

July 31, 1934.

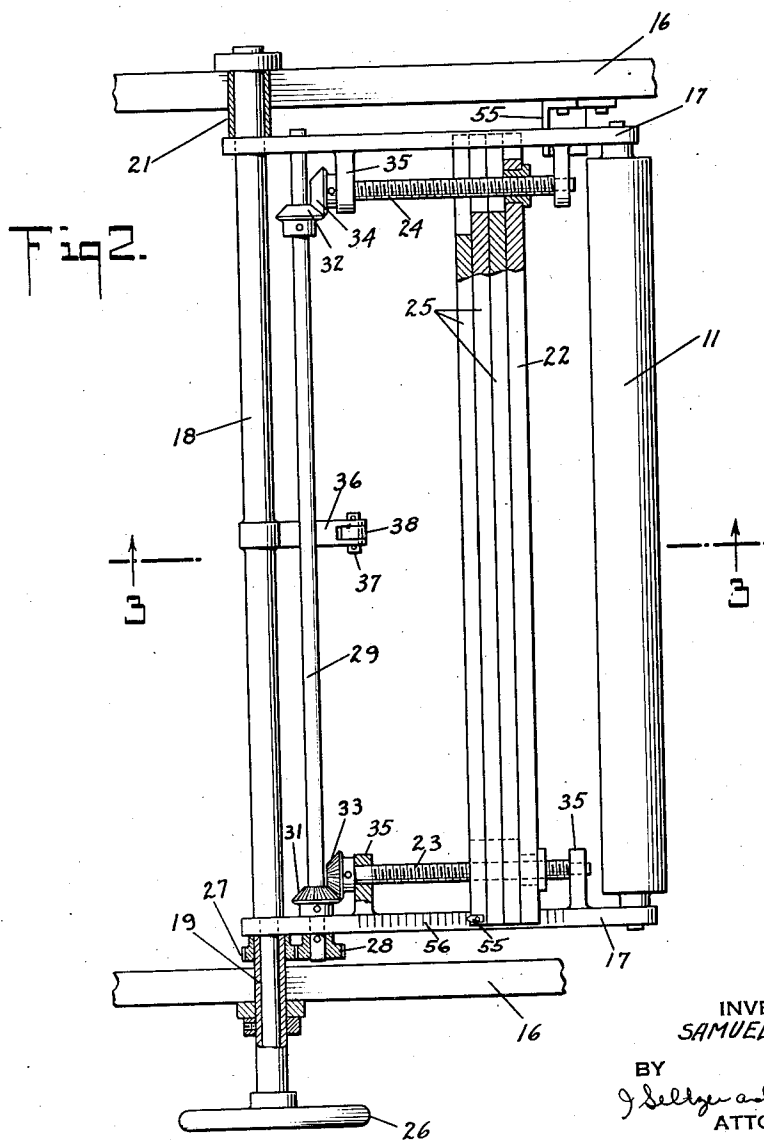
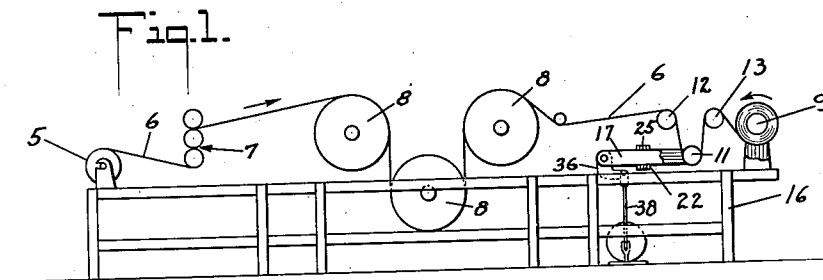
S. B. ROBERTS

