July 5, 1960 R. BALMES SOLANAS 2,943,364

DRAWING MECHANISMS FOR TEXTILE ROVINGS

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FIG. 1

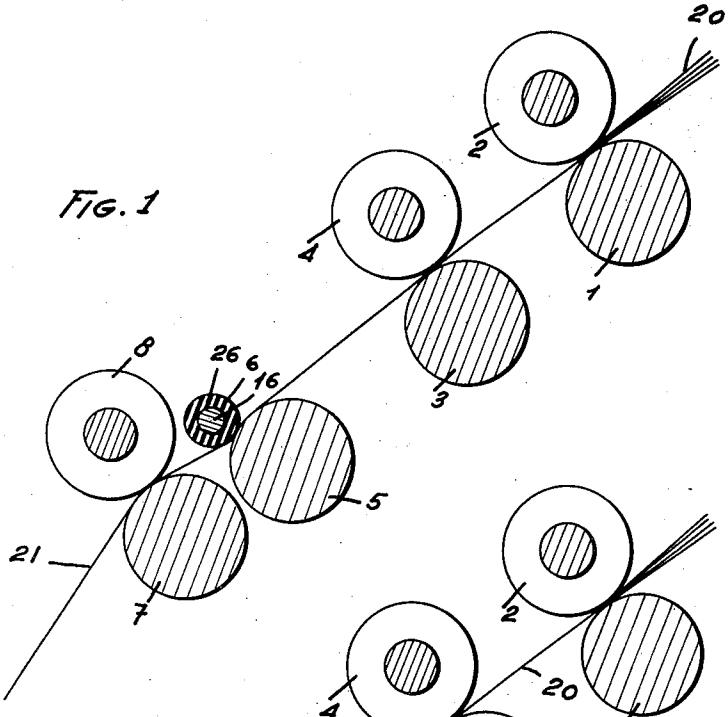

FIG. 2

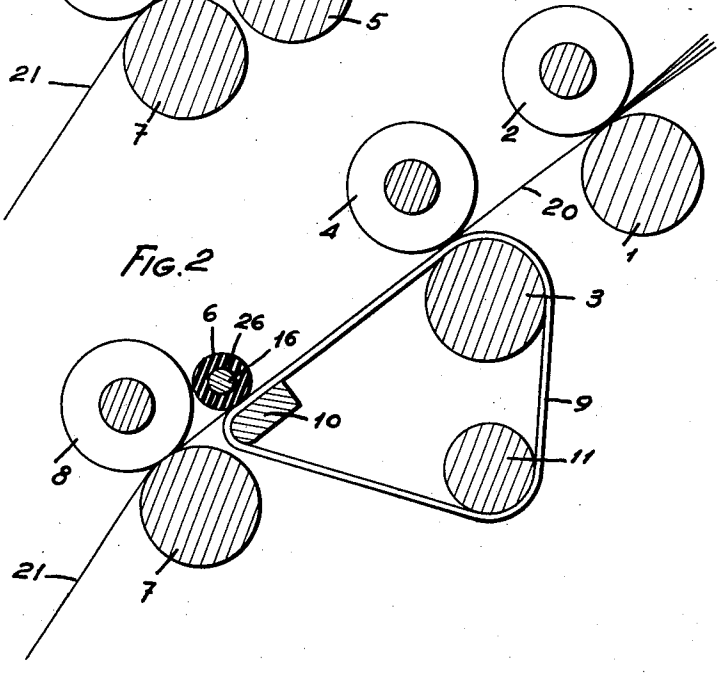

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FIG. 3

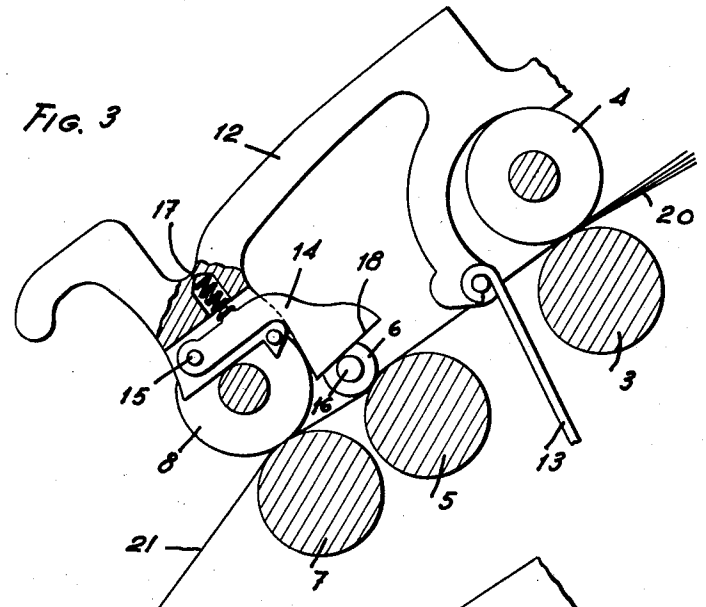
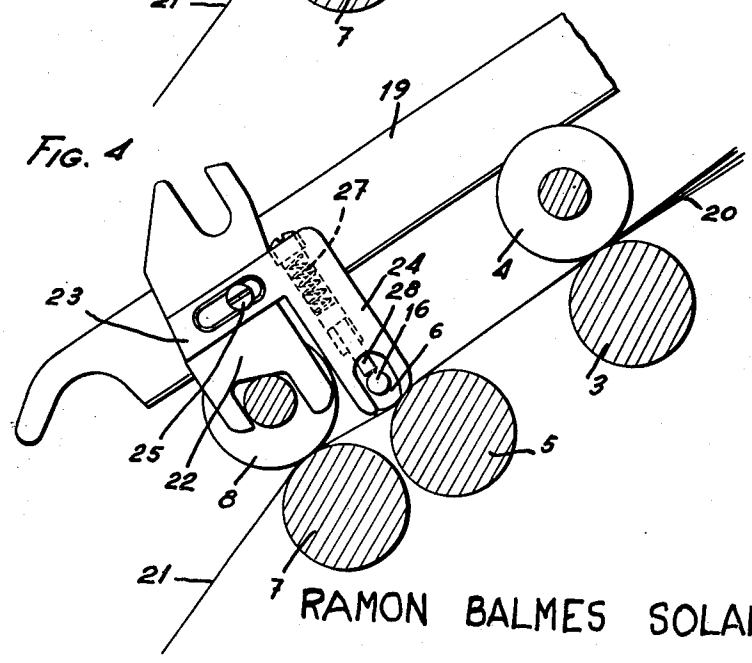


FIG. 4



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DRAWING MECHANISMS FOR TEXTILE ROVINGS

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4 Claims. (Cl. 19—135)

The present invention relates to improvements in the mechanisms for the drawing of rovings or slivers of textile fibres, in which there is employed, in a position very close to the final or delivery rollers of the yarn or roving, a pair of rollers consisting of a positively actuated bottom roller and a top roller of small diameter which bears by its own weight upon this bottom roller, in such a way that this pair of rollers permits the slipping of the fibres that are already seized by the final or delivery rollers.

The improvements of this invention are similarly applicable to apparatus in which the guidance of the fibres from the middle rollers to the producer or delivery rollers is effected by the action of a positively actuated endless belt, upon which there bears by its own weight, at a point very close to the delivery rollers, a roller of small diameter, in such a manner that it likewise permits slipping of the fibres that are seized by the delivery rollers.

In all these appliances this roller of small diameter close to the delivery rollers has always been made of metal, synthetic resin or other rigid material, and is arranged in such a manner that it bears upon the fibres solely by its own weight, for the purpose of permitting the fibres to slip.

