March 10, 1970 J. M. NOGUERA 3,499,191

TOP ARMS FOR TEXTILE FIBRE ROLLER DRAFTING MECHANISMS

Filed Dec. 8, 1967 2 Sheets-Sheet 1

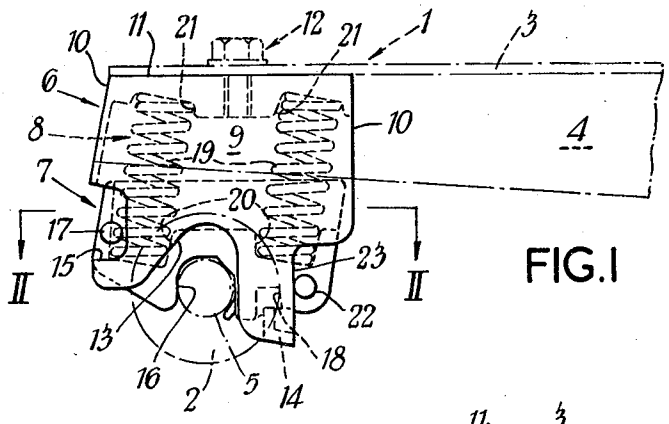

FIG.1

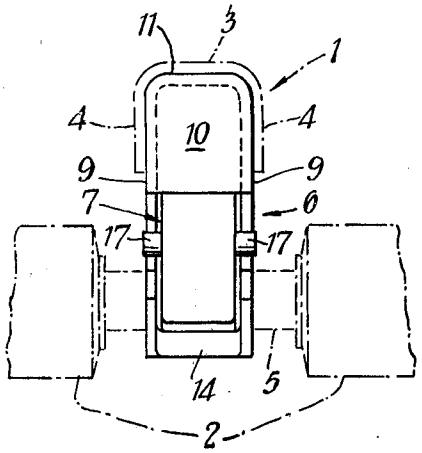

FIG.3

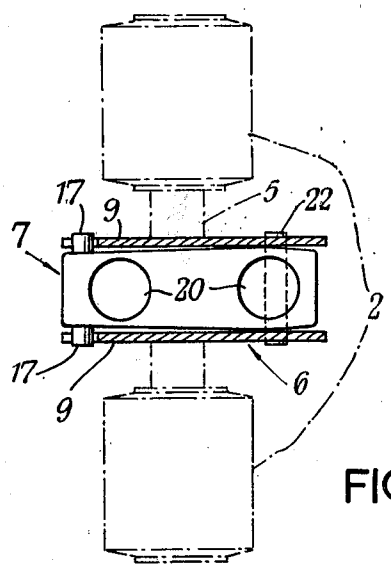

FIG.2

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TOP ARMS FOR TEXTILE FIBRE ROLLER DRAFTING MECHANISMS

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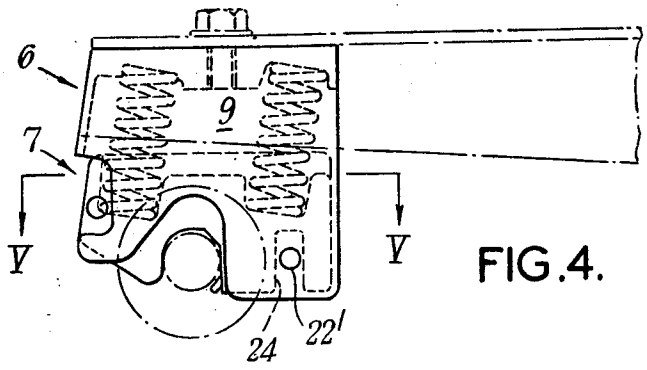
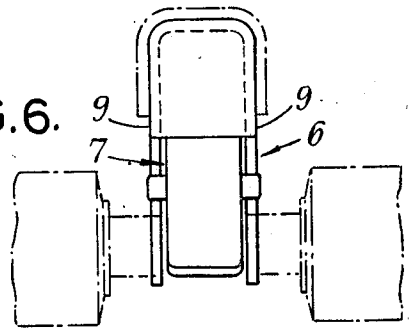


FIG.4.

FIG.6.



