Sept. 14, 1943. B. C. SHAW 2,329,655

DRAFTING MECHANISM FOR SPINNING AND ROVING FRAMES

Filed Feb. 17, 1941 2 Sheets-Sheet 1

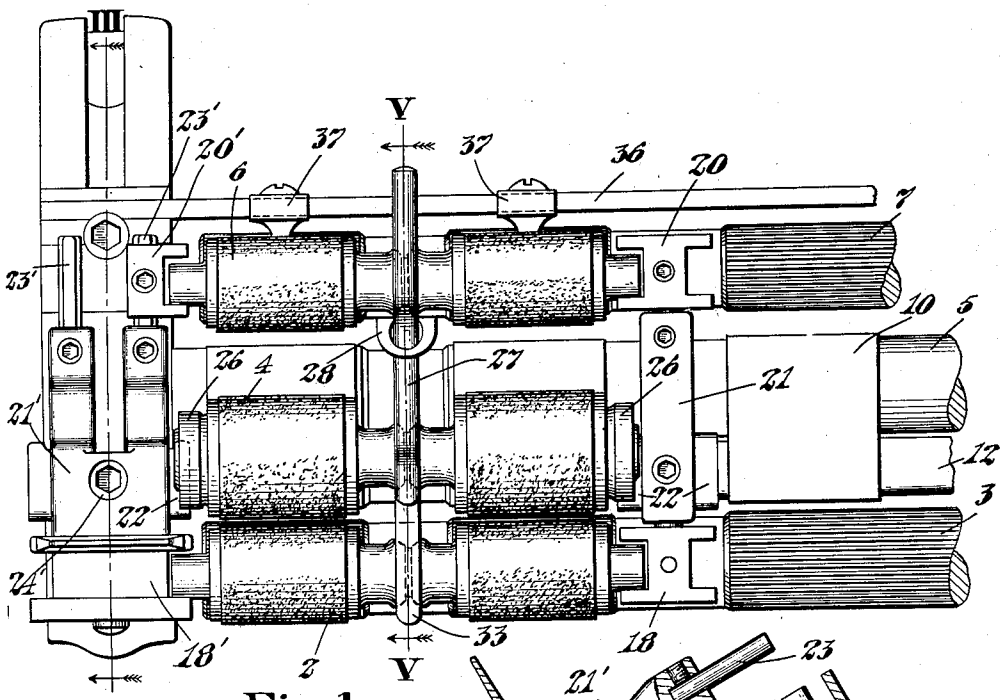


Fig.1.

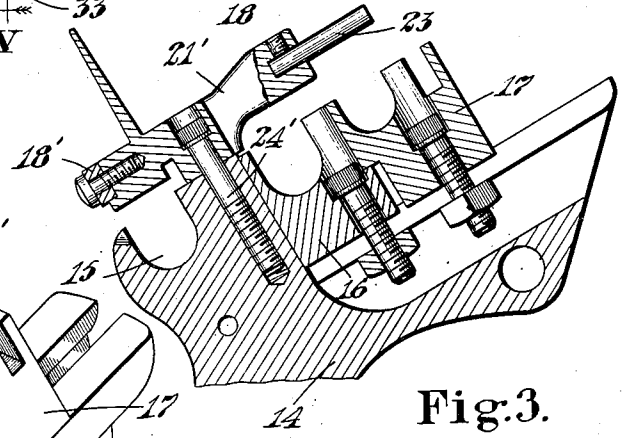


Fig.3.

