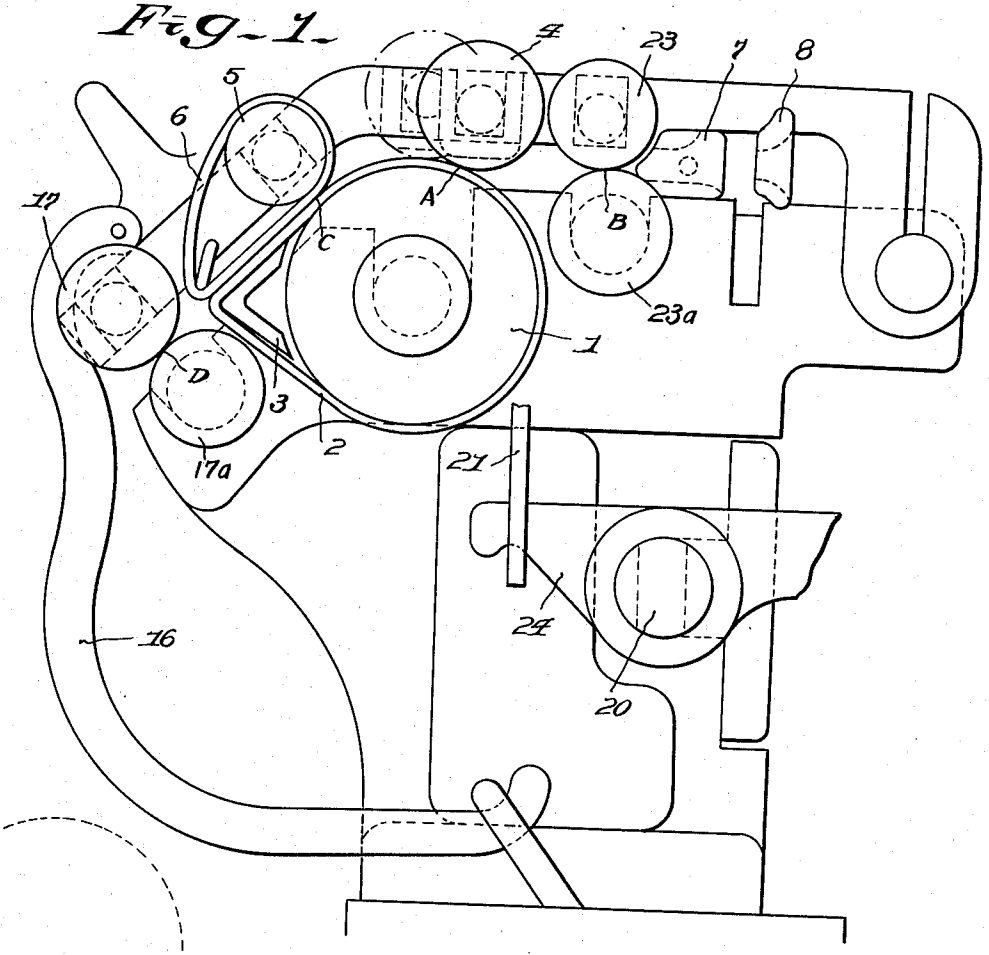
Oct. 11, 1960 SHOZO NODA 2,955,329

DRAFT ASSEMBLY CAPABLE OF DRAFTING SLIVER OR ROVING IN A SPINNING FRAME

Filed June 20, 1956

3 Sheets-Sheet 1

Fig. 1.



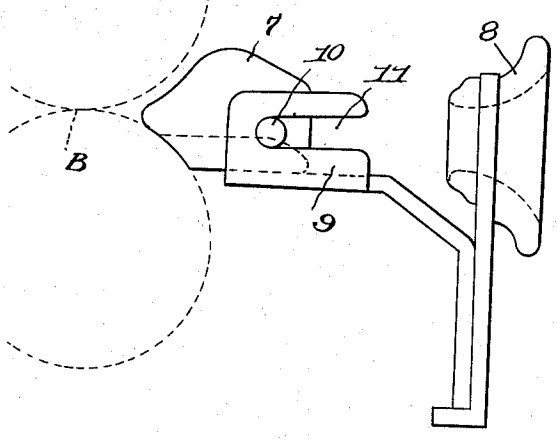


Fig. 2.

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Fig. 3.