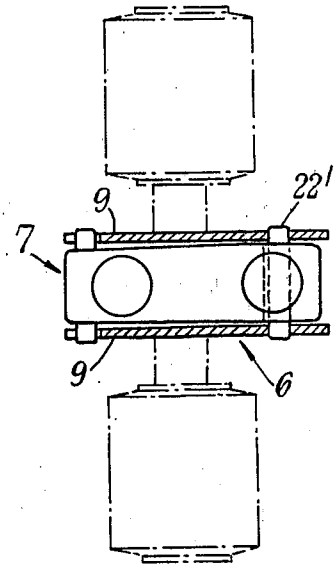


FIG.5.

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TOP ARMS FOR TEXTILE FIBRE ROLLER DRAFTING MECHANISMS

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ABSTRACT OF THE DISCLOSURE

A roller holding and weighting device for use with a top arm of a textile fibre roller drafting mechanism, the device comprising an outer holder part attachable to the top arm and an inner holder part mounted in the outer holder part for moving up and down therein, against resilient pressure, guided by guide means maintaining parallelism between the axes of a top roller supported by the inner holder part and the associated bottom roller but offering substantially no frictional resistance to small up and down movements of the top roller and inner holder part.

This invention relates to top arms for textile fibre roller drafting mechanisms, the arms being of the type arranged to extend over the drafting field from a rear mounting and having devices for holding and weighting consecutive dual-boss top rollers from their center necks.

In drafting systems employing such top arms, the top roller holding and weighting devices must fulfil a number of functions simultaneously. In the first place, each top roller must be held with its axis parallel to its associated bottom roller. Secondly, the working load on each top roller must be constant. To this end, the top roller must be permitted a small amount of up and down movement in its holder, in order to allow both for roller vibration as well as eccentricity, such movement being as free as possible. Finally, such small movements which the top roller carries out have to be confined to the plane containing the top roller axis and the associated bottom roller axis. Movement in any other direction will cause the nip between associated top and bottom rollers to move. Failure to meet any of the foregoing requirements will adversely affect the quality of the roving or yarn being produced.

The known roller holding and weighting devices at present commonly employed with top arms fall broadly into two classes. In the first class, a roller holder is connected to a pivot located on the top arm at some distance behind the working position of the holder, and a so-called "pendulum" action tends to bring a supported top roller parallel with the associated bottom roller. This arrangement however, has a number of drawbacks, one of which is that the centering force, which is automatically generated if the top roller runs out of parallel with the associated bottom roller, depends on the angle of misalignment and becomes very small if the misalignment is small. Thus, while there is a strong tendency to correct serious deviation from parallelism, the small deviations which occur in practice are very slow to correct themselves, and the rollers tend to run slightly out of parallel for long periods of time. A further drawback is that the position of the pivot is always such that the direction of the small up and down movements is not quite correct. There is so much mechanism directly behind the top roller axis, that the pivot has to be placed too high. The top roller must therefore move forward as it moves upwardly and the drafting nip moves with it. The weighting pressure may be applied by compression springs disposed between the holder and top arm and in front of the pivot axis.

In the second class, the roller holder has no pivot but does have a positive locating surface for the roller. Given

accurate manufacture, parallelism is thus maintained correctly with this class of roller holder and movement is always in the correct line. However, the rotation of the drafting rollers tends to urge the top roller forward in its holder, making it bear against the locating surface. The pressure thus caused provides frictional resistance to the small movements which, as previously stated, should be as free as possible.

A main object of the present invention is to provide a generally improved roller holding and weighting device which fulfils the requirements set forth and, at the same time, avoids the drawbacks and disadvantages inherent in the aforesaid known arrangements.

Accordingly, the invention provides a roller holding and weighting device for use with a top arm of the kind specified; said device including an outer holder part attachable to the arm in a dependent position, a separate dependent inner holder part which is adapted to straddle and releasably grip the neck of a top roller, which inner holder part can freely move up and down in said outer part, a resilient pressure means operative to apply weighting pressure to the inner holder part, and guide means consisting of a guide surface and rider provided one on each said holder part at one end of said device and maintained in co-operation by said resilient pressure means; the arrangement being such that in operation of the device with a top roller supported in the holder the guide means acts to maintain parallelism between the axes of the supported top roller and its associated bottom roller whilst offering substantially no frictional resistance to small up and down movements of the top roller and the inner holder part in the outer holder part, which latter movements are accommodated by a small rolling movement of the rider against the guide surface, the end of the inner holder part that is at the end of the device remote from said guide means being capable of unhampered movement during such operation of the device.

