June 9, 1931. J. PFLIMLIN 1,809,251

DRAWING DEVICE FOR SPINNING FRAMES AND FOR PREPARING MACHINERY

Filed Jan. 6, 1930

Fig. 1



Fig. 2

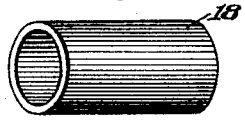


Fig. 3



Fig. 4

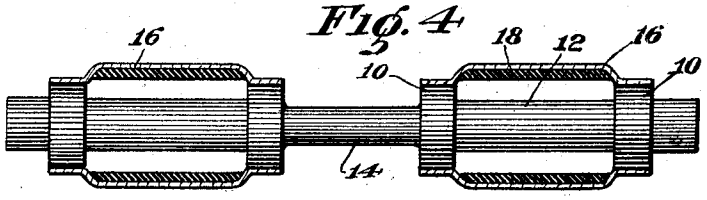
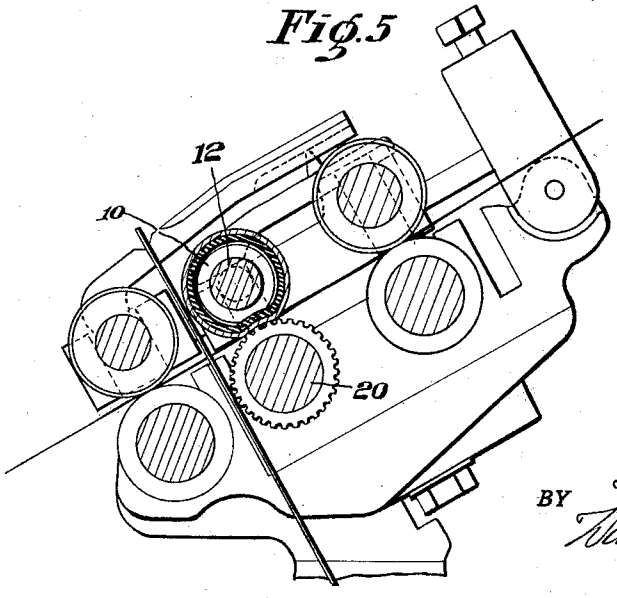


Fig. 5



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UNITED STATES PATENT OFFICE

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DRAWING DEVICE FOR SPINNING FRAMES AND FOR PREPARING MACHINERY

Application filed January 6, 1930. Serial No. 418,711.

My invention relates to sliver or roving drawing devices devised for the drawing effected by spinning frames and the like, as also by preparatory machines and for drawing frames.

I have discovered, as disclosed by my U. S. Patent #1,749,156, dated March 4, 1930, that for the greatest efficiency the top roll of the intermediate or middle pair should comprise a sleeve-like body so soft and supple that, as a result of its own weight or of a supplementary weight, it will readily deform and conform to the surface of the fluted bottom roll of said pair, the resilience or compressibility being in such high degree that the bottom roll is embraced by the top roll over a comparatively large arc of its circumferential surface.

The object of the present invention is to simplify the construction and increase the softness of drawing rolls having the characteristic feature of clasping the sliver upon a comparatively great length, but under comparatively light pressure, and with only a restricted portion of the total pressure imparted to the sliver.

To the accomplishment of this object and such others as may hereinafter appear, as will readily be understood by those skilled in the art, the invention comprises the features and combinations of parts and processes of manufacture hereinafter described and then particularly pointed out in the appended claims.

The nature and scope of the invention will best be understood from a description of the preferred embodiment thereof illustrated in the accompanying drawings, in which:

Figure 1, is a view, in perspective, of the cot or flexible skin cover for the drawing roll;

Fig. 2 is a like view of the deformable backing, preferably soft rubber;

Fig. 3 shows the parts of Figs. 1 and 2 after assembly; to form a reinforced, but still supple, sleeve;

Fig. 4 shows a metal arbor, of the collar type, having two of my novel drawing sleeves secured thereon in a manner to produce soft and flexible rolls; and

Fig. 5 illustrates a spinning frame showing the belt-like contact between my novel roll and the co-acting, fluted bottom roll.

The metal arbor for my new drawing roll is of the type having a pair of spaced collars 10—10 of greater diameter than the intermediate shaft 12. In Fig. 4 I have shown an arbor for two drawing rolls, the collars being duplicated at each end of the arbor and the twin formation being connected by a central portion 14 of the shaft. The spacing of the collars and their diameter may be varied to accommodate any desired size of drawing roll.

