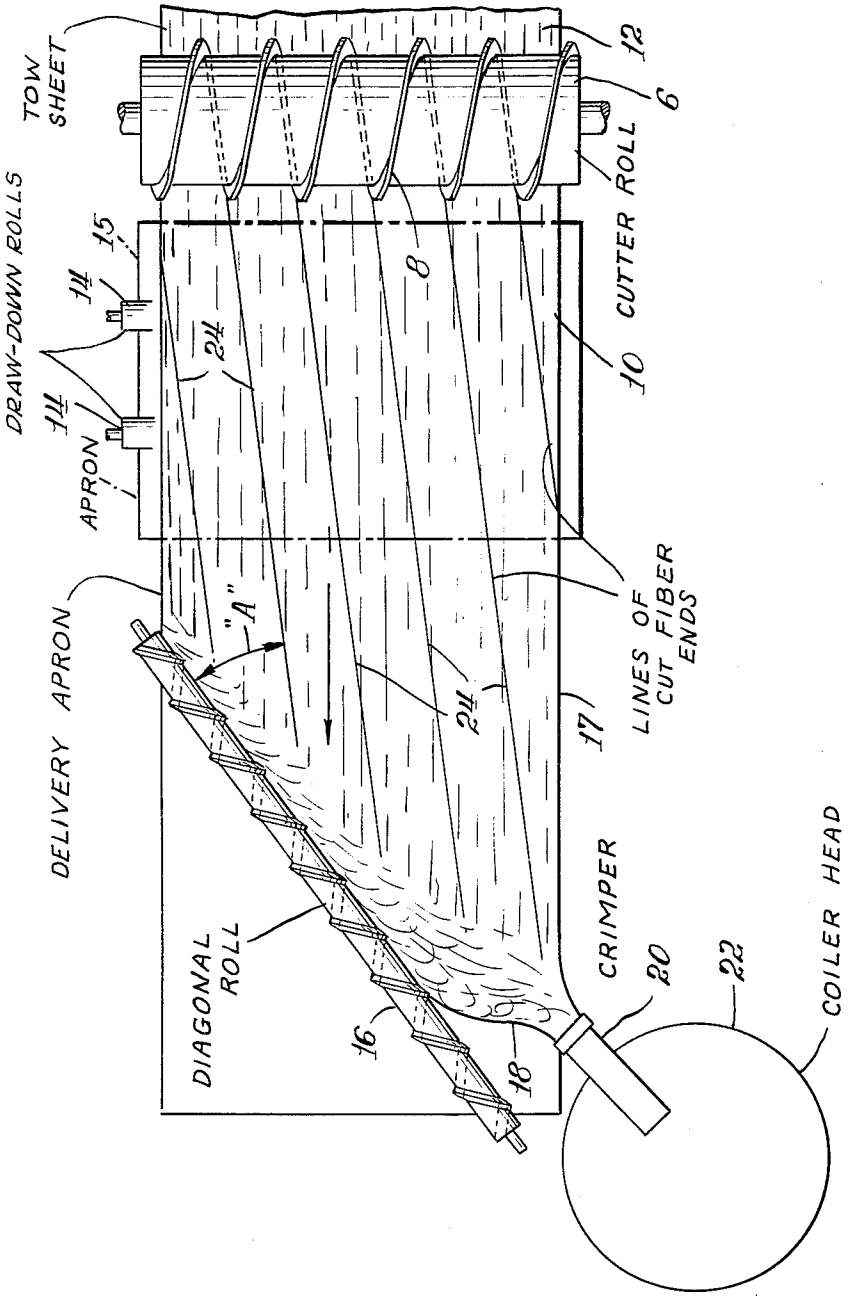
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CUTTER ROLL FOR CONVERTER

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CUTTER ROLL FOR CONVERTER

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This invention relates to a method and apparatus representing an improvement in cutting and rolling continuous strand filaments, made from tow into a sliver.

