

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pulley-like guide 21, down through pigtail guide 22 and finally to a conventional ring-twister spindle designated 23 which is rotatably driven in the usual fashion by means not shown.

Supported by a cross member 31 above feed-roll assembly 11 is an auxiliary feed-roll 32 consisting of a roll 33 driven in any desired manner, as for example by a sprocket, not shown, on the end of the roll operatively coupled with the sprocket 16, and a weight roll 34 superposed on feed-roll 33, both of the rolls being rotatably mounted on a bracket 35. A strand of effect yarn E coming from a source 36, and passing through a tension device 37, drop wire eye 19 is gripped between feed-rolls 33 and 34 and advanced thereby, being introduced to the carrier strand C at a point just prior to the latter's passage over and around guide-like pulley 21. Effect yarn E entwines around carrier yarn C and moves with carrier yarn C down through guide eye 22 to the ring twister spindle 23.

In accordance with the present invention, it is necessary that feed-rolls 33 and 34 be driven at a higher rate of speed than are feed-rolls 12 and 13, so that as a result there is an excess of effect yarn as compared to the core yarn. Since the nip of feed-rolls 33 and 34 is spaced vertically from the path the carrier yarn takes on leaving the feed-rolls 12 and 13 and moving to pulley-like guide 21, a zone is created just prior to the point or locus of combination of the effect yarn with the carrier yarn at which the yarn assumes a relaxed or slackened condition. Being highly twisted, the effect yarn kinks up into twisted loops to take up the slack or excess and is wrapped in this configuration around the carrier yarn. As the tension in the combined strand is virtually all borne by carrier yarn C, the twisted loops in effect yarn E are not pulled out as the yarn is taken up on the ring twister spindle 23 but retain their full size and shape during passage through the balloon area of the spindle, under the spindle traveler and onto the spindle take-up package.

It has been found that where the distance between the nips of the auxiliary feed roll assembly and the locus of combination of the two strands exceeds about two to three inches and the effect strand is allowed to move freely and unrestricted through the zone defined by these two points, there exists a tendency for the effect strand to kink up into relatively long tails, say two or more inches in length. While in some instances tails of this magnitude may be desirable, it is generally preferable that the tails be shorter in length, say from one-eighth inch to one inch. This desideratum may be accomplished by providing a guide bar 40 closely adjacent the path of the carrier strand just prior to pulley 21 and behind and under which the effect yarn passes, thus more or less fixing the locus at which the effect strand combines with the carrier strand, and mounting a circular porcelain guide eye 41 between and in general alignment with the nip point and locus of combination through which the effect strand moves. By this means the effect strand is held to an essentially straight line path as it advances through the relaxation zone and is prevented from rolling up into excessively long tails.

The unique appearance of the novel yarn is clearly shown in Figure 2, effect strand E being entwined around carrier strand C with the twisted tails T projecting in a general radial direction from the body of the yarn.

An essential feature of this invention is the twist initially possessed by the effect yarn and I have found it necessary to employ twists in the order of that known in the art as "crepe" twist. As the name implies, this term indicates that range of twist usually inserted in yarns which are to be woven into crepe fabrics, and, in

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general, includes twist of from about 30 to 35 turns per inch up to about 125 turns per inch, or higher, the upper limit being determined only by the amount of twist which the yarn will withstand without breaking. Within this general range, the particular twist to be inserted in the effect strand may be varied widely dependent upon the particular end result which it is desired to achieve. It has been found that the greater the amount of twist inserted in the effect strand, the more tightly twisted are the loops and the harsher the hand of the fabric made therewith. The manner in which the twist is inserted in the effect strand is immaterial but it must be inserted in the yarn prior to its combination with the carrier strand. A two-for-one twister spindle could, for example, be conveniently employed as the twist inserting device.

The twist in the carrier yarn is of little or no importance in the present invention since the carrier strand merely performs its usual role of functioning as a support or base for the effect strand. Thus, the twist in the carrier yarn may be that conventionally employed in plying operations, say of a low order from zero to 15 turns per inch. Similarly, the twist at which the yarns are plied together may be any reasonable or conventional value commensurate with standard plying practices.

In so far as it is known, the length or extent of the relaxation zone, that is, the distance between the nip of the auxiliary or effect yarn feed-rolls and the locus of combination of the yarns, is not critical, provided that the yarn is given a reasonable opportunity to kink or twist into loops. Thus, distances from several inches to a foot or more may be employed with good results provided, however, if such distances exceed two or three inches guide means such as shown at 40 are provided to guide the effect yarn to the point where it commences to ply with the carrier.

As the successful practice of the invention appears to depend upon the extreme twist differential in the component yarns and the manner in which they are plied together, the invention is virtually independent of the particular materials employed as the effect or carrier yarns. Accordingly, any standard yarn which is available to the textile industry may be utilized regardless of whether it is staple or continuous filament, so long as the yarn which is to serve as the effect yarn is capable of withstanding fairly high twist. The size of the yarns may be varied widely dependent upon the characteristics which it is desired that the final yarn should possess.

