No. 802,492. PATENTED OCT. 24, 1905.

S. BIRCH.

DRAWING AND EVENING MACHINE.

APPLICATION FILED JULY 15, 1904.

2 SHEETS—SHEET 1.

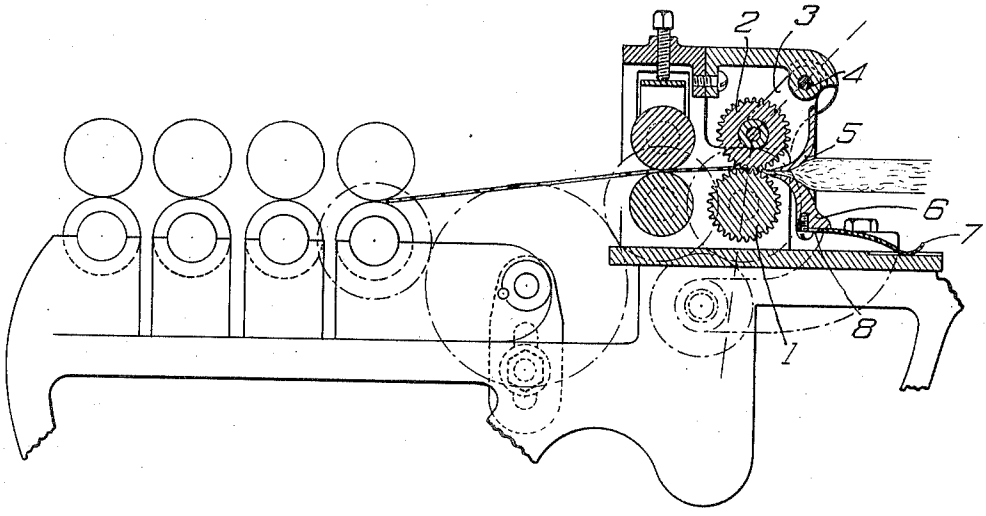

FIG. 1.

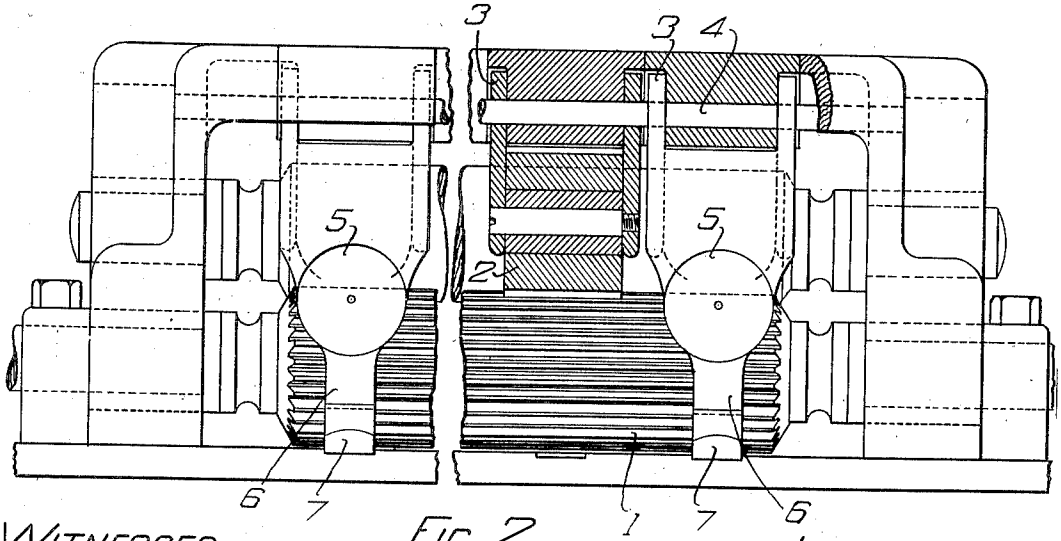

FIG. 2.

