

Sept. 17, 1968

J. R. WHITEHURST
APPARATUS FOR CONTROLLING SLIVER BETWEEN
DRAFTING ROLLS AND A COILER HEAD

3,401,429

Filed May 9, 1966

2 Sheets-Sheet 1

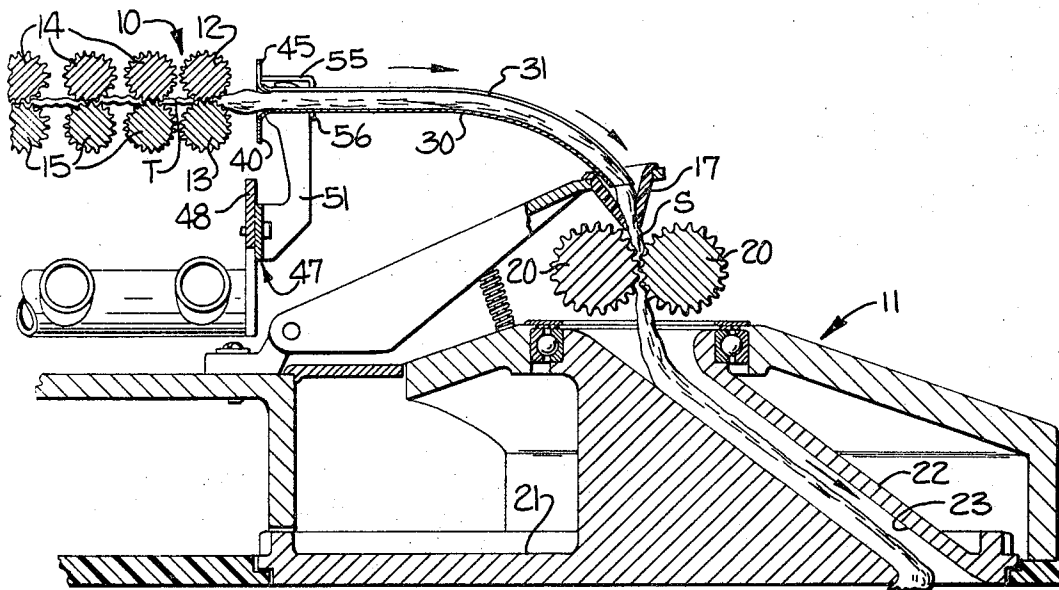


Fig-1

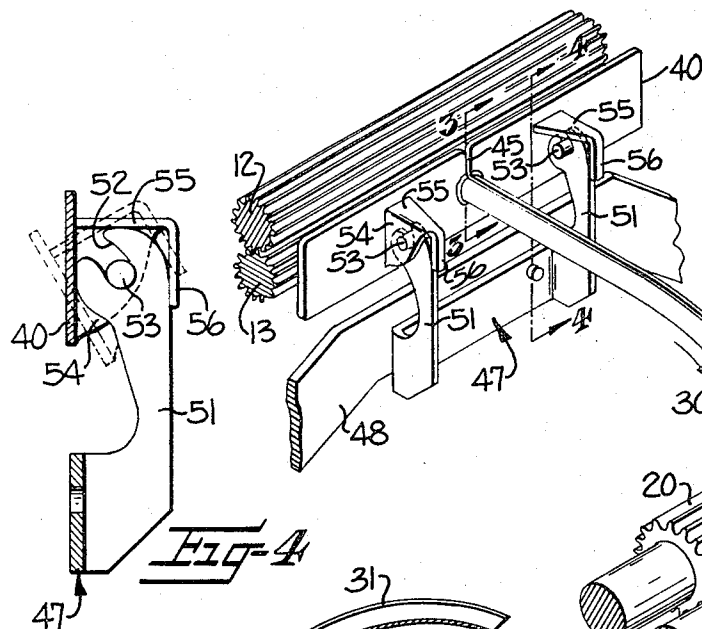


Fig-4

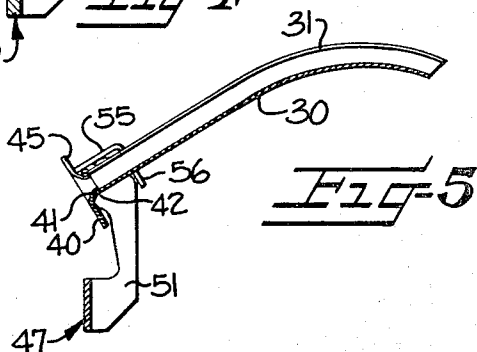


Fig-5

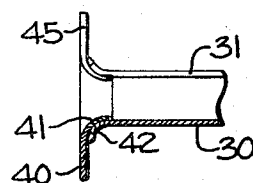


Fig-3

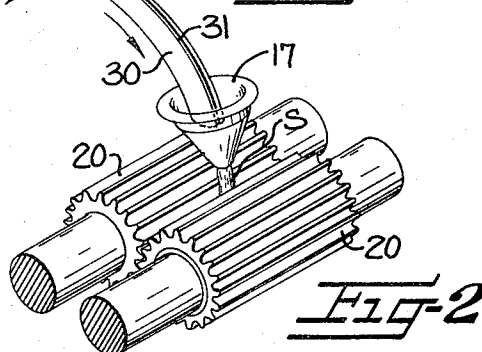


Fig-2

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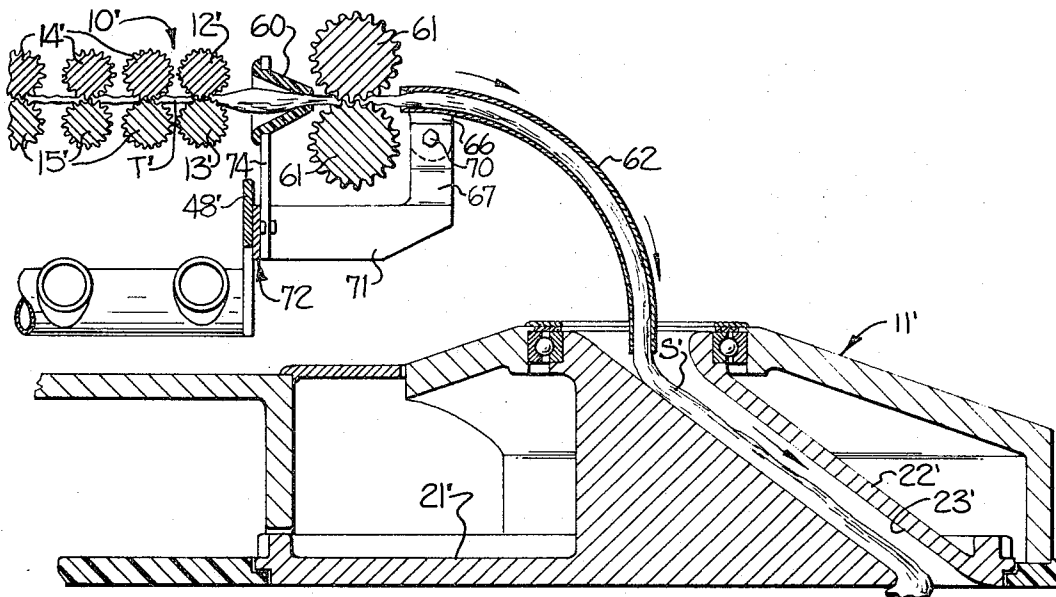


Fig-6

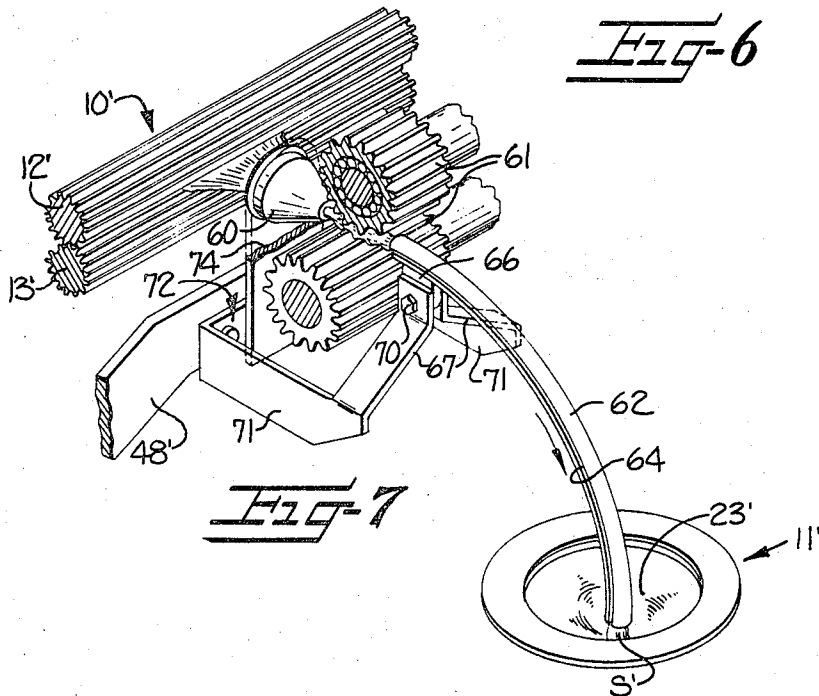


Fig-7

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APPARATUS FOR CONTROLLING SLIVER BETWEEN DRAFTING ROLLS AND A COILER HEAD

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Filed May 9, 1966, Ser. No. 548,691

4 Claims. (Cl. 19-288)

ABSTRACT OF THE DISCLOSURE

Apparatus for controlling textile material during its travel from the delivery rolls of a drafting unit to a coiler to reduce the amount of nonuniformity heretofore occurring therein by guidingly confining the textile material in its path of travel in a guide tube of predetermined internal dimensions so as to maintain substantial cohesion and integrity of the fibers relative to each other.

This invention relates to drawing frames and the like and, more especially, to an improved apparatus for controlling the passage of textile fibers from the delivery rolls of a drafting unit to a coiler head in such a manner as to minimize the escapement or detachment of small fibers from the moving textile fibers and to reduce the amount of increase in the C.V. reading (coefficient of variation) of sliver nonuniformity occurring during its travel from the delivery rolls to the coiler head.

