Jan. 23, 1940. R. M. JONES 2,187,830

DRAFTING MECHANISM FOR ROVINGS, SLIVERS, AND THE LIKE

Filed Feb. 23, 1937 2 Sheets-Sheet 1

Fig. 2

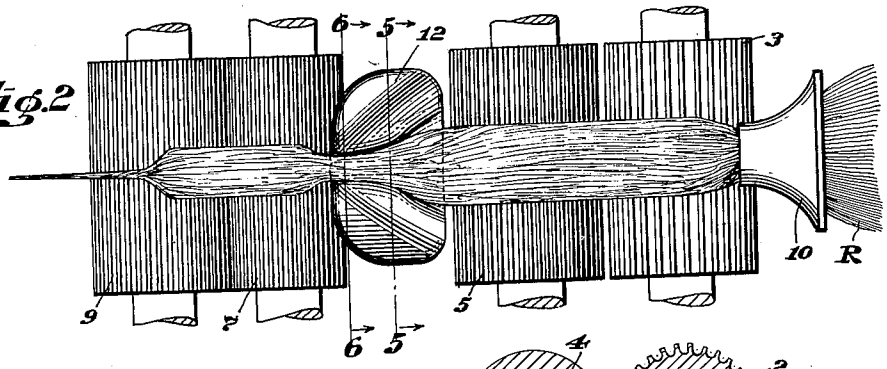
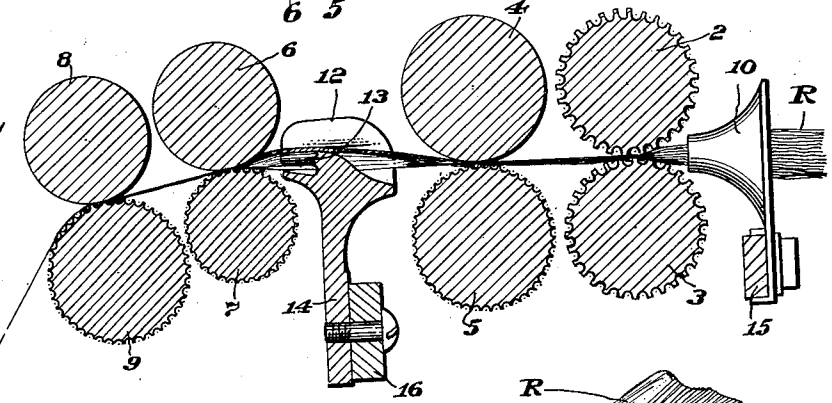
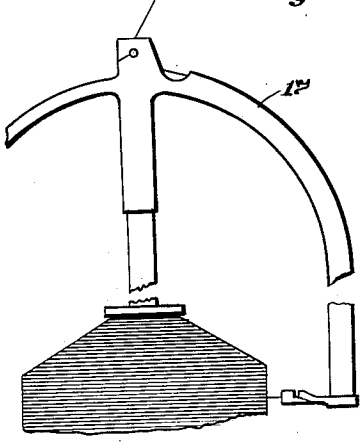


Fig. 1





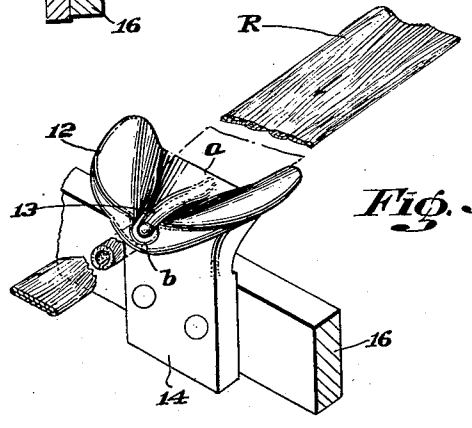


Fig. 3

Fig. 4

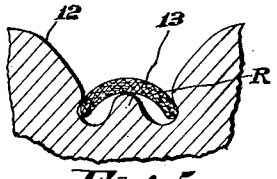
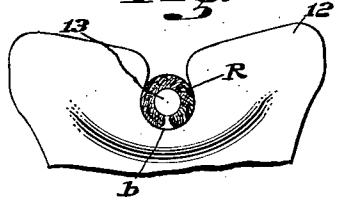


