Aug. 10, 1937. H. DREYFUS 2,089,193

TEXTILE YARN AND FABRIC AND THE PRODUCTION THEREOF

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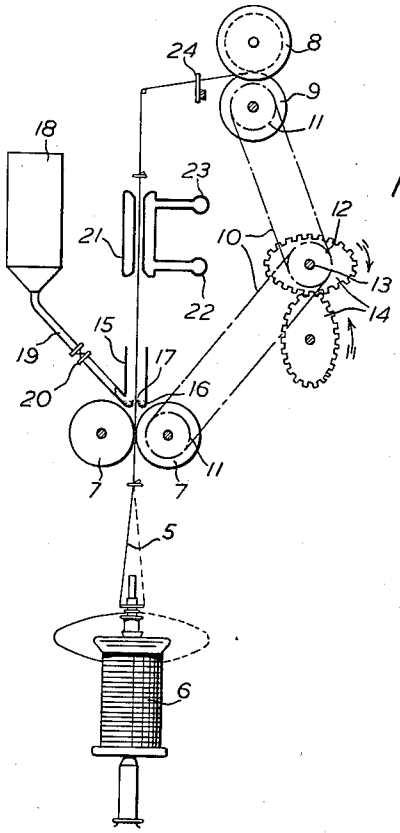


FIG. 1

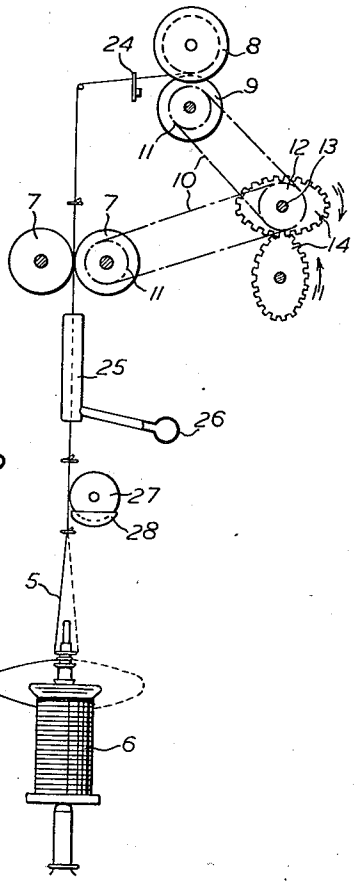


FIG. 2

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TEXTILE YARN AND FABRIC AND THE PRODUCTION THEREOF

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15 Claims. (Cl. 117—2)

This invention relates to the production of textile materials, and particularly to the production of crêpe yarns and fabrics, and has for its object the production of such materials giving enhanced crêpe effects.

According to the invention, twist is imparted to a crêpe yarn to a degree that varies along the length of the yarn, and during the insertion of the twist steps are taken to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist. For example, the length of the yarn into which the twist is being inserted may terminate in a roll or pair of rolls round or between which the yarn passes so that by the engagement of the yarn with the roll or rolls running of the twist along the yarn is restrained. In this way high twist in one portion of the yarn is confined therein by the roll or rolls and has substantially no effect on an adjacent portion of the yarn undergoing twisting; likewise, low twist in a portion of the yarn is confined to such portion, the low twist being substantially unaffected by higher twist in an adjacent portion of the yarn undergoing twisting.

The variation in the degree of twisting in the different portions of the yarn is conveniently effected by correspondingly varying the rate of travel of the yarn, in which case the rate of operation of the twisting device itself may be kept constant. Conveniently, the roll or rolls serving to prevent the running of the twist may be used to control the rate of travel of the yarn. Any suitable means may be provided to effect the variation in the peripheral speed of the roll or rolls, several suitable devices for this purpose being described in U. S. application S. No. 538,486 filed 19th May 1931. The roll or rolls may thus serve to draw the yarn at a non-uniform rate from a bobbin on a twisting spindle and deliver the yarn after it has received a corresponding non-uniform twist to a take-up bobbin.

The take-up bobbin may also be driven at a similarly varying rate of speed, or it may be constantly driven, a compensator being provided if desired to allow for the varying rate of delivery of the yarn to the take-up bobbin.

The unevenness of the twist results in a corresponding unevenness of crêping power in the yarn and an enhancement of the crêpe effect obtained by the use of the yarn. The strength of the effect may be varied by varying the lengths of the yarn containing the different degrees of twist. The alternation of the higher and lower twists may be regular or irregular, as desired.

A further feature of the invention comprises setting the twist as soon as possible after its insertion so as to fix the different degrees of twist in the respective portions of the yarn. One method of setting the twist is to apply size to the yarn, for example immediately after the yarn has passed the roll or rolls described above, or the size may actually be applied by the roll or one of the rolls as the yarn is engaged thereby.

The above-mentioned features may be applied to the manufacture of crêpe yarns of textile materials in general, e. g. natural silk, cotton and wool, or cellulose acetate or other cellulose derivatives and viscose or other cellulosic artificial yarns.