Various prior art devices, commonly known as sliver guides, have been proposed for guiding textile fibers from delivery rolls to a coiler head. Some of the prior art devices have been in the form of open-topped chutes, pans or troughs having the primary function of supporting the fibers in their course to a coiler trumpet. In some instances, such open-topped sliver guides have served to guide a web emerging from the delivery rolls in a convergent manner into a sliver which was condensed further as it passed through the coiler trumpet. In other prior art devices for guiding the textile fibers from the delivery rolls to a coiler head, a closed tapered tubular chute of much greater cross-sectional area than the textile material has been employed with means in association therewith for drawing lint, fly and the like away from the textile material in its passage from the chute into the coiler trumpet.

While these prior art devices serve for condensing the web and guiding the sliver, and the closed tubular chute device has suction removal means in association therewith for disposing of escaping fibers, lint, fly and the like, such arrangements all result in a substantial increase in nonuniformity or C.V. reading of the sliver due to the fact that such prior art devices do not enclose the traveling textile fibers in such a manner as to maintain the integrity and cohesion of the fibers and avoidance of false draft as well as to prevent the escapement of fibers from the sliver.

As is well known in the art, during the movement of sliver from the delivery rolls of a drafting unit to a coiler trumpet, especially at high speeds of about 750 feet per minute, for example, the C.V. reading of the sliver increases as compared to the C.V. reading of textile fibers as they emerge, in web form, from the delivery rolls. Throughout the textile industry, tests have shown that webs of textile material taken directly from the delivery rolls have a C.V. reading of about 2 percent and, utilizing

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the known prior art types of sliver guides as discussed earlier, an average C.V. reading of about 3.5 percent has been obtained in slivers taken from the coiler trumpet. In other words, there is an average increase in nonuniformity of sliver traveling from delivery rolls to a coiler of about 1.5 generally throughout the textile industry.

A slight draft, commonly known as "tension draft," is imparted to sliver as it is drawn from delivery rolls to a coiler head.

With this in mind, it has been determined that, if a greater control were placed on the fibers through confining the same and preventing their spreading or expanding and to thereby enhance the cohesion of the fibers, the sliver would move in a more unitary manner and, thus, would not be subjected to false draft and consequent thin spots occasioned by the tension draft. Also, by confining the sliver during its travel from the drafting unit to the coiler head, it has been determined that the rolling or sliding back of individual fibers is reduced to avoid formation of thick places in the sliver. It has been determined that these factors contribute to the decrease in the C.V. reading of sliver controlled in accordance with the instant invention. Additionally, by confining the sliver according to the instant invention, the escapement of fibers, lint, fly and the like from the sliver is prevented, further reducing nonuniformity of the sliver throughout its length and contributing, therefore, to the decrease in the C.V. reading of the sliver.

It can be appreciated that a reduction in the C.V. reading of as little as 0.5 may have considerable merit in subsequent processing of the sliver and yarns and products made from the same, since the improved uniformity of the sliver reduces ends down in spinning, twisting, winding and weaving operations, permits increased winding speeds and tensions, reduces slubs, and reduces seconds in finished material.

It is therefore the primary object of this invention to provide apparatus for significantly reducing the normally occurring substantial increase in the C.V. reading of sliver during its travel from a drafting unit to a coiler head and to substantially prevent the escapement of lint, fly and the like from the traveling sliver.

According to the invention, fibrous textile material emerging from a drafting unit is drawn as a sliver into and through a tube extending from a point closely adjacent the drafting unit to a point closely adjacent the coiler head or coiler trumpet, with the tube having such a cross-sectional area with respect to the size or weight per yard of the sliver as to closely confine the sliver and maintain the cohesion and integrity of the fibers thereof relative to each other by limiting cross-sectional spreading and expansion of the sliver, without restricting movement of the sliver through the tube.

Another object of this invention is to provide apparatus of the character described wherein the egress end portion of the tube is positioned within a tubular sliver-receiving element, such as a coiler trumpet or the inclined tubular passage of the coiler head, thus closely confining the sliver in the tube substantially throughout the travel of the sliver from the delivery rolls to the coiler head so that a minimum of waste fibers are cast from the sliver and so that the sliver is guided properly into the sliver-receiving member regardless of the speed at which the web of which the sliver is formed emerges from the delivery rolls.

In order to thread the sliver through the sliver guide tube, the tube is provided with a very narrow slot throughout its length. In this regard, it has been found that a

tubular sliver guide of about one-half inch internal diameter substantially throughout the length thereof is ideally suited to the passage of the usual range of sizes of cotton and/or synthetic textile fibers therethrough; i.e., 50 grain to 70 grain slivers. Further, it has been found that the threading slot in the tube should preferably be from .020 to .042 of an inch in width substantially throughout the length thereof.

It is still another object of this invention to provide a sliver controlling apparatus of the type described and including a condensing member, preferably in the form of a broad flat plate, positioned between the delivery rolls and the ingress end of the sliver guide tube, and wherein the condensing member is provided with a trumpet-shaped or tapered passage therethrough communicating with the ingress end of, and preferably being of slightly smaller diameter than, the internal diameter of the sliver guide tube so as to gather and condense the web emerging from the delivery rolls into the sliver guide tube.