Fig. 5



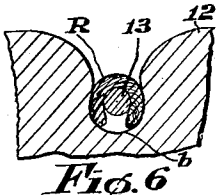


Fig. 6

Fig. 7

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DRAFTING MECHANISM FOR ROVINGS, SLIVERS, AND THE LIKE

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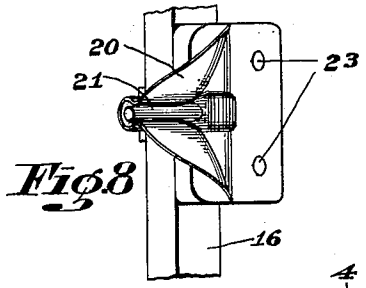


Fig. 8

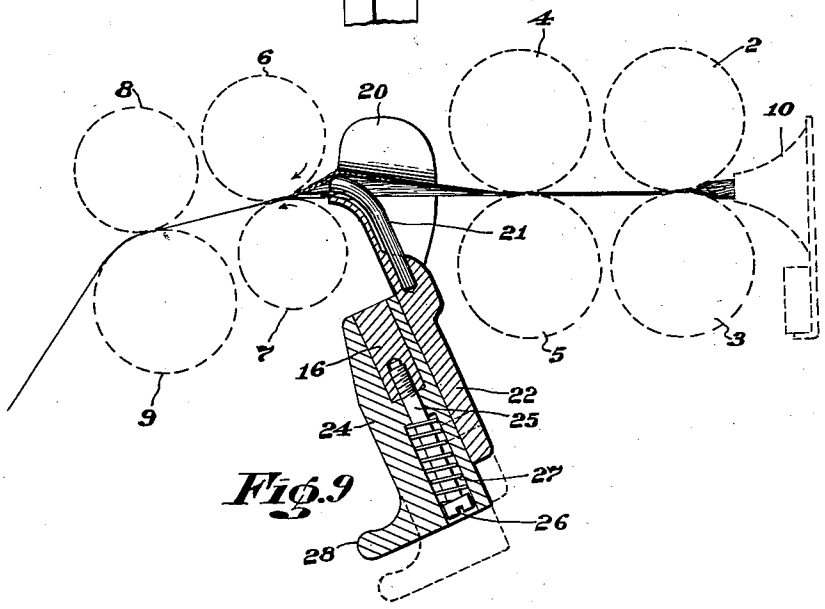
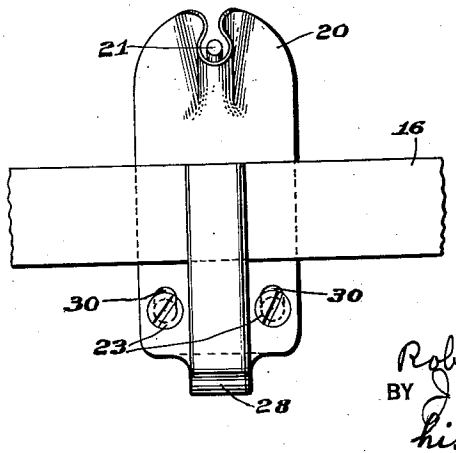


Fig. 9

Fig. 10



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Patented Jan. 23, 1940 2,187,830

UNITED STATES PATENT OFFICE

2,187,830

DRAFTING MECHANISM FOR ROVINGS, SLIVERS, AND THE LIKE

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Application February 23, 1937, Serial No. 127,055

4 Claims. (Cl. 19—130)

This invention relates to drawing mechanisms of the general character used in the preparation of cotton roving, sliver, or the like, for spinning.

Such mechanisms are designed to reduce the cross-sectional dimensions of the rovings and present them in an attenuated form better adapted for spinning, to straighten the fibers, and to draw them into a more nearly parallel relationship to each other which is desirable in order to produce yarn of max'mum strength from a given staple. Since a series of these drawing operations is necessary in order to work the sliver or roving into a suitable form for the final spinning, it is evident that a long draft is of advantage in a single machine in order to produce these results with as few operations and as little handling of the fibers as possible. As a roving is compressed in passing between the rolls, belts, or equivalent devices which perform the drawing operation, those fibers at the edges of the flat, ribbon-like strip produced by such compression, are not gripped with the same degree of firmness as are those fibers between the margins of this strip. Some of them are scarcely gripped at all. Consequently, these edge fibers may get out of control and they are not drawn out in the same orderly manner as are those fibers in the main body of the roving. It has been found heretofore that these difficulties are reduced and satisfactory drafting is facilitated by folding the sliver transversely upon itself at an intermediate stage in the drawing operation, and thus moving the fibers at the extreme edges of the roving back into the line of flow of the main body of fibers. The devices heretofore used for such purpose have been open to the objection that it is troublesome to control the "fly" produced in the drawing frames in which they are used, and such devices are difficult to "thread" or "piece up," and generally require the removal of parts in order to accomplish threading, and their replacement after threading.