1,968,097

TENSIONING DEVICE

Filed Sept. 27, 1932

2 Sheets-Sheet 1



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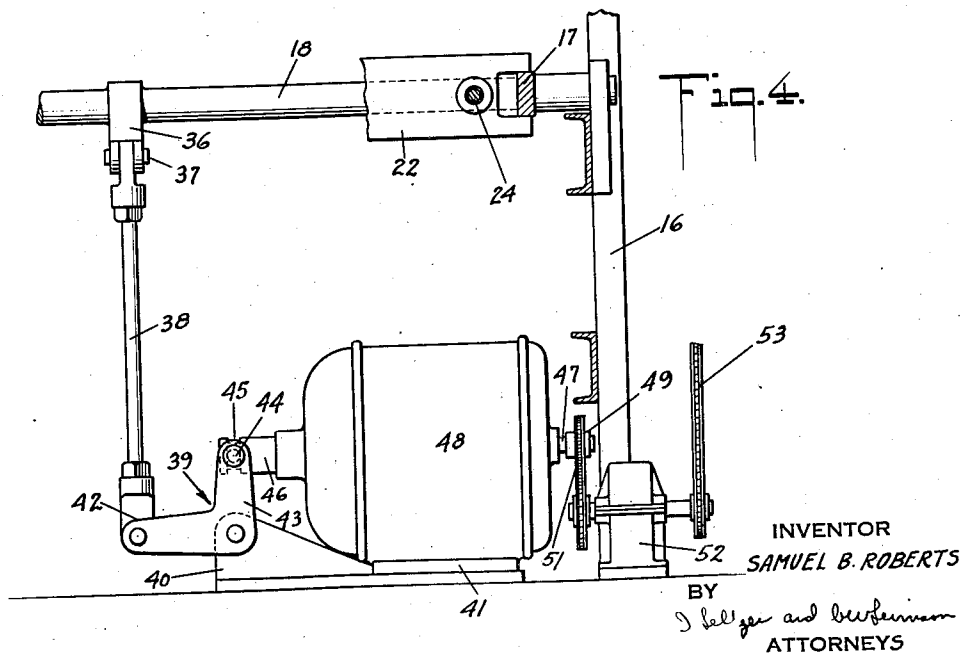
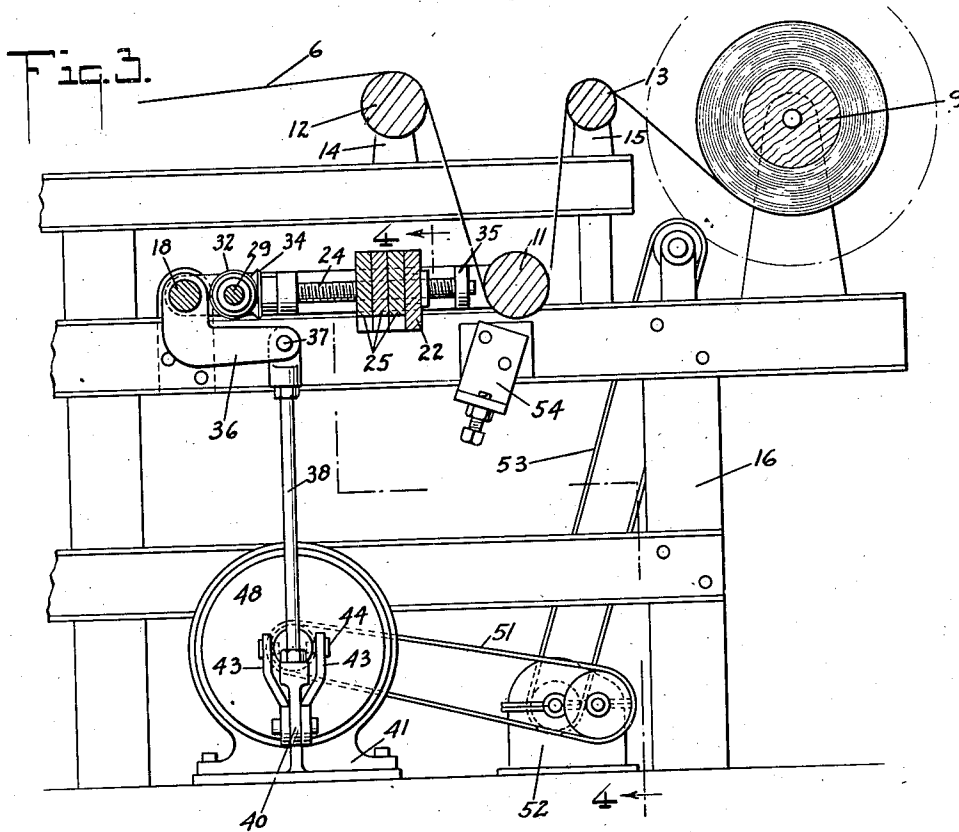
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UNITED STATES PATENT OFFICE

1,968,097

TENSIONING DEVICE

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4 Claims. (Cl. 242—75)

This invention relates to devices for treating textile material and more particularly to means for maintaining substantially uniform tension on the textile material being treated.

pendently driving the take-up beam in such a manner that the warp is always maintained under substantially uniform tension. This means comprises a motor which is provided with a device for controlling the torque by moving the armature to and fro in an axial direction under the pole faces of the stator. The motor control device is connected by a simple linkage to the dancing bar which is provided with removable and adjustable weights to take care of all speeds when the take-up beam is either full or starting.