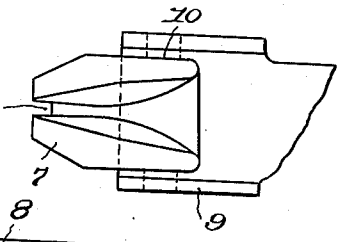
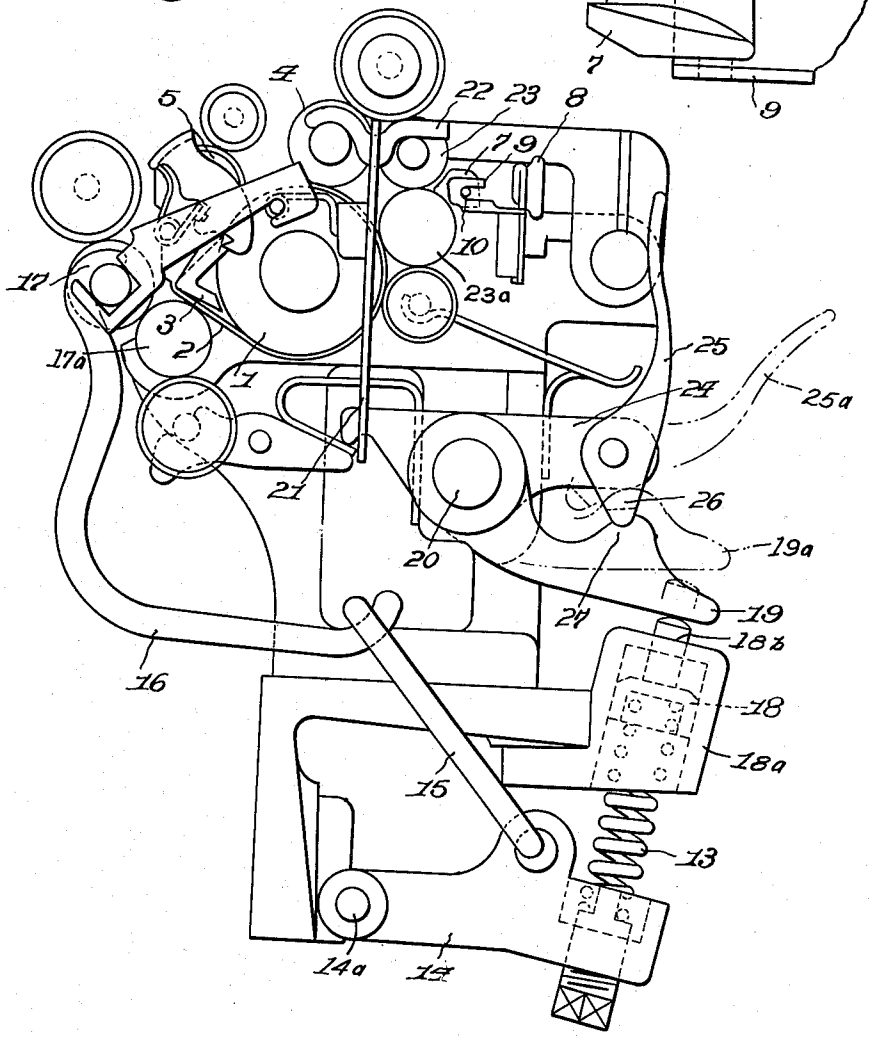


Fig. 4.