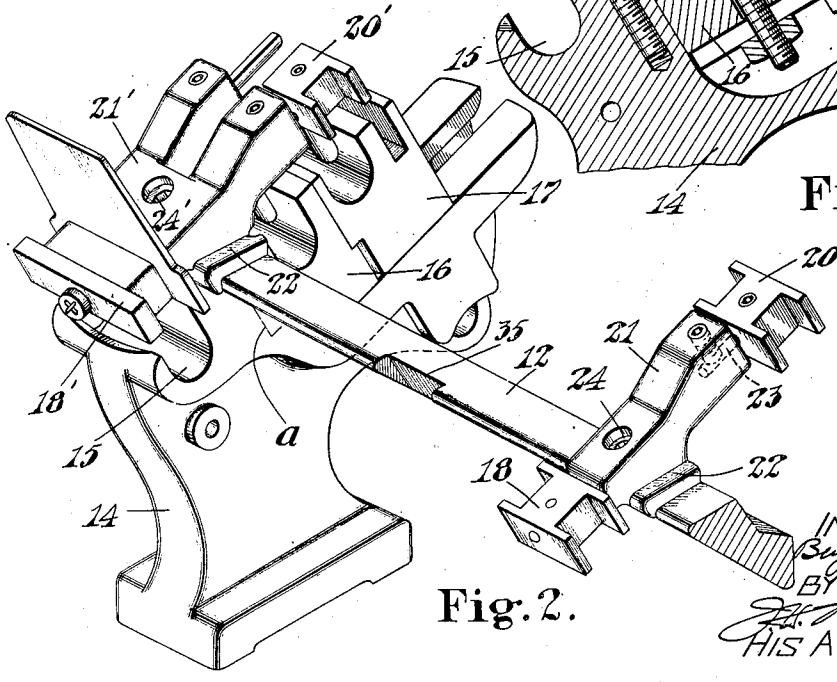


Fig.2.

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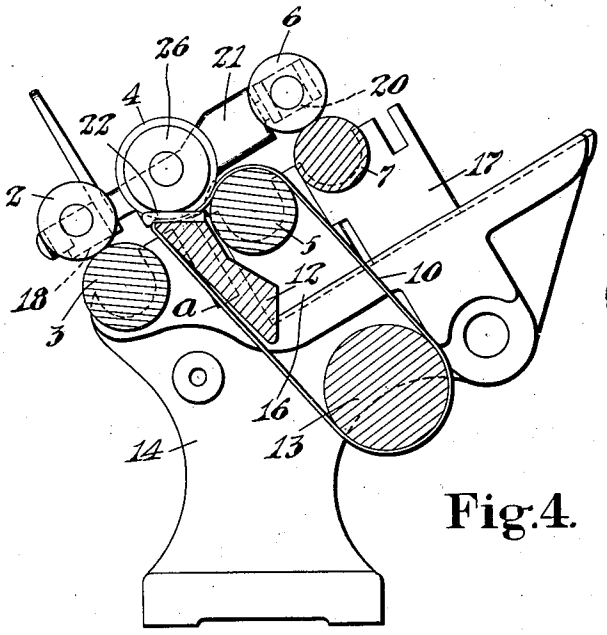


Fig.4.

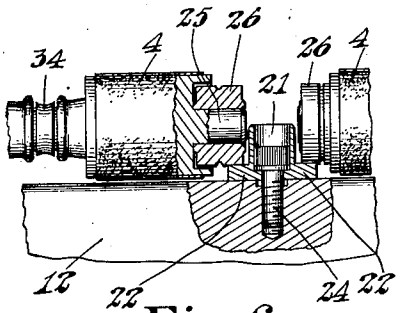


Fig.6.

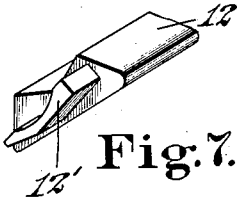


Fig.7.

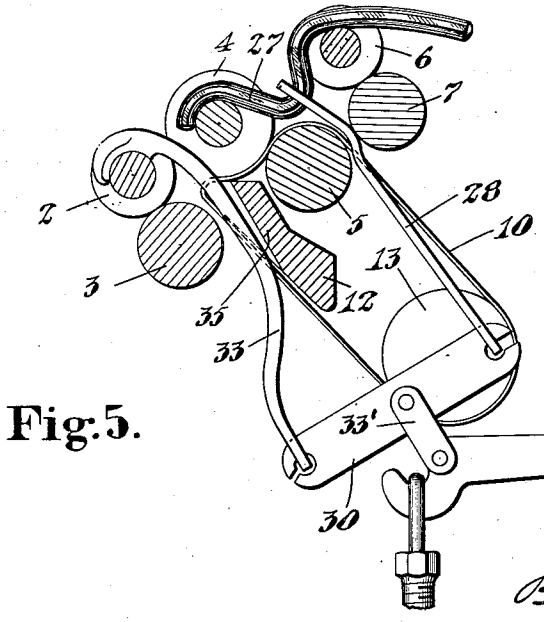


Fig.5.

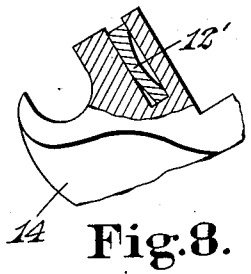


Fig.8.

