

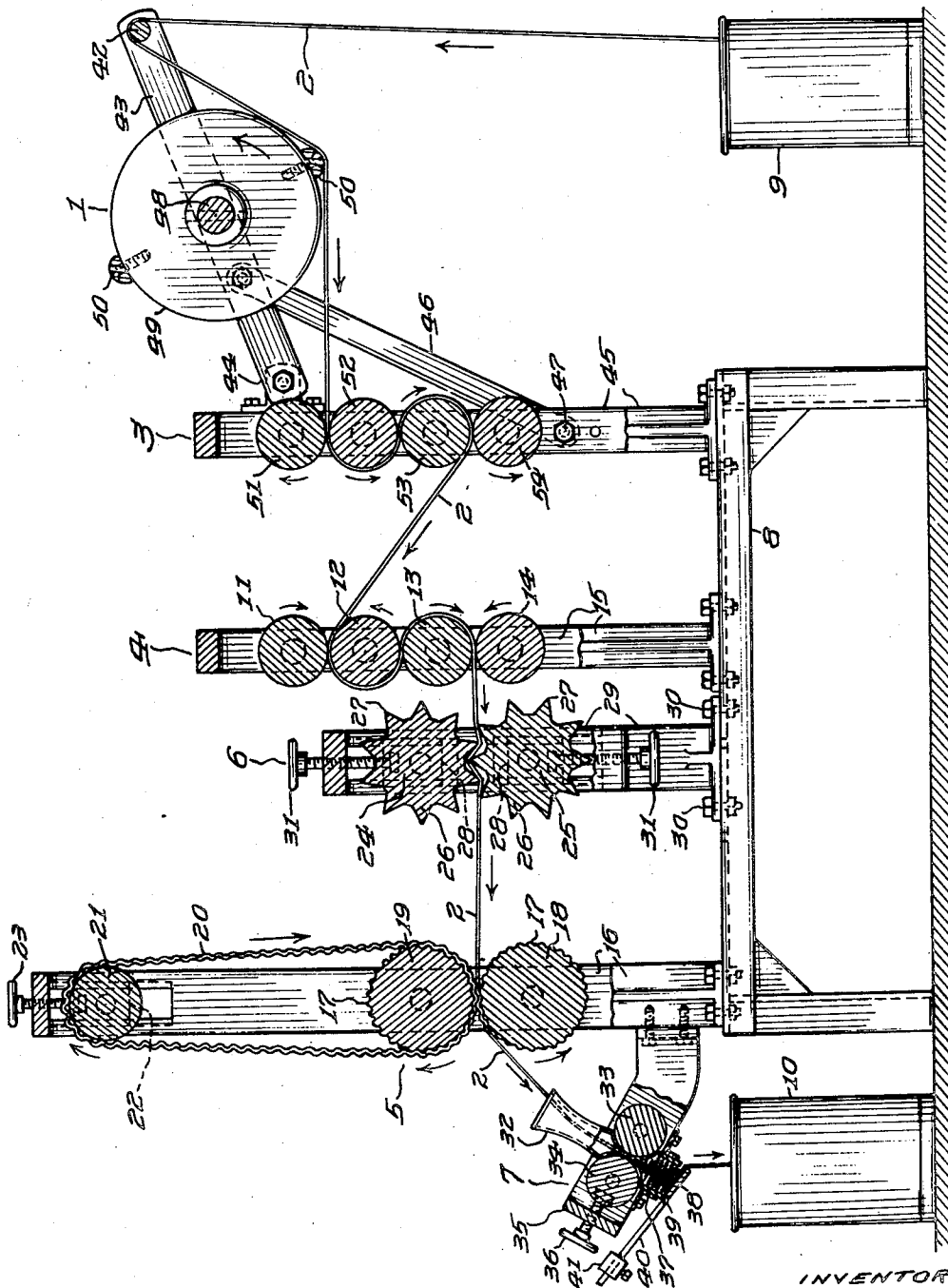
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PROCESS AND APPARATUS FOR PRODUCING STAPLE FIBERS

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PROCESS AND APPARATUS FOR PRODUCING
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The invention relates to a process and apparatus for converting a sliver of textile filaments into staple fibers without destroying the continuity of the sliver and without unduly stretching the staple fibers, and is directed specifically to the treatment of a sliver of continuous filaments in such a manner and by such means that the individual filaments are reduced to staple fibers by a tensioning or breaking action adapted to effectively control the length of the staple fibers.