In the embodiment of the invention illustrated in the drawing showing my invention applied to the middle top roll I form a flexible, tubular sleeve that spans or bridges the space between two collars 10 on the arbor. The sleeve, while concentric to the axis of the arbor, has no radial support except at its ends. The smaller diameter of the shaft 12 provides a single, unbroken air chamber beneath the entire length of the effective or working portion of the completed roll. This air cushion, in effect, gives to the tubular sleeve a material elastic thickness, because the air chamber supports the sleeve so lightly that a very inconsiderable pressure will cause it to deform or cushion. The suppleness of the roll is thus considerably increased over deformable rolls that depend upon a material thickness of elastic material and this leads to other advantages that will appear in the following description.

The surface of the middle top rolls must be smooth and of long wearing quality. A skin of soft and flexible leather has long been used on top rolls but this alone, used as a bridge between the collars of the arbor would not be effective because of its natural ability to stretch. The top roll, for best results and long life, should be substantially resilient or have the quality of regaining its cylindrical form after deformation by pressure against the middle bottom roll or by the action of the passing sliver. Accordingly in making my sleeve I employ a surface sheath 16 of a smooth and flexible leather skin and a backing or interior reinforcement 18 of material that will impart to the sleeve the cushioning quality of elasticity, resiliency or suppleness to the desired degree. Owing to the great in-

crease in suppleness of the completed roll, due to the air cushion, it is possible to use a cot or sheath 16 of greater weight or thickness which gives the roll greater wearing qualities without detracting from its effectiveness in progressively deforming as it is rotated against a bottom roll and under working conditions and clasping the sliver against a considerable portion of the circumferential surface of the said bottom roll.

The material that I prefer as a flexible backing or inner reinforcement for the outer sheath, is rubber. A very soft and pliable rubber tube may be manufactured having an outside diameter enabling it to fit smoothly against the inner wall of the cot 16 and a short length 18 cut from such a tube can readily be folded and slipped in place within the cot. The two tubes, leather and rubber, may be secured together by an adhesive, the outer wall of the rubber tube desirably being first roughened as by buffing. In the illustrated form of the reinforced sleeve the length of the leather cot is somewhat greater than the distance between the outer faces of the pair of arbor collars 10, and the length of the rubber backing is such that it provides substantially a bridge across the space between said collars. I preferably make the flexible backing twice as thick as the sheathing cot. It is within the scope of my invention to vary the materials and/or the dimensions of these parts as may be found desirable in practice. The inside diameter of the tube 18 is somewhat greater than that of the collars 10, in practice about $\frac{3}{32}$ inch. The sleeve may thus easily be slipped into place on the arbor. Since the tube 18 contacts the inner surface of the cot 16 the inside diameter of the extended ends of the cot is considerably greater than the diameter of the collars 10. It is requisite, therefore, that the skin forming the two ends of the type of sleeve illustrated by Fig. 3 be contracted, as by shrinking, in order to fit on the two collars. The ends of the sleeve may be shrunk to an inside diameter equalling the collar diameter either before or after it has been slipped on the arbor. To secure the sleeve in place the collars may be coated with adhesive and a firm joint is made by shrinking with a hot iron. Excess length of the cot, if any, may then be trimmed even with the outer surfaces of the collars.

In the preferred construction of the sleeve the backing tube 18 is not longer than the shaft 12 of the arbor so that when the ends of the sheath 16 are shrunk the skin material is drawn down across and covers the ends of the tube 18 thus forming shoulders which define a central or working portion of the sleeve of greater diameter than its end portions. It will be seen from Fig. 4 that the rubber backing is held out of contact with the collars by the shrunk ends of the cot so that complete lengthwise portions of its surface may be moved in by pressure without being obstructed. Its inherent elasticity moves it out when the pressure is relieved. When the top roll is pressed against its co-acting roll, i. e. the generally fluted middle bottom roll 20 (Fig. 5) this enlarged or over-sized working portion of the sleeve will be uniformly deformed throughout its length by depression of the elastic backing into the annular air chamber therebeneath in a manner to enable the top roll to embrace several flutes of the co-acting roll with a belt-like engagement. This movement is permitted because there is greater flexibility at the ends of the circumferential wall that comprises the working portion than throughout said working portion itself. The annular end walls of the sheath that are downturned over the ends of the reinforcement provide weaker end sections where the sleeve engages the arbor causing the sleeve to simulate a bellows, its stiffer or stronger working portion moving in and out freely on these flexible joints. This action is shown by Fig. 5 wherein, it will be observed, the depth of the deformation is less than the difference in the diameters of the skin covered collars and the enlarged working portion so that the only contact between the two rolls is by the medium of the deformable sleeve. The most desirable and effective control of the sliver by light pressure over a substantial distance in the direction of its extent cannot be obtained in other sleeve forms where the diameter of the drawing roll is the same throughout the length of the sleeve because then the arbor collars must ride on the co-acting roll and only a line contact between the two rolls will be obtained.

