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R. L. CARROLL
STRAND TENSIONING MEANS

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2 Sheets-Sheet 1

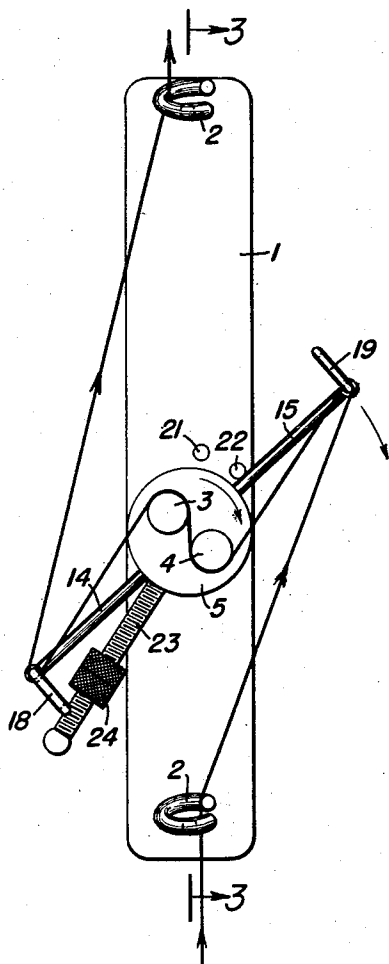


FIG. 1.

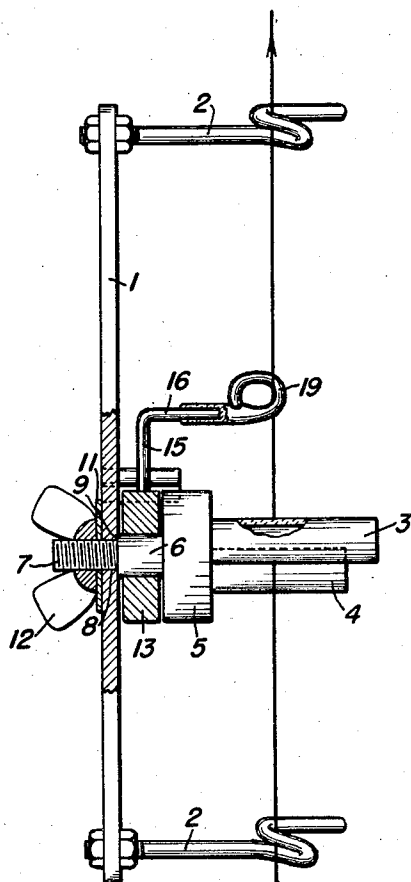


FIG. 3.

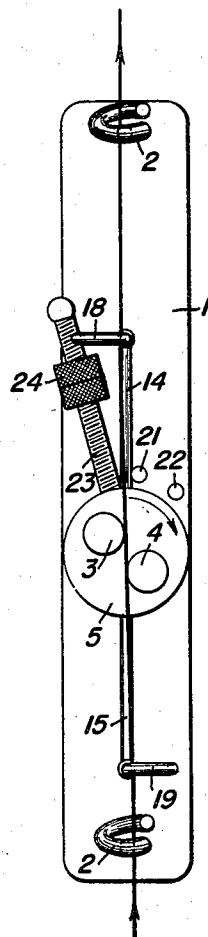


FIG. 2.