In a conventional method of cutting and rolling or collecting continuous strand filaments from tow, as in the manufacture of crimped acrylonitrile polymer fibers, a helical cutter roll and an anvil are used whereby a sheet of filaments, i.e., tow, are cut on a bias as the sheet moves through the machine. The cut sheet then passes through a series of rolls and aprons which draft or draw-down the cut ends to disperse them more uniformly along the length of the sheet, after which the drawn-down fiber sheet is laid on an apron conveyor which moves the fibers to a diagonal roll or collecting cylinder where they are rolled into a sliver, which is subsequently crimped and collected in a suitable container. The conventional position of the diagonal roll or collecting cylinder is at a high angle to the line of cut fiber ends in the cut and drawn-down sheet. This causes the thick and thin drawn-down sections of the fibers to be rolled onto themselves, thus producing an unevenness along the length of the sliver. The collecting cylinder positioned in this manner also rolls and curls the fibers which are nepped and tangled in subsequent drafting operations. In the processing of fine deniers such as 2 denier per filament, and long lengths such as 3 denier per filament of 6 inch length fibers, a subsequent carding or combing process is generally required to correct such defects.

The method and apparatus of the present invention avoids the shortcomings of conventional apparatus as above discussed. More particularly, the apparatus of the invention includes a collecting cylinder which collects or rolls the cut fibers on an axis more nearly parallel to the line of cut of the fiber ends. The maintenance of parallel fibers along the sliver axis produces a sliver having less curled and tangled fibers and more uniformity in the evenness of the sliver, thus requiring less processing after converting, and making for improved yarn quality. It will be seen that the principles of the invention may be applied to any tow cutting and sliver forming machine in a simple and inexpensive manner.

The main object of this invention is to provide a method and apparatus representing an improvement in cutting and collecting continuous strand filaments made from tow.

A more specific object is to provide a method and apparatus wherein cut fibers of tow may be rolled in a sliver having less curled and tangled fibers, and more uniformity in the evenness of the sliver.

A further object is to produce a sliver from cut filaments which requires less processing, and which makes for improved yarn quality.

Another object is to provide an improvement in forming a sliver of cut tow wherein a simple modification may be easily made on existing machinery.

These and further objects and features of the invention will become more apparent from the following description and accompanying drawing which illustrates, in somewhat schematic form, apparatus embodying the principles of the invention.

Referring now to the drawing, numeral **6** identifies a rotatable cutter roll having a helical blade **8**, which is supported above a conveyor means, including a draw-down roll apron section **10**, whereby strands of tow **12** will be cut and delivered to a pair of draft or drawn-down rolls **14**. The roller **6** is arranged to rotate so that the cutting edge at the helical blade, in contact with the tow, moves in the same direction as the tow. It will be noted that the slope of the helical blade **8** extends downwardly from left to right, as viewed from above, as in the illustration. The draw-down rolls are positioned above a conveyor means, such as a movable apron **15**, and rotate at a speed slightly greater than the speed of the apron **15**, which causes a flattening of the cut fibers into a sheet of more uniform thickness.

A rotatable diagonal roll or collecting cylinder **16** which rotates in the opposite direction of the roll **6**, is positioned above a conveyor means, such as delivery apron **17** and is adapted to roll the cut tow into a sliver **18** which is directed into a crimper **20** feeding into a coiler head **22**. It will be observed that the arrangement of the helical blade **8**, i.e., slope of blade relative to the tow being cut, produces a sheet of cut fibers, the ends of which are defined by parallel lines identified by the numeral **24**, which lines are disposed at a small angle "A" (i.e., angle of approach) relative to the axis of the collecting cylinder **16**, said angle being from 0° to 25°, and preferably less than 15°. Such an arrangement results in a rolling or collecting of the fibers into a sliver, the individual fibers of which are more nearly parallel with the axis of the collecting cylinder. This produces a sliver having less curled and tangled fibers, and more uniformity in the diametrical dimension of the sliver along the length thereof.

The variation in structure which distinguishes this invention over prior art devices, namely, the means for reducing the angle between the cut fibers and the collecting cylinder, may be simply and inexpensively applied to conventional machines of the prior art. More specifically, the helix of the cutter blade on a conventional machine, such as the Warner and Swasey Pacific Converter, may be changed to extend in the direction, i.e., slope, of the helix **8**.

From the foregoing, it will be seen that the described apparatus will satisfy the objectives of the invention.

The foregoing description has been given in detail without thought of limitation since the inventive principles involved are capable of assuming other forms without departing from the spirit of the invention or the scope of the following claims.