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UNITED STATES PATENT OFFICE

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DRAFTING MECHANISM FOR SPINNING AND ROVING FRAMES

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Application February 17, 1941, Serial No. 379,202

14 Claims. (Cl. 19—131)

This invention relates to mechanisms for drafting cotton and other fibrous materials and is more especially concerned with mechanisms of this type used in roving and spinning frames.

In my pending application Ser. No. 213,368, filed June 13, 1938, I have shown and described a drafting mechanism which has proved especially satisfactory in machines of the types just mentioned. The present invention aims further to improve mechanisms of this character with a view to reducing the care and attention which they require, making them more convenient for the operators to work on and to keep clean, facilitating the making of adjustments required for different lengths of staple, devising a better weighting means, and generally improving and perfecting such mechanisms. It is contemplated that some features of the invention may be used in drafting mechanisms of a different type from that shown in my application above referred to.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a plan view of those portions of a drawing mechanism for spinning and roving frames with which this invention is more especially concerned and illustrates features of the invention;

Fig. 2 is a perspective view of a roll stand and parts associated therewith for supporting and guiding the drafting elements;

Fig. 3 is a sectional view approximately on the line III—III, Fig. 1;

Fig. 4 is a vertical section through the mechanism at one side of the roll stand with some parts omitted;

Fig. 5 is a vertical, sectional view approximately on the line V—V, Fig. 1;

Fig. 6 is a fragmentary, sectional view through a cap bar and portions of the middle top rolls associated with it;

Fig. 7 is a perspective view of an end portion of an apron bar; and

Fig. 8 is a vertical, sectional view through a portion of a roll stand showing the manner in which the end of an apron bar is supported in it.

Referring first to Fig. 4, the mechanism there shown comprises three sets of drawing devices arranged to act successively on a cotton sliver. In this particular embodiment of the invention these devices include a front pair of upper and lower drawing rolls 2 and 3, respectively, an intermediate pair 4 and 5, and a rear pair 6 and 7. Interposed between the two middle rolls is a belt or apron 10 driven by the lower roll 5 and arranged to run over a guide or apron bar 12, a pulley or idler 13 applying the necessary tension to the apron to hold it taut.

So far as the features just enumerated are concerned, the construction is like that shown and described in my pending application above referred to, and reference may be had to that application for a more detailed description of the mechanism and such factors as roll spacing, typical drafts between successive pairs of rolls, and the like.

The lower rolls 3, 5 and 7 are positively driven, as is customary in mechanisms of this kind, and they usually consist of fluted or knurled steel rolls. At suitable intervals they are supported in roll stands, one of which is shown at 14 in Figs. 2 and 4. Each such stand has a groove 15 to receive the reduced journal portions of the front roll and is provided with a guideway adjustably supporting two bearing blocks 16 and 17 having sockets in which the journal portions of the middle and rear bottom rolls 5 and 7, respectively, are mounted. The mechanism for securing these blocks in their adjusted position is best shown in Fig. 3.

The upper rolls rest on their respective lower rolls, and the two front and rear rolls, in most instances, are held in cooperative relationship to their respective lower rolls by guides 18 and 20, Figs. 1, 2 and 4, adjustably mounted on cap bars 21. At the roll stands a somewhat different type of cap bar is used for supporting these rolls, as shown at 21', Fig. 1, but it includes slotted members 18' and 20' similar to the guides 18 and 20 on the cap bars, all of these guiding members cooperating to engage the reduced gudgeons projecting from the opposite ends of the top rolls and supporting them against any substantial forward or backward movement out of contact with their respective lower rolls. The middle roll is not so supported by the cap bars but it is supported for backward and forward movement on horizontal guides or steps 22 formed on the cap bars.

It has been customary to provide cap bars for holding the top rolls in cooperative relationship to their respective bottom rolls, but these cap bars have been supported heretofore on a rod located at the back of the drawing mechanism and extending longitudinally of the machine. The present invention departs radically from this practice in that the cap bars 21 are mounted

on the upper edge of the apron bar 12, and they are supported solely by this bar. This construction is simpler than the prior art arrangements and it leaves more free space at the back of the frame where room is highly desirable to facilitate the cleaning operations and to give more room for the roving supply. When operating on rayon fibers, or mixtures of rayon and cotton, this feature is especially valuable.

