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PRODUCTION OF EXTENSIBLE BUNDLES OF ARTIFICIAL THREADS

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Fig. 1

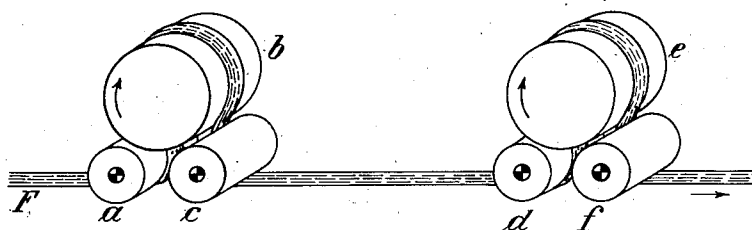


Fig. 2

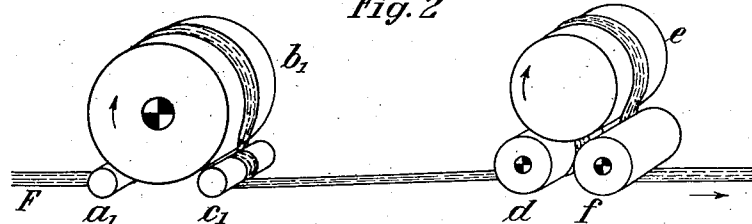


Fig. 3

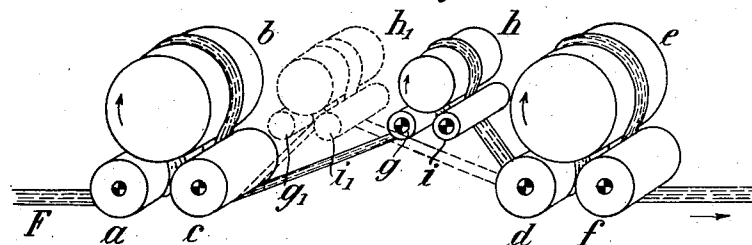


Fig. 4

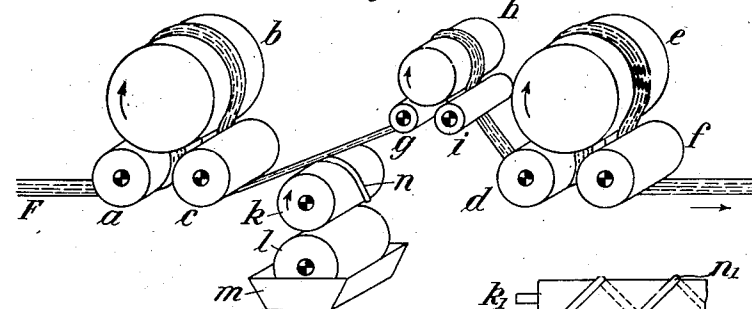


Fig. 5.



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PRODUCTION OF EXTENSIBLE BUNDLES OF
ARTIFICIAL THREADS

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5 Claims. (Cl. 19—1)

Our present invention relates to the conversion of a bundle of continuous artificial fibers into an extensible band.

One of its objects is a process for making a bundle of continuous artificial fibers into an extensible band which can be worked up on the machines known from wool spinning or flax spinning. Another object is an apparatus for this purpose. Further objects will be seen from the detailed specification following hereafter.

It has frequently been proposed that a bundle of continuous artificial fibers should be subjected to the section of a tearing device in order to obtain a longitudinally extensible bundle of torn artificial fibers. In the suggested processes, however, the bundle, during the tearing operation, is subjected to a considerable mechanical strain due to pressure, whereby the constituents of the bundle are injured in such a manner that from the sliver obtained there can be produced only a yarn having a woolly, rough appearance.

It is the object of this invention to reduce the bundle of artificial threads to staple lengths by drawing without applying pressure to the fibrous material. By avoiding pressure during the drawing operation, there may be produced a yarn which has a smooth appearance resembling that of linen or schappe and previously unobtainable by a tearing process.

According to the invention the tension necessary for drawing the continuous threads in the bundle is not applied to the travelling bundle by a gripping action involving pressure but by a braking action, due, for instance, to friction with a surface. For this purpose the bundle is guided over rollers or rods which in part are mounted to be movable in controllable manner and in part mounted to be movable or stationary; or over such rollers and rods in a combined system.

In a preferred form the feed and draft mechanism each comprises three or more rollers, wherein the rollers of the draft mechanism run at a greater peripheral speed than do those of the feed mechanism. By this expedient a bundle of continuous fibers while travelling from one roller system to the next is subjected to a tearing action, and the fibers are broken into pieces that are shorter than is the distance between the roller systems.

It has proved useful to adopt as a roller system not an aggregate of rollers, but a combination of a driven roller which may be a porcupine roller or the like, and of fixed rods, about which, for realizing a better braking effect, the fiber bundle to be treated may be wound in one or more turns.

Guiding such bundles round rods while avoiding mutual friction of the turns of the fiber bundle, is known.

In another form of mechanism for the invention there is inserted between the feed roller system and the draft roller system another stretching device displaceable both in a horizontal plane and in a vertical plane and capable thus of any variation of its position with regard to the feed system and the draft system.

It has further proved advisable to prepare the fiber bundle for breakage at predetermined places by continuously wetting it periodically in known manner, either between the feed system and the draft system or between the feed system and the said stretching device.

The accompanying drawing illustrates in Figs. 1, 2, 3 and 4 respectively, in diagrammatic elevation, four systems of rollers or rollers and rods suitable for practising the invention. In each the fiber bundle is indicated by F; it travels in the direction marked by the arrow, that is from left to right. Fig. 5 shows a helical arrangement of the wetting fillet.