It happens, however, that on the one hand it is convenient that this driving roller should be of small diameter, in order that it may be able to occupy a position very close to the producer or delivery rollers, as a result of which its weight is always relatively very limited, and the pressure or retaining force that it exerts upon the fibres is likewise very limited. On the other hand, since this top roller turns solely owing to the frictional impulsion of the bottom roller or belt, slipping or lag is liable to occur between the top roller and the bottom roller, and this, combined with the smallness of the pressure exerted by the top roller, and the smallness of its adhesion to the fibres, results in the fibres not being suitably retained by this roller, but that occasionally it permits the passage, at indeterminate intervals, of fibres that have not yet been engaged by the final drawing rollers, and therefore ought not to be entrained.

These disadvantages of the drawing mechanisms already known are obviated by the present invention by means of which a very efficacious retention of the fibres is obtained, ensuring that only the fibres that are already effectively engaged by the drawing or delivery rollers will slip in contact with this small roller, while the other fibres of the roving will remain conveniently retained until the moment at which, by the natural advance of the roving, they reach the point of engagement by the delivery rollers.

These improvements consist in making the small top roller, either as a whole or only in its outer portion, of a resilient material, capable of flattening slightly and of exerting a strong retention of the fibres, and loading this roller by means of a suitable pressure mechanism, so that it works with a pressure several times as great as the pressure that would be exerted if it were acting merely by its own weight.

