May 24, 1949. W. F. BIRD 2,471,056

APPARATUS FOR DRAFTING TEXTILE FIBERS

Original Filed Feb. 2, 1946

Fig 1

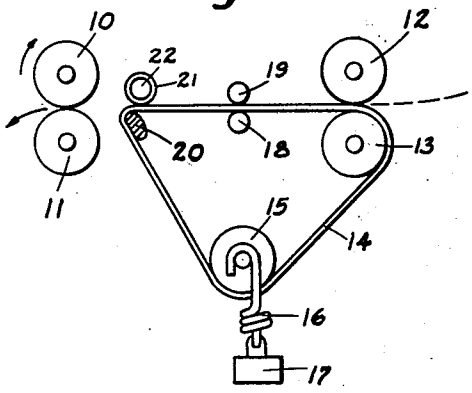


Fig 2

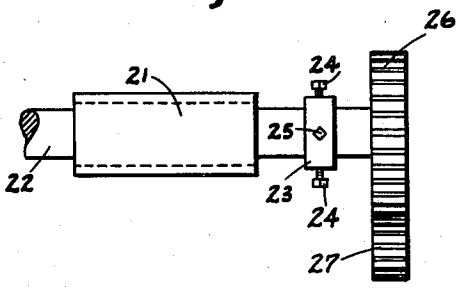


Fig 3

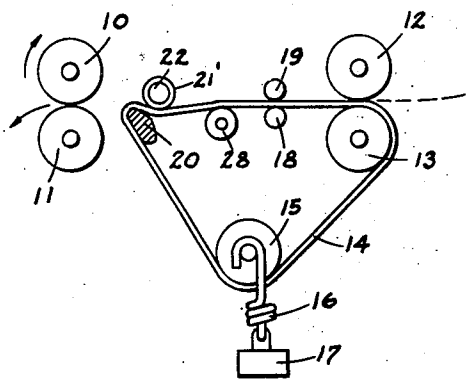


Fig 4

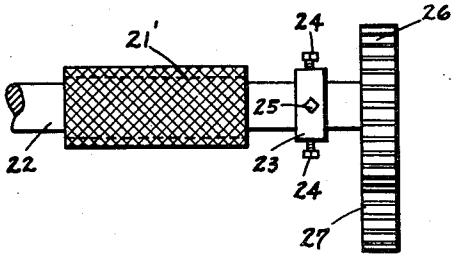


Fig 5

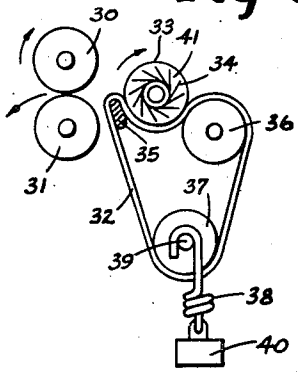
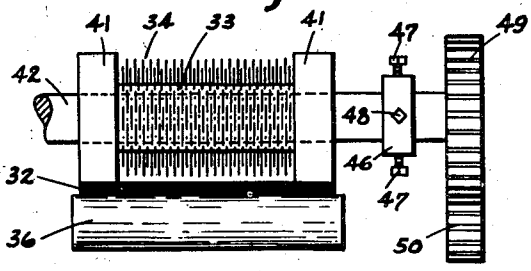


Fig 6



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APPARATUS FOR DRAFTING TEXTILE FIBERS

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4 Claims. (Cl. 19—131)

1

This invention relates to drafting devices for the processing of textile fibers in the formation of continuous strands such as worsted type rovings and yarns containing blends of fibers including long wool and cotton. More particularly, it relates to drafting devices for these fibers of substantial length variation on equipment comprising an apron and cooperating control roller. The present application is a continuation in part of my prior application, Serial No. 635,642, filed December 18, 1945. This application is a division of my prior application Serial No. 645,055, filed February 2, 1946, now abandoned. It includes additions and modifications highly useful in drafting fibers of substantial length variation and those which are difficult to control for other reasons, as will be more fully set forth.

As pointed out in my earlier application, common current procedures are to blend cotton and wool fibers by selecting short fiber wools which have a fiber length nearly that of cotton, or of cutting wool top into lengths so that the cut fibers may be spun with cotton on what is commonly described as the cotton system. This system of drafting is generally characterized by the use of a short ratch for the draft stage, as is well understood throughout the industry.

