July 27, 1954 H. J. McDERMOTT 2,684,755

FILAMENTARY THREAD GUIDE

Filed Feb. 26, 1952

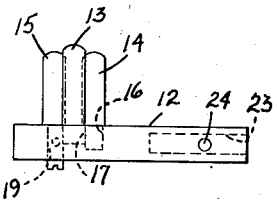


Fig. 2

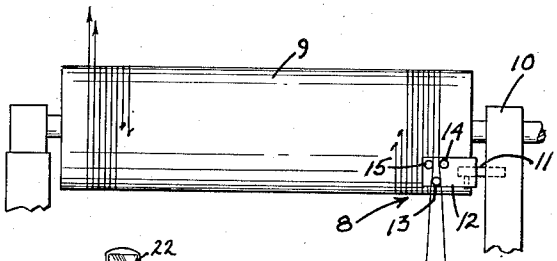


Fig. 1

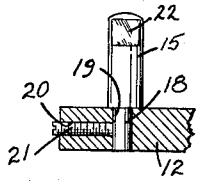


Fig. 4

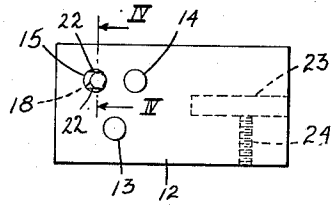
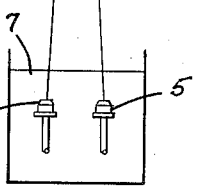


Fig. 3



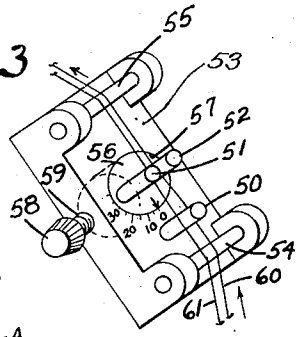


Fig. 8

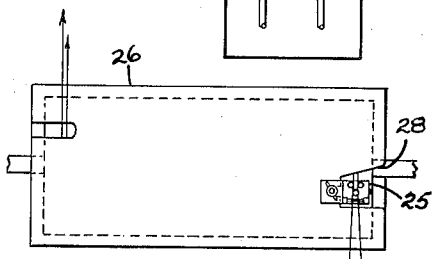


Fig. 5

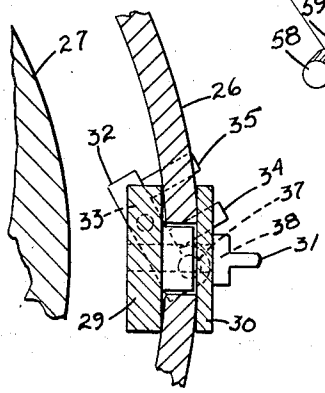


Fig. 7

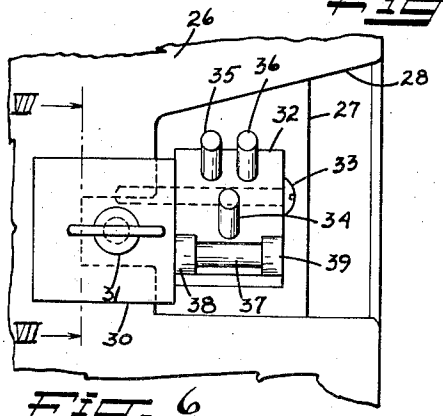
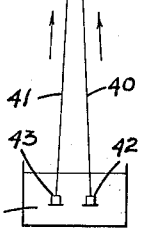


Fig. 6



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FILAMENTARY THREAD GUIDE

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6 Claims. (Cl. 203—340)

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This invention relates to a thread guide for filamentary material and more particularly to a thread guide wherein the lateral disposition of a pair of filamentary strands may be adjustably controlled.

In the continuous so-called "wet spinning" method of producing artificial threads, such as from solutions of cellulose and derivatives thereof, the filamentary material or yarn is commonly conducted successively in a helical fashion over a plurality of thread-advancing devices. In this way the yarn, as it helically progresses along each of the thread-advancing devices may be conveniently subjected to various successive processing operations such as washing, desulfurizing, dyeing, bleaching, and drying.

As the demands of production continue to require of existing equipment increased quantities of yarn, it has been found expedient to helically wrap one or more additional strands of filamentary material between the adjacent helical convolutions of the originally accommodated strand of filamentary material. In this way a plurality of individual filamentary strands may be simultaneously handled on the same processing machine and its productive output may be thereby increased.

For proper processing results, however, each strand of yarn should be subjected to each treating solution for a certain minimum time interval. As this time interval is dependent upon the number of helical convolutions of each strand on the yarn handling drums, it is oftentimes necessary to place adjacent convolutions of the individual strands of yarn relatively close together. Due to lateral vibrations of the yarn strands as they approach the various thread advancing devices, the spacing between adjacent convolutions may occasionally become reduced so that the surface tension of the liquid on the treated yarn draws the adjacent strands together and allows the separate strands to become entangled or overlapped to such an extent as to render subsequent separation difficult. Although various so-called "wetting agents" may be employed to reduce the surface tension of the liquid on the helix of yarn being treated, and to facilitate separation after being overlapped, it is often undesirable to use a wetting agent.