WITNESSES

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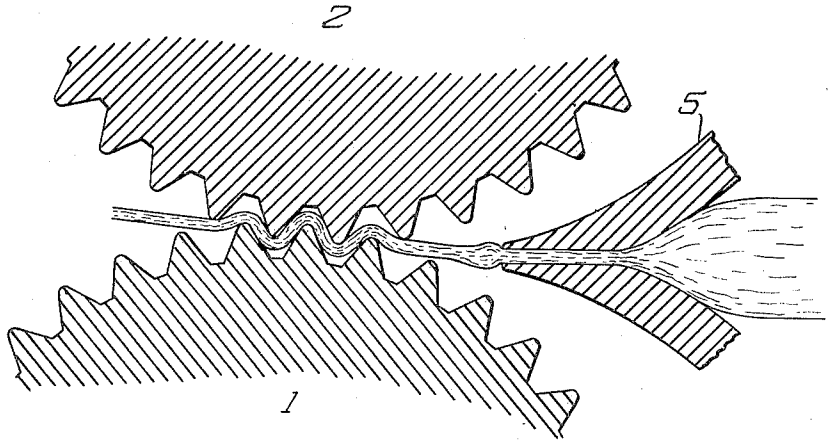

FIG. 3.

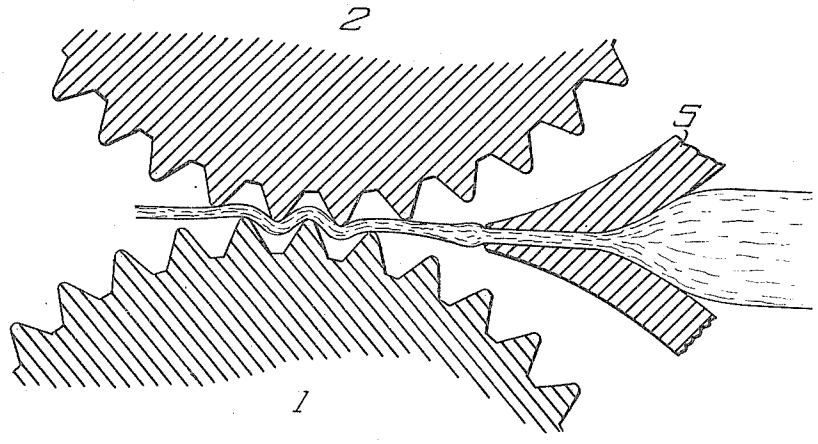

FIG. 4.

WITNESSES

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DRAWING AND EVENING MACHINE.

No. 802,492. Specification of Letters Patent. Patented Oct. 24, 1905.

Application filed July 15, 1904. Serial No. 216,685.

To all whom it may concern:

Be it known that I, SYDNEY BIRCH, a subject of the King of the United Kingdom of Great Britain and Ireland, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Drawing and Evening Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improvement in drawing and evening machines.

In drawing and evening machines the object is to produce as uniform a roving as is possible; and to this end it has been proposed to provide mechanism for driving the drawing-rolls provided with cone-pulleys operating to increase the speed of the drawing-rolls with an increase in the weight of the roving, whereby the draft is correspondingly increased. These devices, however, were complicated in their nature and tardy in operation, the increase in the draft occurring after the increase in the weight of the roving had passed by—that is to say, the regulating mechanism while it would compensate for persisting variations was incapable of taking proper care of impermanent and transitory variations.

The object of the present invention is to reorganize and improve drawing and evening machines in order to produce a construction in which the drawing of the roving is more perfectly equalized by immediate compensation for variations, both persisting, impermanent, or transitory, in the weight of the roving.

To this end the invention consists in the devices and combinations of devices hereinafter described, and particularly defined in the claims.

In the accompanying drawings, illustrating the preferred form of the invention, Figure 1 is a sectional elevation of so much of a drawing and evening machine as is necessary for an understanding of the invention. Fig. 2 is a rear elevation, partly in section, showing details of construction; and Figs. 3 and 4 are diagrammatic illustrations of the principle of the invention.