The main body of the cap bar may conveniently consist of a die casting and it is provided with a stem or pin projecting forwardly therefrom and supporting the guide 18. At its rearward end it has a socket to receive a short rod or pin 23, Fig. 3, which is adjustably secured in said body by a set screw, the guide 20 also being similarly fastened on the pin. Each cap bar 21 is secured to the apron bar by a screw 24, and the cap bars 21' are similarly secured to the roll stands by a screw 24'. The latter cap bars have the same provision for adjustably supporting their rear guides 20' as do the cap bars 21.

In assembling a spinning or roving frame the cap bars 21 may be mounted on their respective apron bars and thereafter these bars may be installed in the machine by sliding their reduced ends 12', Fig. 7, into slots *a*, Figs. 2 and 4, in the roll stands 14. They are prevented from being accidentally lifted out of these slots by the fact that portions of each cap bar 21' overlie both end sections of the apron bar positioned in its respective stand.

When it is desired to take out the apron bar, the cap bars are first removed, after which the apron bar with its set of cap bars secured to it are simply lifted out of the slots *a*. If, however, the lower middle roll happens to be set close to the bar, such removal would be prevented without first moving the lower roll back. This fact will be evident from an inspection of Fig. 4. Since the movement of the latter roll is accomplished only with considerable difficulty, the ends of the apron bar have been reduced and curved, as shown in Figs. 7 and 8, so that as this bar is lifted it may be rocked in such a manner as to swing it around the lower roll 5 and thus clear said roll. It may be replaced by a reversal of these operations.

The lower rolls 5 and 7 must be adjusted backward and forward from or toward the front roll to suit the requirements of different kinds and grades of fibers. When such adjustments are made in prior art machines it has also been necessary to adjust the cooperating top rolls. This operation requires the expenditure of much time and involves a considerable degree of skill. The present invention reduces materially both the time and skill so required by providing an arrangement such that the middle top roll automatically adjusts itself to maintain its relationship to its cooperating bottom roll substantially undisturbed by changes in the position of the latter.

For this purpose the middle top roll 4 is provided at each end with gudgeons, one of which is shown at 25, Fig. 6, to receive bearing rolls or disks 26 which run, respectively, on the horizontal steps 22 previously referred to. As shown in Fig. 4, the upper surface of the apron bar 12 is flat and lies in substantially a horizontal plane. Also, the upper surface of the steps or guides 22 are substantially horizontal and are spaced slightly above the surface of the bar 12. Consequently, as the lower roll 5 is adjusted backward or forward, its cooperating upper roll 4 moves with it, the bearing disks 26 simply rolling on the surfaces of the steps which support them and the upper roll, but the spacing of the roll 4 from the upper surface of the apron bar remaining constant. This is important in maintaining substantially constant the relationship between the apron 10 and the top roll 4 in the region where these two members release the fibers gripped between them as such fibers are drawn forward by the front rolls 2 and 3.

Cooperating with the bearing rolls or disks 26 and steps 22 in maintaining the relationship just described, is a weighting mechanism best shown in Fig. 5. It comprises a saddle 27, the forward end of which is curved to hook over the neck of the middle roll 4, while its rearward end portion extends across and rides on the neck of the rear roll 6. Between these rolls the saddle is bent downwardly to a position considerably below a line connecting the bearing points of the saddle on the two rolls 4 and 6, and a mechanism is connected wtih this depressed or U-shaped portion of the saddle to apply weight to it. As shown, this mechanism comprises a stirrup 28 pivotally connected to one end of a floating lever 30 and a weighted lever 31 connected to said lever by a link 33'. A second stirrup 33 having an upper end portion hooked over the neck of the front roll 2 is pivoted to the forward end of the floating lever 30 so that the pressure applied through the weighted lever 31 is distributed in a predetermined manner to the various top rolls.

It will be evident from an inspection of Fig. 5 that this weighting arrangement exerts a downward and rearward pull on the middle top roll 4 in a direction tending to hold it constantly in contact with its cooperating lower roll 5. Also, that this action is not disturbed or materially modified by any adjustment of the lower roll toward or from the front roll 3. As the spacing of the rear rolls from the middle rolls is increased, the top rear roll simply slides farther out under the tail portion of the saddle. Preferably this tail portion is curved, somewhat as shown in Fig. 5, to compensate for the change in direction of pull of the rear stirrup when the spacing of the rear roll relatively to the middle rolls is materially increased.

