July 2, 1940. E. L. MARTIN 2,206,232

APPARATUS FOR DRAFTING TEXTILE SLIVERS OR ROVINGS

Filed Oct. 27, 1938

Fig. 1.

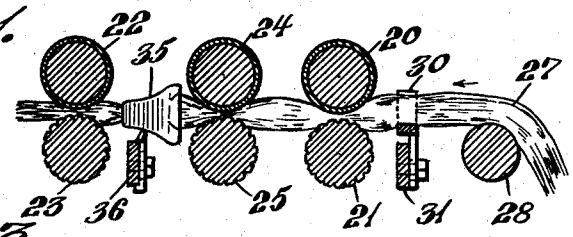


Fig. 2.

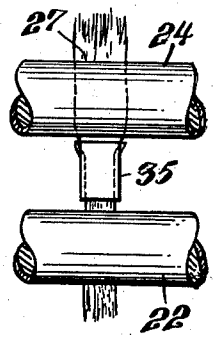


Fig. 3.

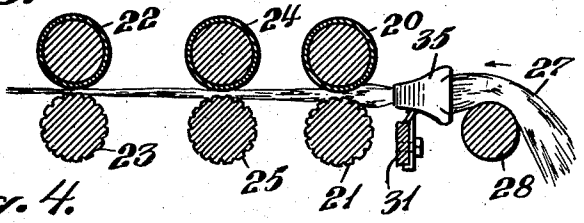


Fig. 4.

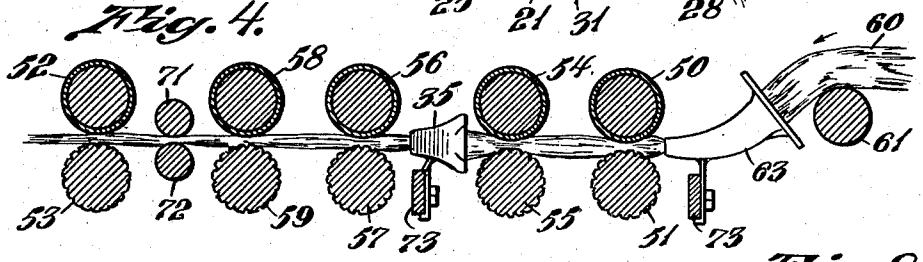


Fig. 5.

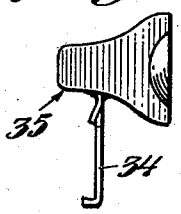


Fig. 6.

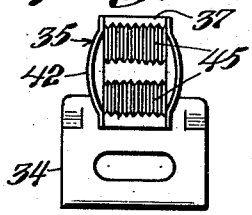


Fig. 7.

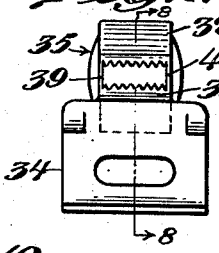


Fig. 8.

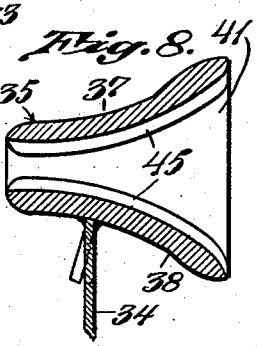


Fig. 9.

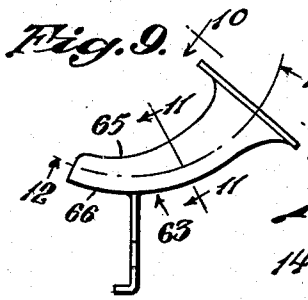


Fig. 10.

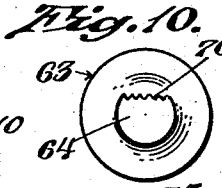


Fig. 11.

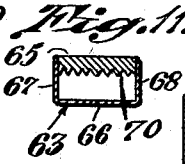


Fig. 12.

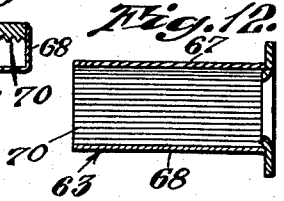


Fig. 13.