Other objects and advantages, together with certain details of construction and combinations of parts, will be described in the specification and pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a diagrammatic side elevation of a sizing machine with the present invention shown applied thereto;

Figure 2 is a partial plan view of the machine, partly in section, showing the dancing bar construction;

Figure 3 is a cross-sectional view of the machine taken on line 3—3 in Figure 2 in the direction of arrows, and

Figure 4 is a cross-sectional view taken on line 4—4 in Figure 3 in the direction of the arrows and shows the linkage between the motor and the dancing bar.

Like reference numerals indicate like parts throughout the several views of the drawings.

Referring to Figure 1 of the drawings, the reference numeral 5 indicates a warp beam from which the warp yarns 6, which are to be sized, are drawn. The warp 6 is passed through quetch rolls 7, where the size is applied, to the drying drums 8. The drying drums are driven at a slightly greater peripheral speed than the quetch rolls. The speeds may be regulated to produce any required stretch on the warp yarns. This stretch may be up to 16%. The drums 8 are preferably heated internally by steam and dry the size which has been applied to the warp yarns. The warp is then passed to take-up or winding beam 9 where the warp yarns are wound or reeled, as finished sized warp.

It has been found that in order to prevent any additional stretch on the yarns, to prevent the yarns from becoming slack with the consequent tendency of the individual ends thereof to roll on each other and also to avoid broken ends, it is necessary that the warp be maintained under substantially uniform tension as it passes from the drying drum 8 to the take-up beam 9. To this end I have provided an automatic tensioning

5 While this invention is of general application and is particularly applicable in all cases where one end or a plurality of ends of yarns are being passed from one package to another, the greatest advantages of this invention accrue when it is applied in apparatus for applying liquids such as dye solutions, sizes, conditioning liquids and the like to yarn. This invention will therefore be described in connection with means for applying a size to a warp of yarns.

15 In machines for applying size to a warp of yarns, as heretofore commonly constructed, the quetch rolls, drying drums and the take-up beam are driven by one motor and the take-up of the warp is controlled by a suitable slipping device.

20 In one well-known sizing machine, the take-up is controlled by increasing or decreasing the tension in the driving belt by means of a mechanism including an adjustable idler roller adapted to bear onto the belt. Such an arrangement results in a jerky drive due to the slipping and gripping of the belt against the pulley which rotates the take-up beam. The friction between the belt and the pulley reaches a maximum just before the slippage takes place and the tension quickly drops at the instant the slippage begins. Since this sequence is repeated many times per revolution of the take-up beam, it will be readily apparent that substantially uniform tension on the yarn is impossible of obtainment. Sizing machines of this type, because of the uneven tension, produce a warp having an uneven stretch throughout the length thereof or on the individual strands of yarn and having numerous broken ends.

40 It is an important object of this invention to provide an improved yarn tensioning arrangement which will be free from the above-mentioned and other disadvantages and which will be especially simple in construction and efficient in operation.

Another object of this invention is to provide means for automatically maintaining substantially uniform tension on yarns that are being passed from one package to another.

50 A further object of this invention is the provision of means for adjusting the amount of tension on the warp and of means for indicating the amount of tension being applied thereon.

In one aspect the invention comprises the provision in a sizing machine of means for inde-

device. This device comprises a roller 11 of any suitable material such as wood, which is suspended in a loop of the warp 6 formed between guide rollers 12 and 13 suitably journaled in standards 14 and 15, respectively, on the frame 16 of the sizing machine.

The roller 11 is journaled in suitable bearings formed in the ends of levers 17, the opposite ends of which are fixed to a shaft 18, which is journaled in sleeves 19 and 21 carried by the frame 16. Mounted on the levers 17 is the weight 22 which is movable, on and by screws 23 and 24, with respect to the roller 11, as will be hereinafter described, in order to adjust the amount of tension on the warp. Where it is necessary to increase the tension on the warp, additional weights 25 are attached by means of bolts to weight 22. These weights are in the form of rectangular rods having U-shaped ends which are adapted to straddle the levers 17.

