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SYNTHETIC THREAD AND METHOD OF PRODUCING THE SAME

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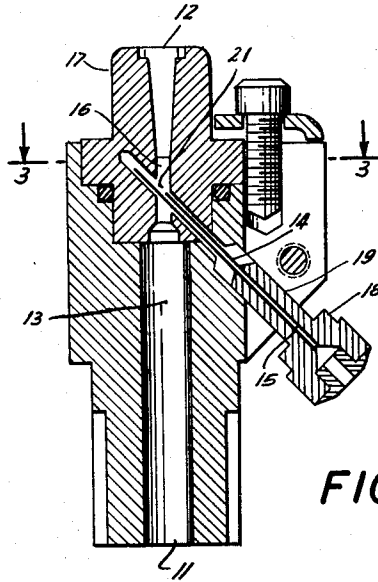


FIG. 1

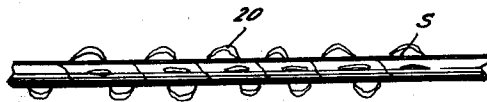


FIG. 2

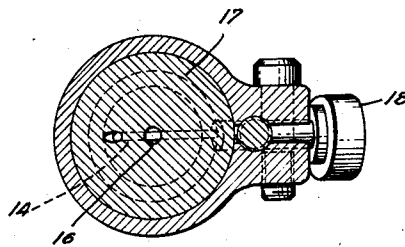


FIG. 3

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SYNTHETIC THREAD AND METHOD OF PRODUCING THE SAME

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4 Claims. (Cl. 57—140)

This invention relates to a synthetic or artificial thread and to a method of producing the same.

The thread may be produced from thermoplastic filaments such as that obtained from polyamides of the nylon type, polymerized acrylics, polystyrene, polyesters, rayon polymers, cellulose acetate, regenerated cellulose and the like.

Conventional threads produced from artificial filaments have a tendency to sever or cut by cross threads and the severed threads being relatively smooth and compact will pull out from woven or sewed condition so as to leave runs or allow seams to open. The present invention, therefore, has for an object to produce a synthetic or artificial thermoplastic thread which will form a seam that will not run back or slip when employed as a sewing thread.

Another object of the invention is to provide a synthetic thermoplastic thread having a fibrous surface whereby a relatively rougher surface and increased bulk is imparted thereto. The increased roughness and bulk prevents relative slippage of the thread and the thread more closely fits the eye of the usual sewing machine needle. Furthermore, when used for sewing the increased roughness and bulkiness reduces the temperature of the sewing machine needle which has been one of the problems encountered in the use of conventional synthetic thermoplastic thread.

Another object of the invention is to provide a synthetic or artificial thermoplastic thread which has advantages for use as a sewing machine thread.

Another object of the invention is to provide a synthetic or artificial thermoplastic thread which has advantages over the conventional type of thermoplastic thread for tailoring purposes whereby the improved thread is less conspicuous and color matching may be improved due to the roughness of the surface.

The invention also relates to a method of producing a synthetic or artificial thermoplastic thread of the aforesaid character.

In carrying out the process a plurality of artificial thermoplastic filaments are twisted to impart any desired number of turns thereto and the resulting strand is then treated to distort the filaments to produce a fluffing out thereof from the surface of the strand in the form of loops with a resulting increase in bulkiness of the strand and a reduction in length thereof. This may be carried out as shown in the drawings in which:

Fig. 1 is a sectional view of an air nozzle through which the twisted strand is passed for producing the looping fibrous characteristics to the surface thereof.

Fig. 2 is a view of the completed thread.

Fig. 3 is a sectional view taken approximately on line 3—3 of Fig. 1.

The air nozzle illustrated in the drawings is formed with an air inlet 11, an air outlet 12 and a passageway 13 therebetween. A needle 14 having an opening 15 there-through extends into the nozzle with the inner end 21 thereof opening into a venturi 16 of a tubular member 17 secured in the outlet end of the passageway 13. The

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needle 14 is mounted in a plug 18 secured in an opening 19 in the nozzle.

A strand composed of a plurality of thermoplastic filaments is drawn through the needle 14 and then through the venturi 16 and out through the outlet end 12. The venturi 16 constricts the air passageway so as to materially increase the velocity of the air at the location where the strand enters the venturi. This produces a fluffing out of the filaments of the strand in the form of loops 20 as well as an increase in bulkiness and reduction in the length of the strand. The increased bulkiness in the strand may vary from 2 to 30 percent and the reduction in the length of the strand may also vary from 2 to 30 percent. The pressure of the air at the inlet of the nozzle may be 45 pounds per square inch and the strand may be drawn through the nozzle at a rate of 100 yards per minute for certain types of thermoplastic filaments.

The thread is produced in accordance with the following steps:

A plurality of continuous thermoplastic filaments are twisted to impart any desired number of turns ranging from two turns per inch to twenty five turns per inch and preferably twelve to fourteen turns per inch.

The strand is then treated to distort the filaments to produce a fluffing out thereof from the surface of the strand in the form of loops with a resulting increase in bulkiness of the strand and a reduction in length thereof.