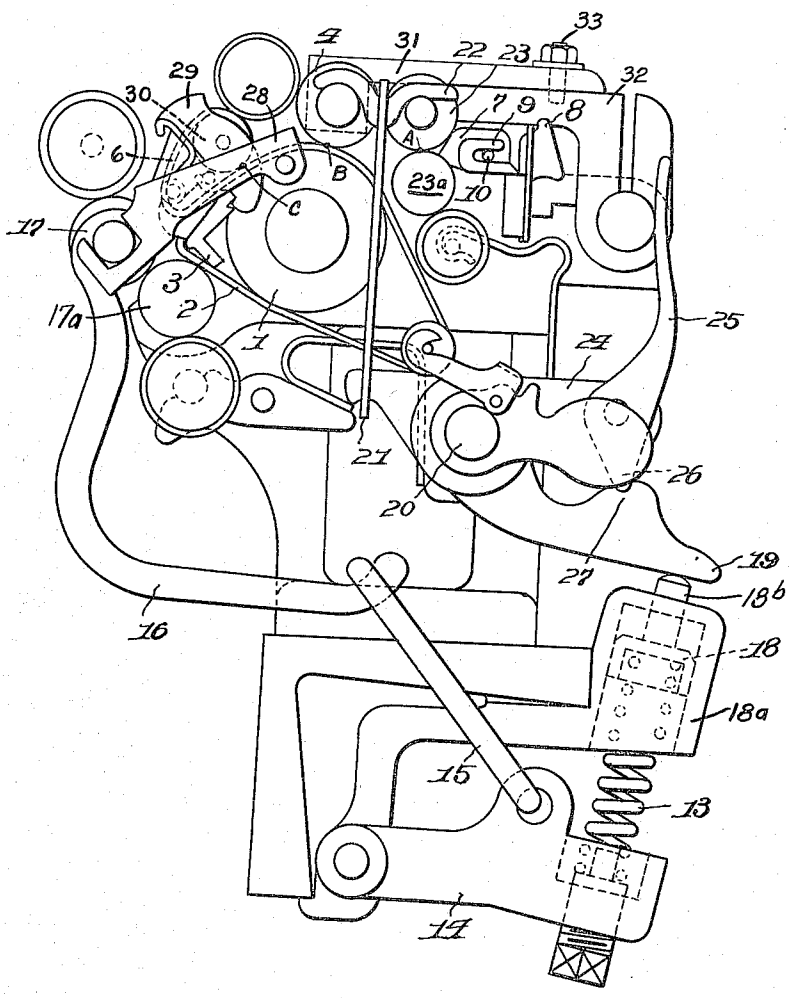
Oct. 11, 1960 SHOZO NODA 2,955,329

DRAFT ASSEMBLY CAPABLE OF DRAFTING SLIVER OR ROVING IN A SPINNING FRAME

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3 Sheets-Sheet 3

Fig. 5.



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2,955,329

DRAFT ASSEMBLY CAPABLE OF DRAFTING SLIVER OR ROVING IN A SPINNING FRAME

Shozo Noda, Nagoya-Shi, Japan, assignor to Howa Kogyo Kabushiki-Kaisha, Aichi-Ken, Japan, a corporation of Japan

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Claims priority, application Japan Aug. 19, 1955

3 Claims. (Cl. 19—131)

This invention relates to an improvement of a draft assembly or mechanism capable of drafting sliver or roving in a spinning frame to be used for processing cotton, staple fiber and other kinds of fibers.

The usual draft assembly or mechanism of three line rolls is, generally, composed of front rolls, middle rolls, and back rolls.

The front top roll is weighted with a dead weight by a hook or any other mechanism so as to form a positive bite point. On the other hand, a bottom apron or belt is arranged against the middle roll and a middle top roll or a combined device of a top apron. These rolls are also weighted by a weighting mechanism. Accordingly, middle position bite points are formed between the top roll and the bottom apron and between the aprons.

Furthermore, the back roll is conventionally weighted by the self-weight of a back top roll of large diameter or by weighting the top roll with a suitable loading mechanism, whereby a back positive bite point is formed so as to construct a draft assembly group. The above-mentioned bottom rolls are rotated by a suitable gear train with a suitable selection of the speed ratio of said rolls to carry out the draft. The main drafting zone and back drafting zone (or break drafting zone) are made possible, respectively, between the front and middle rolls and between the middle and back rolls. The Casablancas, Shaw and Roth systems are representative assemblies of the above-mentioned system.

In these systems or mechanisms, it is intended that the relative speed of the middle and back bottom rolls be standardized at a low ratio such as 1.0 to 1.8. However, it has become possible to obtain a higher value, such as two or five, by weighting the middle and back top rolls with a heavier load, and also by the roll setting between the middle and back bottom rolls setting them at a distance equal to staple length. As a result, the total draft of said system will be up to 30, in this new arrangement it has also become possible to obtain a draft of 40 to 100 or more.

Since this draft is obtained by a most suitable and critical setting of rolls, the setting distance between the middle roll and back roll should be adjusted very strictly in accordance with the length of the staple to be treated, and moreover the adjustment should be carried out very simply and accurately.

For example, when the setting or radial distance is selected as follows, very favourable results will be obtained:

	Inches
For coarse count	1 7/32
For medium count	1 11/32
For fine count	1 13/32

However, for the purpose of obtaining the draft of two or four by utilizing a small or narrow setting distance between rolls as illustrated above, it is necessary that more weight than that customarily used should be applied to the middle top roll and back roll.