The present invention aims to devise a drawing mechanism in which the advantages of turning in the edges between successive drawing steps can be most effectively utilized while still effectively controlling the fly, and which can be readily "pieced up" or threaded, and without removing parts or using special attachments.

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 vertical, sectional view, somewhat diagrammatic in character, of a drafting mechanism embodying the invention;

Fig. 2 is a plan view of the drafting mechanism illustrated in Fig. 1 with the top rolls removed;

Fig. 3 is a perspective view of the novel forming device and also shows the cross-sectional form of the roving at different points in its path of travel relatively to the folder;

Fig. 4 is a front elevation of the forming device shown in Fig. 3;

Figs. 5 and 6 are vertical, sectional views approximately on the lines 5—5 and 6—6, respectively, Fig. 2;

Fig. 7 is a front view, partly in section, showing the change in shape which the roving goes through in passing from the discharge end of the forming device into the drawing rolls;

Fig. 8 is a plan view of another form of the forming device;

Fig. 9 is a vertical, sectional view of said device showing it in its relationship to the drawing rolls; and

Fig. 10 is a front view of said forming device.

In the drawings the invention is illustrated as embodied in a drafting mechanism applicable more especially to roving frames, although the invention obviously is not limited to such application.

Referring first to Figs. 1 and 2, a typical series of drawing rolls is there shown, these rolls being arranged in pairs and each pair comprising an upper and a lower roll. In this particular arrangement a pair of back rolls 2 and 3, respectively, draw the roving R from a coiler can, or other source of supply, and feed it toward the next pair of rolls indicated at 4 and 5. In front of these are additional rolls 6 and 7 located immediately behind the front rolls 8 and 9. Preferably the roving is drawn through a trumpet 10 before entering the bite of the rear rolls, this trumpet having an approximately rectangular aperture so that it tends to condense the roving and present it in a better form for the drafting operation. The second pair of rolls 4 and 5 are driven at a higher surface speed than the back rolls so that a draft occurs between these two pairs of rolls. A further draft takes place between the two forward pairs of rolls. Between these drafting points or zones it is desirable, for the reasons above pointed out, to reform the roving, and the chief feature of the present invention consists in the provision of a novel forming device, and in the relationship and functioning

of this device with respect to the rolls immediately behind and in front of it.

This device comprises a guide 12 which provides an elongated passage for the roving with dual deep grooves extending therethrough and tapered in the direction of travel of the roving to form at the outlet end a single cylindrical groove. This guide is relatively wide at the receiving end *a*, Fig. 3, and is narrow and constricted at the delivery end *b*. Between these points the guide engages a substantial length of roving and it overhangs somewhat the edges of the roving as it tapers gradually toward the delivery end. The guide is provided with smooth surfaces of considerable area contacting the roving and are designed continuously to support and guide the same. When it enters the guide the roving is in the form of a thin, relatively flat ribbon, as indicated in Figs. 2 and 3, but in passing through such guide is changed in shape and reduced in over-all width. This change is effected by the cooperation of the sliver with the tapered guiding walls of the device to gradually reduce the width of the sliver beginning with the region immediately in front of the bite of the rolls 4 and 5. A roving or sliver is very flimsy, has practically no transverse strength and only slightly greater lengthwise strength against rupture between points spaced apart by a distance greater than that of the longest fiber. The spacing of the two middle pairs of rolls practically always exceeds this distance. Consequently, the problem of forming such material is a matter of some delicacy.