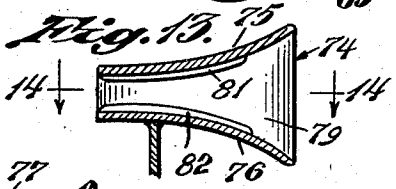
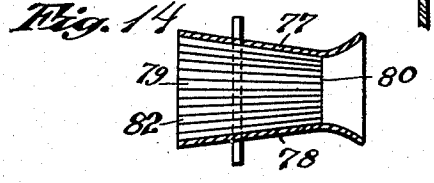


Fig. 14.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR DRAFTING TEXTILE SLIVERS OR ROVINGS

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Application October 27, 1938, Serial No. 237,260

12 Claims. (Cl. 19—130)

This invention relates to improvements in drafting apparatus for textile slivers and rovings; and has for one of its objects the provision of means for acting upon the strand of sliver or roving preliminary to its passage between a pair of draft rolls to separate and straighten the fibers and arrange them into substantial parallelism.

Another object of the invention is to provide a device through which the roving strand of sliver passes in its travel to a pair of draft rolls in which the construction of the device is such that a combing action will be imparted to the sliver so as to lay smooth and straighten into substantial parallelism the fibers thereof preparatory to their being drafted.

Another object of the invention is the separation and straightening of the outer fibers of a moving strand of sliver or roving without compressing the same to a greater density than it had before such treatment.

Another object of the invention is the drafting and redrafting of the slivers by means of a succession of drawing operations and the arranging of the fibers in substantial parallelism before being subjected to each drafting process.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a diagrammatic longitudinal cross-sectional view of a drawing mechanism embodying my invention;

Fig. 2 is a diagrammatic plan view of a fragmentary portion of the drawing mechanism represented in Fig. 1, showing a sliver combing device located in a different position;

Fig. 3 is a diagrammatic longitudinal cross-sectional view of a modified arrangement of drawing mechanism embodying my invention;

Fig. 4 is another modification showing a diagrammatic longitudinal cross-sectional view of a drawing mechanism embodying my invention;

Fig. 5 is a side elevational view of one form of a sliver combing device made in accordance with my invention;

Fig. 6 is an end view of the device shown in Fig. 5, showing the entrance end thereof;

Fig. 7 is an end view of the device shown in Fig. 5 showing the discharge end thereof;

Fig. 8 is an enlarged central longitudinal cross-sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a side elevational view of a modified form of sliver combing device embodying my invention;

Fig. 10 is an end view taken on the line 10—10 of Fig. 9, looking into the entrance end of the device;

Fig. 11 is a transverse sectional view taken on the line 11—11 of Fig. 9;

Fig. 12 is a longitudinal sectional view taken on the arcuate 12—12 of Fig. 9;

Fig. 13 is a vertical longitudinal sectional view of another modified form of sliver combing device; and

Fig. 14 is a horizontal longitudinal sectional view taken on the line 14—14 of Fig. 13.

It is desirable in drafting textile slivers or rovings that the fibers of the sliver being fed to the draft rolls be presented in as nearly a parallel condition as possible so as to prevent fuzzing, curling or outward bending of the short fibers at the selvage edges and the outer surfaces of the material during the drafting process. In the past, various attempts have been made to improve the disposition of the fibers by the use of forming trumpets or condensers, but such prior devices have not been found to be entirely satisfactory since they were designed to act on the sliver to compress and condense the material so that it left the devices in a more compact state than it had before such treatment, and with no better parallelism of the fibers being obtained; and in order that the fibers may be separated and laid in substantial parallelism and with uniformity at the surface portions of the sliver, I have provided a hollow closed device through which the moving strand of sliver passes and is guided during its passage to a set of draft rolls, and I have further provided inside of the device a plurality of serrations or ribs on one or more of the interior wall surfaces of the device against which the sliver has frictional contact in passing through the device, and these serrations or ribs extend longitudinally throughout the major portion of the device in the direction of the travel of the sliver, and they are so arranged as to act on the fibers on one or both sides of the sliver to provide a combing action thereon during its passage relative to the ribs through the device; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawing, there is illustrated in Fig. 1 a conventional drawing mechanism consisting of a pair of feed rolls 20 and 21, a pair of discharge rolls 22 and 23, and a pair of intermediate drafting rolls 24 and 25. The