This saddle may conveniently be made from a heavy wire or small rod of circular cross-section, and in order to maintain it in a fixed position between the bosses of the top rolls the necks of the latter are grooved circumferentially as shown in Fig. 1. Preferably the groove is deepened at the middle so as to receive and hold a small quantity of oil or other lubricant. A slightly different construction is shown in Fig. 6 in which the groove 34 is positioned between and raised above two oil grooves, the latter being flanked by circular flanges serving to prevent the oil from working on to the fiber engaging surfaces of the roll. In both cases, the contact of the saddle with the necks of these rolls permits the saddle to swing laterally, and the downward pull of the stirrup 28 on the depressed portion of the saddle, acting at a level below that of the bearing points of the saddle, holds the saddle automatically in the grooves of the necks of the rolls. The forward edge of the bar 12 is slotted at suitable intervals, as shown at 35, Figs. 2 and 5, to accommodate the stirrup 33.

It will be evident from the foregoing that such a construction as that above described is exceptionally easy to clean considering the fact that each drafting unit includes an apron; that the matter of making the necessary adjustments has

been facilitated, and that hand adjustment of the middle top roll has been eliminated, the adjustment of this element being automatic. Since the spacing of the middle top roll from the upper flat face of the bar 12 over which the apron travels immediately after passing out of contact with the roll is fixed by the engagement of the bearing rolls 26 with their steps 22, such spacing is not disturbed by changes in the spacing of the bottom middle roll from the front roll. This arrangement is useful in some drafting mechanisms which do not include an apron.

While I have herein shown and described a preferred embodiment of my invention, it will be understood that the invention may be embodied in other forms without departing from the spirit or scope thereof.

Having thus described my invention, what I desire to claim as new is:

1. In a mechanism for drafting cotton sliver and the like, the combination of a plurality of pairs of upper and lower drafting rolls arranged one in advance of another to feed and draw a cotton sliver, or the like, means supporting said lower rolls in spaced relationship to each other, cap bars holding certain of said upper rolls in cooperative relationship to their respective lower rolls, and supports for said cap bars engaging them at points between the front and rear rolls.

2. In a mechanism for drafting cotton sliver and the like, the combination of a plurality of pairs of upper and lower drafting rolls arranged one in advance of another to feed and draw a cotton sliver, or the like, means supporting said lower rolls in spaced relationship to each other, cap bars holding certain of said upper rolls in cooperative relationship to their respective lower rolls, and means engaging said cap bars at intermediate points in their lengths and supporting them in their operative positions.

3. In a mechanism for drafting cotton sliver and the like, the combination of a plurality of pairs of upper and lower drafting rolls arranged one in advance of another to feed and draw a cotton sliver, or the like, means supporting said lower rolls in spaced relationship to each other, cap bars holding certain of said upper rolls in cooperative relationship to their respective lower rolls, and a bar extending in a generally parallel direction to the bottom rolls and located between the front and rear bottom rolls for supporting said cap bars.

4. In a mechanism for drafting cotton sliver and the like, the combination of a plurality of pairs of upper and lower drafting rolls arranged one in advance of another to feed and draw a cotton sliver, or the like, roll stands supporting said lower rolls in operative relationship to each other, and means supporting said upper rolls in cooperative relationship to their respective lower rolls including cap bars and a bar supported in said roll stands between the lower rolls, the latter bar supporting said cap bars.

5. In a mechanism for drafting cotton sliver and the like, the combination of a pair of upper and lower rolls arranged to grip and feed a sliver between them, a second pair of upper and lower rolls behind the first pair and between which said sliver is fed on its way to the front pair of said rolls, an apron interposed between said rear rolls, a stationary bar supporting said apron and over which it is guided, and means supporting one or more of said upper rolls in cooperative relationship to its respective lower roll, said means including cap bars mounted on said apron bar.