These procedures are uneconomic in that proper short wool fibers are not readily available, and the price of worsted top stock is considerably higher. In addition, the highly important benefits of the long wool staple, both in processing and in the finished yarn, are obviously lost by the prior cutting step. The area close behind the nip or contact line of the front rolls is a critical drafting area. In this area, the fibers engaged by the front rolls are being rapidly separated from the other fibers. If an untwisted sliver of long and short stock is processed, conventional slip rolls and an apron will not control the short fibers properly. The fibers will pull through in bunches and I have found that the front slip roll will often have a surface speed higher than that of the supporting apron. If the weight of the front slip roll, i. e. that slip roll nearest the usual nose bar, is increased to better control the short fibers, the weight would have to be increased to such an extent that the fibers will not turn it and the frictionally driven apron will actually stall. These considerations in addition to variations of drafting characteristics in different stocks render it exceedingly difficult and sometimes impossible to maintain a predetermined rate of speed between a slip roller and

2

apron under a wide range of desirable operating conditions.

I have overcome the difficulties of the prior practices and have provided a frictionally driven apron which is in no way impeded in its forward motion by the weight of my control roller. The roller of my improvements actually assists the uniform driving of the apron and yet controls the fibers being drafted in the critical drafting area as the stock moves through the device. It permits uniform drafting results, and, while affording considerable flexibility in initial setting, is devoid of variations in speed during operation, and hence eliminates undesirable variations in fiber control which result from the use of slip rollers which are driven by the stock being processed.

My control pressure rollers are adjustable and positively driven, and their surface may be smooth, fluted, knurled or provided with pins as in my prior application, Serial No. 635,642. The control rollers may be used in a depressed apron arrangement and/or in conjunction with conventional slip rollers, in which case my positively driven roller is the forward control roller in the drafting area. The action of my improved control roller is not influenced by stock variations in drafting characteristics or fiber length, and it functions well on both smooth and relatively rough fibers.

An object of my invention is to improve the fiber control of drafting devices using an endless belt or apron type stock support.

Another object is to provide a drafting device including an apron and a positively driven control roller, which roller is positioned close to the nip of a pair of front draft rolls.

Another object is to provide a drafting device including a frictionally driven apron and a positively driven control roller which is positioned close to the nip of a pair of front draft rolls.

Another object is to provide a control roller which is driven independently of the stock or of the stock supporting apron.

Another object is to provide a positively driven control roller within the critical drafting area of a long fiber drafting device, which control roller will aid in or not impede the frictional driving of a stock supporting and feeding apron.

Another object is to provide fiber control means including an apron and depressing roller which is adjustable for fiber control, which assists in the driving of a stock supporting apron and/or which has rotatable collars permitting any de-

sired speed ratio between the apron and stock contacting portion of the roller.

These and other objects of invention will be manifest from a consideration of the following description, claims and drawings in which:

Fig. 1 is a diagrammatic side elevational view of a draft stage showing a frictionally driven apron, a conventional slip roll, and my positively driven control roller within the critical drafting area.

Figure 2 is a sub-assembly view showing the roller and drive for the roller of Figure 1 and one of the adjustable bearings for moving the roller horizontally or vertically for selective positioning relative to the apron and stock.

Figure 3 is a diagrammatic side elevational view of a modification in which the control roller is knurled, and is positioned slightly rearwardly of the tip of the nose bar.

Figure 4 is a view of the roller of Figure 3 and of a simple driving and adjustment means as in Figure 2.

Figure 5 is a diagrammatic side elevational view showing a combined pin and pressure roller with rotatable collars adjacent thereto which permit variations in speed between the control pressure roller and the apron.

Fig. 6 is an additional view of the structure of Fig. 5 emphasizing the adjustability of the frame, the apron driving nip arrangement formed by the end portions and the roller **36** and the more fragile central fiber control portion being protected against deformation by the apron.

Referring to the drawings, Figure 1 shows pairs of rolls **10**, **11** and **12**, **13**, which are respectively the front and back rolls of a draft stage. Roll members **10**, **11** rotate at several times the speed of back rolls **12**, **13** to reduce or draft the fiber stock. As will be understood, the back rolls **12**, **13** are essentially convenient feeding means and are usually spaced from the front rolls a distance in excess of the length of the fibers being drafted. The supporting apron **14** is maintained under tension by the guide and weight roll **15**, to which spring **16**, secured to fixed part **17**, is attached. Roller **18** supports apron **14**, and slip roll **19** which is rotated by the movement of fiber stock, twisted or untwisted, through the device.

Close behind, or superposed on the nose bar **20**, is a control roller **21** fixed to or integral with shaft **22**. The shaft **22** is supported in square or rectangular journals diagrammatically shown at **23**, which are horizontally and vertically adjustable by pairs of screws **24** and **25**. Pairs of screws **24**, **25** press against the journal **23**. By advancing one screw of a set and withdrawing the other a like amount the journal can be adjusted either horizontally or vertically relative to a frame structure (not shown) in which the screws are mounted for turning. Gear **26** is adjusted with the shaft after which gear train indicated at **27** may be conveniently adjusted to driving engagement with gear **26**.