A further method of setting the twist comprises the subjection of the yarn to the action of moist steam or hot water, for which purpose the methods described in U. S. applications S. Nos. 746,134 filed 29th September 1934, 746,135 filed 29th September 1934, 25,054 filed 5th June 1935 and 4,085 filed 30th January 1935 may be employed.

By way of example some forms of apparatus for carrying out the invention will now be described in greater detail with reference to the accompanying drawing, in which—

Fig. 1 illustrates somewhat diagrammatically an end elevation of apparatus for imparting to yarn a varying degree of twist and sizing and drying the yarn so twisted; and

Fig. 2 is a similar view of apparatus for imparting to yarn a varying degree of twist and steaming the yarn so twisted.

Referring to Figure 1, yarn 5 is drawn upwardly over the head of a twisting bobbin 6 by a pair of engaging nip rolls 7, and is wound on a package 8 driven by a friction drum 9.

The drum 9 rotates with a peripheral speed substantially equal to that of the nip rolls 7 or maybe somewhat lower, the rolls and the drum being driven in synchronism and at a varying rate by chains 10 which engage sprockets 11 fixed to the nip rolls and drum. The chains 10 are driven by sprockets 12 fixed to a shaft 13, the shaft 13 being driven in turn at the desired rate by elliptical gearing 14.

The twisting bobbin 6 rotates at a constant rate, and by reason of the varying rate of draw-off of the yarn 5 a varying degree of twist is inserted in the yarn, i. e. relatively high twist is inserted when the nip rolls 7 and drum 9 rotate slowly, and relatively low twist is inserted in the yarn when the rolls and drum rotate quickly.

The nip rolls 7 reduce the tendency of the high

twist from a portion of the yarn above the rolls to run back along the yarn to the portion of the yarn undergoing twisting; likewise a portion of yarn having just received a lower degree of twist and having passed the rolls, is maintained in such low-twisted condition and is substantially unaffected by higher twist in the yarn below the nip rolls.

The yarn 5 may also be sized immediately after twisting so as to fix the different degrees of twist in the respective portions of the yarn, by a sizing device situated immediately above the nip rolls 7. The sizing device comprises a tubular container 15 having an open top and a re-entrant base, the base being formed as an annular cup 16 and being pierced at 17 for passage of the yarn.

The cup 16 is supplied with size from a container 18 through a pipe 19, the flow of size along the pipe being controlled by a tap 20 which is adjusted to maintain the level of the size in the cup slightly higher than the level of the aperture 17. On passing through the aperture 17 the yarn takes up the excess size which otherwise would escape from the cup, the size being dried on the yarn by a steam dryer 21 disposed round the path of the yarn above the sizing device. The dryer is supplied with steam at high temperature from a conduit 22, the exhaust steam escaping along a second conduit 23.

After passing through the dryer the sized yarn is traversed to and fro along the package 8 by a guide 24 reciprocated by cam or like means (not shown).

In Figure 2 the twisted yarn 5, drawn upwardly from the rotating bobbin 6 by the nip rolls 7, passes through a steam chamber 25 which is supplied by steam from a conduit 26, the twist being set in the yarn by the steam in the chamber. The chamber 25 may be similar to the steam chamber described in British application No. 35191/34 filed 7th December 1934. As in Figure 1, the nip rolls 7 and drum 9 are driven intermittently from elliptical gearing 14. The yarn 5 is preferably moistened prior to passing into the chamber 25 by contacting with a roller 27 which dips into a watertrough 28. The roller 27 may be grooved or felt-covered, and may rotate freely under the influence of the travelling yarn, or may be driven by chain or like means (not shown).

It is found that the steam treatment is particularly efficacious in facilitating the crêping of cellulose acetate and other cellulose derivative yarns.

The frequency of the highly-twisted and lesser twisted portions of the yarn may be varied by driving the elliptical gearing 14 faster or slower, as desired. The elliptical gears may also be changed for gears of different ratios. The chain sprockets 11 are similarly changeable, and if desired, the nip rolls 7 and drum 9 may be changed for rolls and a drum of larger or smaller diameter.

It will be understood that while elliptical gear-operated take-up mechanism is illustrated, other forms of variable or intermittent drive for the nip rolls 7 and drum 9 could be employed. For example, variable drive mechanisms of the types described in U. S. application S. No. 538,486 filed 19th May 1931 can be employed, the different rates of progress of the yarn from the twisting bobbin enabling the crêping qualities of a yarn to be varied. Again, the rate of rotation of the twisting bobbin can be varied, the variations in the rate of take-up of the yarn and the rate of rotation of the twisting bobbin being synchronized or not as desired.

What I claim and desire to secure by Letters Patent is:—

1. Process for the production of crêpe yarn, which comprises irregularly twisting the yarn and concomitantly with such irregular twisting, fixing the twist in the yarn.