In Fig. 1, *a*, *b* and *c* represent the feed mechanism, and *d*, *e* and *f* represent the draft mechanism. The rollers *a*, *c*, *d* and *f* (hatched axles) are driven, whereas the rollers *b* and *e*, being idle rollers, are driven by the rollers *a* and *c*, and *d* and *f* respectively. The rollers *d* and *f* of the draft mechanism are driven at a higher peripheral speed than the rollers *a* and *c* of the feed mechanism, whereby the fiber bundle becomes torn between the rollers *c* and *d*.

In Fig. 2 the feed mechanism for instance consists of two glass rods *a*₁ and *c*₁ and of a driven roller *b*₁, the latter being a porcupine roller in order to ensure that the fiber bundle is the better braked thereby. The braking action may be increased by guiding band F once or several times around the rod *a*₁ or *c*₁ or both.

Fig. 3 shows a band stretching device between the feed mechanism and the draft mechanism. This device, too, is a three roller system, *g*, *h* and *i*, wherein the rollers *g* and *i* are driven. If the length of the fiber bundle between the rollers *i* and *d*, that is to say the length on which tearing of the bundle occurs, is to be increased between the rollers *i* and *d*, the stretching mechanism has to be displaced towards the feed mechanism that is in the case of Fig. 3 to the left, as is indicated by the dotted lines (*g*₁, *h*₁, *i*₁). For varying the angular position of the stretching device relative to the feed and the draft mechanism, the stretching device may be displaceable in a vertical plane.

The use of such a stretching device makes it possible that the tension, which produces tearing between the rollers *i* and *d*, may increase progressively from the roller *c*. To this effect the rollers *g* and *i* of the stretching device are driven at a peripheral speed higher than that at which the rollers *a* and *c* of the feed mechanism are driven and the rollers *d* and *f* of the draft mechanism are driven at a peripheral speed higher than that at which the rollers of the stretching device are driven.

Fig. 4 shows the use of the wetting device *k*, *l*, *m*. The wetting liquid is contained in the trough *m* and by means of a revolving roller *l* is applied on the wetting fillet *n* of the roller *k* which revolves at a controllable speed. The fillet may be arranged in any way, for instance, obliquely on the surface of the roller or helically on the roll, as represented by *n*₁ on roller *k*₁, as shown in Fig. 5.

The following example serves to illustrate the invention:

An endless bundle of artificial fibers of about 60,000 deniers is fed to a tearing device having on the feeding side and on the tearing side three aggregates of rollers. Each aggregate consists of three rollers arranged in the manner shown in Fig. 1. The upper roller has a diameter of 60 mm. and the lower roller has a diameter of 42 mm. The breaking distance, that is to say the distance between the last lower roller on the feeding side and the first roller on the tearing side is 150 mm. The speed at which the fiber band is fed amounts to 10 meters per minute and the speed at which the band is torn amounts to 20 meters per minute. In this manner an extensible bundle of artificial fibers is obtained which can be worked up for textile purposes on the machines known from wool spinning and flax spinning.

What we claim is:

1. An apparatus for converting a bundle of continuous artificial fibers into an extensible bundle of artificial fibers which comprises aggregates of three cylindrical elements constituting a feed mechanism, said cylindrical elements being spaced apart so that a bundle of continuous artificial fibers fed by said aggregates is not pressed, aggregates of three cylindrical elements constituting a draft mechanism, said cylindrical elements being spaced apart so that a bundle of artificial fibers is not pressed, and a bundle of artificial fibers engaging said cylindrical elements frictionally.

2. An apparatus for converting a bundle of continuous artificial fibers into an extensible bundle of artificial fibers which comprises aggregates of three rollers constituting a feed mechanism, said rollers being spaced apart so that a bundle of continuous artificial fibers fed by said aggregates is not pressed, aggregates of three rollers constituting a draft mechanism, said rollers being spaced apart so that a bundle of artificial fibers is not pressed, and a bundle of artificial fibers engaging said rollers frictionally.

3. An apparatus for converting a bundle of continuous artificial fibers into an extensible bundle of artificial fibers which comprises aggregates of a roller and two rods constituting a feed mechanism, said rollers and said rods being spaced apart so that a bundle of continuous artificial fibers fed by said aggregates is not pressed, aggregates of three rollers constituting a draft mechanism, said rollers being spaced apart so that a bundle of artificial fibers is not pressed, and a bundle of artificial fibers engaging said rollers and said rods frictionally.

4. An apparatus for converting a bundle of continuous artificial fibers into an extensible bundle of artificial fibers which comprises aggregates of three rollers constituting a feed mechanism and a draft mechanism, said rollers in each aggregate being spaced apart so that a bundle of continuous artificial fibers fed by said aggregates is not pressed, a stretching device of three rollers between said feed mechanism and said draft mechanism, said rollers of said stretching device being spaced apart so that a bundle of artificial fibers is not pressed and being capable of displacement in a horizontal and in a vertical plane, and a bundle of artificial fibers engaging said rollers frictionally.

5. An apparatus for converting a bundle of continuous artificial fibers into an extensible bundle of artificial fibers which comprises aggregates of three rollers constituting a feed mechanism and a draft mechanism, said rollers in each aggregate being spaced apart so that a bundle of continuous artificial fibers fed by said aggregates is not pressed, a wetting device arranged between said feed mechanism and said draft mechanism for wetting a bundle of artificial fibers passing from said feed mechanism to said draft mechanism, and a bundle of artificial fibers engaging said rollers frictionally.

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