This fibre-retaining roller preferably consists of a metal shaft of suitable diameter, around which is arranged the body of the roller, made of a rubber composition or of a sufficiently soft and resilient synthetic material, so that when this roller is applied to the bottom roller or belt and receives the pressure of the loading mechanism, the lower portion of the roller will flatten slightly and apply itself to the bottom roller over an area of appreciable extent. In this way an efficacious retention will be exerted upon the fibres without impairing them, owing to the pressure being exerted by a pliable and resilient substance.

Two examples of drawing mechanism of types already usual, provided with the improvement forming the subject of this invention, are diagrammatically illustrated in the accompanying drawings, in which:

Figure 1 illustrates diagrammatically the rollers of a drawing mechanism consisting of successive pairs of rollers, including a roller of small diameter according to this invention;

Figure 2 represents, likewise diagrammatically, the arrangement of a drawing mechanism in which there is employed, for the guidance and impulsion of the fibres, an endless belt, upon which the roller of small diameter bears;

Figure 3 shows one example of the manner of loading or giving pressure to this roller of small diameter in drawing mechanisms in which a pressure saddle is used; and

Figure 4 illustrates the manner of loading this roller of small diameter in drawing mechanisms provided with an upper arm which loads all the rollers of the mechanism.

The mechanism diagrammatically illustrated in Figure 1 comprises a rear pair of feed or delivery rollers **1**, **2**, a pair of middle rollers **3**, **4**, another pair of middle rollers **5**, **6**, and a pair of drawing rollers or final producer rollers **7**, **8**. The roving **20** passes through in succession, between these pairs of rollers, which revolve with progressively increasing speeds, and issues at **21**, diminished in thickness so as to be able to receive the torsion and to be converted into yarn.

Between the pair of rollers **1**, **2** and the following pair **3**, **4** there is a distance greater than the length of the fibres, and between them is produced a first draft, which undoes the torsion exhibited by the roving.

Between the rollers **3**, **4** and the rollers **5**, **6** the distance is likewise greater than the length of the fibres, and between these pairs of rollers there is usually arranged some fibre-conducting member, such as is described in earlier patents of ours.

The distance between the line of contact of the rollers **5**, **6** and that of the rollers **7**, **8** is on the other hand always substantially less than the length of the fibres, so that the fibres that are already engaged by the rollers **7** and **8** have to be able to slip through between the rollers **5** and **6** and these rollers in reality effect a work of retention of the fibres of the roving, so as to prevent the fibres that are not yet engaged by the rollers **7**, **8** from being dragged along by contact with the other fibres of the roving, which are already engaged by this pair of rollers.

The arrangement of the mechanism illustrated in Figure 2, which is likewise of a usual construction, is practically the same, the only difference being that the roller **3** drives an endless belt **9**, which moves in the same direction as the fibres of the roving, and impels these fibres to the small roller **6**. This endless belt preferably passes round a fixed support **10** and a bottom roller **11**, which serves as a belt tightener, for the purpose of causing the belt to bear conveniently upon the roller **3** and to be driven by this roller.

In all the usual mechanisms in which this roller **6** of small diameter is employed for impelling the fibres and

retaining them, and for delivering them to the drawing roller 7, 8 there has always hitherto been employed a solid roller 6 of metal or other hard material and of smooth surface, and this roller 6 is arranged quite loose, so that it is rotated by contact with the bottom roller 5 or with the belt 9, and only exerts upon the fibres the pressure due to its own intrinsic weight. This pressure is always very small, because this roller 6 has to be of small diameter, to enable it to be located as close as possible to the rollers 7, 8.

Contrary to this usual arrangement, according to the present invention the roller 6 is not solid, of metal or other hard material, but consists of a shaft or core 16 of metal or other suitable material, which is extended at the end of the roller to form journals for this roller, and a covering 26 of a resilient composition having a basis of india rubber or of a resilient plastic rubber substitute, and this roller is furthermore loaded by the same pressure mechanism as the other rollers, with a pressure which is always several times as great as the actual weight of a completely metallic roller.

This pressure may be as much as 1000 grams or more, or may be ten or more times the pressure that would be exerted by the intrinsic weight of the roller 6; and owing to the roller being of soft material it flattens slightly in contact with the bottom roller 5 or with the belt 9, so that instead of there being only line contact between the roller 6 and the bottom roller 5 or belt 9 there is a surface or small zone of contact between the roving 20 and the bottom roller or belt.

From this it follows that the fibres that form the roving remain compressed between the resilient material of the roller 6 and the bottom roller 5 or belt 9, and are much better retained than in the usual mechanisms, in which the roller is solid and hard, and only touches the bottom roller or belt along a line or generatrix.

