METHOD OF PRODUCING STAPLED FIBERS

Paul Nikles, Collombey, and Franz Wisskemann, Zurich, Switzerland

Application December 1, 1936, Serial No. 113,696
In Switzerland December 5, 1936

2 Claims. (Cl. 19--1)

It is known, to heap artificial silk at the spinning machine into bundles and to pass on the thus obtained strands directly to a cutting appliance. The bundles of fibers wetted with spinning bath liquid are thereby cut into pieces of appropriate lengths and after-treated in the form of stapled fibers. In most cases the stapled fibers thus obtained are artificially curled before or after drying the same.

Another known method consists in gathering the threads arriving from the spinning machine into bundles and to after-treat the artificial fibers in the form of strands, the fully treated strand being cut into pieces of any desired lengths either before or after the drying. The stapled fibers resulting from this method are too stiff and straight, so that artificially curling the fibers obtained is necessary in every case.

The object of the present invention is to provide a method and apparatus by means of which the severing of the fibrous strands arriving from the spinning machine will be substantially facilitated and which permits of dispensing with curling the product obtained.

The method according to the present invention provides for directing one or more fluid jets onto the fibrous strand prior to the latter contacting with a cutting appliance, in such a way that the fibrous strand is imparted a turning effect by means of which the individual fibers are twisted in the manner of a rope as tightly as permissible.

Experience has shown that a fiber bunch of this kind can be cut more neatly and quickly.

The fluid jet for carrying out the method consists, preferably, of spinning bath solution as such but, if desired, plain water may also be used for this purpose.

It is essential that the amount of twist imparted to the fiber bunch can be controlled at will by varying the direction and volume of the fluid jet.

A further feature of the novel method consists in setting up a certain amount of internal tension in the individual fibers prior to severing the same by action of the turning effect provided. Experience has proven that artificial fibers which prior to being cut were imparted a certain internal tension by action of this effect curl up much more readily and adequately during the after-treatment process.

Practical tests in this respect have further shown that this desired effect obtains only where there is possibility of regulating the turning movement of the fiber bunch to some extent prior to cutting the same, in order that the fibers can be relieved from tension during the after-treatment such an amount that the most satisfactory curling effect ensues.

Still another feature of the novel method consists in the fact that the fibrous strand to be separated is so guided by means of the fluid jet that it meets with the cutting blade, in as stiff a condition as possible in which way the curling effect is increased.

The fibrous strand is intended to be acted upon by the cutting blade in a relative position thereof to which it is centrally included in a controlled fluid jet and is thus prevented from evading the blade.

A further possible mode of carrying out the method according to the invention consists in that the bunch to be severed is urged on a portion of the wall of an exit passage, in concentric disposition, by means of a controlled fluid jet and is thus also kept from evading the cutting blade.

The method according to the invention may be so varied that either the fluid jet for imparting to the fibers the required twist acts at the same time to guide the fiber bunch onto the cutting appliance, or that two separate fluid jets are provided. In the latter event one of the jets imparts to the fibers the twisting movement, while the second jet acts to direct the fibrous strand towards the cutting appliance.

Alternatively, the method according to the invention may consist in that by increasing or decreasing the efficiency of the fluid jet the feed motion of the fibrous strand relative to the cutting appliance is maintained and regulated respectively, so that shorter or longer lengths of staple are obtained.

In other words the fiber bunch to be cut can thus be conducted towards the cutting appliance at a regular feed rate and in stiff condition without the necessity of employing a special mechanical contrivance for this purpose.

If for carrying out the method spinning bath liquid is used as operating fluid, all the artificial fibers then come into very close contact with the consolidating bath once more prior to the cutting which fact may be of advantage in various respects.

In the accompanying drawing two forms of treating devices for carrying out the method according to the invention together with modifications of details are shown by way of example only, in which Fig. 1 shows an elevation partly in section of a first form of the treating device;
Fig. 2 shows a side elevation of Fig. 1;
Fig. 3 shows a horizontal section through the fluid admission chamber of Fig. 1;
Fig. 4 shows an elevation partly in section of a second form of the treating device;
Fig. 5 is a view of a modified cutting appliance and
Fig. 6 is a view similar to Fig. 5 of a further modification of the cutting appliance.

The fibrous material C to be cut in appropriate lengths arrives in the form of a band from a sizing device A to pass about a guide roller B into the feed funnel of a treating apparatus D. In the fluid admission chamber F surrounding the inner end of the feed funnel and connecting laterally with a fluid supply conduit E, the fibrous material emanating from the feed funnel is imparted a required twisting effect by the stream or jet of operating fluid passing through the chamber F in the direction of the arrows shown in Figs. 1 and 3. The distance between the guide roller B and the outer end of the feed funnel of the treating apparatus D is regulable by means not shown and is so chosen that a predetermined amount of twist is imparted to the strand of fibers treated by means of the method according to the invention under the circumstances prevailing in every practical case.

Incidental to the fibrous material leaving the treating apparatus at the exit it moves past rotatable cutters H which cut the material in timed relation with its feed movement in the required length of fiber.

In Fig. 2 it is evident that the twisting operation applied to the fibrous material is effective rearwardly beyond the feed funnel of the treating apparatus, as indicated by tapering the band of material C between the guide roller B and the feed funnel.

Fig. 4 shows a second form of treating apparatus which operates on the same general principle as the preceding one except that an additional fluid jet is applied which is supplied by a conduit I connecting with the casing of the apparatus transversely and merging gradually with the direction of passage of the material through the treating device. In this way is obtained that the strand of fibers is led through the exit nozzle of the treating device either in eccentric or concentric relation thereto for passing it on to the cutting appliance in stiff condition.

In the Figs. 5 and 6 two different modifications of the cutting appliance are shown.

What we claim is:
1. A method of producing Stapled fibers, comprising feeding a strand of spun artificial filaments to be cut in appropriate lengths of staple fiber, directing two fluid jets onto said moving strand, one of said jets being directed rotationally thereby imparting a turning effect to said strand, controlling said turning effect for twisting the individual filaments of said strand in the manner of a twisted rope as tightly as permissible, and cutting the twisted rope into appropriate lengths of staple fiber in timed relation with its feed movement while guided by said jets, said second jet longitudinally surrounding said twisted portion of the rope to steady said portion while being cut.
2. A method of producing stapled fibers, comprising directing two fluid jets onto a moving strand of spun filaments to be cut in appropriate lengths of staple fiber, one of said jets being rotationally directed to impart a turning effect on said strand, controlling said turning effect for twisting the individual filaments of said strand in the manner of a twisted rope as tightly as permissible, cutting said twisted rope in timed relation with its movement while said second jet is directed longitudinally of the rope and surrounds the twisted portion of the rope for steadying said portion during the cutting.

PAUL NIKLES.
FRANZ WISSEMANN.