The length and frequency of the twisted loops is, of course, controlled by the amount in which the effect yarn is overfed with respect to the carrier yarn and the location of member 40. Hence, by increasing the feed rate of the effect yarn while maintaining the rate of feed of the carrier yarn constant, longer tails may be produced, and by adjusting the position of member 40 a larger number of shorter tails may be formed.

To achieve the desired result, the effect yarn must be advanced at a rate greater than that of the carrier yarn. The particular feed ratio is, of course, a matter of individual choice, being dictated by the number and frequency of loops desired. The upper limit is defined only by practical commercial considerations since it will be apparent that there is a point beyond which the tails would be so long that fabric assembled therefrom would have no practical value. In general, I have found that feed ratios of from 1.2 through 2 to 1 may be used to good advantage.

When woven into cloth, the yarn produced in accordance with this invention preferably constitutes the filling in a conventional warp. The fabric thus produced has an extremely unusual appearance as some of the tails during weaving become enmeshed with adjacent threads, giving the appearance of slubs or nubs, while other of the tails project from the face of the fabric. Such fabric

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is of particular utility as upholstery or drapery material and, in some cases, in garments for outerwear.

The following examples of the invention will illustrate the successful practice thereof:

Example 1

An effect strand of 100 denier, 40 filament, viscose crepe yarn, having about 52 turns per inch of S twist inserted therein, is plied on the apparatus heretofore described with a carrier stand of 18 singles staple yarn, containing 8 percent acetate and 92 percent viscose, and having 12.75 turns per inch of S twist therein, at a feed ratio of effect yarn to carrier yarn of 1.625 to 1, the carrier yarn being fed at 40 feet per minute. The ply twist inserted in the yarn is 9.2 turns per inch S with the ring twister spindle rotating at a speed of 5,000 R. P. M. The yarn has a knobby feel, having short loops of a length of from about $\frac{1}{16}$ to $\frac{5}{16}$ of an inch occurring at intervals along the yarn from $\frac{3}{8}$ of an inch to about an inch and a quarter.

Example 2

A strand of the same effect yarn as employed in Example 1 is plied with a 100 percent viscose staple carrier yarn, having 16.8 turns of twist per inch in the S direction therein, at the same feed ratio as was used in Example 1. The twist inserted in ply is 11.6 turns per inch in the S direction. The loops in this novelty yarn are from $\frac{1}{8}$ to about $\frac{5}{16}$ of an inch long, being of a slightly greater average length than was the case in Example 1 and are spaced about the same distance along the yarn.

Example 3

Example 2 is repeated with the exception that a feed ratio of 1.538 to 1 is employed, the rate of feed of the carrier yarn being 40 feet per minute and that of the effect yarn being 61.5 feet per minute. The loops on this yarn are smaller than in either of the preceding examples being of about a sixteenth to a quarter of an inch in length and are spaced further apart, say from about one-half to one and one-half inches between loops.

It will be appreciated by those skilled in the art that the essence of my invention resides in associating a highly twisted effect yarn with a carrier yarn in such a fashion that the effect strand is permitted to relax or grow slack prior to its being plied with the carrier yarn and that the other details such as initial materials, size of yarns, ply twist, carrier yarn twist, etc., may be selected substantially at will in accordance with well known standards of yarn twisting and throwing. Therefore I do not choose to be limited by the specific examples of the improved novelty yarn or the method of forming the same but only by the scope and spirit of the hereunto appended claims.

Having thus described my invention, that which is claimed is:

1. A method for making a novelty yarn which comprises passing a strand of effect yarn, twisted to such an extent that it tends to kink when permitted to relax, through a zone of relaxation, to thereby permit kinks to form in said yarn, while partially constraining said effect yarn at least at one point in said zone of relaxation to control the length of the kinks formed therein, and plying said effect yarn, immediately after passage thereof through said zone of relaxation and without removing the kinks formed therein, with a moving strand of carrier yarn to form a plied strand having, at randomly spaced points, projecting twisted loops of said effect yarn.

2. The method of making a novelty yarn which comprises withdrawing a strand of carrier yarn from a first yarn supply, simultaneously withdrawing a strand of highly twisted effect yarn from a second yarn supply, said effect yarn being withdrawn at a rate in excess of the rate of withdrawal of said carrier yarn, passing said effect yarn

into a zone of relaxation to allow the same to kink, partially constraining said effect yarn with guide means within said zone of relaxation to control the length of the kinks formed therein, and thereafter twisting together the kinked effect yarn and said carrier yarn to form a plied strand having, at randomly spaced points, projecting twisted loops of said effect yarn.

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