SPINNING OF TEXTILE YARNS

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ABSTRACT

A method of and apparatus for the open end spinning of textile yarns from continuous filaments in which a filament or tow of filaments is continuously advanced to a severing station where the filament or tow is severed into fibers of staple length. The staple fibers so formed at the severing station are conveyed in discrete manner to an internal fiber collecting surface of a spinning rotor from which they are continuously removed to form the tail-end of a yarn which is continuously drawn off from the rotor.

13 Claims, 3 Drawing Figures
The present invention relates to the spinning of textile yarns and is particularly concerned with a method of and apparatus for the open end spinning of textile yarns from continuous filaments.

In one method for the open end and spinning of textile yarns, a twisted yarn is formed by continuously depositing discrete fibers on a rotating collecting surface, continuously removing them from the surface to form the tail-end of a yarn and drawing off the continuously formed twisted yarn.

According to a second aspect of the present invention, there is provided a method of open end spinning of textile yarns comprising a spinning rotor having an internal fiber-collecting surface, fiber-supply means for supplying discrete fibers to the fiber-collecting surface and yarn draw off means for drawing off yarn formed by the continuous removal of the fibers from the collecting surface, said fiber supply means including severing means, filament-forwarding means for forwarding the severed tow of filaments to the severing means which severs the filament or tow to produce fibers of staple length, and conveying means for continuously conveying the severed fibers in discrete manner to the fiber-collecting surface of the spinning rotor.

The severing means may comprise a cutting device which cuts the filament or tow of filaments into staple fibers or may comprise stretch-breaking means for stretching the filament or tow until it breaks into staple fibers.

Some embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a schematic sectional side elevation of an open end spinning machine according to a first embodiment of the invention.

FIG. 2 is a schematic sectional side elevation of an open end spinning machine according to a second embodiment of the invention, and

FIG. 3 is a schematic sectional side elevation of an open end spinning machine according to a third embodiment of the invention.

Referring first to FIG. 1 a tow 11 of continuous filaments is fed by a fluted feed roller 12 to a rotary cutter 13 provided with helical blades 14. The cutter 13 in association with an anvil 15 converts the continuous filaments into fibers 16 of staple length. A rotary beater 17 provided with a saw tooth wire clothing 18 acts on the filaments extending from the nip between the cutter blades 14 and the anvil 15 and severs the filaments when the filaments are severed by the advancing blades 14, the cut lengths of filament are separated by the beater 17 and conveyed thereby to a fiber feed duct 19 through which they pass in an airstream to a high speed spinning rotor 20 where they are deposited on an internal collecting surface 21 of the rotor 20. The rotor 20 is enclosed in a housing 22 and air is removed from the interior of the rotor 20 either by means on the rotor itself, or by external suction means connected to a suction duct 23 leading to the housing 22. Fibers are removed from the fiber collecting surface 21 and twisted into an end of yarn 24 in well known manner in open end spinning and the twisted yarn 24 is continuously removed from the spinning rotor by yarn delivery rollers 25, 26 and taken up on a package (not shown).

The rotary beater 17, may, if desired, be replaced by an opening roller provided with needles. Alternatively, the rotary beater 17 may be replaced by a roller drafting system as illustrated in FIG. 2, which shows a two-over-two drafting system with front rollers 27 and 28 and back rollers 29 and 30 provided with cooperating top and bottom aprons 31 and 32. The draw ratio of the drafting system is made high in order to assist in the separation of the mass of fibers into discrete fibers before their entry to the fiber feed duct 19.

The filament tow may, if desired, be cut by any other means or may be stretch broken as illustrated in FIG. 3 by feeding it successively through pairs of rollers 33, 34 and 35, 36, the latter of which is run at a considerably higher speed than the former, and then subjecting the staple fibers thus formed to a drafting or opening operation in a roller drafting system as described with reference to FIG. 2 before feeding them in an airstream through the duct 19 to the spinning rotor 20.

Two or more tows of the same material or different materials may be fed to the staple forming and spinning section to provide a yarn of blended material, or staple fibers may be fed to the spinning section in addition to those formed from the continuous filament tow.

It will be appreciated that instead of feeding a tow of filaments to the severing means a mono filament can be fed cut into staple lengths for feeding to the spinning rotor.

What we claim is:

1. A method of open end spinning of textile yarns, comprising the steps of continuously advancing a filament or tow of filaments to a severing station, severing the filament or tow into fibers of staple length at the severing station, conveying the fibers in discrete manner to an internal fiber collecting surface of a spinning rotor, continuously removing them from the fiber collecting surface to form the tail-end of a yarn, and drawing off the continuously formed twisted yarn.

2. A method according to claim 1, wherein the filaments or tow of filaments is severed by cutting them.

3. A method according to claim 1, wherein the severing of the filament or tow of filaments into fibers of staple length is effected by stretching-breaking it.

4. A method according to claim 1, wherein the fibers are opened in said opening operation by subjecting them to high draft in a roller drafting zone.

5. A method according to claim 1, wherein the filaments of staple length are delivered to the fiber collecting surface of the spinning rotor in an airstream.

6. Apparatus for the open end spinning of textile yarns comprising a spinning rotor having an internal fiber collecting surface, fiber supply means for continuously supplying discrete fibers to the fiber collecting surface, and yarn draw off means for drawing off yarn formed by the continuous removal of the fibers from the collecting surface, said fiber supply means including severing means, filament-forwarding means for forwarding the severed tow of filaments to the severing means which severs the filament or tow to produce fibers of staple length, and conveying means for continuously conveying the severed fibers in discrete manner to the fiber-collecting surface of a spinning rotor, continuously removing the fibers from the fiber collecting surface to form the tail end of a yarn, and drawing off the continuously formed twisted yarn.

7. A machine according to claim 6, wherein said severing means comprises a cutting device which cuts the filament or tow of filaments into fibers of staple length.

8. A machine according to claim 7, wherein said cutting device comprises a rotary cutter provided with helical blades which cooperate with a stationary anvil to cut the continuous filament or tow of filaments into fibers of staple length.

9. A machine according to claim 6, wherein the severing means comprises a stretch-break drafting zone.

10. A machine according to claim 9, wherein said drafting zone is formed by first and second pairs of rollers through which the filament or tow of filaments is successively passed.
with the second pair of rollers running at a sufficiently higher speed than the first pair of rollers to stretch-break the filament or tow of filaments drafted therein.

11. A machine according to claim 6, wherein said opening means comprises a rotary beater provided with saw tooth wire clothing.

12. A machine according to claim 6, wherein said opening means comprises a high draft roller drafting zone.

13. A machine according to claim 6, wherein the conveying means includes a fiber feed duct through which the fibers are conveyed to the fiber collecting surface of said spinning rotor in an airstream.