2. Process for the production of crêpe yarn of cellulose acetate or other organic derivative of cellulose, which comprises irregularly twisting the yarn and concomitantly with such irregular twisting fixing the twist in the yarn.

3. Process for the production of crêpe yarn comprising twisting the yarn to a degree that varies along the length of the yarn, and concomitantly with such twisting, restraining the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and fixing the different degrees of twist in the respective portions of the yarn.

4. Process for the production of crêpe yarn comprising twisting the yarn to a degree that varies along the length of the yarn, and concomitantly with such twisting sizing and drying the yarn so as to fix the different degrees of twist in the respective portions of the yarn.

5. Process for the production of crêpe yarn of cellulose acetate or other organic derivative of cellulose, comprising twisting the yarn to a degree that varies along the length of the yarn, and concomitantly with such twisting sizing and drying the yarn so as to fix the different degrees of twist in the respective portions of the yarn.

6. Process for the production of crêpe yarn comprising drawing the yarn at an irregular rate over the end of a rotating supply package so as to twist the yarn to a degree that varies along the length of the yarn, winding the yarn so drawn, and concomitantly with such winding nipping the yarn progressively along its length so as to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and sizing and drying the yarn so as to fix the different degrees of twist in the respective portions of the yarn.

7. Process for the production of crêpe yarn of cellulose acetate or other organic derivative of cellulose, comprising twisting the yarn to a degree that varies along the length of the yarn, and concomitantly with such twisting, nipping the yarn progressively along its length so as to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and applying steam to at least part of the yarn actually receiving twist, under conditions such that moisture is present, so as to fix the different degrees of twist in the respective portions of the yarn.

8. Process for the production of crêpe yarn of cellulose acetate or other organic derivative of cellulose, comprising drawing the yarn at an irregular rate over the end of a rotating supply package so as to twist the yarn to a degree that varies along the length of the yarn, winding the yarn so drawn, and concomitantly with such winding restraining the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and applying steam to at least part of the yarn actually receiving twist, under conditions such that moisture is present, so as to fix the different degrees of twist in the respective portions of the yarn.

9. Process for the production of crêpe yarn of cellulose acetate or other organic derivative of

cellulose, which comprises drawing the yarn at an irregular rate over the end of a rotating supply package so as to twist the yarn to a degree that varies along the length of the yarn, and concomitantly with such twisting, nipping the yarn progressively along its length so as to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and applying steam to at least part of the yarn actually receiving twist, under conditions such that moisture is present so as to fix the different degrees of twist in the respective portions of the yarn.

10. Apparatus for the production of crêpe yarn, comprising means for twisting the yarn, means for winding the twisted yarn, means for driving said winding means at a varying rate so as to vary the degree of twist in the yarn, and means disposed between said twisting means and said winding means for fixing the twist in the yarn.

11. Apparatus for the production of crêpe yarn, comprising means for twisting the yarn, means for winding the twisted yarn, means for driving said winding means at a varying rate so as to vary the degree of twist in the yarn, nip rolls disposed so as to engage the yarn between said twisting means and said winding means and adapted to nip the yarn progressively along its length so as to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, means for moistening the yarn and means for steaming the yarn between said nip roll and said winding means.

12. Apparatus for the production of crêpe yarn, comprising means for twisting the yarn, means for winding the twisted yarn at a varying rate so as to vary the degree of twist in the yarn, nip rolls disposed so as to engage the yarn between said twisting means and said winding means and adapted to nip the yarn progressively along its length so as to restrain the tendency of high twist in portions of the yarn to run into adjacent portions of lower twist, a common driving member adapted to drive both the winding means and the nip rolls at a varying rate, and means disposed between said nip rolls and said winding means for fixing the different degrees of twist in the respective portions of the yarn.

13. Apparatus for the production of crêpe yarn, comprising means for twisting the yarn, means for winding the twisted yarn, means for driving said winding means at a varying rate so as to vary the degree of twist in the yarn, nip rolls disposed so as to engage the yarn between said twisting means and said winding means and adapted to nip the yarn progressively along its length so as to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and means disposed between said nip rolls and said winding means for fixing the different degrees of twist in the respective portions of the yarn.

14. Apparatus for the production of crêpe yarn, comprising means for twisting the yarn, means for winding the twisted yarn, means for driving said winding means at a varying rate so as to vary the degree of twist in the yarn, nip rolls disposed so as to engage the yarn between said twisting means and said winding means and adapted to nip the yarn progressively along its length so as to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and means for sizing and drying the yarn between said nip rolls and said winding means.

15. Apparatus for the production of crêpe yarn, comprising means for twisting the yarn, means for winding the twisted yarn, means for driving said winding means at a varying rate so as to vary the degree of twist in the yarn, nip rolls disposed so as to engage the yarn between said twisting means and said winding means and adapted to nip the yarn progressively along its length so as to restrain the tendency of higher twist in portions of the yarn to run into adjacent portions of lower twist, and means for steaming the yarn between said nip rolls and said winding means.

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