Still another object of the invention is to provide a condensing member of the type described which is attached to or formed integral with the ingress end of the sliver tube and wherein the condensing member also is provided with a sliver-threading slot therein which is coextensive with the threading slot in the sliver guide tube.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

FIGURE 1 is a longitudinal vertical sectional view through a portion of a drawing frame, including the drafting rolls and coiler head thereof, and showing a preferred embodiment of the sliver controlling apparatus of the present invention in association therewith;

FIGURE 2 is a perspective view of the sliver controlling apparatus of FIGURE 1;

FIGURE 3 is an enlarged fragmentary vertical sectional view taken substantially along line 3—3 in FIGURE 2;

FIGURE 4 is an enlarged fragmentary vertical sectional view taken substantially along line 4—4 in FIGURE 2;

FIGURE 5 is a fragmentary view similar to the upper portion of FIGURE 1 showing the sliver guide tube in a tilted position in which the front or egress end of the tube is positioned above the upper extremity of the trumpet, as is desirable to facilitate manually threading sliver from the tube into the trumpet;

FIGURE 6 is a view similar to FIGURE 1, but showing a second embodiment of apparatus for controlling the passage of sliver from the delivery rolls to the coiler head and wherein calender rolls are positioned between the web condensing means adjacent the delivery rolls and the ingress end of the sliver guide tube;

FIGURE 7 is a perspective view of the sliver controlling apparatus shown in the upper portion of FIGURE 6.

The term "C.V." is used throughout the textile industry and in the instant specification and claims to mean the coefficient of variation in the volume of successive portions of a textile sliver, and the term "C.V. reading" means the percentage of variation in cross-sectional volume of the sliver as calculated in a well-known manner by passing test lengths of sliver through a "stock variation analyzer" or comparator. One type of testing device commonly used for this purpose is known as a "Uster tester."

Referring more specifically to the drawings, and to FIGURE 1 in particular, the first or preferred embodiment of novel apparatus for carrying out the method of this invention is shown in association with a drawing frame and is located between a drafting unit 10 and a coiler head 11. The drafting unit includes a series of sets of top and bottom drafting rolls including front or delivery rolls 12, 13 rearwardly of which additional sets of upper and lower drafting rolls 14, 15 are provided for drafting fibrous textile material T therethrough. The textile material T emerges from the delivery rolls 12, 13 in

the form of a broad, thin, flat web which, is condensed into a sliver S as it passes from the delivery rolls 12, 13 through a coiler trumpet 17.

Sliver S is drawn through trumpet 17 by driven calender rolls 20 which feed the sliver into coiler head 11. In this instance, coiler head 11 includes a rotary sliver coiling member or tube gear 21 having a tube portion 22 provided with a downwardly and outwardly inclined passage 23 therein which is open at its upper end for receiving sliver S from the calender rolls 20, and which is open at its lower end for laying the sliver in coils in a suitable can (not shown), as is well known. It should be noted that trumpet 17 and tube gear 21 each constitute a tubular sliver-receiving member.

The textile material T travels a distance of several inches from the delivery rolls 12, 13 to coiler trumpet 17, during which the textile material is maintained under a slight tension draft and is condensed from a web to a sliver. At high speeds; especially at speeds of more than 700 feet per minute, when the textile material is not controlled according to the instant invention, the nonuniformity or C.V. reading already in the textile material emerging from the delivery rolls 12, 13 is substantially increased as heretofore stated, because the required tension draft produces an abnormal or false draft at previously existing areas of relatively low density in the textile material. It is axiomatic that such relatively low-density areas are of lesser tensile strength than adjacent areas of high or normal density and, therefore, the density of such low-density areas, and areas contiguous thereto, is further reduced, thereby increasing the C.V. reading of the textile material.

Also, as a consequence of the high speed travel of the material through the air, the resistance of the air has the effect of retarding the movement of surface fibers from the moving fibrous mass and thus separates or dislodges many surface fibers, especially relatively short fibers, from the fibrous mass. Such separated fibers further increase the C.V. reading of the sliver and are carried into the ambient air as fly and settle and accumulate as lint on various adjacent parts of the drawing frame and on the textile material in process. Such accumulated lint reduces efficiency in operation of the drawing frame and is difficult to remove. Further, the quality of the sliver is reduced by lint settling upon the sliver.

According to the apparatus and method of the instant invention, the sliver is so controlled in its passage from the delivery rolls to the coiler head as to substantially completely enclose the sliver in a relatively lightly condensed state and to substantially prevent the escapement of fibers from the main body of the textile material such as to minimize the accumulation of lint on adjacent parts of the drawing frame and to improve the uniformity of the textile material as compared to the uniformity of the textile material which may be attained when utilizing other known prior art types of sliver guide means between the drafting unit and the coiler head of a drawing frame. Accordingly, I have provided an elongate sliver guide tube 30, open at both ends, and whose rear or ingress end is positioned in closely spaced relation from and forwardly of the delivery rolls 12, 13. The diameter or cross-sectional area of the tube 30 is substantially less than the open upper end of trumpet 17 and the egress end portion of tube 30 extends downwardly within and is encircled by the internally tapered upper portion of trumpet 17.