In Patent No. 1,883,384, granted to me and Henry H. Perry on October 18, 1932, there is disclosed a process for making yarn from a sliver composed of a multiplicity of substantially continuous fibers grouped in substantial parallelism by reducing the fibers to staple fibers while maintaining their substantial parallelism and the continuity of the sliver, by simultaneously or thereafter drafting the resulting sliver, and by then suitably twisting such resulting sliver to produce a yarn, or a roving from which the yarn is subsequently made. In accordance with the disclosure of that patent, the step of reducing the continuous filaments to staple fibers is performed in and by the drafting of the sliver. This is an important feature of the patented invention, since it was discovered that by making a continuous sliver composed of a multiplicity of substantially continuous, conventional fibers grouped in substantial parallelism, and drafting such a sliver, the continuous fibers could be reduced to staple fibers. It was also discovered that, in thus reducing the continuous fibers to staple fibers, they were broken in a haphazard manner into irregular staple lengths, and that the substantial parallelism of the fibers would be maintained. It was discovered further, as disclosed in the patent, that such haphazard breaking would produce a proper imbrication of the staple fibers so that the continuity of the sliver would also be maintained.

In simultaneously breaking the continuous filaments and drafting the sliver, the length of the staple fibers produced in accordance with the above patent is determined, within limits, by the adjustment of the drafting mechanism. For example, where drafting rollers are employed, the length of the staple fibers desired in the yarn is determined by what is known as setting the ratch, which is the distance between the nips of the two sets of drafting rollers, the drafting mechanism being adjusted or set for the maximum length of staple fibers to be produced in the breaking operation. In this way the maximum length of

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the staple fibers may be varied, in the practice of the patented process, to suit the character of yarn to be produced and the procedure and machinery employed in such production.

While staple fibers of irregular length are satisfactory for many textile purposes, it is desirable under certain circumstances to have staple fibers of more uniform length than those produced by the procedure described in said patent. It has therefore been found desirable to provide a process and apparatus whereby the length of the staple fibers may be controlled. The present improvement constitutes a modification of the procedure disclosed and claimed in the above patent in that effective control over the length of the staple fibers may be secured notwithstanding the fact that tensioning and breaking operations only are utilized in reducing the continuous filaments to staple fibers.

It has also been found desirable for some purposes to have staple fibers which have not been stretched to the extent which is required when only longitudinal tensioning of the filaments is employed for breaking continuous fibers and thereby converting them into staple fibers. The present procedure is therefore a modification of that disclosed and claimed in the above patent in that, in addition to the longitudinal tensioning employed by the patented process, the improvement utilizes a procedure whereby the tensioned sliver is intermittently deflected abruptly out of the path through which it normally travels during the tensioning and breaking operation. In this manner the individual filaments are bent sharply while under tension, and are thereby broken at their points of deflection to thus produce staple fibers which have not been stretched as much as if longitudinal tensioning alone were relied upon to break the filaments.

It has also been found that, while the procedure disclosed in the patent referred to above operates satisfactorily upon a relatively small sliver of the order of a few thousand filaments, excessive pressure must be employed upon the breaking and drafting rollers of the apparatus in order to operate upon large slivers of the order of twenty-five thousand to one hundred thousand or more filaments, with consequent damage to the filaments and the apparatus employed. I have found that these larger slivers may be processed in accordance with the procedure of the above patent, but without the necessity of resorting to undue pressure upon the breaking and drafting rollers and the filaments, if the tensioned sliver is intermittently deflected from its

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normal path of travel between the two sets of breaking and drafting rollers to thereby produce, in the individual filaments, a loop or bend sufficiently sharp in character as to substantially weaken the tensioned filaments and thereby cause them to break at the bend or point of deflection.