6. In a mechanism for drafting cotton sliver and the like, the combination of a pair of upper and lower rolls arranged to grip and feed a sliver between them, a second pair of upper and lower rolls behind the first pair and between which said sliver is fed on its way to the front pair of said rolls, an apron running over the lower of said rear rolls, an apron bar positioned between said lower rolls, said apron running over said bar and said upper rear roll bearing on said apron between said bar and said lower rear roll and depressing the apron, said bar having an upper rounded edge portion positioned in the space between said lower front roll and said upper rear roll, said edge being separated from said upper rear roll by a maximum distance only slightly greater than the thickness of said apron, weighting means for pressing said upper rear roll toward its cooperating lower roll to pinch the apron between them, and means supporting said upper rear roll for backward and forward rolling adjustment to maintain automatically a substantially constant relationship to its cooperating lower roll notwithstanding changes in the spacing of the latter roll relatively to said front lower roll.

7. In a mechanism for drafting cotton sliver and the like, the combination of a pair of upper and lower rolls arranged to grip and feed a sliver between them, a second pair of upper and lower rolls behind the first pair and between which said sliver is fed on its way to the front pair of said rolls, an apron running over the lower of said rear rolls, an apron bar positioned between said lower rolls, said apron running over said bar and said upper rear roll bearing on said apron between said bar and said lower rear roll and depressing the apron, stationary approximately horizontal guides supporting said upper rear roll for automatic rolling adjustment backward and forward with its lower roll, and weighting mechanism acting on said upper rear roll in a direction tending to maintain it continuously in engagement with its lower roll.

8. In a drafting mechanism according to preceding claim 7, a construction including cap bars for holding the upper front roll in cooperative relationship to its respective lower roll, said stationary guides for the upper rear roll being carried by the cap bars.

9. In a mechanism for drafting cotton sliver and the like, the combination of a pair of upper and lower rolls arranged to grip and feed a sliver between them, a second pair of upper and lower rolls behind the first pair and between which said sliver is fed on its way to the front pair of said rolls, a bar lying between and extending parallel to said lower rolls, and guides supported by said bar and on which said rear top roll is mounted for rolling movement backward and forward.

10. In a mechanism for drafting cotton sliver and the like, the combination of a pair of upper and lower rolls arranged to grip and feed a sliver between them, a second pair of upper and lower rolls behind the first pair and between which said sliver is fed on its way to the front pair of said rolls, said upper rear roll having gudgeons projecting from opposite ends thereof, bearing rolls encircling said gudgeons, stationary guides on which said bearing rolls rest, said guides and said bearing rolls supporting said upper roll for rolling movement backward and forward.

11. In a mechanism for drafting cotton sliver and the like, the combination of a pair of upper

and lower rolls arranged to grip and feed a sliver between them, a second pair of upper and lower rolls behind the first pair and between which said sliver is fed on its way to the front pair of said rolls, said upper rear roll having gudgeons projecting from opposite ends thereof, bearing rolls encircling said gudgeons, stationary guides on which said bearing rolls rest, said guides and said bearing rolls supporting said upper roll for rolling movement backward and forward, and weighting means acting on said upper rear roll in a direction tending to hold it constantly in contact with its respective lower roll.

12. In a mechanism for drafting cotton sliver and the like, the combination of a pair of upper and lower rolls arranged to grip and feed a sliver between them, a second pair of upper and lower rolls behind the first pair and between which said sliver is fed on its way to the front pair of said rolls, an apron running over the lower of said rear rolls, an apron bar positioned between said lower rolls, said apron running over said bar and said upper rear roll bearing on said apron between said bar and said lower rear roll and depressing the apron, and guiding means for said upper rear roll holding it spaced by a minimum distance from said apron bar in the region adjacent to the forward edge thereof but supporting the latter roll for movement backward and forward automatically to maintain its relation to its cooperating lower roll substantially unaffected by forward and rearward adjustments of the latter roll.

13. In a drafting mechanism according to preceding claim 7, weighting mechanism for said upper rear roll acting on it in a direction to urge it constantly backwardly and downwardly into contact with its cooperating lower roll.

14. In a mechanism for drafting cotton sliver and the like, the combination of three pairs of upper and lower drafting rolls arranged one in advance of another to feed and draw cotton sliver or the like, means supporting said lower rolls in spaced relationship to each other, cap bars holding said front and rear upper rolls in cooperative relationship to their respective lower rolls, supports for said cap bars engaging them at points between the front and rear rolls, guiding elements supporting said middle upper roll for rolling movement backward and forward, and means acting on said middle upper roll to hold it constantly in cooperative relationship to its respective lower roll notwithstanding changes in the adjustment of the latter roll.

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