What is claimed is:

1. A method of cutting and rolling a plurality of continous strands of filaments arranged in sheet form as a tow into a sliver comprising the steps of, cutting the filaments while so arranged in said sheet form in uniform lengths, moving the cut filaments while still arranged in sheet form substantially longitudinally toward a collecting cylinder so that the lines generated by the ends of the cut filaments relative to the longitudinal axis of the cylinder make an angle within a range of 0° to 25°, and causing the cylinder to roll the filaments into a sliver.

2. A method of cutting and rolling a plurality of continuous strands of filaments arranged in sheet form as a tow into a sliver comprising the steps of, cutting the filaments while so arranged in said sheet form in uniform lengths, moving the cut filaments while still arranged in sheet form substantially longitudinally toward a collecting cylinder so that the lines generated by the ends of the cut filaments relative to the longitudinal axis of the collecting cylinder make an angle within a range of 0° to 15°, and causing the cylinder to roll the filaments into a sliver.

3. Apparatus for cutting and rolling a plurality of continuous strands of filaments arranged in sheet form as

a tow into a sliver comprising, a cutting means for cutting the filaments while so arranged in said sheet form into uniform lengths with the ends lying in generally parallel lines of cut, a collecting cylinder, an advancing means for receiving and moving the cut filaments into engagement with the collecting cylinder, said collecting cylinder being angularly positioned with respect to said advancing means to effect a continued movement of the cut filaments in the general direction of travel effected by said advancing means, the longitudinal axis of said angularly positioned cylinder and said parallel lines of cut forming an angle within the range of 0° to 25°.

4. Apparatus for cutting and rolling a plurality of continuous strands of filaments arranged in sheet form as a tow into a sliver comprising, a rotatable cutting means for cutting the filaments while so arranged in said sheet form into uniform lengths with the ends lying in generally parallel lines of cut, a collecting cylinder, draw-down rolls, and conveyor means, said draw-down rolls and said conveyor means being operatively arranged to receive and draw-down the cut lengths to disperse them more uniformly along the length of the sheet and to move the filaments into engagement with said collecting cylinder, said collecting cylinder being angularly positioned with respect to said conveyor means to effect a continued movement of the cut filaments in the general direction of travel effected by said conveyor means, the longitudinal axis of said angularly positioned cylinder and said parallel lines of cut forming an angle within the range of 0° to 25°.

5. Apparatus for cutting and rolling a plurality of continuous strands of filaments arranged in sheet form as a tow into a sliver comprising, cutting means including a cutting roll having a helical blade for cutting the filaments while so arranged in said sheet form into uniform lengths with the ends lying in generally parallel lines of cut, a rotatable collecting cylinder arranged to rotate in a direction opposite to that of the cutting roll, draw-down rolls and a conveyor means, said draw-down rolls and said conveyor means being operatively arranged to receive and draw-down the cut lengths to disperse them more uniformly along the length of the sheet and to move the filaments into engagement with said collecting cylinder,

said collecting cylinder being angularly positioned with respect to said conveyor means to effect a continued movement of the cut filaments in the general direction of travel effected by said conveyor menas, the longitudinal axis of said angularly positioned cylinder and said parallel lines of cut forming an angle within the range of 0° to 25°.

6. Apparatus for cutting and rolling a plurality of continuous strands of filaments arranged in sheet form as a tow into a sliver comprising, cutting means including a rotatable cutting roll having a helical blade for cutting the filaments while so arranged in said sheet form into uniform lengths with the ends lying in generally parallel lines of cut, said cutting action taking place in the direction in which the strands are moving, a rotatable collecting cylinder arranged to rotate in a direction opposite to that of the cutting roll, draw-down rolls having a surface speed somewhat greater than the movement of the cut lengths thereinunder, and conveyor means, said draw-down rolls and said conveyor means being operatively arranged to receive and draw-down the cut ends to disperse them more uniformly along the length of the sheet and to move the filaments into engagement with said collecting cylinder, said collecting cylinder being angularly positioned with respect to said conveyor means to effect a continued movement of the cut filaments in the general direction of travel effected by said conveyor means, the longitudinal axis of said angularly positioned cylinder and said parallel lines of cut forming an angle less than 15°.

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