Figures 3 and 4 are similar to Figures 1 and 2 respectively, and like parts are given like reference numerals for the sake of brevity. Figure 3 shows the shaft **22** adjusted rearwardly and downwardly to depress apron **14**. A supporting roller **28** for the apron **14** and the substitution of knurled roll **21'** for smooth roll **21** are the only differences in the two constructions.

Figure 5 illustrates a modification omitting the back rolls, the fibers being fed in any convenient manner, as suggested in prior application, Serial No. 635,642, directly to the fiber control

pressure roller and/or comb. In this figure, rolls **30** and **31** have a surface speed several times the feeding rate, and control of the fibers against undesirable or premature forwardly movement is effected by apron **32** cooperating with a pressure roll **33** which may take the form of a pin or porcupine roll having pins **34**. Apron **32** is looped about nose bar **35**, driven roller **36**, and weight roll **37**, to which spring **38** is attached at **39**. Spring **38** is also secured to fixed member **40**.

The pins **34** are preferably slightly spaced from apron **32**. Anti-friction or ball bearing collars **41** are pressed into place on the shaft **42** so that the inner race of the bearing rotates with the shaft **42** and the outer race engages the apron **32**, and turns freely therewith, as will be understood. Any suitable collar, including needle and dry lubricated bearings, may be used, and they may be secured against lateral movement in any of a number of convenient ways. The control or porcupine roll **33** may be assembled by the securing together of two halves over the shaft **42** in position between a pair of collars **41**. The collars **41** are preferably of substantial width so as to form a firm nip with driven roller **36**, and thus cooperate in the frictional driving of the feeding and fiber control apron **32**.

Driven roller **36** and collars **41** determine the rate of apron drive. Where there is no special requirement for an independence in driving rates between the apron and the roll **33**, the end portions may of course be integral with roll **33** as specifically illustrated in my prior application Serial No. 635,642. It will be noted that when the end portions are integral with the roll, simplification in driving requirements are automatically attained as the apron may then be driven from a single source connected to either of the nip forming rolls **33** or **36**, with a resultant saving of driving parts. All the feature advantages relating to aiding in the driving of the apron by a slip draft roll in combination with guarding the fragile or deformable central fiber control portion against deleterious pressure effects of the apron are retained.

The drive for the pin or pressure roll **33**, Figure 6, is similar to the drives of Figures 2 and 4. It includes journals such as **46** and adjusting pairs of screws **47** and **48** for the journals and gear **49**. A driving gear train indicated at **50** will drive the mechanism in adjusted position. It will thus be seen that the speed of rotation of the pressure roller **33** may be completely independent of the rate of movement of the apron **32**, and that this modification permits a wide choice of operating conditions, depending on the relative speeds of the operating parts. It is to be understood that while I have shown but a single drafting unit for each modification, I contemplate their use in series as in multi-stage drafting devices. The means for feeding the stock to the control unit may vary in accordance with the type installation, and length and type of fibers being drafted. For example, in Fig. 5, a pair of nip rolls similar to rolls **30**, **31** may be positioned rearwardly of roll **36** and constitute a pair of front rolls for a preceding draft stage and/or a feeding unit for stock into a single draft stage or stages in line.

I have described the invention in connection with preferred embodiments thereof, but I do not wish to be limited thereto, but rather by the scope of the following claims.

I claim:

1. In a drafting device for textile fibers comprising a pair of front drafting members, stock

feeding means including an apron, guiding, supporting and tensioning means for the apron, a positively driven pressure roller in superposed relation to the apron, rotatable collars on said roller, said collars being in running contact with the apron during operation of the device, and means for positively driving the pressure roller at a predetermined rate.

2. In a drafting device for textile fibers comprising a pair of front drafting members, stock feeding means including an apron, guiding, supporting and tensioning means for the apron, a pressure roller in superposed relation to the apron, said pressure roller comprising a positively driven portion and a portion rotatable relatively to the positively driven portion, means for positively driving said first named portion at a predetermined rate, and means including the apron for frictionally driving the rotatable portion of the pressure roller.

3. In the combination set forth in claim 2, further characterized in that the frictionally driven portion of the pressure roller depresses the apron into a curved path and forms a nip with apron driving means.

4. In a drafting device for textile fibers com-

prising a pair of front drafting members, stock feeding means including an apron, guiding, supporting and tensioning means for the apron, driving means for the apron, a roll in superposed relation to the apron, said roll having end collars which are rotatable relatively to the roll and are in running contact with the apron, fiber control means positioned around the roll between the end collars, said fiber control means being guarded against apron pressure by the end collars.

WHITWORTH F. BIRD.

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