While in general, Casablancas drafting mechanisms are customarily provided with a pair of aprons, the bottom apron utilized on the middle bottom roll and the top apron on the top roll, and the top rolls are weighted by a weighting apparatus for obtaining a positive bite between them. When the top roll is weighted with a pressure which is twice as much as the amount of the pressure which is customarily used, the aprons are apt to travel toward either side, and push against a side of the cradle, which is arranged to guide said aprons, thus causing an irregular elongation or tensioning of the aprons and damage thereof. By increasing the weight of the middle top roll, the desired positive bite will be obtained, but unfavourable effects to the aprons will occur.

Therefore, a principal object of this invention is to provide a draft assembly having no such disadvantages as described above, but having the advantages described above and other favourable characteristics.

In attaining the object of this invention, a special improvement is adopted in connection with the arrangement of the middle bottom and top rolls.

According to the invention, in order to obtain a draft assembly capable of satisfying two opposite requirements such as described already, one apron roll and one top roll covered with a synthetic resilient material are so arranged in tandem in position above the middle bottom roll, and the bottom apron is so arranged between said bottom roll and said two top rolls, so that the main drafting may be carried out in a zone between two positive bites at the front roll and the apron top roll, and back draft may be carried out in a zone between two positive bites at the synthetic covered top roll and the back roll.

Furthermore, according to this invention less weight than that customarily used for the apron top rolls is applied to produce a proper positive bite for the main draft, and a heavier weight than that customarily used for the synthetic covered top roll is applied to produce an effective positive bite for the back draft. By use of the heavy weighting, non-slip driving of the bottom apron by the middle bottom roll is established. Accordingly, the speed of the top apron and the synthetic covered top roll will be equal to that of the bottom apron.

In the Casablancas or Shaw systems, it is conventional to equip the apparatus with a mechanism capable of adjusting longitudinally the positions of the back top roll and the back bottom roll in order to set the middle roll and the back roll at a proper distance.

According to the invention, however, the distance of the roll setting is selected, as described already, so as to be equal to the staple length. That is to say, a distance below ½" is sufficient making it possible to carry out the intended results of the invention. In the arrangement according to the invention, the proper setting of said distance is made possible by setting the back bottom roll and the top roll at fixed positions and by adjusting only the position of the top roll above the large common middle roll.

Now, when the total draft is made more than 100, the width of the stock passing the assembly is extended over a relatively large range, whereby the fly waste becomes excessive and the tendency of lapping up on the roll increases which makes it impossible to maintain steady drafting conditions.

In order to minimize the tendency, as described above, a so-called reducing device for use in the convention systems has been adopted. It is often called a "reducer," "collector" or "condenser." This device is provided with a slot the width of which is determined in proportion to the thickness of the sliver. It is conventional to make this slot narrow progressively from the back to the front. However, when the reducing effect is too much, the drafting conditions become unfavourable.

In order to avoid the above mentioned unfavourable conditions the invention is provided with a special stabilizer capable of feeding the sliver or roving into the back portion of the draft assembly in a state necessitating no reducing of the stock width even when large drafting is carried out between the back position and the front position.

The novel features which are believed to be characteristic of the present invention are set forth with particularity in the appended claims, the present invention itself, however, both as to its organization, manner of construction, and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a schematic side view of a mechanism according to the invention.

Fig. 2 is an enlarged side view of a stabilizer according to the invention.

Fig. 3 is a plan view of the stabilizer shown in Fig. 2.

Fig. 4 is a schematic side view of another embodiment of this invention, provided with a weight releasing mechanism.

Fig. 5 is a schematic side view of a modification of the embodiment in Fig. 4.

Referring to the drawings, wherein similar members have the same reference numbers, and more particularly to Fig. 1, a bottom apron 2 is disposed over a large middle bottom roll 1. A tension-applying bar or guide 3 cooperates with the apron 2. On the middle bottom roll 1 are arranged a common top roll 4 and an apron top roll 5, respectively, adjacent to front rolls 17, 17*a* as shown. A back draft zone or field is formed between the nip points B and A, the former point being positioned between both back rolls 23, 23*a* a nd the latter point being positioned between the synthetic covered top roll 4 and the middle roll 1.

On the other hand, a front draft zone or field is formed between the nip points or bite points C and D, point C being positioned between the middle apron top roll 5 and the middle bottom roll 1 and the point D being positioned between the front rolls 17, 17*a* as shown.

