April 21, 1942. O. VON KOHORN ZU KORNEGG 2,280,326

METHOD FOR MANUFACTURING STAPLE FIBER WITH HIGH STRETCHING CAPACITY

Original Filed June 3, 1935

Fig. 1.

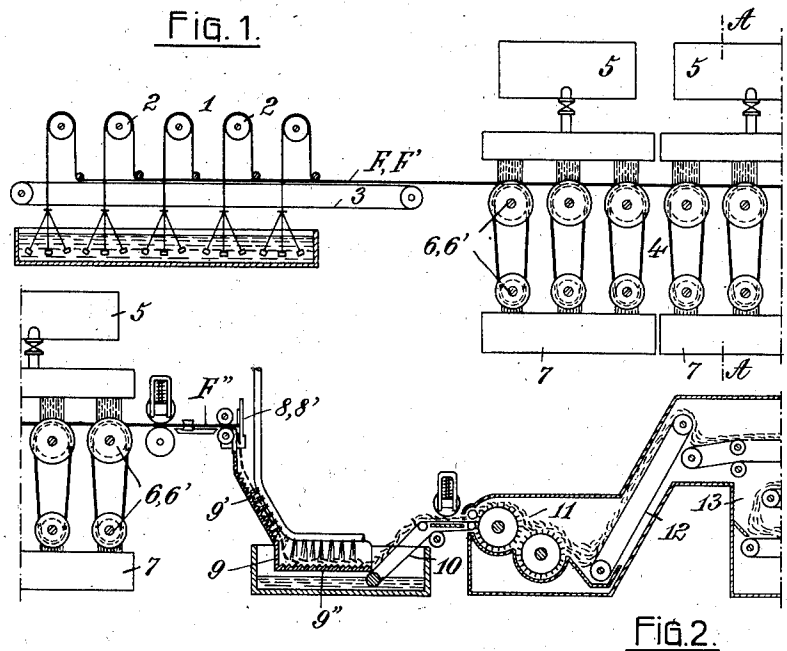


Fig. 2.

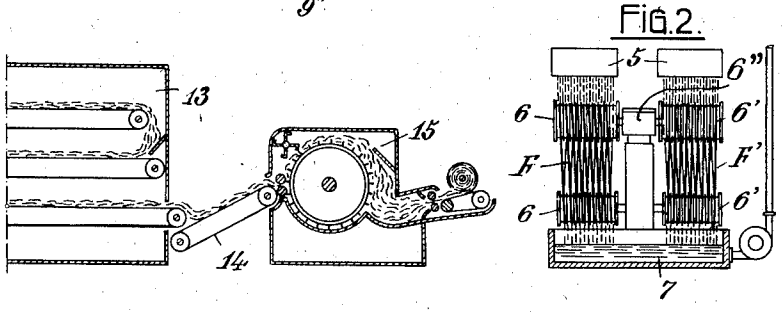
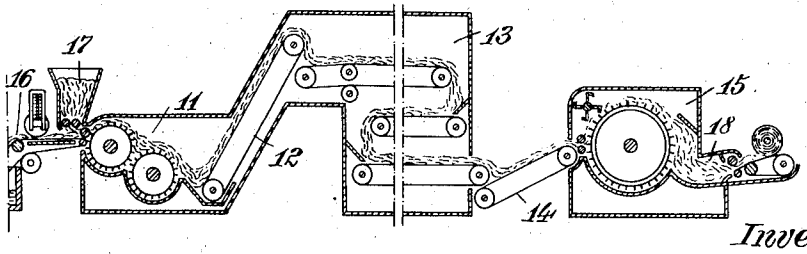


Fig. 3.



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METHOD FOR MANUFACTURING STAPLE FIBER WITH HIGH STRETCHING CAPACITY

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Application October 21, 1938, Serial No. 236,201, which is a division of application Serial No. 24,750, June 3, 1935. Divided and this application April 12, 1940, Serial No. 329,218

2 Claims. (Cl. 18—54)

The present invention relates to a process and plant for the continuous manufacture of staple fibers from artificial threads, more particularly artificial threads produced from viscose or other cellulose derivatives. In this process and plant, the cutting of the threads to staple length is carried out after the after-treatment and before drying, in one of at least two cutting devices, to be used alternatively. Due to the fact that the drying takes place on the comparatively short staples and not on the continuously running bundle of threads, the material is afforded a better opportunity of shrinking and twisting so that the final product produced according to this form of construction has a far higher stretching capacity than when the cutting of the staples takes place on the previously dried bundles of fiber. The cut staples may be subjected to an additional treatment by softening or curling agents before they are introduced into the drier.

This application is a division of my application Serial No. 236,201, filed October 21, 1938, the latter being a divisional application of application Serial No. 24,750, filed June 3, 1935, and issued as U. S. Patent No. 2,134,160 on October 25, 1938.

The above mentioned features and advantages as well as other features and advantages will be more fully disclosed in the following specification reference being had to the accompanying drawing forming a part of this specification, in which:

Fig. 1 is a diagrammatical side view of a plant for carrying out my process, partly in section. For the convenience of illustration, this figure has been divided into three parts.

Fig. 2 is a sectional view of the part of the plant in which the threads are treated with liquids, taken on line A—A of Fig. 1.

Fig. 3 shows a top plan view of the cutting device on an enlarged scale.