Tube 30 extends forwardly from adjacent the rolls 12, 13 and is curved downwardly so that its egress end portion faces generally toward the upper portion of trumpet 17. It is very important that the egress end of sliver guide tube 30 is positioned within the upper portion of the sliver-receiving member embodied in trumpet 17 in order to insure that a minimum of air turbulence may be created between the egress end of tube 30 and the

area of the trumpet at which maximum condensing of sliver S is effected by the relatively small or restricted lower portion of trumpet 17. Otherwise, it has been found that the sliver S will expand or open up as it emerges from the egress end of tube 30 and will be easily ruptured at this area or, at least, the expanding or opening of the fibers in the sliver S will choke the trumpet so that the calender rolls 20 will then rupture and part the sliver adjacent the point at which it emerges from the lower end of the trumpet 17. Also, by positioning the egress end portion of the sliver guide tube 30 within the enlarged upper portion of the passage through trumpet 17, the prevention of expansion of the fibers thus assured prevents the escapement of lint or fly from the sliver S. Tube 30 is preferably of circular internal cross-section but may be of somewhat oblong or elliptical internal cross-section without departing from the spirit of the invention.

To facilitate manually threading the textile material through sliver guide tube 30, the upper wall portion of sliver guide tube 30 is provided with a very narrow threading slot 31 throughout the length thereof which extends radially through the wall of the tube 30. In the first embodiment of the invention shown in FIGURES 1-5, the threading slot 31 is located in the uppermost portion of the wall of the sliver guide tube 30. Slot 31 is of substantially less width than the width of the mass of textile material passing through sliver guide tube 30.

By way of example, a sliver guide tube 30 was employed which was of about one-half inch internal diameter throughout at least the major portion of its length, and the slot 31 in the tube was approximately $\frac{1}{32}$ inch wide throughout its length.

A sliver guide tube 30 having an internal diameter of about one-half inch has been found ideally suited for the guiding of textile sliver of constant weight per yard and within the range of about 50 to 70 grains per yard, and a threading slot $\frac{1}{32}$ inch wide in the sliver guide tube permitted very little, if any, fly or fibers to escape from the sliver passing through the sliver guide tube at speeds of 750 feet per minute or more. It has been found that the width of the slot may vary about .010 inch above or below $\frac{1}{32}$ inch and the internal diameter of the sliver guide tube 30 may be within the range of about $\frac{7}{16}$ to about $\frac{9}{16}$ inch, depending upon the weight per unit length of the sliver being processed, with satisfactory results being obtained.

According to the method of this invention, the cross-sectional area of the tube 30 closely corresponds with the cross-sectional area of the sliver being drawn there-through so as to closely confine the sliver and maintain the cohesion and integrity of the fibers relative to each other by limiting cross-sectional spreading and expansion of the sliver without restricting movement of the sliver through the tube. By such an arrangement, the density of the sliver is substantially constant throughout its passage through tube 30 to minimize the occurrence of false draft in the traveling sliver, thereby significantly reducing the normally occurring substantial increase in the C.V. reading of the sliver during its travel from the drafting unit 10 to the coiler head 11. In the drafting of cotton and/or synthetic fiber slivers weighing within the range of about 50 to 70 grains per yard, which is the range of sliver sizes most used in cotton and/or synthetic fiber processing mills, the internal cross-sectional area of the tube should be such as to maintain the corresponding size of sliver at a substantially constant density and within a range of about 6 to 10 grains per cubic inch substantially throughout the travel of the sliver through tube 30. For example, it is desirable to (a) use a tube 30 having an internal diameter of about $\frac{7}{16}$ inch (or a cross-sectional area of about .150 square inch) for guiding a 50 grains-per-yard sliver to confine the sliver at a density of about 9.31 grains per cubic inch; (b) use

(or a cross-sectional area of about .196 square inch) for guiding a 60 grains-per-yard sliver to confine the sliver at a density of about 8.50 grains per cubic inch; and (c) use a tube having an internal diameter of about $\frac{9}{16}$ inch (or a cross-sectional area of about .249 square inch) for guiding a 70 grains-per-yard sliver to confine the sliver at a density of about 7.84 grains per cubic inch. A tube having an internal cross-sectional area of up to .300 square inch (about $\frac{5}{8}$ inch) may be used, especially for guiding a sliver whose weight is on the high side of the range of weights (50 to 70 grains per yard) discussed heretofore. While such sliver size to tube size relationships are desirable for most favorable control of the traveling slivers, it has been found more practical and economical to use a tube 30 of $\frac{1}{2}$ inch internal diameter, plus or minus $\frac{1}{16}$ inch, or about .196 square inch cross-sectional area for guiding any of the slivers of substantially constant weight per yard, within the range of about 50 to 70 grains per yard, without materially reducing the efficiency of the tube 30 in significantly reducing the normally occurring substantial increase in the C.V. reading of the sliver during its travel from the drafting unit to the coiler head. Using a tube 30 of $\frac{1}{2}$ inch internal diameter, 50, 60, and 70 grains-per-yard slivers would be confined at respective densities of about 7.13, 8.50 and 9.93 grains per cubic inch and the C.V. reading of each sliver was about 2.5 percent; that is a reading of about 1 less than the 3.5 average C.V. reading of slivers coming from coiler heads throughout the textile industry and with an increase in C.V. reading of only about 0.5 above that of the slivers emerging from corresponding drafting rolls.