According to the arrangement, it is possible to obtain a sufficiently favourable roll setting suitable for spinning various counts of yarn so long as the difference of roll setting distances is within ½". Accordingly, for the purpose of carrying out back roll settings of a desirable amount, only adjustment of the setting or position of the middle top roll 4 is necessary and it is not necessary to adjust the setting positions of other rolls.

In the draft assembly of this invention, positions of the bottom rolls belonging to the front, middle and back rolls are fixedly set and top rolls belonging to the front, apron top and back rolls are also fixedly set. Furthermore, adjustment and setting of the critical position of the back draft zone can be easily and quickly carried out by adjusting only the position of the third middle top roll in accordance with the staple length. Such characteristic can be partly applied to the spinning of long staple fibers. That is to say, although in some cases it is impossible to set fixedly the position of the back roll, as in the case of cotton spinning, a minute adjustment of said back roll's position can be carried out by setting of said back roll.

According to this invention, the above disadvantage can be effectively eliminated by equipping the draft mechanism with a draft stabilizer 7 which is capable of sliding freely in the longitudinal direction of the draft assembly so that said stabilizer may be placed at the nearest possible position to the nip point of the back rolls along the sliver feed path. The stabilizer is fixed to the traverse bar together with the roving guide, so that the stabiblizer can traverse together with the roving with the transverse of the traverse bar.

For optimum results the stabilizer should feed roving into the nip point of the back rolls in the order of a width

of 1.5–2.0 mm. The entry of the roving into the nip point of the back rolls, from the nozzle of said stabilizer should be from a position as close to said point as possible. The proximity of the stabilizer nozzle is indispensable to maintain the draft in the best condition. Such a stabilizer 7 is illustrated in Figs. 1–3, in which sliver or roving is conventionally guided by a back trumpet 8 so as to make the nip point B of the back rollers traverse regularly axially of said rolls. Besides said conventional arrangement, the draft stabiblizer 7 is mounted between the back trumpet 8 and the nip point B of the two back rolls 23 and 23*a* on a holding element 9 constructed as one unit with the back trumpet 8. The element 9 receives the stabilizer 7 in a U-shaped slot and a pin 10 projecting from the stabilizer 7 is held by a slot provided on the side wall of the holding element 9, as shown in the drawing, whereby the stabilizer 7 is freely movable to the left and to the right in the drawing. The stabilizer is held from movement in an upward and downward direction in such a position that the left end of the stabilizer 7 is positionable against the surface of the back bottom roll 23*a*. Preferably the stabilizer has a nozzle 12 the width of which is 1.5–2.0 mm. so as to feed sliver or roving in a sufficiently narrow state into the back rolls.

According to such a construction, the sliver or roving to be fed at nip point B of the two back rolls 23 is fed into the back rolls after being narrowed in its width by the nozzle 12 of stabilizer 7, generally disposed adjacent the nip point B of the two back rolls as near as possible, thereby the sliver or roving at the nip point B is accurately maintained at a width which is nearly equal to that of the nozzle 12 of the stabilizer 7. Because of this it is possible to obtain satisfactory spinning of a large amount of draft without need of any special device capable of narrowing the width of the sliver before reaching the front rolls.

In the embodiment of this invention shown in Fig. 1 when any one portion of the draft assembly is in an improper condition as, for example, due to released weighting or insufficient weighting, spun yarns having irregular and indefinite counts will be obtained. If such a damaged portion occurs, it is preferable to break the yarns without spinning them. Accordingly, in the embodiment in Fig. 1 it is desirable that the loading weights exerting pressure on the top rolls belonging to the front, third and back rolls be uniformly in the best of condition and apply proper pressures, or be in a released condition.

According to the invention, uniform yarn due to proper pressures can be obtained by the devices as illustrated in Figs. 4 and 5. In the embodiment in Fig. 4, a compressed spring 13 is used for weighting the front top roll 17, the third top roll 4 and the back top roller. The spring 13 is supported between a free end portion of a lever 14, which is pivoted at a pivotal shaft 14*a* and a cap member 18 which is slidably supported in a stationary portion 18*a* of the frame. The member 18 is provided with a projecting pin 18*b*.