I have found, however, that if the lower edge of the delivery aperture *b* of the guide is located substantially in the plane connecting the bites of the two pairs of rolls at opposite ends of the guide, then the extreme outside edges of the ribbonlike strip of roving will remain substantially in said plane as they pass through the guide, and will be brought practically into meeting relationship at its delivery end, provided the intermediate body of fibers is held out of the path of movement of said edges. I accomplish the result just described by positioning a central portion 13 which, after the edges of the roving have been initially contacted and bent downwardly (see Fig. 5), prevents the collapse of the intermediate part of the roving while the elongated converging walls of the grooves meanwhile continue to engage and bend the selvage edges toward each other. This central portion 13 is preferably integral and, in any case, is anchored securely in the shank 14 of the guide, extends upwardly and forwardly in an inclined direction, as shown in Fig. 1, to a point somewhat behind the delivery end *b* of the guide, and then projects forward horizontally into said end in a substantially free and centered relationship with reference to the delivery portion of the guideway or passage. Such relationship is clearly shown in Figs. 1, 3, 4 and 6. The effect then is to gradually form the sliver by bending it into an inverted U-shape, and subsequently forming it into an approximately closed tubular form as it emerges from the end *b* of the guide with the meeting edges of the sliver located at the bottom of such tubular formation. This tubular section travels only a short distance, say one-quarter of an inch, or thereabout, before entering the bite of the rolls 6 and 7 which act upon the tubular sliver and flatten and fold it down into the form shown in Fig. 7, having the folded edges thus formed by the rolls.

It should be observed that the entire forming operation on the sliver takes place automatically due to its travel through, and its engagement with, the stationary surfaces of the forming device, the action of which is limited to a transverse turning of the edges and which does not effect any drawing or other longitudinal re-arrangement of the fibers of the sliver. It is usually preferable to run the pair of rolls 6 and 7 immediately in front of the guide at, say, two to five percent higher peripheral speed than the rolls 4 and 5 immediately behind it so as to apply a slight degree of tension to the roving during its passage through the former itself. It may also be noted that the forward horizontal end of the central portion 13 lies above the plane of the bites of the rolls and directly in the line of flow of the fiber. Preferably, also, the bottom of the grooves in the forming guide are sloped or inclined so that while they lie chiefly or wholly below the plane of the bites of the rolls, they gradually approach said plane as it extends forward toward the discharge end *b*.

This arrangement has been found to operate very satisfactorily in turning the edges of the flattened roving inwardly while it travels from one drawing point to another. It produces no substantial volume of fly, such fly as is produced being continually carried along by the bulk of the roving and eliminating the need of special clearers. Ordinary V, flat, or roller clearers, such as are common on standard draft frames, are sufficient for the rolls. Thus a spinning frame equipped with the forming devices of this construction runs substantially as clean as those in which they are not used. Also, since the entire guide is open at the top from one end thereof to the other, the matter of threading up presents no difficulties. The new end of sliver coming out of the third rolls 4 and 5 rides up over the central portion 13 and moves forwardly until it strikes the second top roll which, in turn, carries this end down into the bite of the second pair of rolls 6 and 7 and the sliver is drawn down into the forming guide by the pull of the rolls.

It should also be understood that while the drawing or drafting elements are herein shown as rolls, any desired number of these rolls can be replaced with revolving belts or aprons, the latter being the equivalent, so far as this invention is concerned. Also, that various combinations of belts and rolls can be used.

Preferably both the trumpet 10 and the forming device 12 are traversed, and for this purpose these devices are mounted securely on bars 15 and 16, respectively, which are reciprocated horizontally in unison and in paths parallel to the axes of the drawing rolls. Any suitable form of traverse motion may be used for this purpose, that disclosed in pending application Serial No. 108,191, filed October 29, 1936, assigned to the assignee of the present invention, being preferred.

After leaving the front rolls 8 and 9, the roving travels to the flier 17, or other twisting device, which twists it into the form of yarn, sliver, or the like, depending upon the nature of the machine in which this drawing mechanism is used.