sliver 27 is raised by a carrier roller 28 and fed in the direction of the arrow shown in Fig. 1 through the usual condenser guide or trumpet 30 which is suitably fixed to the usual reciprocable traverse bar 31, and in the course of which feeding movement of the sliver 27 the above sets of upper and lower rolls of the drawing mechanism operate successively on the sliver 27 with progressively increased velocities to impart the desired degree of attenuation to the sliver in its final state when discharged at the front or delivery rolls 22 and 23 of the drawing mechanism. As indicated in Fig. 1, all the lower draft rolls 21, 23 and 25 are of the usual fluted construction while the upper rolls 20, 22 and 24, respectively, which are removably supported by the lower rolls of their respective set, are either leather or cork covered. The upper rolls may be weighted in any suitable manner as is customary practice in the art, the particular weighting mechanism used forming no feature of the present invention. As the sliver 27 passes between the intermediate draft rolls 24 and 25 in its travel from the feed rolls 20 and 21, the sliver receives an appreciable draft due to the faster velocity of the rolls 24 and 25.

In passing from the set of draft rolls 24 and 25 to the front or discharge rolls 22 and 23, the drafted sliver 27 is caused to travel through a device 35 which acts on the sliver during its passage therethrough to separate the fibers and straighten them by exerting thereon a combing action on one or more surfaces of the sliver so as to lay smooth and straighten out the outer fibers. The device 35 is supported by an arm 34 fixedly secured to a traverse bar 36 which is reciprocably arranged for movement parallel to the axes of draft rolls of the mechanism by suitable mechanism, not shown, simultaneously with the reciprocation of the traverse bar 31.

The device 35 is shown in Figs. 5 to 8, inclusive, and comprises a hollow closed funnel-shaped body having relatively converging top and bottom walls 37 and 38 respectively, connected together by a pair of straight side walls 39 and 40 which are tapering in height from one end to the other to form with the top and bottom walls a central passage 41 of progressively diminishing height from the entrance end to the discharge end of the device and extending throughout the whole length of the body for receiving and guiding a single strand of sliver or roving. As illustrated, the entrance end of the device is shown as being enlarged and flared outwardly as indicated at 42 while the outlet or discharge end of the device has been reduced in height and is flat and broad and of a generally rectangular formation in its exterior contour.

In order to separate and straighten the fibers of the sliver as it is caused to travel relative to the device during its movement therethrough, I have provided on the inside of the passage 41, a plurality of ribs 45 which project from the inner faces of the upper and lower walls 37 and 38 respectively of the body, and the ribs 45 extend longitudinally thereof throughout substantially the whole length of the passage 41 for acting simultaneously on opposite sides of the sliver upon frictional contact therewith and by the dragging effect due to the feeding movement of the sliver relative to the ribs to cause a combing action on the fibers disposed in the vicinity of the outer surface of such portions of the sliver. As shown in Figs. 6 and 7, the inside upper and lower walls 37 and 38 respectively of the body are serrated or notched across the entire width of the passage 45 so that the fibers in the vicinity of the outer surface of the sliver at opposite sides thereof are separated by the ribs 45 and extend into the grooves between alternate ribs to be straightened and laid in general parallelism during the travel of the sliver through the device.

In the construction illustrated in Fig. 3, I have shown a modification of the drafting mechanism shown in Fig. 1 and utilizing the same feed delivery and intermediate drafting rolls represented therein but differing from that construction in the position of the funnel device 35 which in Fig. 3 is shown as being placed in advance of the feed rolls 20 and 21 to replace the condenser guide or trumpet 30 generally located in such position. In this modified construction the sliver 27 is fed by the carrier roller 28 to the funnel-shaped device 35 where a combing action is imparted to the sliver in passing therethrough to cause separation and better parallelism of the fibers preliminary to the sliver being drafted during subsequent passage between the sets of draft rolls 20—21, 24—25 and 22—23 respectively.

In the embodiment illustrated in Fig. 4 there is represented a slightly different arrangement of drawing mechanism consisting of a pair of feed rolls 50 and 51, a pair of delivery or discharge rollers 52 and 53, and three sets of upper and lower intermediate drafting rolls 54—55, 56—57 and 58—59 respectively. The sliver 60 to be drafted is fed by a carrier roller 61 to a funnel device 63 and passes through a longitudinal passage therein, the inside of which has a serrated portion for acting upon the sliver to separate and straighten the fibers of the sliver upon engagement therewith, the specific construction of the device 63 being hereinafter more fully described. After passage through the device 63, the sliver 60 is given an appreciable draft by passage between the sets of drafting rolls 54 and 55 and 56 and 57 respectively. A second combing action is imparted to the sliver by means of a funnel device 35 which is arranged in the path of travel of the sliver and interposed between the sets of draft rolls 54 and 55, and 56 and 57 respectively, which rolls are rotated at substantially the same velocity, and hence do not operate upon the sliver to impart an appreciable draft thereto. The combed sliver 60, is again drafted in passing between the sets of draft rolls 58 and 59, and 52 and 53 respectively, after which the sliver, upon emerging from the draft rolls 52 and 53, may be wound upon the usual bobbin, not shown, as is customary in the construction and operation of such apparatus. A pair of rollers 71 and 72 of a smaller size than the usual draft rolls are disposed between the last pair of intermediate draft rollers 58 and 59 and the front set of delivery rollers 52 and 53 respectively, whereby a slight amount of "slip" draft is imparted to the sliver 60 during its passage through this draft zone prior to being discharged at the front of the machine. The funnel devices 35 and 63 are fixedly mounted on reciprocable traverse bars 73 which are usually employed in drawing mechanisms and impart movement of the devices 35 and 63 parallel with the draft rolls.

As shown in Figs. 9 to 12, inclusive, the funnel device 63 consists of a hollow closed body having a passage 64 extending therethrough, and formed with upwardly curved upper and lower walls 65 and 66, and straight parallel side walls 67 and 68 (see Fig. 12). The inside face of the upper wall

65 is shown in Figs. 10 and 11 as being of a serrated formation to provide a plurality of longitudinally extending ribs 70. The remaining portion of the passage is generally smooth and the passage 64 is reduced in height from the entrance end to the discharge end of the body. As shown in Fig. 10, the shape of the passage 64 is of generally circular contour and is reduced to one of generally rectangular formation at the outlet end of the device. The side walls 67 and 68, however, are generally parallel throughout their extent, as shown in Fig. 12.

In Figs. 13 and 14 I have shown another modified construction of the funnel device which is similar to that shown in section in Fig. 8 by having a body 74 formed with relatively converging upper and lower walls 75 and 76, and straight side walls 77 and 78 and with a central passage 79, but differs therefrom in that the side walls 77 and 78 instead of being parallel throughout the body as shown in Fig. 8, in the present instance diverge outwardly from a constricted portion 80 of the passage 79 near the entrance end of the device. The inside part of the funnel passage is provided with a plurality of spaced ribs 81 and 82 on the inner faces of its top and bottom walls respectively, the adjacent ribs 81 and 82 in each portion being inclined with respect to each other so as to radiate outwardly from a transverse line at the narrow portion of the passage 79 as a focal point whereby a broad spreading action will be imparted to the sliver during its travel through the device to the draft rolls so that it will be delivered thereto in a wide ribbon of uniform material.

These funnel devices 35, 63 and 74 may be constructed of metal, either cast or in sheet form, porcelain, or of suitable plastic molding compositions, such as for example, thermoplastic synthetic resin materials.