My novel top roll may be saddle weighted according to well known principles, or it may be self weighted. For best results the depression of the reinforced and air-cushioned sleeve while in contact with the middle bottom roll is not more than $\frac{1}{16}$ of an inch. An air cushion having a depth of about $\frac{3}{32}$ of an inch, will amply care for this degree of deformation. Hence the shafts 12 may conceivably be made heavy enough to enable the metal arbor itself to effect this slight deformation in a top roll having such extreme flexibility and softness as herein described.

It will be understood from the foregoing description that the use of my drawing roll for other than middle top rolls is within the scope of my invention.

Reference is made to my co-pending application Serial No. 418,712 filed January 6, 1930, (a division of my application filed November 10, 1928, now United States Patent No. 1,749,393, March 4, 1930) in which will be found the claims which are generic to the subject-matter disclosed in this and said co-pending application.

While it is preferred to employ the spe-

cific construction and arrangement of parts shown and described it will be understood that this construction is not essential except so far as specified in the claims, and may be changed or modified without departing from the broader features of the invention.

What is claimed as new, is:—

1. A drawing roll for spinning frames and the like comprising an arbor having two spaced collars and a shaft of smaller diameter intermediate said collars, a sleeve of flexible skin extending from one collar to the other and secured to said collars at its ends, and a shorter flexible backing inside said sleeve and held thereby out of contact with said collars, said sleeve and its backing lying out of contact with said shaft and concentric to its axis.

2. In drawing devices for spinning frames and preparatory machinery a top roll comprising a working portion formed by a hollow sleeve of flexible and deformable material between annular ends of even greater flexibility, an arbor shaft within said sleeve of smaller diameter than the inside diameter of the sleeve to which said sleeve is secured by its ends forming a single annular air chamber between the sleeve and the shaft, and a co-acting roll acting to deform said sleeve by depression of the entire length of the working portion into said air chamber when the top roll is pressed against said co-acting roll.

3. A drawing roll for spinning frames and the like comprising an arbor shaft, spaced collars in said shaft, and a hollow sleeve of flexible and deformable material supported by its ends on said collars in spaced relation to said shaft, said sleeve having a working portion between said collars of greater diameter than its end portions forming a shoulder at each end of the working portion that stands above said collars.

4. A drawing roll for spinning frames and the like comprising an arbor shaft, spaced collars on said shaft, a hollow tube of rubber having an inside diameter greater than that of the collars extending axially between said collars, and a sheath of flexible skin, within which said rubber tube is retained, having a length sufficient to lap said collars and an inside diameter substantially equal to the outside diameter of said rubber tube, and having its ends secured to said collars.

5. A sleeve for drawing rolls comprising a tubular sheath of flexible skin having a substantially centralized inner reinforcement consisting of a shorter tube of flexible material.

6. In a drawing roll for spinning frames and the like, a flexible and deformable sleeve consisting of a short length of rubber tubing, a longer sheath of flexible skin of larger diameter than the rubber tubing, said rubber tubing lying within and substantially central of the length of the sheath, and the extended ends of the sheath being reduced in diameter about the ends of the rubber tubing.

7. In a drawing roll for spinning frames and the like, a flexible and deformable hollow sleeve having tubular ends of reduced diameter and a central working portion of greater diameter, said working portion having a wall that is relatively stiffer than said tubular ends.

8. The method of making drawing rolls for spinning frames and the like which comprises producing an arbor having spaced collars and an intermediate shaft, forming a sleeve by assembling a flexible tube, having a length substantially that of said shaft, centrally inside a sheath of flexible skin having a length adapted to lap said collars, said tube having an inside diameter somewhat greater than the diameter of said collars, and securing said sleeve axially on the arbor by reducing the diameter of the extended ends of the sheath to engage said collars and fastening said ends to said collars.

In testimony whereof I affix my signature.

JULES PFLIMLIN.