Oct. 29, 1940. R. B. SOLANAS 2,219,666

SLIVER DRAWING MECHANISM

Original Filed Nov. 23, 1936

Fig. 1

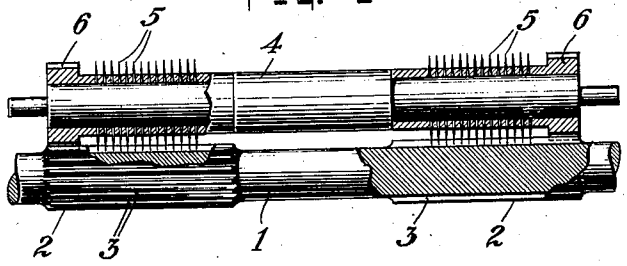


Fig. 2

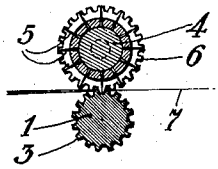


Fig. 3

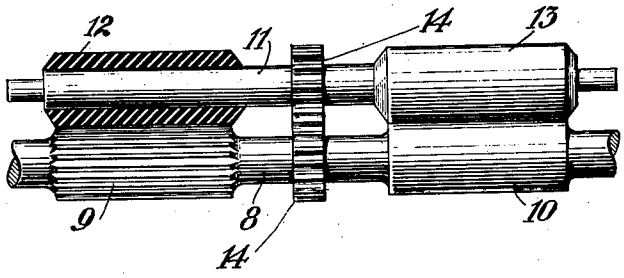


Fig. 4

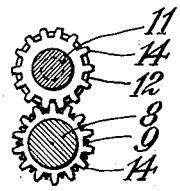
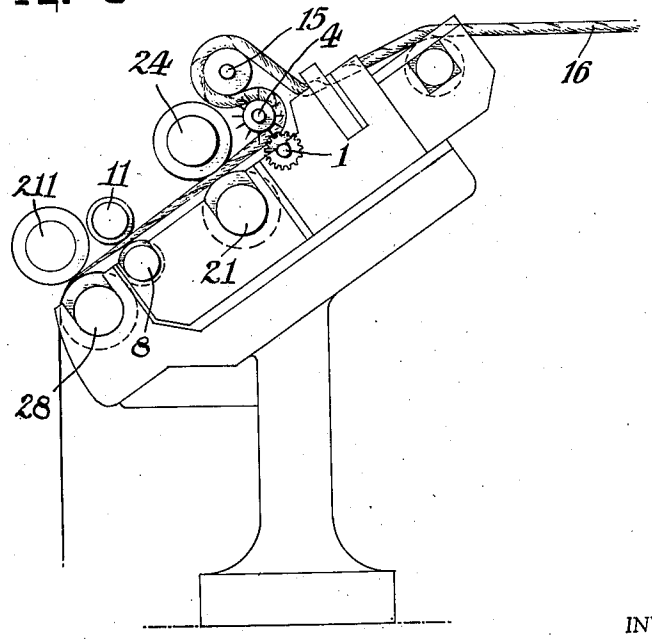


Fig. 5



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SLIVER DRAWING MECHANISM

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1 Claim. (Cl. 19—130)

The present invention relates to sliver-drawing mechanism for use in textile machinery and is more particularly directed to mechanism of this kind which is used in the spinning and preparation of cotton.

The main object of the invention is to facilitate and improve the drawing of slivers composed of fibres of greatly varying lengths and of the same or different nature while preserving or improving the ordinary characteristics of the yarns so that a better quality than that hitherto maintained may be obtained. A further object of the invention is to provide an apparatus, by means of which the treatment of the slivers in one or more preparatory machines may be dispensed with, whereby the costs of production are considerably reduced.