In the condition as shown in Fig. 4, in solid lines in which the end 26 of a weight releasing handle 25 is in engagement with a slot 27 of a weighting lever 19, with the handle 25 being pivoted on a weighting lever 24 which is pivotally supported by a pivotal shaft 20 and lever 19 being also pivotally supported by the shaft 20, the top rolls 17, 23 and 4 are maintained in a weighted condition. On the one hand, the spring 13 weights the front top roll 17 at its lower end through the lever 14, a lever 15 coupled with said lever 14 and engaged at another end thereof with a member 16 applying pressure on roll 17. On the other hand, the end of the spring 13 weights the third top roll 4 and the back top roll 23 through the pin 18*b*, the weighting lever 19, the releasing handle 25, the weighting lever 24 which is urged counterclockwise by the engagement of the end 26 and the slot 27, a weighting wire or rod 21 which is hooked at its lower end with the left side end of the lever 24 and a saddle 22 which is

connected at the upper end of said rod and which is engaged with the rollers 4 and 23 so as to urge said rollers in a downwardly direction.

However, when the engaging end 26 and the slot 27 are disengaged by turning the handle 25 in the position 25*a* shown by the broken lines, the spring 13 pushes the lever 19 up to the position 19*a* shown by broken lines by means of the pin 18*b*. In this condition, the spring 13 extends so as to restore its normal length and the pressure applying or weighting force thereof becomes zero or nearly zero, whereby all top rolls 27, 23 and 4 are uniformly released from their loaded or weighted condition.

As described above, the top rolls of the front, third and back rolls can be weighted or released from their loaded weights at one portion, so that if the spinning frame starts accidentally, the yarn is broken at the released assembly and the fiber can not be spun in spite of the fact that another weighted assembly can continue its spinning.

It will be understood that the embodiment in Fig. 4 relates to a draft assembly, in which a short apron band or belt 2 is arranged at the bottom, but it may be modified as shown in Fig. 5, in which said short apron band 2 is substituted by a long apron band, their operation and characteristics being entirely the same. In both embodiments the tension of the apron is adjustably controlled by a tension bar 3.

In Fig. 5 the draft assembly front roll 17 is rotatably mounted in a fixed position by support member 28 and the pivotal position of roll 30 is fixed by a cradle 29. Back top roll 23 is pivotally mounted in slots, not shown, in a cap bar finger 32. Middle top roll 4 of the assembly is mounted in slots provided on cap bar finger 32 but is adjustably positionable by moving a member 31, which engages an end of roll 4 as shown, longitudinally in opposite directions. The member 31 is adjustably held on finger 32 by a set screw 33. In this manner the length of the drafting zone can be easily set.

While preferred embodiments of the invention have been illustrated and described, it will be understood that the invention is in no way limited to those embodiments and that many changes may be made within the spirit and scope of the invention as defined by the following claims.

What is claimed is:

1. In a drafting mechanism having a main drafting zone comprising a pair of cooperating front delivery rolls at one end, a middle bottom apron driving roll having a sliver-supporting apron disposed thereon and an upper apron driving roll having an upper apron disposed thereon cooperating to form a pair of holding rolls at the opposite end, a back draft zone comprising an upper drafting roll cooperating with said middle bottom apron driving roll at one end thereof, a pair of back holding rolls at the opposite end, whereby two positive bite points are positioned on the middle lower apron driving roll and associated lower apron, means for mounting the rolls other than the upper drafting roll in fixed spaced relationship relative one another in the longitudinal direction of the mechanism, and movable means for mouting the upper drafting roll thereby to allow displacement of said upper drafting roll in a longitudinal direction of the mechanism in a selected range of distances to vary the length of the back drafting zone.

2. In a drafting mechanism having a main drafting zone comprising a pair of cooperating front delivery rolls at one end, a middle bottom apron driving roll having a sliver-supporting apron disposed thereon and an upper apron driving roll having an upper apron disposed thereon cooperating to form a pair of holding rolls at the opposite end, a back draft zone comprising an upper drafting roll cooperating with said middle bottom apron driving roll at one end thereof, a pair of back holding rolls at the opposite end whereby two positive bite points are positioned on the middle lower apron driving roll and associated lower apron, said back rolls cooperating to form a positive bite point for receiving sliver at the last-mentioned bite point, sliver-stabilizer means for delivering sliver to the back rolls at a predetermined width, and means movably mounting said sliver-stabilizer means to allow movement of said stabilizer in a longitudinal direction of the mechanism toward and away from said last-mentioned bite point, whereby the stabilizer is positionable substantially next adjacent the bite of the back rolls and away therefrom to control desired width characteristics of sliver to be drafted.

3. In a drafting mechanism according to claim 2, including means for releasably applying selected weighting and pressures to the rolls at opposite ends of said zones thereby to maintain a dependable bite between cooperating rolls and for selectively breaking the sliver or roving being drafted in at least one of said zones.

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