The invention contemplates, broadly, the use of a feeding device for drawing and evening rolls operating to crimp the roving and to feed it to the drawing-rolls and having means controlled by the size of the roving, by virtue of which it operates to crimp the roving the more, and thereby to feed it faster, when it is below its normal weight and to crimp it less, and thereby feed it slower, when it is above its normal weight. The preferred embodiment of the invention employs fluted rolls as the crimping devices. They constitute the best devices for the purpose of which the applicant is aware, because they are simple in construction and are readily cleared of lint and dust. It is preferred that the crimping and feeding devices should participate in the drawing operation—as, for example, in the illustrated embodiment of the invention; but such participation is not essential to the carrying out of the invention viewed in its broader aspects. Irrespective of the omission of this feature the invention secures the important function of regulating the feeding of the roving to the drawing-rolls, with the attendant result of securing increased uniformity of the product.

The use of the present invention eliminates a large part of the evening process required in the manufacture of yarn and materially reduces the expense incident to this process not only by diminishing the cost of the plant, (as a result of the fewer steps required to accomplish the same amount of draft,) but also by diminishing the expense for labor, power, and repairs.

In the illustrated embodiment of the invention the lower back drawing-roll 1 constitutes the lower roll of the feeding device. It is a fluted drawing-roll which may be of the ordinary form of fluted drawing-roll and driven in the usual manner. The upper back drawing-roll, which constitutes the upper roll of the feed device, is divided into as many parts 2 as there are trumpets for receiving the rovings, and each drawing-roll 2 is carried by a pivoted yoke 3, which is supported upon a rod 4, carried by ears on the frame of the machine. The yoke 3 carries a trumpet 5, through which the roving passes to the back drawing-rolls. The yoke carries below the trumpet an arm 6, to which is attached a spring 7, which normally tends to move the trumpet away from the drawing-rolls and to move the yoke so as to cause the flutes of the upper drawing-rolls to enter the normal distance into the interdental spaces of the lower drawing-roll, so as to engage the roving passing between the rolls and deflect it into a tortuous form. The length of the roving path is the greater the closer the rolls are together.

Referring to Fig. 3, in which the back drawing-rolls 1 and 2 are shown with their flutes projected a normal distance into the corresponding interdental spaces, the length of the roving path is greater than in Fig. 4, in which the flutes of the two back rolls penetrate less deeply into the opposing interdental spaces, as a consequence of which, assuming the rolls to be driven at the same speed in both cases, more roving will be fed forward by these rolls when they engage each other more deeply, as shown in Fig. 3, than when they engage each other less deeply, as shown in Fig. 4. The roving in passing through the trumpet 5 engages the trumpet frictionally and tends to move it toward the nip of the rolls. When the roving increases in weight, its passage through the trumpet causes a greater friction to be exerted thereon, and the pull of the rolls 1 and 2 upon the roving pulls the trumpet forward. The connections between the trumpet 5 and the upper drawing-roll 2 operate when the trumpet is moved forward to lift the upper drawing-roll 2 and to increase its distance from the lower drawing-roll. Thus the roving delivered to the rolls is at such time diminished in length, which tends to equalize the amount of fiber delivered to the other drawing-rolls. Referring again to Figs. 3 and 4, it will be assumed that in Fig. 3 the roving entering the trumpet 5 is normal in size and that the amount of roving delivered by the back drawing-rolls 1 and 2 will be a certain amount. Now if the roving increases in weight, as shown in Fig. 4, the increased friction incident to its passage through the trumpet 5 will draw the trumpet forward, and thereby lift the top drawing-roll 2 and cause the rolls 1 and 2 to tend to deliver less roving in proportion to the weight of the roving passing through the trumpet; but the drawing-rolls will deliver the same amount of roving as before, because the other drawing-rolls will stretch the roving more than in the former case. Similarly if the weight of the roving decreases below the normal the friction exerted upon the trumpet will be diminished, and the spring 7 will pull back the trumpet and, cause the upper drawing-roll through the means described to approach closer to the lower drawing-roll and to project its teeth more deeply into the interdental spaces thereof, whereby the length of the roving path will be increased and a greater amount of roving in proportion to that entering the trumpet will be delivered by the back drawing-rolls; but the weight of the roving emerging from the rolls will remain constant.