The twisted and treated strand is again twisted in the same direction as in the direction of the original twist imparted thereto. Eight to thirty additional turns per inch may be imparted thereto varying with the type and size of the thread to be produced. On coarse strands no additional twist may be required.

Several of the twisted and treated strands are then twisted together, the direction of twisting being opposite to that imparted to the individual strands. The number of strands twisted together may consist of two to ten and the turns per inch imparted thereto are usually somewhat less in number than the total number of turns imparted to the filaments in producing the strands.

The twisted strands are then stabilized by setting with heat or steam or other suitable means to complete the formation of the thread S.

Instead of stabilizing the strands by heat or steam, each strand may be stabilized by coating the same with an adhesive applied thereto after the strand has been treated to form the loops 20 in the filaments. The adhesive may consist of six parts nylon resin dissolved in eighty-four parts ethyl alcohol and ten parts of water after which the adhesive is dried. The resulting adhesive coating consists of approximately 5% of the weight of the finished thread.

The following are examples of the thread produced in accordance with the invention:

Example 1

Using 70 denier composed of 34 nylon filaments, twist 12 right hand turns per inch to form a strand.

Treat the strand to impart the loops 20 to the filaments thereof with a reduction of 10 percent in length.

Twist the treated strand to impart 11 right hand turns per inch.

Twist three of the treated and twisted strands together to impart 17 left hand turns per inch to form the thread.

Stabilize the thread by heat or steam or stabilize each strand by coating the same with an adhesive after the same has been treated to form the loops 20 in the filaments.

Example 2

Using 100 denier composed of 34 nylon filaments, twist 12 left hand turns per inch to form a strand.

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Treat the strand to impart the loops 20 to the filaments thereof with a reduction of 10% in length.

Twist the treated strand to impart 9 left hand turns per inch.

Twist three of the treated and twisted strands together to impart 15 right hand turns per inch to form the thread.

Stabilize the thread by heat or steam or stabilize each strand by coating the same with an adhesive after the same has been treated to form the loops 20 in the filaments.

Example 3

Using 210 denier composed of 34 nylon filaments, twist 12 right hand turns per inch to form a strand.

Treat the strand to impart the loops 20 to the filaments thereof with a reduction of 10% in length.

Twist four of the treated and twisted strands together to impart 10 left hand turns per inch to form the thread.

Stabilize the thread by heat or steam or stabilize each strand by coating the same with an adhesive after the same has been treated to form the loops 20 in the filaments.

Example 4

Using a bundle of any desired number of thermoplastic filaments, form a strand of any desired denier.

Treat the strand to impart the loops 20 to the filaments thereof with any desired reduction in length.

Twist any desired number of the treated strands together to impart any desired number of turns thereto per inch to form a thread.

Stabilize the thread in any desired manner.

Example 5

Using 70 denier composed of 34 nylon filaments, treat to impart loops 20 to the filaments thereof with a reduction of 5% in length.

Twist the treated filaments 22 right hand turns per inch to form a strand.

Twist 2 of the treated and twisted strands together to impart 17 left hand turns per inch to form the thread.

Stabilize the thread by heat or steam or stabilize each strand by coating the same with an adhesive after the same has been treated to form the loops 20 in the filaments and twisted.

What is claimed is:

1. A method of producing a thermoplastic sewing thread comprising twisting a plurality of thermoplastic filaments together in one direction a plurality of times per inch of length to provide a strand of twisted filaments, treating the strand to form outwardly projecting loops in the filaments thereof, twisting the treated strand not less than eight nor more than thirty additional turns per inch of length in the same direction as the original twist, twist-

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ing a plurality of said treated and twisted strands together a plurality of times per inch of length in a direction opposite to the aforesaid twisting to thereby form a thread, and treating the thread to stabilize the same.

2. A method of producing a thermoplastic sewing thread comprising twisting a plurality of thermoplastic filaments together in one direction a plurality of times per inch of length to provide a strand of twisted filaments, treating the strand to shorten the same and to form outwardly projecting loops in the filaments thereof, twisting the treated strands not less than eight nor more than thirty additional turns per inch of length in the same direction as the original twist, twisting a plurality of said treated and twisted strands together a plurality of times per inch of length in a direction opposite to the aforesaid twisting to thereby form a thread, and treating the thread to stabilize the same.

3. A method of producing a thermoplastic sewing thread comprising twisting a plurality of thermoplastic filaments together in one direction a plurality of times per inch of length to provide a strand of twisted filaments, treating the strand to shorten and increase the bulkiness of the same and to form outwardly projecting loops in the filaments thereof, twisting the treated strand not less than eight nor more than thirty additional turns per inch of length in the same direction as the original twist, twisting a plurality of said treated and twisted strands together a plurality of times per inch of length in a direction opposite to the aforesaid twisting to thereby form a thread, and treating the thread to stabilize the same.

4. A thermoplastic sewing thread composed of a plurality of strands twisted together a plurality of times in a uniform direction, each of said strands being composed of a plurality of thermoplastic filaments having outwardly projecting loops arranged at random intervals along the filaments, and the thermoplastic filaments of each of said strands being twisted together not less than eight nor more than thirty turns per inch of length in a direction opposite to the aforesaid twisting of the strands whereby the aforesaid loops of the filaments are arranged within and on the surface of the body of each strand.

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