It is a principal object of the present invention to provide a novel and improved thread guide wherein the inherent lateral vibratory movement of the filamentary material is substantially eliminated as it approaches the filamentary handling device.

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It is a further object of the present invention to provide a novel and improved thread guide which permits a plurality of slightly separated filamentary strands to track separately in a helical manner about the thread advancing drum.

It is a further object of the present invention to provide a novel and improved thread guide which is adjustable such that the space between adjacent convolutions of a pair of individually helically wound filamentary strands may be conveniently controlled.

Other objects and advantages of the present invention will be apparent from the following description.

In the drawing which is illustrative of the invention,

Figure 1 is a diagrammatic front view of one embodiment of the present invention;

Figure 2 is an enlarged bottom view of the improved thread guide shown in Figure 1;

Figure 3 is a front view of the thread guide of Figure 2;

Figure 4 is an enlarged sectional detail as seen at IV—IV of Figure 3;

Figure 5 is a diagrammatic view of a second embodiment of the present invention;

Figure 6 is an enlarged detail showing the thread guide means shown in Figure 5;

Figure 7 is a sectional detail as seen at VII—VII of Figure 6; and

Figure 8 is a perspective of still another embodiment of the improved type of thread guide of the present invention.

As illustrated in Figure 1 of the drawing the filamentary strands 3 and 4 progress upwardly from their respective spinnerets 5 and 6 through the coagulating or regenerating bath 7 toward the thread guide 8 and the thread advancing or handling device 9 which is shown diagrammatically in the drawing but which may take any convenient form such as a pair of canted yarn advancing drums or a single yarn advancing reel. The thread guide means 8 may be mounted on the frame 10 which rotatably supports the device 9 by any convenient means such as by the bracket 11 shown in the drawing. Strands 3 and 4 pass through the thread guide 8 in a manner which will be hereinafter more fully explained and thereafter progress helically about the device 9 from right to left as shown by the arrow in Figure 1. Thereafter each of the strands proceeds to the next processing station which is not shown on the drawing.

In Figures 2, 3 and 4, the structure of the thread guiding means is more clearly shown.

Essentially it comprises a body member 12, and three triangularly disposed guide pins 13, 14, and 15 which extend outwardly therefrom. Pins 13 and 14 are mounted in apertures 16 and 17 in the body member as shown in the drawing but may be affixed thereto in any convenient manner. The distance between the peripheries of pins 14 and 15 is less than the diameter of pin 13 and the line joining the centers of pins 14 and 15 is substantially transverse to the path of travel of filaments 3 and 4. One or both of the pins 14 and 15 is preferably eccentrically mounted on the body member so that the spacing therebetween may be varied and the proximity of adjacent strands may be controlled as they approach and helically progress along the thread advancing device. Thus, as shown in Figures 3 and 4, the eccentric reduced diameter portion 18 of pin 15 is rotatably mounted in the body member aperture 19. The hexagonal shaped upper portion 22 of the pin 15 is preferably provided to facilitate an adjustment thereof while the laterally disposed threaded aperture 20 and its complementary set screw 21 provide a means whereby the pin 15 may be clamped in a desired position.

Although the eccentric portion 18 of adjustable pin 15 is shown herein as being reduced in diameter, it is to be understood that its diameter may be similar to or larger than the diameter of the strand contacting portion of the pin without departing from the spirit or scope of the present invention. Similarly, although only one of the pins 14 and 15 is shown in the drawing as being adjustable, as indicated hereinbefore it is to be understood that each of the pins may be made adjustable without departing from the spirit of the invention.

As stated hereinabove the guide means may be mounted on the frame 10 of the thread advancing device 9 by any convenient means such as by the bracket 11. Preferably the body member 12 of the guide means is provided with an inwardly extending aperture 23 and a set screw 24 whereby the guide may be conveniently adjustably positioned on bracket 11 with respect to the device 9.

In operation the separate strands 3 and 4 emerge from their respective spinnerets 5 and 6 into coagulating bath 7 and progress upwardly toward the thread guide means 12. The strands pass on opposite sides of the fixed guide pin 13 and thereafter inwardly between the fixed pin 14 and the adjustable pin 15. Thus, it is to be noted that each of the strands is successively flexed slightly in opposite directions from its normal thread path as it slidably contacts its pair of associated guide pins. In this way the lateral vibratory movement of each of the strands is dampened and practically eliminated such that the spacing therebetween may be accurately controlled as they approach and contact the thread advancing device. Pin 15 is made adjustable so that strand 4 may be centrally positioned between successive helical convolutions of the strand 3 about the thread advancing device. The parallel strands after they emerge from the opposite end of the drum proceed toward a similar subsequent processing station which is not shown on the drawing.