In consequence of this, and as the tests carried out have shown, when the fibres are engaged by the front rollers 7, 8 which are very close to the rollers 5, 6 they only advance the fibres that are really engaged by the line of tangency between the rollers 7 and 8, while the other fibres are retained without being carried along by the engaged fibres, which are already moving with greater speed of the rollers 7, 8. In consequence of this, irregularities do not occur in the absorption of the fibres by the rollers 7, 8, and yarns of a noticeably greater regularity are obtained.

Moreover since the fibres that are being drawn by the rollers 7, 8 remain imprisoned and held by the roller 6 over a wide and resilient zone, the pressure of the roller 6 can be calculated in such a way that the force or tension to which the fibres are subjected will be less than the force necessary to break them, and this force constrains the fibres to straighten energetically at the same time as the resilient contact strip permits them to slip following the velocity of the rollers 7, 8, which contributes decidedly to bringing it about that the fibres that have to form the yarn on issuing from the rollers 7, 8 remain very straight, and therefore completely parallel to one another, a condition which likewise contributes towards imparting to the yarns an appearance of regularity considerably superior to that of yarns obtained with the usual mechanisms.

The fact that the roller 6 is covered with a soft and resilient material, and is subjected to a pressure up to ten times as great as the pressure of the intrinsic weight of the roller, imparts a security of rotation to the roller 6, so that the slightest risk of pernicious slipping of this roller 6 upon the bottom roller 5 is eliminated, thereby providing a certainty and a greater uniformity of the fibres delivered by these rollers to the front rollers 7, 8.

Finally the resilience of the contact surface of the roller 6 enables the separation between the contact area of the rollers 5 and 6 and the contact line of the rollers 7 and 8 to be reduced even more than usual, thus contributing to the greater regularity of the drawing operation.

In Figures 3 and 4, mechanical devices suitable for loading this roller 6 with the necessary pression are illustrated.

Figure 3 represents the case of a drawing mechanism in which an ordinary pressure mechanism with a pressure saddle 12 of a type already known is employed for loading the top rollers 2, 4 and 8, actuated by a tractive element 13.

To load the roller 6 in this mechanism all that is necessary is to arrange, in the front part of the pressure saddle, close to the point at which the roller 8 bears, an arm or lever 14, which can turn about a shaft or pivot 15 and which is actuated by a spring 17, this arm 14 having at its free end a plane surface 18, which bears upon the journals 16 of the roller 6.

Figure 4 illustrates the application to a drawing mechanism which comprises an upper arm 19, which carries the bearings of the top rollers 2, 4 and 8, and suitably loads these rollers. In this figure, for the sake of simplifying the drawing, only the bearing 22 of the top roller 8 has been shown, which is the only one that is of interest for the comprehension of the mechanism.

In this embodiment there is mounted on each side of the bearing 22 an angular bracket 23, 24, the arm 23 of which is fixed in an adjustable position to the bearing 22 by means of a clamping screw 25, while the arm 24 is formed with a notch which embraces the journals 16 of the roller 6 of a small diameter, and has a bore enclosing a piston-like push-piece 28, which is actuated by a spring 27, and which bears upon the journals 16, and thus loads the small roller 6.

As will be understood, other mechanical arrangements may be employed for suitably loading these rollers 6.

I claim:

1. A drawing mechanism for textile rovings comprising a pair of delivery rollers, and a small diameter, undriven roller preceding said delivery rollers and spaced therefrom a distance less than the length of the fibers of the roving said small diameter, undriven roller having a center of rigid material and a peripheral layer of soft, resilient material, a driven roving conveying means against which said small diameter roller bears for conveying the roving between said small diameter roller and said roving conveying means, and delivery roller pressure applying means bearing on one of said delivery rollers and further pressure applying means mounted on said delivery roller pressure applying means and bearing on said small diameter roller and pressing on said small diameter roller with a force several times the weight of said small diameter roller and sufficient to cause said small diameter roller to contact said roving conveying means over an area having a dimension in the direction of movement of the roving substantially greater than the area of a line contact.

2. A drawing mechanism as claimed in claim 1 in which said pressure applying means applies pressure on said small diameter roller at least ten times the weight of said small diameter roller.

3. A drawing mechanism as claimed in claim 1 in which said further pressure applying means comprise a lever having one end pivotally mounted on said delivery roller pressure applying means, said small diameter roller having journals on which the other end of said lever bears, and spring means on said delivery roller pressure applying means and bearing on said lever and urging said lever against the journals of said small diameter roller.

4. A drawing mechanism as claimed in claim 1 in which said further pressure applying means comprise an

angular bracket having one arm slidably mounted on said delivery roller pressure applying means, and having a slot in the end of the other arm, said small diameter roller having journals thereon, said slot receiving said journals therein, and spring loaded piston members in said other arm of said bracket and bearing on said journals and urging said roller against said roving conveying means.

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