For a better understanding of the present invention and to show how the same may be carried into effect reference will now be made, by way of example, to the accompanying drawing, in which:

FIGURE 1 is a side view of a roller holding and weighting device,

FIGURE 2 is a sectional plan view of the roller holding and weighting device of FIGURE 1, taken on the line II—II of FIGURE 1,

FIGURE 3 is a front view of the roller holding and weighting device of FIGURES 1 and 2, and

FIGURES 4 to 6 are views, similar to FIGURES 1 to 3 respectively, of an alternative form of roller holding and weighting device.

In FIGURES 1 and 3 there is shown the free end of a top arm **1** of a textile fibre roller drafing mechanism having roller pairs arranged, for example, in three consecutive rows of upper and lower rollers, a dual boss top roller **2** of one upper row being shown in all the figures. The top arm **1**, which may be of inverted channel section with a flat transverse top wall **3** and shallow dependent side walls **4**, is pivoted and supported in a convenient manner on a rear mounting (not shown) and, when operatively positioned, extends over the drafting field to overlie the center neck **5** of a dual-boss top roller **2** in each of the three consecutive rows. Catch means (also not shown) of any appropriate construction are also provided to hold the arm down in the aforesaid operative position. To support and weight consecutive dual-boss top rollers **2**, the arm **1** is further provided with a number of roller holding and weighting devices of the invention, each composed of separate outer and inner roller holder parts **6**, **7** and in an interposed resilient pressure device **8**.

The outer holder part **6** of each such holding and weighting device is in the form of a channel-member

having side walls 9 which are partially closed across the ends by walls 10 and joined by a generally flat transverse wall 11 that is the web of the channel-member, the side walls 9 being extended in depth beyond the end walls 10 of the channel-member. This channel-member is dimensioned to fit in an inverted position between the top arm side walls 4, with the flat transverse wall 11 secured against the undersurface of the arm top wall 3 by, for example, bolt or screw means 12 (shown in FIGURE 1 but omitted from FIGURE 3). Provision may also be made for adjustment of the channel-member in the lengthwise direction of the arm 1 by providing elongated openings for the securing bolts or screws.

When the channel-member forming the outer holder part 6 is fitted to the arm 1 as aforesaid, the channel side walls 9 project downwardly below the arm side walls 4. Downwardly opening registering recesses 13 formed in the parts of the channel side walls 9 that extend below the end walls 10 enable the side walls 9 to clear the center neck 5 of the dual-boss top roller 2 which is to be supported in the holder. Behind the downwardly opening recesses 13, the rear portions of the parts of the channel side walls 9 that extend below the end walls 10 project downwardly somewhat beyond the front portions of these parts of the side walls 9 and are inter-connected by a cross-member 14. For a purpose explained hereinafter, forwardly opening registering recesses 15 are provided in the front edges of the channel side walls 9 clear of the channel end walls 10.

The inner holder part 7 is in the form of a block which is dimensioned to fit loosely between the side walls 9 of the outer holder part 6 and to this end the block has a slightly tapered form from rear to front, as viewed in plan (FIGURE 2). This block is approximately the same length as the outer holder part 6 and is formed with a transverse downwardly opening intermediate seating 16 for engaging around the center neck 5 of a dual-boss top roller 2 to be supported by the holder. The block is also provided with means, of any generally known type, for releasably retaining the roller neck 2 within the seating 16. Near its forward end, the block is provided with small lateral pegs 17, one on each side thereof, which project freely through the forwardly opening recesses 15 in the front edges of the channel side walls 9 of the outer holder part 6. These pegs 17 can abut the lower ends of the recesses 15 to limit downward displacement of the forward end of the inner holder part 7 in relation to the outer holder part 6. Downward displacement of the rear end of the inner holder part 7 is limited by abutment of the inner holder block against the cross-member 14 between said rear portions of the channel side walls 9, there being a groove 18 in the inner holder block which receives the cross-member 14.