I have also found that undesirable irregularity in the length of the staple fibers, such as an excessive number of short fibers, as well as the difficulties encountered in applying the procedure of the above patent to relatively large slivers, can be decreased to a substantial extent if the sliver is flattened out or formed into a band or ribbon of substantially uniform thickness before it is fed to the first set of breaking rollers. When formed or flattened out in this manner the requisite pressure of the breaking rollers upon the individual filaments may be materially reduced, and may be made more uniform so that the individual filaments throughout the width of the band are tensioned to substantially the same extent upon a given movement of the two sets of breaking rollers.

As will be apparent from the above, one of the principal objects of the invention is the provision of a substantial degree of control over the length of staple fibers produced by progressively tensioning continuous filaments and thereby breaking them into staple lengths. Another important object of the invention is a decrease in the degree of tension to which such filaments are subjected in the process of reducing them to staple fibers. Another object of the invention is a decrease in the amount of pressure which must be applied to the filaments, or to the drafting rollers, in simultaneously reducing a sliver of continuous filaments to staple fibers and drafting the sliver.

In accomplishing the above purposes various procedures may be followed and different forms of apparatus may be employed. For example, the sliver of continuous filaments may be drawn over a breaker edge positioned between the nipping points of two sets of drawing rollers and movable intermittently in a direction transversely of the direction of movement of the sliver in order to bend the individual filaments sharply thereover. Preferably, such a breaker edge should also have a movement longitudinally of the sliver in a manner similar to the movement of conventional faller bars in a gill box. In the apparatus which I have found to operate most satisfactorily, a rotary breaker device is positioned between the two sets of drawing rollers and is provided with one or more breaker edges which are moved into and out of contact with the sliver as the device rotates. Preferably two rotary breaker devices are utilized with this type of apparatus, one on each side of the advancing sliver, and the breaker edges on each device are so arranged as to intermesh with the breaker edges on the other.

A preferred form of apparatus is illustrated in the accompanying drawing in which the essential features are shown partly in side elevation and partly in vertical section, the driving connections between the various moving parts being omitted inasmuch as these will be clear from the description which follows.

In the main, this apparatus comprises a spreader or beater 1 designed to contact intermittently with the sliver 2, a set of spreader rollers 3, a set of feed rollers 4, a set of delivery rollers 5, a breaker device 6 positioned between the feed rollers 4 and the delivery rollers 5, and

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a crimping device 7 to which the sliver 2 is delivered by the delivery rollers 5. The above elements are suitably mounted on a base 8 in such a manner that the sliver of continuous filaments may be taken from a container 9 or other source of supply at one end of the machine, reduced to a sliver of staple fibers, drafted to such an extent as may be desired, and then delivered by the crimping device 7 at the other end of the machine to a receptacle 10.

While the feed rollers may be otherwise constructed and arranged, I have found that four cylindrical rollers 11, 12, 13, 14, arranged one above the other, operate to snub the sliver 2 satisfactorily with the present improvements. The opposite ends of each feed roller may be suitably supported for rotation in a pair of standards 15 bolted to the opposite sides of the base 8. The roller 11 may run freely, while rollers 12, 13, 14 are geared together and are positively driven in any suitable manner. All four feed rollers have their ends supported in the standards 15 in such a way that the pressure on the sliver 2 may be varied as desired. This pressure may be cushioned in any manner well known in the art, such as by the use of spring-pressed bearings. The function of the set of feed rollers 4 is to draw the sliver of continuous filaments from the container 9 or some other suitable source of supply, and to snub or nip it as it serpentine through the rollers 4 and is fed into the reducing zone between the feed rollers and the delivery rollers 5.