The weights are moved toward or away from the roller 11 by means of a handwheel 26 fixed to sleeve 19. A gear 27 carried by sleeve 19 meshes with a gear 28 keyed to shaft 29. Also keyed to shaft 29 are the bevelled gears 31 and 32 which mesh with bevelled gears 33 and 34 keyed to the screws 23 and 24 which are journaled in brackets 35 on the levers 17. Thus when the handwheel 26 is rotated in a clock-wise direction, the weights will be moved toward the roller 11 thereby increasing the tension on the warp. To decrease the amount of tension, the handwheel is turned in a counter-clockwise direction. The ends of the weights 25 are cut deeper than those of weight 22 in order to clear the brackets 35 and thus increase the range of adjustment.

Rigidly mounted on the shaft 18 is a lever 36, the free end of which is bifurcated and carries, pivoted on a pin 37, a link 38. The other end of the link is pivoted in a shifting yoke, generally indicated by reference numeral 39, fulcrumed on lugs 40 on the motor base 41. The shifting yoke comprises two bell-crank levers having arms 42 and 43, the extremities of the latter carry pins 44 which are fitted in a groove 45 in the extension sleeve 46 on armature shaft 47 of an adjustable-speed motor 48 in which the torque is controlled by moving the armature to and fro in an axial direction under the pole faces of the stator.

The armature shaft 47 carries a sprocket wheel 49 which through chain 51, reduction gears housed in box 52 and chain 53 rotates take-up beam 9, as is well understood in the art.

Stop 54 is mounted on the inside of frame 16 and is adapted to limit the fall of roller 11.

One of the weights 25 or 22 may be provided with a pointer 55 and the lever 17 may be so graduated as at 56, that the operative may tell at a glance just what weight is being applied to the warp. However, it will be understood that any other form of weight measuring device such as a spring scale, may be attached to the lever 17.

The operation of my automatic tensioning device is as follows: The warp 6 is passed from warp beam 5 through the quetch rolls 7, around the drying drums 8, under the roller 11 and then

to the take-up beam 9 at a constant rate of feed. The tensioning device is adjusted to place the desired amount of tension on the warp. This adjustment is made by moving the weights 22 and 25 away from or toward the roller 11 by means of the handwheel 26 which rotates the screws 23 and 24 and/or by adding or removing weights 25. The tension initially placed upon the warp will be automatically maintained by my device, for the position of the roller 11 on the warp governs the speed of the motor and thereby the speed of the rotation of the take-up beam which controls the amount of tension on the warp. As the take-up beam fills up the tension on the web will increase. This tends to flatten the slack in the warp between rollers 12 and 13 which raises the roller 11. The raising of the roller 11 rotates the shaft 18 which through lever 36 raises the link 38 thus causing the shifting yoke 39 to push the extension sleeve 46 inwardly which slackens the speed of the motor thus multiplying any increase in tension on the warp. It will thus be seen that substantially uniform tension will be automatically maintained regardless of any periodic variations and of the size of the warp beam.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. Apparatus for imposing a tension on textile material comprising a shaft, levers carried thereby, a roller mounted on said levers, said roller in operative position being adapted to rest on said material, screws mounted on said levers, a weight on said screws and means for rotating said screws for moving said weight.

2. Apparatus for imposing a tension on textile material comprising a shaft, levers carried thereby, a roller mounted on said levers, said roller in operative position being adapted to rest on said material, screws mounted on said levers, a weight on said screws and manually operated means for rotating said screws for moving said weight.

3. Apparatus for imposing a tension on textile material comprising a shaft, levers carried thereby, a roller mounted on said levers, said roller in operative position being adapted to rest on said material, screws mounted on said levers, a weight on said screws and means including a handwheel for rotating said screws for moving said weight.

4. Apparatus for imposing a tension on textile material comprising a shaft, levers carried thereby, a roller mounted on said levers, said roller in operative position being adapted to rest on said material, screws mounted on said levers, a weight adapted to be moved by said screws, means for rotating said screws to move said weight and means for indicating the amount of tension being imposed on said material.

SAMUEL B. ROBERTS.