In order to condense the web emerging from delivery rolls 12, 13 into the ingress end of sliver guide tube 30, a web condensing member 40 is provided between delivery rolls 12, 13 and the ingress end of sliver guide tube 30. Condensing member 40 is preferably in the form of an elongate plate having a flat and substantially straight rear surface against which the web emerging from delivery rolls 12, 13 is propelled.

As shown in FIGURE 3, the central portion of condensing plate 40 is provided with a tapered or trumpet-shaped opening or passage 41 therethrough defined by a trumpet portion 42 integral with condensing plate 40. The ingress end portion of sliver guide tube 30 is suitably attached to condensing plate 40 for communication with the trumpet-shaped opening 41.

Preferably, the ingress end portion of sliver guide tube 30 is flared outwardly and fits over trumpet portion 42 of condensing plate 40. Sliver guide tube 30 may be brazed, welded or otherwise suitably secured to condensing plate 40 as shown in FIGURE 3. It is desirable that the smallest end of the tapered passage 41, which is shown located within tube 30 in FIGURE 3, is of an internal diameter slightly less than the internal cross-sectional area or internal diameter of the corresponding end of sliver guide tube 30.

In practice, utilizing a sliver guide tube 30 having an internal diameter of about $\frac{1}{2}$ inch, the internal diameter of the small end of trumpet portion 42 was about $\frac{15}{32}$ inch. This assures a smooth transition of the sliver, into which the web is condensed by the condensing plate 40, from the trumpet portion 42 into sliver guide tube 30. More particularly, this arrangement has resulted in enhanced uniformity of sliver as indicated by improved, lower, C.V. readings. While the reasons for such improved C.V. readings are not fully understood, it is to be noted that the reduced end of the trumpet portion 42 serves to compact the sliver to a cross-sectional area less than that of the tube, which is believed to enhance the fiber cohesion of the sliver moving through the tube thereafter.

The length of the plate 40 should be at least equal to or greater than the width of the web emerging from delivery rolls 12, 13 and the flat rear surface of plate 40 should preferably be located about $\frac{1}{2}$ inch to $\frac{3}{4}$ inch

forwardly of delivery rolls 12, 13. To facilitate threading the textile material T into the trumpet-shaped passage 41 in condensing plate 40, the condensing plate is provided with a threading slot 45 therethrough which is open at the upper edge of plate 40 and is coextensive with threading slot 31 provided in sliver guide tube 30.

Means are provided for supporting condensing plate 40 and tube 30, which supporting means is so constructed as to permit raising the forward portion of the sliver guide tube 30 to remove its egress end from within coiler trumpet 17 to facilitate the threading of sliver S from sliver guide tube 30 into and through trumpet 17. Also, by manually raising the forward portion of sliver guide tube 30, the interior of coiler trumpet 17 then becomes readily accessible for cleaning or for removing any fibers which may have choked up the passage through trumpet 17. To this end, the supporting means for the sliver controlling apparatus comprises a bracket 47 suitably secured to a fixed part 48 of the machine below the level of drafting rolls 12, 13, 14, 15.

Bracket 47 is provided with a pair of laterally spaced, rigid, upstanding arms 51 thereon which project upwardly in front of condensing plate 40. As best shown in FIGURE 4, each support arm 51 has a curved slot 52 extending laterally therethrough which is open at its upper end for receiving a corresponding pivot shaft or pin 53 which normally rests against the bottom of the slot 52. Each pivot pin 53 is suitably secured to and projects from one wall of an angle bracket 54 suitably secured to and extending forwardly from condensing plate 40. Each angle bracket 54 has an upper flange 55 which overlies the upper end of the corresponding upstanding arm 51 of bracket 47. Each overlying flange 55 is provided with a downturned stop member or abutment 56 thereon which is so located that, when the corresponding pivot pin is resting upon the bottom of a slot 52, abutment 56 engages the front edge of the corresponding upstanding arm 51 by virtue of the weight of sliver guide tube 30 tending to move the condensing plate 40 in a clockwise direction in FIGURE 4 about the axis of pivot pins 53.

The upper portion of each support arm 51 is curved at its rear and forward edge portions adjacent condensing plate 40, flange 55 and abutment 56. It will be observed in FIGURE 4 that the curvature of the upper end portion of each support arm 51 of bracket 47 is such that condensing plate 40 and sliver guide tube 30 may be easily rotated in a counterclockwise direction to substantially the broken-line position of FIGURE 4 and the solid-line position of FIGURE 5 without being encumbered by the condensing plate 40, the corresponding flange 55 and the abutment 56 engaging the upper portion of the corresponding support arm 51. Also, since each abutment 56 is of relatively small cross-section at its juncture with the corresponding flange 55, it is to be noted that abutment 56 may be bent to occupy various angular positions with respect to the corresponding flange 55, thus providing means for adjustably positioning the free or egress end of sliver guide tube 30 with respect to coiler trumpet 17.