The delivery rollers 5 have their opposite ends supported in a pair of standards 16 bolted to the opposite sides of the base 8, and their bearings may be spring cushioned in any suitable way. These rollers are preferably made of steel and their faces are provided with flutes 17 in order that a better nip may be obtained upon the sliver of broken filaments. The lower delivery roller 18 is positively driven from any suitable moving part of the machine, and the upper delivery roller 19 is frictionally driven thereby. While the upper delivery roller 19 may be covered with leather or any other suitable resilient facing in a manner well known in the art, it is preferred that the facing be in the form of a leather apron or belt 20 which passes around this roller and also around an idler roller 21 having its opposite ends supported in the upper ends of the standards 16. Each end of the idler roller 21 may be supported in a movable bearing 22 arranged for vertical adjustment by a hand wheel 23 in order to maintain the proper amount of tension on the apron 20. The delivery rollers 18, 19 are rotated at such a rate as to provide them with a surface speed somewhat higher than the surface speed of the feed rollers in order that the filaments in the sliver may be tensioned and broken into staple fibers in the reducing zone between the feed rollers 4 and the delivery rollers 5, and in order to draft the sliver to the extent desired. In operating upon a sliver of twenty-five thousand or more rayon filaments of 5.5 denier, that is, filaments having a diameter of about 0.0009 of an inch, I have found that satisfactory results are obtained when the surface speed of the delivery rollers 5 is approximately two and one-quarter times the surface speed of the feed rollers 4.

In accordance with the present improvement I interpose within the reducing zone, between the feed rollers 4 and the delivery rollers 5, means, such as the breaker device 6, for the

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purpose of intermittently tensioning the sliver transversely of its direction of movement and deflecting it abruptly out of its normal path of travel between the nipping points of the feed rollers 13, 14 and delivery rollers 18, 19, and thereby determining the points at which the filaments will be broken. As shown in the drawing, the breaker device 6 comprises a pair of breaker rollers 24, 25, the former being positioned above and the latter below the path of the sliver between the feed rollers and the delivery rollers. The breaker rollers 24, 25 are preferably made of steel and are provided with prominent flutes 26 which extend lengthwise of the rollers and are so arranged as to intermesh as the rollers rotate. The flutes 26 are preferably of such formation as to provide a sharp angle or breaker edge 27 at their outer extremities in order that the filaments in the sliver 2 may be bent as abruptly as possible when they are sufficiently tensioned by the differential speed of the feed and delivery rollers. The breaker edges 27 on each breaker roller are substantially spaced from each other, and they are so formed and arranged that the edges on one roller do not come into contact with the other roller or the edges thereon as the two rollers rotate.

The opposite ends of the breaker rollers 24, 25 are supported in bearings 28 in a pair of standards 29 secured to the opposite sides of the base 8 by bolts 30 or the like, preferably in such a manner as to be adjustable on the base in a direction toward and away from the feed and delivery rollers. In order that the purposes of the invention may be fully realized it is important that the bearings 28 be movably supported on the standards 29 in such a manner as to be vertically adjustable by such means as the hand wheels 31, or other suitable means whereby one or both of the breaker rollers 24, 25 may be adjusted so as to vary the action of the breaker edges 27 upon the sliver 2. The breaker rollers 24, 25 are geared together and the lower one is positively driven from any suitable operating part of the machine at a rate such that the peripheral speed of the breaker edges 27 is intermediate the surface speed of the feed rollers and the surface speed of the delivery rollers. Such a speed is of importance in preventing the movement of the advancing ends of broken filaments from being obstructed, and in maintaining the continuity of the sliver. With a sliver of rayon such as referred to above, excellent results are obtained when the peripheral speed of the breaker edges 27 is approximately twice the surface speed of the feed rollers, that is, slightly below that of the delivery rollers.

The function of the breaker edges 27 is to deflect the tensioned sliver intermittently and abruptly out of its path of movement between the nip of the feed rollers 13, 14 and the nip of the delivery rollers 18, 19 and thereby bend the tensioned filaments sharply and thus determine the points at which they are broken when tensioned sufficiently by the delivery rollers. By this procedure and with a suitable setting of the breaker edges 27 transversely of the path of the moving sliver, the length of the staple fibers can be effectively controlled.

As shown in the drawing, the breaker rollers 24, 25 are so adjusted with respect to each other that the breaker edges 27 on one roller do not at any time pinch the sliver against the opposing roller. In fact, no pinching or cutting action

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is contemplated or desirable in the operation for the reason that those filaments which have not been tensioned sufficiently by the delivery rollers 18, 19 to be broken over a breaker edge 27 must slip over the breaker edges until the tension is sufficient to cause them to be broken over one of the edges 27. As will be readily appreciated, when the breaker rollers are adjusted away from each other to such an extent that the breaker edges are out of contact with the tensioned sliver, the breaker device will have no effect upon the filaments and the reduction to staple fibers will accord with that described in the patent referred to above. In that case the filaments in the sliver will be reduced in a haphazard manner to staple fibers of irregular length, the maximum length being determined by the distance between the nips of the feed rollers 13, 14 and the delivery rollers 18, 19.

