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T. S. MAYNER

3,001,358

BULKED CONTINUOUS MULTI-FILAMENT YARN

Filed Nov. 28, 1956

FIG. 1.

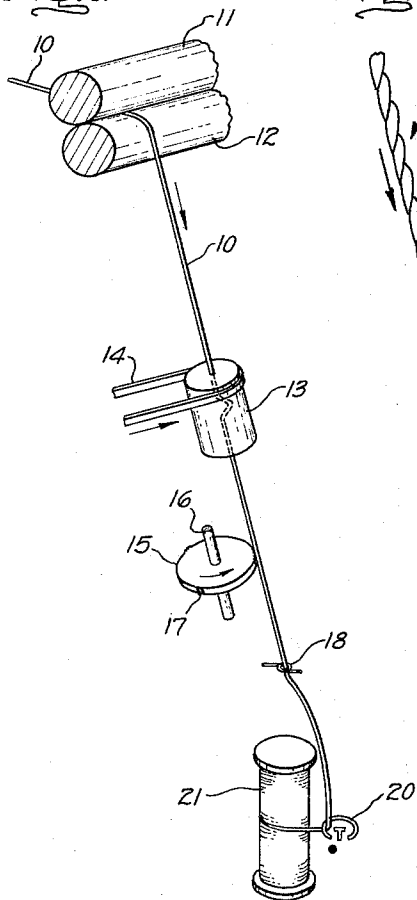


FIG. 6.

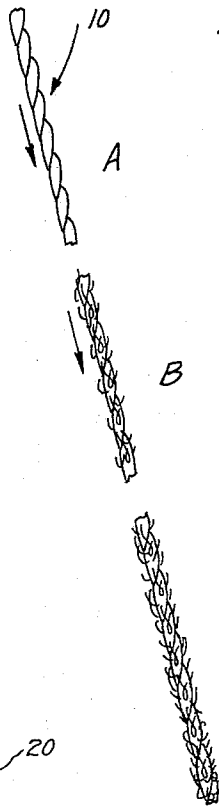


FIG. 2.

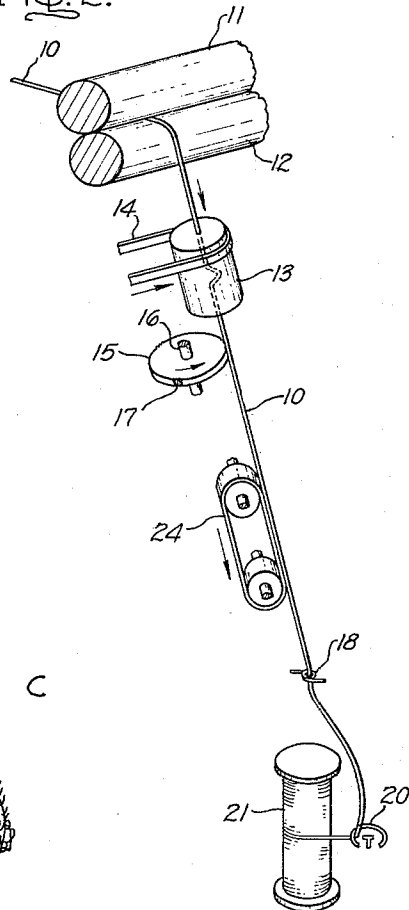


FIG. 3.

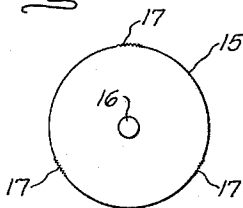


FIG. 4.

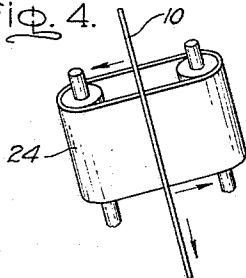
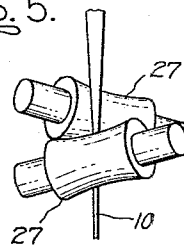


FIG. 5.



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BULKED CONTINUOUS MULTI-FILAMENT YARN
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This invention relates to a method for transforming a continuous filament yarn or thread to one of greater fullness or of increased bulk. More particularly, the method relates to the preparation of a bulky yarn having a spun or a combined spun and convoluted filament effect.

Natural fibers have bulking characteristics adapting them for greater coverage, warmth, appearance and "hand." In recent years considerable effort has been directed, through various processes, on continuous filament yarns to transform them or impart to them some or all of these characteristics. The production of bulk yarn from continuous filament has economic advantages in that a complex number of time consuming operations required in the spinning of natural fibers are avoided. Also, where a core of continuous filament yarns is utilized, bulked yarns are stronger in that the continuous filaments are able to transmit and carry imposed stresses.