In Figs. 1 and 2, the threads, (for example artificial silk threads) spun in the spinning machine 1 on both sides thereof are led over rollers 2 to a band conveyor 3 situated in the centre of the machine and carrying them in the form of two bundles of threads F and F' out of the spinning machine and into the after-treatment machine 4. The latter is made in two sections (see Fig. 2). The bundle of threads F is after-treated in one side of the machine and the bundle of threads F' on the other side. This subdivision of the after-treatment machine into two parts is important, because experience has shown that the after-treatment of the continuously running bundles of threads requires careful attention and occasional intervention on the part of the attendants, the accessibility being in that case limited by the length of the arm. Subdivision in two parts in this case renders it possible in a very simple manner to attend the machine from two sides, so that in such an after-treatment machine it is possible to attain double the capacity of the known construction, in which attention or access is only possible from one side.

The after-treatment comprises, in the known manner, a sequence of a plurality of treatment steps. After-treatment in the sense used and claimed herein includes such known steps as washing, bleaching, and so forth, and is not intended to include simply moistening the threads with water. The after-treatment liquids are introduced into upper tanks 5, trickle down along the bundles of thread F and F', running over the pairs of rollers 6 and 6' at spinning speed, collect in the lower tanks 7 and are pumped back therefrom again into the upper tanks 5 (and are regenerated, replenished and so forth according to requirements). The two bundles of threads run after the manner of the ropes in pulley block tackle from one end of the pair of rollers 6, 6' to the other end, so that despite the high speed of the threads, the bundles of threads can remain a considerable time in each treatment stage, which time is longer, the greater the number of times the bundles of threads are passed around the rollers. The rollers 6, 6' are supported as at 6''.

From the last pair of rollers, the two bundles of threads, still running continuously, are conducted to the cutting apparatus, in front of which they are united to form a single bunch F''. The cutting apparatus comprises two independently operating cutting devices 8 and 8', which are mounted in a fixed position and which may be designed, for example, in the form of rotating discs each provided with three radially mounted cutting blades, the latter co-operating with a stationary counter-blade and producing a shear-like cut.

The staples produced in the cutting apparatus consist (in the case of large machines) of many thousands of adjacent individual threads, which in accordance with their method of production lie parallel to and comparatively firmly against each other. In order to completely open this mass of fibers, which is very desirable for the subsequent treatment, the staples are now subjected to a longer or shorter spraying with water or other suitable liquids (reviving, curling,

softening or the like liquids), which split up and, so to speak, float the adhering staples. In the embodiment according to Fig. 1, this takes place in the trough 9, which comprises a steep part 9' and a horizontal or substantially horizontal part 9''. Both parts have a roughened bottom in order to prevent the staples from being washed away too rapidly. The length, inclination and nature of the bottom of the flotation trough, and also the direction of the sprays, are factors, the choice of which determines the length of time the staples are to remain under the sprays, and which are to be selected according to requirements.

From the loosening device 9, the staples are carried by a conveyor band 10, provided with the moisture removing squeeze roller 10' shown in Figs. 1 and 3 of the drawing, into a preliminary opener 11. Thence, the staples are led by the endless band 12 into the drying chamber 13 where they are dried to the desired degree. Thereupon, the staples are carried by the conveyor device 14 to the opener 15, in which the staples are again subjected to further loosening, which in this case takes place in the dried condition, and is still more effective than the first loosening in the moist state, so that the staples leave the opener 15 in the state of a wadding-like web. This enables them to be spun in the same way and in the same devices as natural fibers.

In the embodiment shown in Figs. 1 and 2, the construction of the preliminary opener 11, the drying chamber 13 (together with its interior arrangement), the opener 15, and the corresponding conveying devices, is similar to the construction of said devices as usually employed in the fiber treatment art.

Fig. 3 shows on a larger scale the cutting apparatus and the uniting of the two bundles of threads F and F' coming from the after-treatment machine in front of the cutting apparatus. It has here been assumed that the two cutting devices of the latter, 40 and 41 are mounted in a fixed position, so that in order to employ the two cutting devices alternately, the bundles of threads F, F' are led in one case to the cutting device 40 and in the other case to the device 41. Two deflecting rollers 42 and 42' are provided for this purpose. If the cutting device 40 is to be employed, the bundle of artificial threads, F', approaching in a direction towards the cutting device 41, is led over the rollers 42' out of the path, and is deflected by means of the roller 42 parallel to the path of the bundle F, so that the bundles F and F' now lie close together and opposite the cutting device 40 (this situation is shown in solid lines in Fig. 3). If now the cutting devices are to be changed, the bundle F' is again allowed to run straight forward and the bundle F is brought over the deflecting rollers 42 and 42' to the bundle F', the path of which runs towards the cutting device 41. This altered situation is shown in Fig. 3 by dot and dash lines.

The provision, according to the invention, of two cutting devices employed alternately has the considerable advantage that the cutting instruments of one device may be removed therefrom and resharpened while the other cutting device is working. Of course, in case of need, the provision of a pair of cutting devices may also be utilized for producing staples simultaneously at two cutting places.

What I claim is:

1. Method for the manufacture of artificial staple fibers in which the fibers are afforded the opportunity to shrink and twist freely, comprising spinning artificial threads, treating said threads while continuously running at spinning speed in pulley block tackle fashion with suitable liquids, cutting the continuous threads into staples, destroying the parallel position of the fibers by application of solutions, removing the excess moisture, opening the fibers mechanically to prepare them for drying, and drying the loosened fibers to the desired degree to give the said fibers a high stretching capacity.

2. Method for the manufacture of artificial staple fibers in which the fibers are afforded the opportunity to shrink and twist freely, comprising spinning artificial threads, treating said threads whilst continuously running at spinning speed with suitable liquids, cutting the continuous threads into staples, destroying the parallel position of the fibers by application of solutions, removing the excess moisture, opening the fibers mechanically to prepare them for drying, and drying the loosened fibers to the desired degree to impart to the said fibers a high stretching capacity.

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