When the breaker rollers are adjusted toward each other to bring the breaker edges 27 into contact with the sliver, the latter will be deflected abruptly out of its path by the breaker edges, and the filaments which are sufficiently tensioned will be broken over one of the breaker edges. Thus the effectiveness of the breaker device in controlling the length of the staple fibers increases as the breaker rollers are adjusted toward each other, it being understood, of course, that the breaker rollers should not be set sufficiently close to pinch the sliver between the breaker edges on one roller and any portion of the co-operating breaker roller. As will appear from the above description, a sliver of continuous filaments may be processed in accordance with the improved method and with the improved apparatus to thereby convert it into a sliver of staple fibers having uniform lengths corresponding to the distance between the breaker device 6 and the delivery rollers 5, or into staple fibers having somewhat irregular lengths where these are desired for certain purposes such as subsequent blending with slivers of wool.

After leaving the delivery rollers 5 the sliver of staple fibers is drawn through a trumpet guide 32 by a pair of rollers 33, 34 forming a part of the crimping device 7. The crimper rollers have their opposite ends supported in a bracket 35 which is secured to the standards 16. The crimper rollers are preferably made of metal, have a smooth cylindrical surface, and the ends of one roller are supported in bearings which are spring pressed and adjustable on the hanger by hand wheels 36 in order that the pressure of the rollers on the sliver may be regulated. The crimper rollers 33, 34 are geared together to rotate in unison and are positively driven at a rate such that their surface speed is slightly higher than the surface speed of the delivery rollers.

The crimper rollers 33, 34 feed the sliver into a crimper box 37 supported immediately beneath the rollers, on the bracket 35. The open lower end of the crimper box 37 is provided with a trap door 38 hinged on one edge to the crimper box as shown at 39, and having thereon a lever arm 40 which supports an adjustable weight 41 for controlling the pressure required to open the door. In the operation of such a crimping device it will be understood that, as the sliver of staple fibers is fed into the crimper box 37 by the rollers 33, 34, the trap door 38 prevents the sliver from leaving the box until the pressure produced upon the trap door by the sliver fed into the box by the crimper rollers is sufficient to open the door against the action of the weight 41. Until such

a pressure is reached, the sliver is crimped or folded back and forth in the crimper box 37, and when the pressure on the trap door is sufficient to open it, a length of crimped sliver will be discharged from the lower end of the crimper box, over the edge of the trap door, until the upward pressure on the trap door due to the weight 41 is sufficient to overcome the downward pressure of the crimped sliver in the box. By crimping the sliver of staple fibers in this manner I have found that the sliver may be deposited loosely in the receptacle 10 and transported and handled without damage to the sliver and without having to twist it or wind it upon a spool in the customary manner.

The sliver of continuous filaments drawn from the container 9 by the feed rollers 4 passes over a smooth guide bar 42 secured in the outer end of a frame 43. The inner end of frame 43 is hinged at 44 to standards 45 which are secured to the base 8. The frame 43 may be secured in position by bracing elements 46 having their upper ends secured to the frame and their lower ends adjustably secured to the standards 45 by means of bolts 47.

After being drawn over the guide bar 42 the sliver passes under the spreader 1 which is preferably of the beater type. The spreader 1 comprises a shaft 48 having its opposite ends rotatably mounted in the frame 43, a pair of spaced disks 49 secured on the shaft 48, and one or more spreader bars 50 extending between the disks 49 and having their ends secured to the peripheries thereof. The shaft 48 is positively rotated in a counterclockwise direction so that the spreader bars 50, moving in a direction opposite to the direction of movement of the sliver 2, are brought into contact with the sliver intermittently to thereby beat the sliver, loosen the filaments, and spread them out into the form of a band.