In accordance with my invention, it will be apparent that I have provided a device and improved process of drafting textile slivers whereby a better parallelization of the fibers is obtained preparatory to the drawing out operation, and at a minimum of expense. In the use of my improved device I intend that it be employed for the treatment of one sliver and there is frictional contact of the single strand of sliver with all the serrations or ribs on one or both sides of the sliver, and these ribs are so designed and employed in such number as to put a slight drag on the sliver during its passage through the funnel yet without subjecting the sliver to excessive friction and to cause a straightening and smoothing effect on the fibers by exerting a combing action thereon to render them more in parallelism. By making the side walls of the funnel devices 35, 63 and 74 either parallel or of diverging arrangement from the point of least width of the sliver conducting passage therein, there will then be no compression of the sliver to a greater degree of compactness as it leaves the discharge end of the device.

The foregoing description is directed solely toward the construction illustrated but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body open at its opposite ends and having a longitudinal passage extending throughout the entire length of said body for receiving and guiding the sliver in its travel through said device, said body having a plurality of ribs projecting from a wall of the body and extending throughout substantially the whole length of said passage for acting on the sliver upon contact therewith to project into, separate and straighten into substantial parallelism the fibers in the vicinity of the outer surface of the engaged portion of the sliver during its longitudinal travel through the body.

2. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body open at its opposite ends and of generally funnel-shaped formation having top and bottom walls with generally straight side walls tapering in height from one end to the other to form a longitudinal passage of progressively diminishing height extending throughout the entire length of the body for receiving and guiding a single strand of sliver, the top wall of said body within said passage being serrated across its entire width to provide a ribbed formation projecting from the inside face of said wall and extending throughout substantially the whole length of said body for contact with and project into the fibers of the sliver to separate and straighten the fibers in the upper portion of the sliver into substantially parallelism by acting with a combining action on the sliver during its travel through the body relative to the ribs.

3. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body open at its opposite ends and of generally funnel-shaped formation having curved top and bottom walls with straight side walls tapering in height from one end to the other to form a longitudinal passage of progressively diminishing height extending throughout the entire length of the body for receiving and guiding a single strand of sliver, the top and bottom walls of said body within said passage being serrated across its entire width to provide a ribbed formation projecting from the inside face of said wall and extending throughout substantially the whole length of said body for contact with the sliver to separate and straighten the fibers in the upper and lower portions of the sliver into substantial parallelism by simultaneously acting with a combing action on the sliver during its travel through the body relative to the ribs.

4. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body open at its opposite ends and of generally funnel-shaped formation having converging top and bottom walls with generally straight side walls tapering in height from one end to the other to form a longitudinal passage of progressively diminishing height extending throughout the entire length of the body for receiving and guiding a single strand of sliver, the top wall of said body within said passage being serrated across its entire width to provide a ribbed formation projecting from the inside face of said wall and extending throughout substantially the whole length of said body for contact with the sliver to separate and straighten the fibers in the upper portion of the sliver into substantial parallelism by acting with a combing action on the sliver during its travel through the body relative to the

ribs, a plurality of ribs projecting from the inside faces of said upper and lower walls and extending longitudinally thereof, the ribs on said upper wall being opposite those on the lower wall, said ribs being of finely spaced formation and each having tapered sides and a pointed edge for engagement with the sliver to separate and straighten the fibers in the upper and lower portions of the sliver during its travel through the body.

5. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body member open at its opposite ends and having upper and lower converging walls joined together at their side edges by generally straight side walls to form a central passage throughout the whole length of the device and of progressively diminishing height from the entrance end to the discharge end thereof, and a plurality of longitudinally extending ribs projecting from the inside face of one of said walls for frictional contact with the sliver to perform a combing action thereon during its passage through the device for straightening the fibers into substantial parallelism, the entrance end of he body being flared outwardly from a constricted portion of said passage, said side walls diverging outwardly from said constricted portion in the direction of the discharge end of the body to form a flat broad outlet opening of reduced height than the entrance opening whereby said sliver will be discharged from the device in a wide ribbon of greater width than its initial breadth upon entering the device, said ribs being angularly disposed to one another and radiating outwardly from said constricted portion of the passage to approach parallelism with the side walls of the body.

6. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving comprising a hollow closed body member open at its opposite ends and having upper and lower converging walls joined together at their side edges by straight side walls to form a central passage throughout the whole length of the device and of progressively diminishing height from the entrance end to the discharge end thereof, and a plurality of longitudinally-extending ribs projecting into said passage from the inside face of said upper and lower walls for frictional contact with the sliver to perform a combing action thereon during its passage through the device for straightening the fibers into substantial parallelism, the entrance end of the body being flared outwardly from a constricted portion of said passage, said side walls diverging outwardly from said constricted portion in the direction of the discharge end of the body to form a flat broad outlet opening of reduced height than the entrance opening whereby said sliver will be discharged from the device in a wide ribbon of greater width than its initial breadth upon entering the device, said ribs in each group being angularly disposed to one another and radiating outwardly from said constricted portion of the passage to approach parallelism with the side walls of the body.

7. In a drafting mechanism, a pair of draft rolls, a support arranged adjacent said rolls, a sliver treating device secured to said support, said device comprising a hollow closed body open at its opposite ends and of generally funnel-shaped formation having relatively converging top and bottom walls and generally straight side walls to provide a passage of progressively diminishing height extending throughout the entire length of said body for receiving and guiding a sliver to be fed to said draft rolls but without laterally compressing the sliver in passing through the passage, said body having a plurality of ribs in the top and bottom walls projecting from their inside faces and extending longitudinally thereof throughout substantially the entire length of the body for contact with the opposite sides of the sliver to separate and straighten the fibers in the upper and lower surface portions of the sliver into substantial parallelism and to perform a combing action on the sliver during its travel through the body.

8. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body open at its opposite ends having a passageway therethrough for receiving and guiding the sliver in its travel through said device, and laterally spaced, longitudinally extending combing ribs extending into said passageway from one of its side walls and with its operating portions in substantial alignment transversely of said passageway for acting on the sliver upon contact therewith to penetrate into, separate and straighten into substantial parallelism the fibers in the vicinity of the outer surface of the engaged portion of the sliver during its travel through the body.

9. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body open at its opposite ends having a longitudinal passage extending throughout the entire length of said body for receiving and guiding the sliver in its travel through said device, and a plurality of longitudinal ribs inside and spaced laterally of said passage and depending inwardly into the same from one of its side walls, the free ends of said teeth being substantially in alignment laterally of the passage for acting on the sliver upon contact therewith as it is fed through the device, said teeth being constructed and arranged to penetrate into, separate and straighten the fibers in the vicinity of the outer surface of the engaged portion of the sliver by projecting into the same to perform a combing action on the sliver in its longitudinal travel through the body.

10. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a hollow closed body open at its opposite ends having a passage therethrough for receiving and guiding the sliver in its travel through said device, and a plurality of spaced, raised combing members in opposed relation inside of said passage and projecting from opposite walls of the body, said members extending along the path of movement of the sliver or roving with the free ends of said combing members being in substantial alignment laterally of the passage for acting on the sliver upon contact therewith to penetrate into, separate, and straighten into substantial parallelism the fibers in the vicinity of the outer surface of the engaged portion of the sliver during its travel through the device.

11. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving in connection with the drafting of the same, comprising a guide member open at its opposite ends and having connected side walls extending in the direction of travel of a moving

strand of textile sliver or roving and forming a guideway through which said sliver or roving passes in its longitudinal movement, said guideway being relatively wide at its entrance end but constricted at the delivery end, said side walls being smooth and continuous from one end of the guideway to the other, and raised, longitudinally extending ribs between said side walls projecting into said guideway and extending along the path of movement of the sliver or roving for engaging the same to penetrate into, separate, and straighten into substantial parallelism the fibers in the vicinity of the outer surface of the engaged portion of the sliver during its travel through the device.

12. A device for separating and straightening into substantial parallelism the fibers of a textile sliver or roving, said device comprising a body member having walls forming a longitudinally extending passageway therethrough for receiving and guiding the sliver or roving in its travel through said device, and ribs extending into said passageway within the zone of action of said passageway for engagement with the outer fibers of the sliver to penetrate into, separate and straighten into substantial parallelism the fibers in the vicinity of the outer surface of the engaged portion of the sliver or roving as it passes through the device.

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