Further, it will be noted that the curvature of the slots 52 in bracket 47 is such that condensing plate 40 may be readily removed from the bracket 47, if desired, simply by raising the forward portion of sliver guide tube 30 to cause the same and plate 40 to occupy substantially the position of FIGURE 5, whereupon the pins 53 may be lifted out of the corresponding slots 52. It follows that condensing plate 40 and tube 30 may be readily installed on the bracket 47 by reversing the latter procedure. Although the abutments 56 are preferably located so as to bear the full weight of the condenser plate 40 and sliver guide tube 30, the lower or egress end of sliver guide tube 30 may rest in engagement with the internal tapered wall of coiler trumpet 17, if desired, without adversely affecting the control of the textile material in its passage from delivery rolls 12, 13 to coiler trumpet 17 or to coiler head 11.

It is thus seen that the web of textile material T emerging from delivery rolls 12, 13 is propelled against the rear surface of condensing plate 40 as it is guided and condensed through the trumpet-shaped passage 41 in the central portion of plate 40 and then is pulled or drawn through sliver guide tube 30, with the sliver guide tube being so positioned that the sliver or textile material leaves the end of the guide tube 30 after the sliver or textile material has entered the coiler trumpet 17. This arrangement aids in reducing the C.V. reading of the textile sliver, because there is practically no escapement of fibers from the sliver from the time the textile material leaves delivery rolls 12, 13 to the time at which sliver S is deposited in a coiler can by coiler head 11.

For some reason which is not fully understood, the rapid condensing of the web between the delivery rolls and the condensing member 40 does not cause any noticeable amount of fibers to be cast from the textile material in this area. Theoretically, it appears that the reason why there are no noticeable fibers cast from the textile material as it passes between the delivery rolls 12, 13 and the condensing member 40 is because the long and short fibers in the textile material, and the air, are all moving in the same direction; i.e. the fibers are maintained within a "funnel" of air. Also, it seems that air is substantially excluded from the textile material due to the squeezing action applied to the textile material at the nip of the delivery rolls 12, 13 so that, in effect, the textile material is "starving" for air. Thus, air is entering, instead of leaving, the textile material as it passes from the nip of the delivery rolls 12, 13 to the trumpet-shaped passage 41 through condensing member 40. Since air is entering the textile material in the latter area instead of leaving the material, it is theorized that the inward flowing air currents tend to lightly compress any loose fibers toward the main body of the material rather than casting such small fibers away from the textile material. In any event, during actual use of the apparatus of the present invention, practically no fibers are cast from the textile material as it passes from the delivery rolls 12, 13 into the condensing passageway 41 and through tube 30 to the coiler trumpet 17, thus practically eliminating the accumulation of waste fibers upon various parts of the machine in the area of the condensing plate 40 and sliver guide tube 30.

In the second embodiment of the invention, shown in FIGURES 6 and 7, the drafting rolls and coiler head may be of the same type as shown in FIGURE 1 and will therefore bear the same reference characters with the prime notation added in order to avoid repetitive description. The second embodiment of the invention shown in FIGURES 6 and 7 differs from that shown in FIGURES 1-5 primarily in that the sliver condensing member and the ingress end of the sliver tube are spaced apart from each other. Also, the calendar rolls, instead of being located immediately above the inlet end of the tube gear, are located between the sliver condensing member and the sliver guide tube.

As shown in FIGURES 6 and 7, the textile material T' emerges from delivery rolls 12', 13' in the form of a web which is condensed into a condensing member 60 which may take the form of a trumpet and which is located closely adjacent to and forwardly of delivery rolls 12', 13'. The sliver S' thus formed is drawn through trumpet 60 by suitably driven calendar rolls 61 which direct the sliver S' into a sliver guide tube 62. The ingress end of sliver guide tube 62 is positioned closely against the nip of calendar rolls 61.

Sliver guide tube 62 curves forwardly and downwardly and has its lower end positioned substantially concentric with the vertical axis of rotation of tube gear 21'. It is also important to note that the lower or egress portion of sliver guide tube 62 (FIGURES 6 and 7) is positioned within the sliver-receiving member embodied in tube 22', of tube gear 21 with the lower or egress end of the sliver guide tube 62 preferably being located about 1/2 inch

below the upper extremity of the inclined passage 23' of tube gear 21'. The ingress end of tube 62 may be flared outwardly as shown in FIGURE 6, for aiding in the reception of the sliver S' by tube 62.

Sliver guide tube 62 is provided with a longitudinally extending relatively narrow sliver threading slot 64 throughout the length thereof which serves the same purpose as the slot 31 provided in the first embodiment of the sliver guide tube 30 shown in FIGURE 2. However, the slot 64 is shown located in one side of the tube 62, i.e., substantially laterally of the direction of movement of the textile material through the tube 62, as may be desirable in some instances. Although the threading slot 31 is provided in the upper wall portion of sliver guide tube 30 (FIGURE 2) it may be located in one side wall portion of the tube 30 substantially in the same manner as that of the slot 64 in tube 62 (FIGURE 7), if desired.

The trumpet 60 and sliver condensing tube 62 may be supported by any suitable means so as to normally occupy the positions shown in FIGURES 6 and 7. In this instance, the ingress end portion of sliver guide tube 62 is provided with a downwardly projecting relatively thin block 66 which may be welded or otherwise suitably secured to tube 62. Block 66 is suitably adjustably secured between the proximal upper portions of a pair of downwardly diverging arms 67, as by means of a screw or bolt 70. The distal ends of arms 67 may be formed integral with a pair of rearwardly extending arms 71 of a bracket generally designated at 72. Bracket 72 is suitably secured to a fixed part 48' of the drawing frame. It is apparent that the screw or bolt 70 facilitates angular adjustment of tube 62 and, of course, the bracket 72 may be vertically adjustable on the fixed part 48' of the drawing frame, if desired.