After leaving the spreader device 1 the band of continuous filaments enters the bight between the two upper rollers 51, 52 of the spreader rollers 51, 52, 53, 54. These spreader rollers are preferably made of metal, have smooth cylindrical surfaces, and their opposite ends are supported in the standards 45. Although they are not positively driven other than by the movement of the sliver therethrough, the spreader rollers are preferably geared together to rotate in unison and are spring pressed toward each other in a well-known manner for the purpose of varying the pressure upon the band of filaments. The spreader rollers operate to further spread the filaments in the sliver and to form them into a band of substantially uniform thickness from side to side as the sliver serpentine through them for delivery to the bight of feed rollers 11, 12 heretofore described. The spreader rollers also tend to snub any filaments that may not be positively gripped by the feed rollers 4.

While the improvement has been particularly described in connection with the manufacture of a sliver or yarn of staple fibers from a sliver of continuous filaments such as rayon, it will be apparent that it is also applicable to the conversion of a sliver of long fibers into a sliver of shorter fibers such as by reprocessing a sliver of broken filaments or fibers of definite length for the purpose of reducing the length of the staple fibers. It will also be apparent that the improved procedure is applicable to a sliver comprising both continuous filaments and fibers having a comparatively short length. In such cases all filaments having a length sufficient to be

nipped by the feed and delivery rollers will be tensioned thereby and will be broken by the breaker edges in the manner described above. Still other adaptations of the improvement will be evident to those skilled in the art, and it is to be understood therefore that the invention is not intended to be limited to the specific process and apparatus described herein.

What I desire to claim is:

1. In the process of converting a sliver of textile filaments into a sliver of staple fibers, continuously advancing the sliver longitudinally, continuously tensioning progressive portions of the sliver having a length greater than the length of the staple fibers desired, and intermittently deflecting the tensioned sliver abruptly out of its path of movement to progressively break the tensioned filaments at the points of deflection.

2. In the process of converting a sliver of textile filaments into a sliver of staple fibers, continuously feeding the sliver into a reducing zone at a given speed, continuously withdrawing the sliver from said zone at a higher speed to progressively tension the portion of the sliver in said zone, and intermittently deflecting the sliver out of its normal path of travel through said zone to progressively break the tensioned filaments at the points of deflection.

3. In the process of converting a sliver of continuous textile filaments into a sliver of staple fibers, spreading the filaments of the sliver to form a band of substantially uniform thickness, continuously feeding the band into a reducing zone at a given speed, continuously withdrawing the band from said zone at a greater speed to tension the band in said zone, and intermittently deflecting the band abruptly out of its normal path of travel through said zone to progressively break the tensioned filaments at the points of deflection.

4. Apparatus for converting a sliver of textile filaments into a sliver of staple fibers, comprising a set of feed rolls adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rolls adapted to nip the sliver and withdraw it from said zone at an increased speed, and a breaker edge supported adjacent the normal path of travel of said sliver through said zone and movable intermittently into and out of said path to deflect said sliver sharply out of said path and break the tensioned filaments at the points of deflection.

5. Apparatus for converting a sliver of textile filaments into a sliver of staple fibers, comprising a set of feed rolls adapted to nip the sliver and feed the same continuously into a reducing zone at a given speed, a set of delivery rolls adapted to nip the sliver and withdraw it from said zone continuously at an increased speed and thereby progressively tension the individual filaments and break the same into staple fibers, and means positioned between said sets of rolls and adjacent the normal path of travel of said sliver through said zone for intermittently acting upon said sliver and abruptly bending and thereby weakening the tensioned filaments and predetermining the breaking points thereof.

6. Apparatus for converting a sliver of textile filaments into a sliver of staple fibers, comprising a set of feed rolls adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rolls adapted to nip the sliver and withdraw it from said zone at an increased speed, a breaker edge supported adjacent the normal path of travel of said sliver through

said zone and movable intermittently into and out of said path to deflect said sliver abruptly out of said path and break the tensioned filaments, and means for adjusting said breaker edge transversely of said path to determine the extent of deflection of said sliver and thereby control the length of the staple fibers.

7. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rolls adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rolls adapted to nip the sliver and withdraw it from said zone at an increased speed, and a breaker edge supported adjacent the normal path of travel of said sliver through said zone and movable intermittently through said path and in the direction of travel of said sliver through said zone to bend the tensioned filaments abruptly and progressively break them into staple fibers.

8. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rolls rotating at a given surface speed and adapted to nip the sliver and feed the same into a reducing zone, a set of delivery rolls rotating at a higher surface speed and adapted to nip the sliver and withdraw it from said zone, and a breaker edge supported adjacent the normal path of travel of said sliver through said zone and movable intermittently through said path and in the direction of travel of said sliver through said zone to bend the tensioned filaments sharply and progressively break them into staple fibers, the speed of movement of said breaker edge in the direction of travel of said sliver being intermediate the surface speeds of said feed rolls and said delivery rolls.

9. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, and a rotary breaker device supported adjacent the normal path of travel of said sliver through said zone and having a breaker edge arranged thereon to deflect said sliver intermittently and abruptly out of its normal path as said device rotates and progressively break the tensioned filaments into staple fibers.

10. Apparatus for converting a sliver of textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, a rotary breaker device supported adjacent the normal path of travel of said sliver through said zone and having a breaker edge arranged thereon to deflect said sliver intermittently and abruptly out of its normal path as said device rotates and progressively break the tensioned filaments into staple fibers, and means for adjusting said device toward and away from said path to control the length of the staple fibers.

11. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rollers rotating at a given surface speed and adapted to nip the sliver and feed the same into a reducing zone, a set of delivery rollers rotating at a higher surface speed and adapted to nip the sliver and withdraw it from said zone, and a rotary breaker device supported adjacent the normal path of travel of

said sliver through said zone and having thereon a breaker edge moving at a speed intermediate the surface speeds of said feed rollers and said delivery rollers to deflect said sliver intermittently and abruptly out of its normal path as said device rotates and progressively break the tensioned filaments into staple fibers.

12. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, a rotary breaker device supported adjacent the normal path of travel of said sliver through said zone and having a breaker edge arranged thereon to deflect said sliver intermittently out of its normal path as said device rotates and progressively break the tensioned filaments into staple fibers, and means for adjusting said device toward and away from said path to thereby control the length of said staple fibers.

13. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, and a rotary breaker device supported adjacent the normal path of travel of said sliver through said zone and having thereon a plurality of spaced breaker edges for engaging successively with said sliver to deflect said sliver intermittently out of its normal path as said device rotates and progressively break the tensioned filaments into staple fibers.

14. Apparatus for converting a sliver of textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, and a pair of rotary breaker devices supported on opposite sides of the normal path of travel of said sliver through said zone and having thereon a plurality of intermeshing breaker edges for engaging successively with said sliver to deflect it intermittently out of its normal path and progressively break the tensioned filaments into staple fibers.

15. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, a pair of rotary breaker devices supported on opposite sides of the normal path of travel of said sliver through said zone and having thereon a plurality of intermeshing breaker edges for engaging successively with said sliver to deflect it intermittently and abruptly out of its normal path and progressively break the tensioned filaments into staple fibers, and means for adjusting one of said breaker devices toward and away from the other breaker device to control the length of the staple fibers.

16. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery

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rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, a pair of rotary breaker devices supported on opposite sides of the path of travel of said sliver through said zone and having thereon a plurality of intermeshing breaker edges for engaging successively with said sliver to deflect it intermittently and abruptly out of its path and progressively break the tensioned filaments into staple fibers, and means for adjusting said devices toward and away from each other to thereby control the length of said staple fibers.

17. Apparatus for converting a sliver of continuous textile filaments into a sliver of staple fibers, comprising a set of feed rollers adapted to nip the sliver and feed the same into a reducing zone at a given speed, a set of delivery rollers adapted to nip the sliver and withdraw it from said zone at an increased speed, a spreader device adjacent said feed rollers for spreading the filaments of the sliver to form a band of substantially uniform thickness as said sliver enters the nip of said feed rollers, and a breaker edge supported adjacent the normal path of travel of said sliver through said zone and movable intermittently into and out of said path

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to deflect said sliver abruptly out of said path and progressively break the tensioned filaments into staple fibers.

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