A slightly different embodiment of the invention is shown in Figs. 8, 9, and 10 in which parts identical with those illustrated in Figs. 1 and 2 are designated by the same numerals. In this form of the invention the forming device comprises a guide 20 and a central member 21, these parts being associated with each other and performing essentially the same functions as do the parts 12 and 13 of the construction above

described. Both of these elements, however, are made integral with, or secured rigidly to, a shank piece 22 which is secured by screws 23—23 to a bracket 24, the upper end of which is slotted, as shown in Fig. 9, to receive the traverse bar 16. A screw 25 mounted in this bracket is threaded into the lower edge of the bar and projects substantially through a recess 26 in which a coiled spring 27 is mounted and encircles the screw. The upper end of this spring abuts against a portion of the bracket 24, while its lower end is backed up by the head of the screw 25. Consequently, this spring normally holds the bracket and the forming device which it carries in their operative positions, as shown in Fig. 9. However, these parts can be pushed downwardly against the tension of the spring, the bracket sliding on the bar 16 and screw 25, and they thus can be quickly moved out of their operative positions when desired to "piece up" or thread in a new end of sliver or roving. A thumb piece 28, Fig. 9, is provided on the lower end of the bracket 24 to facilitate this movement, the spring 27 automatically returning the bracket to its initial position when released. If desired, the holes in the bracket 24 through which the screws 23—23 pass may be made in the form of slots, as indicated at 30—30, Fig. 10, so that the position of the forming device relatively to the rolls may be adjusted. This vertical adjustment with relation to the adjacent rolls determines the relative amount of forming. If desired, by raising the device, the roving can be tubularly formed with the selvage edges brought into complete abutting contact.

While I have herein shown and described typical embodiments of my invention, it will be evident 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 drawing mechanism, the combination with a plurality of pairs of upper and lower rolls arranged to feed and draw a roving, of a guide located between adjacent pairs of said rolls and provided with a tapered guideway for the passage of said roving as it travels from one of said pairs of rolls to another, said guideway having a wide receiving end and a constricted delivery end with smooth surfaces connecting said ends for supporting and forming the roving, a member in said guideway around which the roving is formed by said surfaces, means supporting said guide for movement into and out of its cooperative relationship to said rolls, a spring serving to hold said guide normally in said relationship but permitting said movement out of its normal position, and means cooperating with said spring to determine said normal position.

2. A device for forming a fibrous roving in connection with the drafting of it, comprising a guide having walls forming a tapered guideway therethrough for said roving, said guideway being relatively wide at the receiving end of the guide but constricted at the delivery end, the walls thereof for supporting and guiding the roving being smooth and continuous from one end of said guide to the other, and a raised central portion extending along the path of movement of the roving from an intermediate point in the guide forward into the delivery end portion thereof where the tapering surfaces of said guideway cooperate with said central portion to bend and form the roving around the central portion into a U-shape and ultimately into an approximately tubular form, said guideway being open at the top from one end thereof to the other for the threading of the roving through the guide.

3. In a drawing mechanism, the combination with a plurality of pairs of upper and lower rolls arranged to feed and draw a roving, of a guide located between adjacent pairs of said rolls and provided with a tapered guideway for the passage of said roving as it travels from one of said pairs of rolls to another, said guideway having a wide receiving end and a constricted delivery end with smooth surfaces connecting said ends for supporting, converging and forming the roving, said guide being open at the top from one end thereof to the other for the threading of the roving therethrough and a central portion in said guideway around which the roving is formed by said surfaces into an approximately tubular shape, the bottom surfaces of said guideway in the larger part thereof lying below the plane connecting the bites of said rolls and gradually approaching said plane as it nears the discharge end of the guide, and said central portion being shaped and positioned to deflect the central portion of the sliver upwardly away from said plane and co-acting with the adjacent walls of the guide to converge and form said roving into said approximately tubular shape.

4. In a drawing mechanism, the combination with a plurality of pairs of upper and lower rolls arranged to feed and draw a roving, of a guide located between adjacent pairs of said rolls and provided with a tapered guideway for the passage of said roving as it travels from one of said pairs of rolls to another, said guideway being open at the top from one end thereof to the other and having a wide receiving end and a constricted delivery end with smooth surfaces connecting said ends for supporting, condensing and forming the roving, a central member in said guideway around which the roving is formed by said surfaces into an approximately tubular shape, the walls of said guideway at opposite sides of said central member being spaced farther apart in regions where the edge portions of the roving run in contact with them than above said regions so that these portions of said walls cooperate with the pull of the rolls in front of the guide in curling the margins of said roving downwardly around said central member, and said guide having surfaces above the less widely spaced portions of said walls, which surfaces slope upwardly away from each other as they extend laterally away from the path of travel of said roving.

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