In the drawing frames of spinning machines now in general use employing smooth or grooved rollers which may be wholly of metal or covered with an elastic material and which may or may not act under pressure, the distance or separation between the tangential contact line of the drawing rollers and that of the pair of feed rollers immediately adjacent thereto may be equal to, or greater or less than the length of the longest fibres of the sliver undergoing treatment. Of these fibres, those having a length inferior to the said distance between the rollers will not be controlled or regulated during their passage from the feed rollers to the drawing rollers and such fibres which may be termed "floating" will proceed, often inopportunely, to form part of the yarn and thus be the cause of irregularities.

On the other hand, such fibres as are greater in length than the above mentioned distance between the rollers will encounter a certain resistance to the grip which causes them to slip between the pair of rollers which effect the drawing operation, and this resistance to slipping will increase with the length of the fibres and the extent of the pressure to which they are subjected.

This inconvenience is very evident, if the fibres treated are very irregular in length, since spinning will become nearly impossible because many of the fibres will break In the condition set up, the short fibres remain uncontrolled, while the longer fibres resist translation, the result being the formation of uneven yarns and necessitating, in order to obtain yarns of practical value, adequate spacing of the rollers together with suitable operating pressure and small drafts.

Moreover, since the control of the fibres is obtained by a greater or smaller pressure on the bundle of fibres of the sliver along the tangential line which passes through the point of peripheral contact of the rollers, the pressure acting on each of the said fibres will vary according to the position of the fibre between the edges and the centre of the sliver.

The improvements obtained by this present invention avoid the disadvantages above referred to while providing at the same time the following advantageous effects: The distance or separation of the rollers for controlling a maximum number of short fibres is reduced to a minimum; a control for the greatest possible quantity of fibres is provided in a regular, effective and smooth manner; the draft is superior to that hitherto obtained; the mechanism offers the same resistance to slip to both medium length and long fibres; breaking of the fibres is avoided; in no instance will it be necessary to vary the distances or the pressures of the rollers according to the composition of the silver; the yarn produced has the maximum uniformity, strength and elasticity; the invention enables the basic textile material to be mixed with fibres having a length different to its own; a reduction of manufacturing costs results from the invention and a partial combing of the fibres is effected during the drawing process.

According to my invention I employ as stretching or drawing elements of a sliver drawing mechanism rollers which are disposed in the following manner:

The lower roller which should have the smallest possible diameter, in order to reduce the spacing to a minimum, may be metallic or non-metallic. It may have a smooth peripheral surface but preferably is grooved along its generating line, the number, profile and depth of the grooves being selected as desired. The upper roller is covered with spurs or pins preferably arranged normal to the roller axis and disposed in lines so that the points of the said spurs or needles protrude from the surface of the roller and upon rotation of the latter successively pass through the sliver or ribbon. With the rollers arranged in the above described manner and set in close relation to the drawing or producing rollers, the fibres on being translated by the producing rollers, will be compelled to slip between the projections, whereby a certain combing is effected and the fibres will be permitted to pass between the projections irrespective of their particular length.

Due to the arrangement of the combing pro-

jections the control of the fibres will be efficient, smooth and regular, all the fibres that are greater in length than the distance or spacing being equally controlled without experiencing the prejudicial effects of pressure even if such should be communicated to the roller, if necessary.

The spur or pin covered rollers may form part of any pair of operating rollers of the drawing mechanism, with the exception of the producer rollers located at the discharge or exit side of the mechanism and which are to be of the customary, substantially cylindrical shape and construction, it being preferred to have at least the rollers which are arranged at the inlet end of the mechanism provided with the spur or pin covered surface described.

In Fig. 1 I have illustrated the longitudinal section of an embodiment of a pair of rollers arranged and constructed in accordance with my invention, part of the lower roller being shown in elevation, the effective length of such rollers varying in accordance with the number of slivers or fibre bundles to be simultaneously treated; Fig. 2 is a cross-sectional view.