Trumpet 60 fits in a suitable support bracket or column 74 which extends downwardly between the bottom delivery roll 13' and the bottom calender roll 61 and is suitably secured to bracket 72.

The size of tube 62 relative to the weight of the sliver being processed will be as described heretofore with respect to tube 30 so that tube 62 controls the sliver traveling from the drafting unit to the coiler head in substantially the same manner as described with respect to sliver guide tube 30.

As is well known, as sliver (FIGURE 6) is being coiled into the usual sliver can, not shown, the package of sliver presses against the lower surface of coiling member 21' and rotates at such speed relative to coiling member 21' as to impart a tension draft to the sliver S' and thereby pull the sliver through the inclined passage 23' of the coiling member. It follows, therefore, that the sliver is pulled through tube 62 under relatively light tension. In the embodiment of FIGURES 6 and 7, it is preferred that false bottom sliver cans be used, it being well known that the false bottom of such a can is biased upwardly so the sliver may be held between the false bottom and the coiling member and thereby pulled through the passage 23' and tube 62 when starting to fill an empty sliver can.

In the drawings and specification there have been set forth preferred embodiments of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. Apparatus for controlling textile fibers during their travel from the delivery rolls of a drafting unit to a trumpet of a rotatable coiler; said apparatus comprising condensing means positioned closely adjacent said delivery rolls and having a trumpet-shaped passage therein for condensing into a sliver a fibrous web emerging from the drafting rolls, means associated with said condensing means for receiving the sliver and for guidingly confining the

same in its path of travel to said coiler while maintaining the cohesion and integrity of the fibers relative to each other so that the increase in the C.V. reading (nonuniformity) of sliver is no more than about .5,

said means comprising

- a sliver guide tube communicating with said trumpet-shaped passage of said condensing means and extending forwardly therefrom with its exit end being positioned within the confines of said coiler trumpet, said sliver guide tube being of substantially uniform internal cross-sectional area throughout its length and said internal cross-sectional area being within the range of about .150 to .300 square inch for readily accommodating sliver in the range of 50 to 70 grains per yard, said sliver guide tube having a threading slot of no more than about .042 inch in width extending throughout the length thereof to facilitate threading the sliver into and through the sliver guide tube,

said coiler including a pair of calender rolls positioned below said coiler trumpet for drawing the sliver through said sliver guide tube and into and throughout the coiler trumpet, and

means mounting said sliver guide tube for ready movement of the exit end of the sliver guide tube of the coiler trumpet for facilitating restoring the sliver to its proper running position following a parting thereof.

2. Apparatus according to claim 1 wherein said trumpet-shaped passage in said condensing means extends within said sliver guide tube with the smaller end thereof being of slightly lesser cross-sectional area than the cross-sectional area of at least the major portion of said sliver guide tube, and said condensing means having a threading slot therethrough communicating with said trumpet-shaped passage and with said threading slot of said sliver guide tube to facilitate threading the sliver into said trumpet-shaped passage and said sliver guide tube.

3. Apparatus according to claim 1 wherein the major portion of the sliver guide tube has a cross-sectional area of about .196 square inch.

4. Apparatus for controlling textile fibers during their travel from the delivery rolls of a drafting unit to a rotatable coiler having a sliver-receiving member; said apparatus comprising

condensing means positioned closely adjacent said delivery rolls and having a trumpet-shaped passage therein for condensing into a sliver a fibrous web emerging from the drafting rolls,

means associated with said condensing means for receiving the sliver and for guidingly confining the same in its path of travel to said coiler while maintaining the cohesion and integrity of the fibers relative to each other so that the increase in the C.V. reading (nonuniformity) of sliver is no more than about .5,

said means comprising

- a sliver guide tube communicating with said trumpet-shaped passage of said condensing means and extending forwardly therefrom with its exit end being positioned within the confines of said sliver-receiving member of said coiler, said sliver guide tube being of substantially uniform internal cross-sectional area throughout its length and said internal cross-sectional area being within the range of about .150 to .300 square inch for readily accommodating sliver in the range of 50 to 70 grains per yard, said sliver guide tube having a threading slot of no more than about .042 inch wide extending throughout the length thereof to facilitate threading the sliver into and through the sliver guide tube,

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a pair of calender rolls positioned between said condensing means and sliver guide tube for drawing the sliver through said condensing means and delivering the same to said sliver guide tube and cooperating with said rotatable coiler for moving the sliver through said sliver guide tube, and means mounting said sliver guide tube for readily moving the exit end of the sliver guide tube out of the confines of said sliver-receiving member of said coiler for facilitating restoring the sliver to its proper running position following a parting thereof.

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U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

**UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION**

Patent No. 3,401,429

September 17, 1968

Joe R. Whitehurst

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 10, line 5, "about" should read -- about. --; line 27, after "tube" insert -- out --.

Signed and sealed this 10th day of February 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents