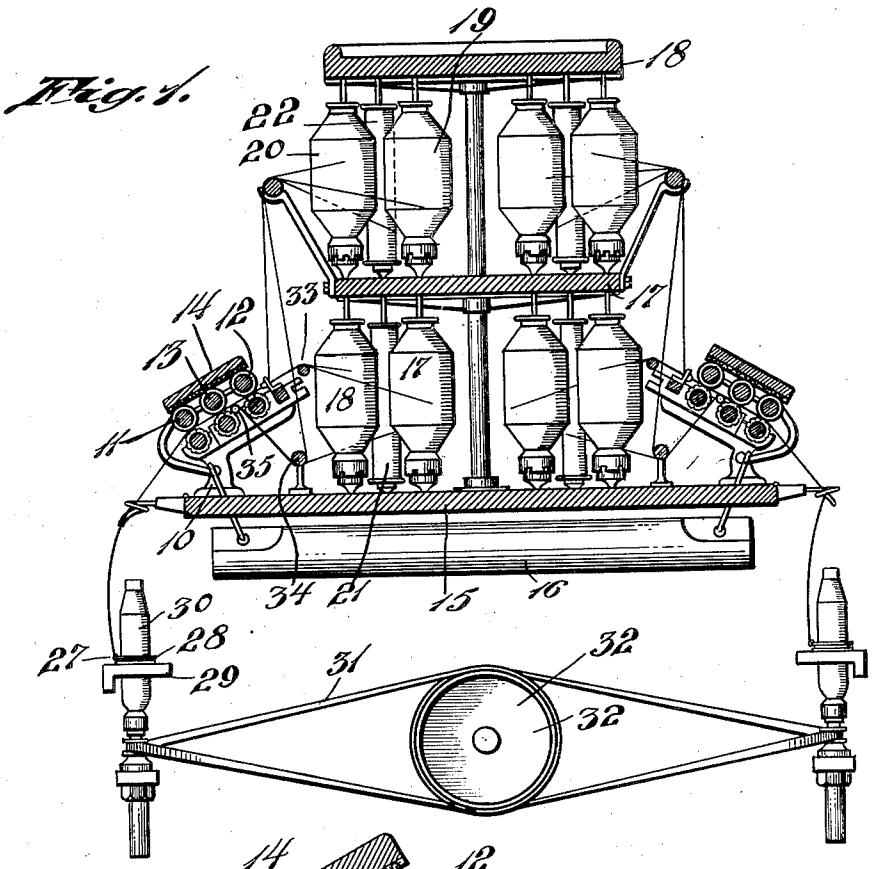
April 6, 1937. T. HARRIS 2,076,270

METHOD OF MAKING COVERED ELASTIC THREADS

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Fig. 1.



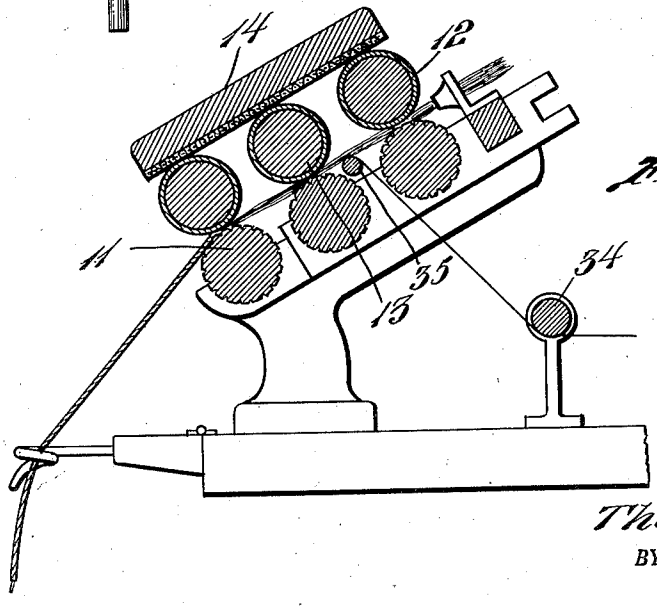


Fig. 2.

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Fig. 3.

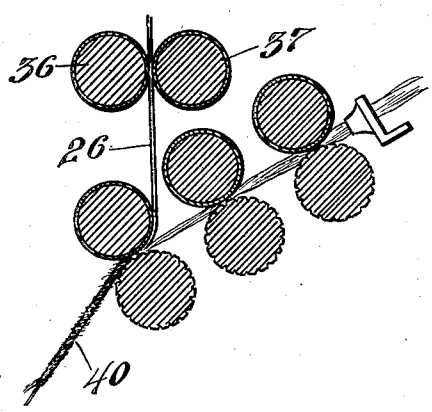


Fig. 4.

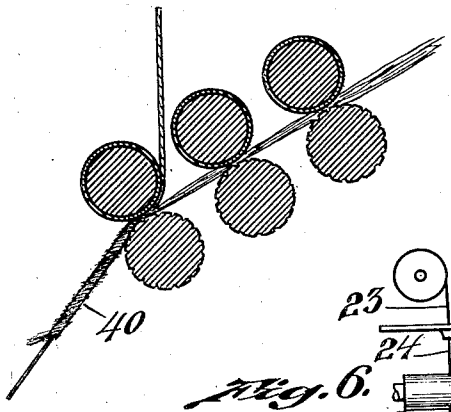


Fig. 5.

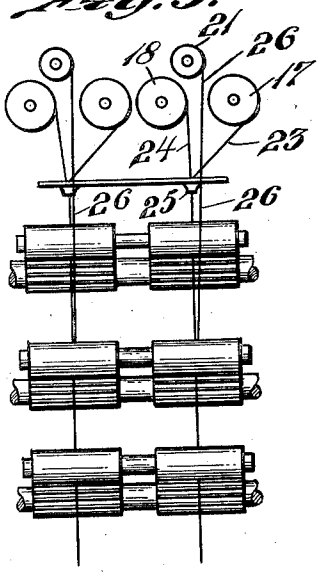


Fig. 6.

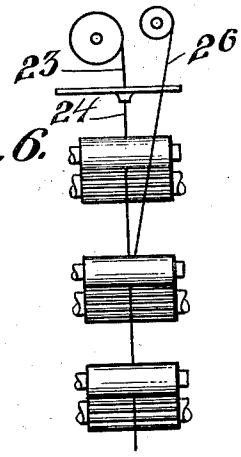


Fig. 7.



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UNITED STATES PATENT OFFICE

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METHOD OF MAKING COVERED ELASTIC THREADS

Thomas Harris, Providence, R. I., assignor to Harris Textile Machinery Corporation, a corporation of Rhode Island

Application August 15, 1935, Serial No. 36,300

7 Claims. (Cl. 117—35)

This invention relates to covered elastic threads and the method of making the same; and has for one of its objects a method by which an improved elastic thread may be made which will be more completely covered and yet will have more freedom of expansion and contraction than one which is covered by a twister thread wrapped about an elastic core.

Another object of the invention is the method by which untwisted fibers may be positioned about an elastic core and securely held thereon.

Another object of the invention is the utilization of a method by which the covering may be formed from a single end or a plurality of ends of fibrous material extending through the same delivery rolls and wrapped either singly or in multiple about an elastic core, without having been previously, separately twisted.

Another object of the invention is a method by which the usual drafting frame may be used and the elastic core merely introduced to be delivered through the rolls which deliver the attenuated yarn, to serve as a core about which the yarn may be wrapped as it is twisted into the final form of the thread desired.

Another object of the invention is the stretching of an elastic core simultaneously with the attenuation of the yarn used for covering the core and in some instances by the same means as that used for operating upon the covering yarn.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a sectional view looking endwise of a spinning frame and showing the creel, the drafting rolls and the ring and traveler for operating upon the finished yarn;

Fig. 2 is an enlarged sectional view similar to Figure 1, showing the drafting rolls and clearer board;

Fig. 3 is a view similar to Figure 2 showing an additional set of rolls;

Fig. 4 is a view similar to Figure 2 of a modified arrangement of feeding the rubber core and showing twist therein;

Fig. 5 is a diagrammatic top plan view showing the arrangement of the rolls and the plurality of ends passing therethrough;

Fig. 6 is a top plan view similar to Figure 5 of a diagrammatic formation showing a single end of covering thread;

Fig. 7 is an elevation of a fragmental portion of the covered thread.

Commercial elastic yarn usually consists of a rubber core about which there is helically wrapped a twisted thread of fibrous material. This twisted thread is wrapped about the core when the core is stretched and prevents contraction of the thread from its original size to leave the core constantly under tension. On the other hand, if the thread were not stretched to its limit when covered, this covering will restrict the thread to a certain amount and prevent it from stretching to the extent it would without the covering. Further than this, spaces are usually formed between the twisted thread which covers the rubber core when stretched and also frequently when contracted; and in order that a more improved thread may be formed, I have provided a covering of fibers which have been relatively untwisted by utilizing the usual drafting frame through which the fibers are delivered and introduce into this machine a core of rubber which may be passed through the delivery rolls or passed through two pairs of nip rolls to be attenuated with the covering fibers and then cause the untwisted fibers as they are delivered from the drafting frame and while in the usual process of being twisted into a thread to at the same time be twisted about a rubber core which may be stretched as desired and when contraction takes place I have a more completely covered core and one in which there is more freedom for both stretching and contracting than where a core is covered with a previously twisted thread which is of such strength as to restrict and bind the rubber limiting its stretching and contracting, and I may use for my covering either a single end of drafted fibers or a plurality of ends of fibers depending upon certain results which I desire; and the following is a more detailed description of the present embodiment of this invention illustrating the preferred means by which these advantageous results may be accomplished.

With reference to the drawings, 10 designates a standard of a drafting frame having delivery pairs of rolls 11, receiving pairs of rolls 12 and intermediate pairs of rolls 13. A cleaning board 14 is shown in engagement with the upper rolls. A usual weighting means for the rolls is provided, there being shown only the common weight 16 for applying pressure to the front or delivery pairs of rolls 11 which is positioned beneath the platform 15 upon which the standards 10 of the frame are mounted.

The usual creel, consisting of decks 17, 18 is

superimposed above the platform 15, supports the supply packages 17, 18, 19 and 20 of non-elastic covering material and also the supply packages 21 and 22 of elastic material for each of the frames, it being understood that there are a plurality of the ends supplied through different rolls or roll sections along the length of the frame.

The showing in Figure 1 illustrates a pair of ends which are more clearly diagrammatically shown in Figure 5 at 23 and 24, being drawn from a pair of packages such as 17 and 18 through a trumpet 25 and passing between the sets of the upper and lower roll sections 11, 12 and 13 where draft occurs; while the elastic core of naked rubber designated 26 is supplied from a package such as 21 and is so arranged as to pass beneath the intermediate pairs of nip rolls 13 and then through the delivery pairs of nip rolls 11 from which last pair of nip rolls the entire strand is twisted. There is more tension upon the rubber than upon the non-elastic fibers, causing the non-elastic fibers to be twisted about the rubber as a core in such a manner as to completely cover the same as at 40 in Figures 3, 4 and 7. This twist takes place between the nip of the delivery roll 11 and the traveler 27 on the ring 28 mounted on the rail 29, which ring encircles a bobbin 30 and by the usual traverse motion of this rail 29 the thread is caused to be laid upon the bobbin 30 in the usual manner. The spindle for the bobbin 30 is driven by a belt 31 from a drum 32.

In order to suitably guide the non-elastic strand which is to be attenuated through the rolls, I provide a guide 33 at the desired elevation just ahead of the trumpet 25, while a guide 34 is provided for the naked rubber core which may be so arranged as to cause the rubber to clear contact with the lower receiving roll 12 and by reason of the provision of another rod 35 between the lower rolls of the pairs 12 and 13, see Figure 2 for a large showing of this structure shown in Figure 1, the rubber core will clear a large portion of the surface of the lower intermediate roll. By this arrangement the non-elastic fibers as they are attenuated at the time of their being twisted are twisted about the rubber core rather than being previously twisted and then wound upon a rubber core as is usual. By passing the rubber core 26 through the pairs of rolls 13 and 11, it is placed under the desired degree of stretch just prior to its being covered with the untwisted fibers.

This rubber core 26 instead of being passed through the pairs of rolls 13 and 11, as shown in Figures 1, 2 and 4, may be passed between a separate and distinct pair of nip rolls designated 36, 37, in Figure 3, which may be driven at a different rate than the pairs of rolls 13 so as to provide a different stretch in the rubber than could be afforded by the same rolls as 13 and 11 in Figure 2, which are used to attenuate the yarn, or in some cases the rubber may be supplied directly to the delivery rolls with the elimination of rolls 36 and 37 and without stretching it by means of rolls in any manner, see Figure 4.

The covering is supplied through one trumpet, either in the form of a single end or a pair of ends 23 and 24, or any desired number of ends, the combined amount being that which is desired for the thickness of covering on the elastic core when finished.

In Figure 6, I have illustrated a single end 24 utilized with a single core of rubber 26 which for most purposes is desirable as I have found that a single end of the desired weight is better than two ends of half the weight and the single end will provide a more compact covering than where the two ends are used as it seems in the use of two ends that the rubber tends to separate the two ends of covering, causing spaces to be formed along the length, whereas when a single strand is used it wraps more tightly about the rubber core and provides a better covered yarn which is more desirable for most purposes.

The non-elastic strands as they come through the drafting rolls are relatively untwisted, the twist being placed in the strand between the nip of the delivery pair of rolls 11 and the traveler. However, at the same time the twist occurs in the cover a twist will also be placed in the rubber core and as it is frequently desirable to have no twist in the rubber core, or a very slight amount of twist, I will twist the rubber core in the opposite direction the same number of turns which would be placed in it between the pair of rolls 11 and the traveler, so that the twist will balance and there will be no twist in the rubber core in the finished product, or if I wish a little twist I may vary this amount of twist previously put into the rubber core to obtain the desired result.

Thus by my method of operation, I am enabled to utilize the ordinary drafting machine and instead of first twisting the fibers which come through the drafting machine and then wrapping them about a rubber core, I will wrap the fibers directly around the rubber core previous to the twisting, the twisting all taking place in wrapping them about the core; and by this method I am enabled to provide a thread which is more flexible in its extension and contraction than threads which have heretofore been formed of twisted non-elastic fibers, and yet my thread is one which is more completely covered and thus one which is more desirable for knitting, weaving, braiding or for other purposes of use.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. The method of forming a covered elastic thread, which consists in attenuating non-elastic fibers and by the same means stretching an elastic strand, and then twisting said non-elastic fibers and elastic strand in a manner to cause the non-elastic fibers to twist about said elastic strand and cover the same.

2. The method of forming a covered elastic thread, which consists in attenuating non-elastic fibers and by the same means attenuating an elastic strand, and then twisting said non-elastic fibers and elastic strand and maintaining them under such relative tensions as to cause the non-elastic fibers to twist about said elastic strand and cover the same.

3. The method of forming a covered elastic thread, which consists in attenuating a plurality of non-elastic fibers and by the same means stretching an elastic strand, and then twisting said non-elastic fibers and elastic strand and maintaining them under such relative tensions as to cause the non-elastic fibers to twist about said elastic strand and cover the same.

4. The method of forming a covered elastic thread comprising a tensioned twisted elastic strand having an outer covering of attenuated

non-elastic fibers which consists in attenuating the non-elastic fibers and without frictionally holding the elastic strand to tension the same, and by the same means positively controlling and stretching the elastic strand, and then twisting said non-elastic fibers and the elastic strand in a manner to cause the non-elastic fibers to twist about said elastic strand and cover the same.

5. The method of forming a covered elastic thread, which consists in passing a sliver of raw non-elastic fibers and an elastic strand between separated pairs of nip rolls which are in nipping engagement with the non-elastic fibers and the elastic strand, attenuating the non-elastic fibers during passage between one pair of the nip rolls and simultaneously elongating the elastic strand by passage between another pair of nip rolls, and thereafter twisting said non-elastic fibers and elastic strand in a manner to cause the non-elastic fibers to twist about said elastic strand and cover the same.

6. The method of forming a covered elastic thread, which consists in passing a plurality of ends of loose untwisted non-elastic fibers and an elastic strand between separated pairs of nip rolls which are in nipping engagement with the non-elastic fibers and the elastic strand, attenuating the non-elastic fibers during passage between one pair of the nip rolls and simultaneously elongating the elastic strand by passage between another pair of nip rolls, and thereafter twisting said non-elastic fibers and elastic strand in a manner to cause the non-elastic fibers to twist about said elastic strand and cover the same.

7. The method of forming a covered elastic thread, which consists in pulling a strand of loose untwisted non-elastic fibers and an elastic strand by retarding each strand at a plurality of separated points simultaneously and at points spaced from each strand supply, said points for each strand being different to attenuate the non-elastic fibers and at the same time to provide a desired stretch in the elastic strand, and then twisting the attenuated and stretched strands at the final nip point in a manner so as to cause the non-elastic fibers to twist about said elastic strand and cover the same.

THOMAS HARRIS.