It is immaterial to the present invention viewed in its broader aspects what form of crimping devices are employed so long as they crimp the roving the more in proportion to its attenuation and the less in proportion to its increase in weight. It is also immaterial to the invention viewed in its broader aspects what devices are used to regulate the operation of the crimping devices, as the invention consists in the combination of crimping devices and automatic controlling means for them operating to cause the crimping devices to feed a uniform quantity of roving irrespective of its weight.

One of the advantages of the invention resides in the fact that by adjustment of the spring 7, as by means of the slot 8, the normal distance of the rolls 1 and 2 from each other may be varied within certain limits, so that the amount of roving fed to the drawing-rolls may be correspondingly varied without necessitating the inconvenient operation of changing the driving-gears for the drawing-rolls.

I am aware that the use of toothed drawing-rolls is old and that such drawing-rolls have been provided with collars which regulated the depth to which the teeth of the rolls entered the interdental spaces of the opposed rolls, thereby maintaining the rolls at constant distances from each other; but this arrangement causes the rolls to deliver a roving of variable weight, because the rolls are maintained at a constant distance apart irrespective of the weight of the roving entering between them.

While the present invention is shown as embodied in a drawing and evening machine for operating upon cotton, it is not limited in its application to such machines or to operation upon cotton, as it may be embodied in various forms of machines for operating upon roving, sliver, or yarn of various materials, such as flax or wool, with such modifications as the nature of the fiber and its staple would necessarily require.

Having thus described the invention, what is claimed is—

1. A drawing and evening machine, having, in combination, drawing-rolls and feeding mechanism for feeding a roving to the drawing-rolls comprising crimping devices controlled by the weight of the roving, operating automatically to crimp the roving the more with a diminution in the weight of the roving and to crimp the roving the less with an increase in the weight of the roving, whereby the quantity of material delivered by the feeding mechanism to the drawing-rolls is equalized.

2. A drawing and evening machine, having, in combination, a pair of fluted drawing-rolls and mechanism operating automatically upon an increase or diminution of the weight of the roving to separate or approximate, respectively, the rolls.

3. A drawing and evening machine, having, in combination, a pair of fluted drawing-rolls, a roving-trumpet, and connections between the trumpet and the drawing-rolls operating automatically to increase the distance between the drawing-rolls upon an increase in the

weight of the roving, and to decrease the distance between the drawing-rolls upon a decrease in the weight of the roving.

4. A drawing and evening machine, having, in combination, a pair of fluted drawing-rolls, a roving-trumpet, and a yoke carrying the upper drawing-roll and the trumpet, operating to lift the upper drawing-roll on an increase in the weight of the roving and to lower the upper drawing-roll upon a decrease in the weight of the roving.

5. A drawing and evening machine, having, in combination, drawing-rolls, and a feeding mechanism for feeding roving to the drawing-rolls comprising crimping devices controlled by the weight of the roving approaching the feeding mechanism and operating automatically to crimp the roving the more with a diminution in the weight of the roving and to crimp the roving the less with an increase in the weight of the roving whereby the quantity of material delivered by the feed mechanism to the drawing-rolls is equalized, the feeding mechanism having provision by which the amount of roving delivered by the feeding mechanism may be regulated.

6. A drawing and evening machine, having, in combination, a pair of fluted drawing-rolls, mechanism operating automatically upon an increase or diminution of the weight of the roving to separate or approximate respectively the rolls and means for varying the normal position of the drawing-rolls.

In testimony whereof I affix my signature in presence of two witnesses.

SYDNEY BIRCH.

Witnesses:
HORACE VAN EVEREN,
FRED O. FISH.