According to Fig. 1 the lower roller 1 is provided with a plurality of sections 2 having a small diameter and being longitudinally grooved or channeled at 3 parallel with the roller axis upon their outer peripheral surface. The upper roller 4 of likewise small diameter is provided, opposite the sections 2, with outwardly extending spurs, pins or needles 5, disposed in planes normal to the roller axis, having an angular pitch equal to that of the grooves 3 and extending thereinto with their points, preferably so as not to contact with the groove bottoms. Both rollers 1 and 4 are caused by pinions 6 meshing with the grooves 3 and limiting the distance between the roller axes to rotate in unison, the number, length and location of the spurs or pins 6 upon the upper roller being so coordinated to the number, profile and depth of the grooves of the lower roller that the projections successively enter the grooves and exert a combing action on the sliver passing between the rotating rollers. Instead of the pinions 6 I might also use with good results any other suitable means, for example, friction rings, as stated.

The sliver or fibre bundle indicated in Fig. 2 as a straight line 7 is drawn between the rollers 1, 2, which revolve in opposite directions, by the drawing or producing rollers arranged ahead of the rollers 1, 2 and not illustrated in Fig. 2, the fibres constituting the said sliver being combed by the spurs or pins 6, as hereinbefore described.

In Figs. 3 and 4 I have illustrated the elevation and cross-sectional view, respectively, of the third pair of rollers disposed within the embodiment illustrated in Fig. 5 of the drawing, 8 designating the lower roller which may be channeled, as indicated at 9, or smooth, as indicated at 10. 11 is the upper roller having an elastic coating 12 or a smooth surface, as indicated at 13, the rotation of both rollers being caused by pinions 14 disposed between the roller sections, as shown, and being so arranged that the teeth of the one pinion never contact with the bottom of the recesses of the other pinion.

In the embodiment of a drawing mechanism according to my invention which I have illustrated more or less diagrammatically in Fig. 5 I arrange four pairs of rollers, 1, 4 and 21, 24 and 8, 11 and 28, 211. At the inlet side of the mechanism I provide a guide roller 15 around which the incoming sliver 16 passes. It then passes around part of the outer surface of the spurred or needled upper roller of the first roller pair 1, 4, constructed in accordance with Figs. 1 and 2 and exerting a combing and retaining or brake action on the sliver which is being stretched by the rotating rollers 21, 24 cooperating with the rollers 1, 4 and being arranged at the smallest possible distance therefrom. Means may be provided for adjusting the said distance according to the particular requirements of the sliver undergoing treatment, it being understood, that the rollers 21, 24 revolve at a greater speed than the rollers 1, 4.

The sliver, after being partly stretched or drawn by the rollers 1, 4 and 21, 24 passes to the third pair of rollers 8, 11 which is to be supposed as constructed in accordance with Figs. 3 and 4, but which may also be provided with a needle or spur covered upper roller and which cooperate with the producer or exit rollers 28, 211 which are constructed in the customary way, the first or initial stretching effected by the rollers 1, 4 and 21, 24 varying for example between 1 and 20, the second or final stretching effected by the rollers 8, 11 and 28, 211 varying between 5 and 20.

The number of stretching or drawing operations to which the sliver or fibre bundle is subjected while passing through the mechanism may obviously be increased by suitably increasing the number of rollers. At any suitable point, for example ahead or behind of the tangential line of the rollers of the third pair 8, 11, suitable contrivances may be provided for limiting the width of the sliver, in order to thus avoid a fluffy appearance of the resulting yarn. I further may arrange roller pressing means, roller cleaning brushes or other cleaning appliances and accessories, wherever this may appear necessary or of advantage. These accessories and auxiliary appliances, as well as the proper actuating mechanism are not illustrated in the drawing, since they may be of any known or suitable nature and do as such not constitute the subject matter of the invention.

What I claim as my invention is:

An apparatus for drawing slivers, comprising means for feeding the sliver, and means for drawing the sliver, said feeding means consisting of a guiding roller, a fluted roller, and a porcupine roller provided with rows of spikes meshing with the flutes of said fluted roller, the axes of said guiding roller, fluted roller and porcupine roller being parallel and arranged in the same plane.

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