Various techniques have been developed for changing the appearance of continuous filament yarns. Bulking of continuous filament yarns has been effected by a number of known processes, such as: forming loops of individual filaments; by partial severing of a traveling yarn bundle of continuous filaments; by imparting high twist then a counter-twist to a yarn bundle; and by crimping in various ways. This invention advantageously provides for a further improved method for bulking continuous filament yarn, one that provides for a simulated spun yarn also having convoluted filaments. More specifically, this invention provides for a yarn resembling spun staple yarn composed of an outer layer of substantially continuous swept-back cut filaments, swept-back and twisted about the yarn core to form loops or whorls at random intervals. The ends of the severed filament plus the loops formed at the points of bend contribute to bulkiness and an unusual and different textured appearance. The method utilized for the production of such a bulked yarn is quite simple and economical as will become apparent in the following description and accompanying drawing, where:

FIGURE 1 is a schematic representation of one form of yarn bulking apparatus wherein a false twist is imparted to traveling yarn then a peripheral severing of filaments prior to final fixation by twisting.

FIGURE 2 is a modification of the apparatus of FIGURE 1 including means for sweeping back severed filaments prior to twisting upon take-up.

FIGURE 3 represents one form of a filament severing wheel.

FIGURE 4 represents a further modified means for sweeping back and entwisting severed filaments about a traveling yarn body.

FIGURE 5 represents a further hyperboloidal means utilized for the provision of a different yarn finish; and FIGURE 6 represents in forming stages as sections A, B, and C the yarn of this invention.

Referring to FIGURE 1 of the drawing a multi-filament yarn 10 of regenerated cellulose or of purely synthetic composition is drawn from a supply at a predetermined rate by draw rollers 11, 12 and is passed through a false twister 13 rotatably supported in the line of travel of the yarn by any desired method (not shown). While passing through the twister 13 it is subjected to desired twisting (yarn section A, FIGURE 6) then substantially immediately it is led over a filament severing wheel 15 rotating on its shaft 16. The wheel 15, positioned in frictional

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contact with the running twisted yarn, desirably rotates at speeds determining frequency of filament cutting, severs the outer or surface filaments as the yarn passes over it. The twisting action on the yarn further tends to enwrap the severed ends about the yarn body. These ends are further enwrapped or entwisted by the ring twister 20 when taken-up or collected on the bobbin 21 (yarn section B, FIGURE 6).

As the multi-filament yarn 10 passes over the filament severing wheel 15 it is continually turning being rotated by the twisting device 13 to present the whole of the yarn circumference to the severing action of the wheel. The continual passage of the yarn over the wheel 15 severs the yarn filaments at various places about the circumference and along the passing twisted yarn bundle. A further variation in the yarn cutting lengths can be had by providing spaced severing sections 17 on the wheel 15 as shown in FIGURE 2, or by various yarn speeds. At the time of take-up some of the severed ends are swept-back along the yarn body by yarn guides and by the flyer of the ring twister and twisted into the yarn in such position, while others are enwrapped and thus twisted into the yarn.

Where an increase in bulkiness is desired in addition to a spun appearance the severed yarn filaments are advantageously deliberately swept-back along the yarn body for a substantial portion of their lengths. The sweeping back or change of direction of the severed filaments is effected while the yarn is turning from the position of the false twist and the swept-back filaments tend to enwrap themselves about the yarn body in a helicoidal manner providing for a loop at the point of reverse bend. A subsequent twisting of the severed and swept-back filaments permanently affixes the convolutions to yield a final yarn having loops as well as protruding ends.

The aforesaid is accomplished by the apparatus as shown in FIGURE 2, where the yarn 10 is passed through the false twister device 13 to give it a rotative motion so that the entire yarn bundle circumference is presented to the severing wheel 15. The yarn 10 then passes along an endless belt device 24, rotating in the opposite direction to the travel of the yarn, to thus sweep back the severed filaments for a substantial portion of their lengths and also to effect a helicoidal wrap of the swept-back yarn filaments about the main yarn body (yarn section C, FIGURE 6). The yarn 10 is then twisted by the ring twister 20 and collected on the package 21. The loops formed by the swept-back filaments are thus permanently fixed. A yarn thus produced, having a combined effect of loops as well as an appearance of spun yarn, advantageously provides for increased bulking properties.

Where increased wrapping of the severed filaments is desired about the main yarn body to provide for a still further effect the yarn, advantageously, is passed over an endless belt 24 of FIGURE 5 that is rotating transversely to the passing yarn rather than counter its movement. The severed filaments are enwrapped about the yarn in a helical manner, the final yarn having loops at the turn-back points and a twisted appearance. Also, where the bulking is to be minimized and a tighter cloth effect is desired, the yarn, having severed and swept-back filaments, can be passed through a pair of hyperboloidal rolls 27 as shown in FIGURE 6, prior to collection on the ring twister. This will produce a smoother yarn with less hairiness and with an appearance resembling combed yarn. The rolls 27 can be used in lieu of the endless belt 24, if desired, or in series with it depending upon final desired yarn appearance.

What is claimed is:

1. A bulky continuous multi-filament yarn comprising, an inner core of continuous filaments, and an outer sur-

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face of loops and ends entwisted in position and formed by sweeping back severed peripheral filaments along the length of the yarn.

2. A bulky continuous multi-filament yarn comprising, an inner core of a plurality of continuous filaments and an outer surface of randomly severed filaments turned back along the length of said core and enwrapped thereabout.

3. A bulky continuous multi-filament yarn comprising, an inner core of a plurality of continuous filaments and an outer surface of randomly severed filaments turned back along the length of said core and helically en-

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wrapped thereabout having formed loops at the points of reversal.

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