A second embodiment of the present invention is illustrated in Figures 5, 6, and 7 of the drawing. As shown therein, a modified thread guide means 25 is adapted to be mounted on the cylindrical shell 26 which surrounds the thread advancing device 27 and confines the liquid treating solution therein. Thus the notch 28 is formed adjacent one end of the shell 26 to accommodate the thread guide means 25. Clamping plates 29 and 30 and the wing screw 21 therebetween provide a mounting means for the thread guide wherein plates 29 and 30 respectively engage the inner and outer surfaces of the shell adjacent the notch. Body member 32 of the guide is adjustably affixed to the clamping plate 29 by means of the machine screw 33. In this way the position of the guide may be rotatably varied depending upon the angle of approach of the filamentary material toward the treating drum. The disposition and construction of the thread contacting pins 34, 35 and 36 is similar to that of the pins 13, 14, and 15 shown and described hereinbefore and therefore will not be described in detail here. The horizontal bar 37 is preferably positioned between the bosses 38 and 39 which extend upwardly from the body 32 and thereby provides additional thread guiding means.

In operation the separate strands 40 and 41 emerge from their respective spinnerets 42 and 43 and the coagulating bath 44 and progress upwardly toward the thread guide means. The strands pass over the horizontally disposed guide pin 37, on opposite sides of the guide pin 34, and between the fixed pin 35 and the adjustable pin 36. They then progress in a helical manner about the treating drum 27, emerge therefrom and thereafter proceed toward a subsequent processing station which is not shown on the drawing.

A third embodiment of the improved type of thread guide of the present invention is illustrated in Figure 8 of the drawing. As shown therein, this modification of the guide includes the three generally triangularly disposed pins 50, 51, and 52 which extend outwardly and preferably transversely from the surface of the plate member 53 and the pair of horizontally disposed guide bars 54 and 55 which are mounted adjacent opposite extremities of the plate member. As in the previously described embodiments of the invention, the pin 50 is affixed to the plate member 53 in any suitable manner. The other thread contacting pins 51 and 52 of this embodiment are fixedly mounted on the cylindrical turnstile member 56 which is positioned in the complementary cylindrical bore 57 in the plate member. The thumb screw 58 which threadedly engages the aperture 59 in the plate member and is adapted to engage and lock the turnstile member in any desired position. As shown in the drawing the plate 53 and the turnstile 56 are preferably suitably calibrated to facilitate predetermined adjustments. Though not shown on the drawing any suitable guide mounting means such as those previously described herein could be employed.

In operation by suitably adjusting the rotational position of the turnstile member the relative separation of the individual filamentary strands 60 and 61 may be readily controlled. As in the previously described embodiments, the horizontally disposed guide bar 54 permits possible angular approaches of the strands 60 and 61 toward the guide from the spinning bath or other preceding processing station. The other guide bar 55 eliminates the vertically disposed flattened surface on each of the filamentary strands or bundles which may be produced as they engage the upright pins 51 and 52 and instead applies a horizontal flattening tendency in the same as they progress toward the thread advancing device. In this way the tendency for the generally oval strands to roll a quarter of a turn in either direction from their upright position when they

contact the thread advancing device is eliminated and still further improved tracking results on the same are obtained.

It has been found that the thread guides of the present invention provide a means whereby the inherent lateral vibratory movement of the filamentary material may be practically eliminated as it approaches the thread handling device. In this way the pitch of the helical windings may be considerably reduced without causing the risk of entanglement thereof and greater quantities of filamentary material may be handled.

While the invention is shown in the drawings and described below in connection with the continuous spinning and process of artificial yarns by the viscose process it is to be understood that the invention is applicable to any machine or procedure in which yarn is handled on a yarn advancing device.

While preferred embodiments of the invention have been disclosed, the description is intended to be illustrative only and it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In apparatus for handling synthetic plastic filaments, the combination which comprises means for feeding at least two filaments along a substantially parallel path, thread-advancing means terminating said path on which the filaments are wound in side-by-side helical turns, a first filament guide positioned between each filament and contacted on opposite sides thereof by each filament, a second filament guide positioned longitudinally along said path in the direction of travel of the filaments and in spaced relation to the first guide, and a third filament guide positioned longitudinally along said path in the direction of travel of the filaments and in spaced relation to both the first and second guides, the transverse spacing of the second and third guides being proportioned with respect to the diameter of the first guide so that each yarn filament is outwardly restrained by contact with the opposing faces of the second and third guides and each yarn filament is inwardly restrained by contact with opposite sides of the first guide whereby each filament is delivered to an axially constant point on the periphery of the thread-advancing means.

2. Apparatus in accordance with claim 1 in which the second and third guides are substantially equally spaced from the first guide.

3. Apparatus in accordance with claim 1 in which one of the transversely spaced guides is adjustable with respect to the other.

4. Apparatus in accordance with claim 1 having a mounting bracket for all three guides in which one of the transversely spaced guides is adjustably secured.

5. Apparatus in accordance with claim 3 in which the adjustable mounting of the guide is an eccentric extension of the guide.

6. Apparatus in accordance with claim 3 in which the transversely spaced guides are both mounted in a rotatable element, and means for locking said element in a preselected rotated position to vary the transverse spacing of the filaments as they pass between said guides.

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