The resilient pressure device 8 for providing weighting pressure on a dual-boss roller 2 engaged by the inner holder part 7 is in the form of a pair of coil compression springs 19 which are inserted, one behind the other, between the inner and outer holder parts 7, 6. These springs 19 are shown in FIGURE 1 but have been omitted from FIGURE 2. For this purpose, upwardly directed spring locating recesses 20 are arranged to open through the top of the inner holder block and corresponding downwardly directed spring locating recesses 21 are provided in the undersurface of the transverse wall 11 of the upper holder channel-member. The spring locating recesses 21, 20 in the outer and inner holder parts 6, 7 are relatively positioned so that the upper ends of the coil springs 19 are set rearwardly to a small extent in relation to the lower spring ends. Thus, when under compression, a total resultant force of the resilient pressure device that acts to apply weighting pressure to the inner holder part 7 is inclined with respect to the direction of up and down movement of the inner holder part 7 in the outer holder part 6. Hence the springs 19 not only apply weighting pressure, but tend also slightly to urge the inner holder part 7 in a forward direction in relation to the outer holder part 6. Separation of the two holder parts 6, 7 under the spring action is, however, limited as aforesaid.

To limit forward movement of the inner holder part 7 in relation to the outer holder part 6 under the spring influence, a pin 22 of circular-section extends through the inner holder block to project on each side of the block. This pin 22 is located near the rear lowermost corner of the block so that the pin axis will be substantially directly behind the axis of a roller neck 5 when seated in the block. The projecting pin ends constitute a rider which bears against undercut rear edge portions 23 of said rear portions of the channel side walls 9 to provide a defined guide path for movement of the inner holder part 7 in relation to the outer holder part 6.

The roller holding and weighting device as described is, in use, raised and lowered with the top arm 1 and, when not in the working position, the inner and outer parts 7, 6 of the holder are separated by the loading springs 19 as far as the limiting stops formed by the bar 14 and the pegs 17 will allow. When the arm 1 is brought down into the working position, however, the contact of the top roller bosses with the corresponding bottom rollers causes the loading springs 19 to be compressed and the inner holder part 7 to slide upwardly within the outer holder part 6. During this sliding movement, the relative location of the inner and outer holder parts 7, 6 is at all times determined by the line contact between the undercut rear edge portions 23 of said rear portions of the channel side walls 9 and the rider formed by the ends of the pin 22 projecting laterally from the inner holder block. Since this contact is permanent, despite the sliding movement, the parallelism of the rollers is thus always maintained. As a result, the inner and outer parts 7, 6 of the roller holder tend always to take up the correct working position without any appreciable friction impeding their relative movement, which is opposed only by the desired resistance of the loading springs 19.

When the springs 19 are under compression the pegs 17 at the forward end of the inner holder part 7 move freely in the forwardly directed recesses 15 in the channel side walls 9 of the outer holder part 6 without contacting the recesses' edges, once the pegs have moved away from the bottom stopped position. The tapered form (FIGURE 2) of the inner holder block ensures that the possibility of contact between the inner and outer holder parts 7, 6 is minimized.

For purposes of assembly, the inner holder part 7 together with the compression springs 19, the rear guide pin 22 being removed, are introduced between the side walls 9 of the outer holder part 6 from the front and are pushed backwards and upwards over the rear cross-member 14 of the outer holder part 6 until the springs 19 are correctly located. The lateral pegs 17 at the front end of the inner holder part 7 are then positioned against the stops provided by the lower ends of the forwardly directed recesses 15 in the outer holder part side walls 9. The rear guide pin 22 is then driven through the inner holder part 7 thereby preventing the assembly from becoming dismantled.

In the alternative form showing FIGS. 4 to 6, said rear portions of the channel side walls 9 are not undercut but instead carry a pin 22' corresponding to the pin 22. In place of a bore to receive the pin 22 the inner holder part 7 has a downwardly open slot 24 in which the pin carried by said rear portions of the channel side walls 9 is located. The shank of this pin 22' constitutes a rider which bears against the rear face of the slot just mentioned, which rear face provides a defined guide path for movement of the inner holder part 7 in relation to the outer holder part 6. As in the form shown in FIGS. 1 to 3, in this alternative form during sliding movement of the inner holder part 7 in the outer holder part 6, the relative location of the inner and outer holder parts 7, 6 is at all times determined by the line contact between the

rear face of the slot **24** and the rider formed by the shank of the pin **22'** carried by said rear portions of the channel side walls **9**.

In operation, any small up and down movements of a top roller supported by either of the forms of holding and weighting devices as described will take place virtually freely, because a small rise and fall of the roller merely results in a small rolling movement of the rider on its associated guide path. No friction of any significance is involved, and the line of contact between the rider and its associated guide path is always directly behind the axis of the top roller. At the small angles involved, therefore, the small movement will also always be made along the correct plane, i.e. that containing the two roller axes. Furthermore very low frictional resistance is offered to relatively large movements of a top roller supported in either of the forms of holding and weighting device.

The inner and outer holder parts may be made of any material having sufficient strength, mouldings of plastic material being especially suitable.

What is claimed is:

1. A roller holding and weighting device for use with a top arm of the kind specified; said device including an outer holder part attachable to the arm in a dependent position, a separate dependent inner holder part for straddling and releasably gripping the neck of a top roller, the inner holder part being mounted for freely moving up and down in said outer part, a resilient pressure means for applying weighting pressure to the inner holder part, and guide means consisting of a guide surface and rider provided one on each said holder part at one end of said device, said resilient pressure means acting on said holder parts and being inclined with respect to said guide surface to maintain said rider in line contact engagement with said guide surface, said guide surface being operatively positioned such that with a top roller supported in the inner holder part, the guide means acts to maintain parallelism between the axes of the supported top roller and its associated bottom roller, said rider being rollable on said guide surface while offering substantially no frictional resistance to accommodate small up and down movements of the top roller and the inner holder part in the outer holder part by permitting pivotal movement therebetween about said rider, the end of the inner holder part that is at the end of the device remote from said guide means being capable of unhampered pivotal movements during such operation of the device.

2. A roller holding and weighting device according to claim **1**, wherein said outer holder part is a channel-member having side walls and is attachable to said arm in an inverted position, and wherein said inner holder part is a block dimensioned to fit loosely between the side walls of the outer holder part, said inner holder part having a downwardly opening seating for engaging the center neck of a dual-boss top roller to be supported by the holder and the side walls of the outer holder part being recessed to accommodate this center neck; said resilient

pressure means being contained within the outer holder part by the inner holder part so as to act to urge the inner holder part downwardly out of the outer holder part, and stop means for retaining the inner holder part in the outer holder part, said stop means being operative when no load is applied from below to a top roller supported by the device.

3. A roller holding and weighting device according to claim **2**, wherein the inner holder part has a tapering form that is narrowest at said end of the inner holder part that is at the end of the device remote from said guide means.

4. A roller holding and weighting device according to claim **2**, wherein said stop means includes, adjacent said end of said device remote from said guide means, peg means carried by one of the parts for co-operation with the other of the parts so as to be clear of the other of the parts during said up and down movements of the inner holder part in the outer holder part and so as to engage the other of the parts when no load is applied from below to a top roller supported by the device.

5. A roller holding and weighting device according to claim **2**, wherein said stop means further includes, adjacent said guide means, a recess in one of said inner and outer holder parts in which is located a member carried by the other of said inner and outer holder parts, this member being clear of the holder part in which the last-mentioned recess is formed during said up and down movements of the inner holder part in the outer holder part, and engaging the holder part in which said last-mentioned recess is formed when no load is applied from below to a top roller supported by the device.

6. A roller holding and weighting device according to claim **2**, wherein said guide surface is formed by the edges of undercut edge portions of said side walls of the outer holder part, and wherein said rider is formed by the projecting ends of a pin carried py the inner holder part.

7. A roller holding and weighting device according to claim **2**, wherein said guide surface is formed by a face of a slot formed in the inner holder part, and wherein said rider is formed by the shank of a pin carried by the side walls of the outer holder part.

8. A roller holding and weighting device according to claim **2**, wherein said resilient pressure means is a pair of compression springs the ends of which are located in recesses formed in opposing faces of the inner and outer holder parts, one spring being adjacent said one end of the device and the other spring being adjacent the other end of the device.

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