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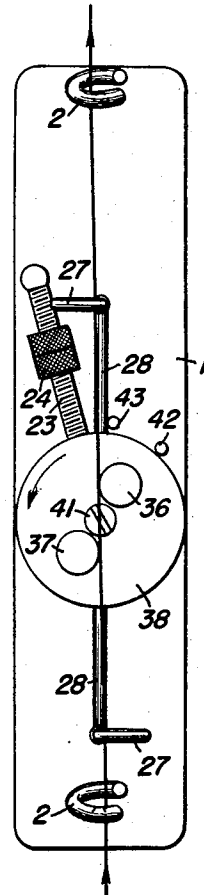
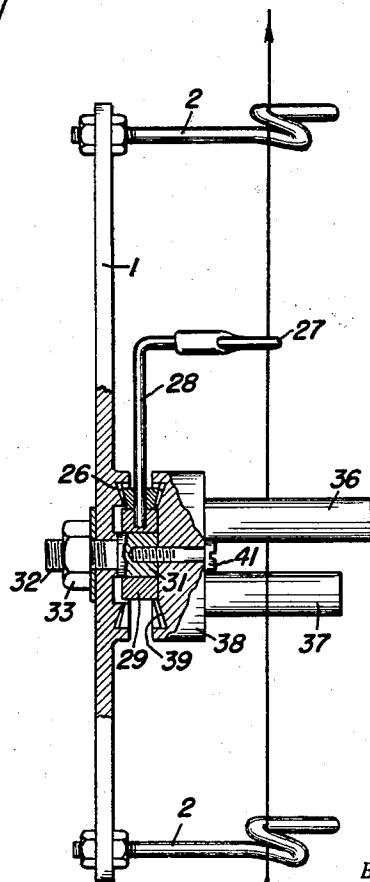
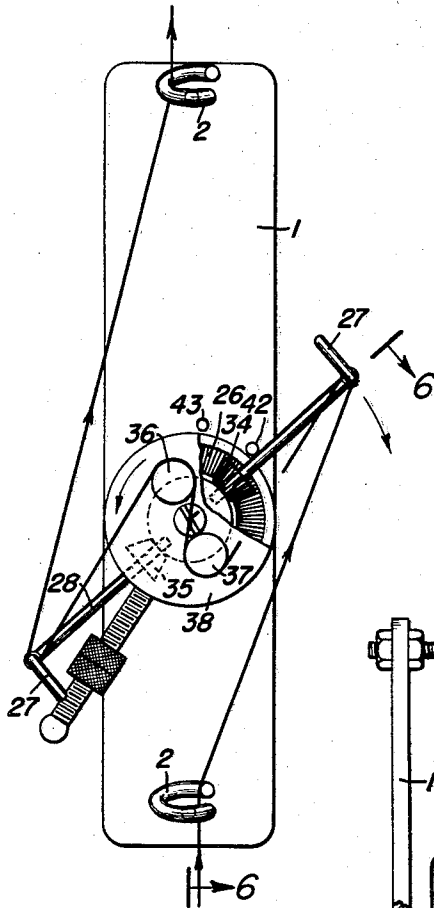
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FIG. 6.

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STRAND TENSIONING MEANS

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Application August 27, 1954, Serial No. 452,601

11 Claims. (Cl. 242—154)

This invention relates to strand tensioning means for use in textile machines, and has for its object to afford a simple, efficient and practical device that automatically maintains a substantially constant uniform tension on the yarn or strand as it is drawn through the machine.

More particularly, the invention has for its purpose to provide mechanism including a pair of spaced parallel cylindrical friction posts around which the yarn travels and which are adjustable, or automatically movable, as a unit in relation to the yarn to increase or decrease the extent of friction surfaces over which the yarn travels and thus vary the normal tension exerted on the strand.

Another purpose of the invention is to provide a pair of yarn guide members on arms extending oppositely from a carrier that is rotatable about an axis parallel to the axis of adjustment, or movement, of said friction posts and controlled as to its normal position by an adjustable weighted element which automatically changes the position of the arms in relation to the friction posts in accordance with changes in tension on the yarn, thus causing the yarn to travel over a greater extent of friction surface as the tension decreases and over a lesser extent of friction surface as the tension increases, so that the tension on the yarn is held substantially constant at the point for which the friction posts and arm-controlling weight are respectively adjusted.

An additional object is to afford a simple and economical structure employing few parts and which lends itself to a quick and easy adjustment for maintaining any desired tension, which is positive and uniform in its control under all conditions, and which employs a weight for automatically varying the position of the guide members.

Still an additional purpose is to provide a mechanism in which the yarn guide members and friction posts are automatically moved in opposite directions responsive to changes in tension exerted on the yarn.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Fig. 1 is a view in front elevation illustrating a preferred embodiment of the invention, with the cylindrical friction posts adjusted for a preselected normal tension and the movable arms and guide members in the positions of minimum tension;

Fig. 2 is a similar view, with the arms and guide members occupying the positions to which they move automatically when the tension on the yarn is at a maximum;

Fig. 3 is a side elevation, partially in section, on line 3—3 of Fig. 1, looking in the direction indicated;

Fig. 4 is a view similar to Fig. 1, illustrating a modified form of the invention;

Fig. 5 is a view similar to Fig. 2 of the modification shown in Fig. 4, and

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Fig. 6 is a sectional view on line 6—6 of Fig. 4, looking in the direction indicated.

Referring more particularly to the drawings, in which like reference numerals throughout the several views refer to the same parts, 1 designates a support provided at its upper and lower ends with guide eyes 2, through which the strand or yarn travels in the direction indicated, it being understood that the support 1 is mounted in the textile or other machine in any suitable fashion and suitably positioned therein.

Referring to Figs. 1 to 3 inclusive, 3 and 4 designate spaced parallel cylindrical friction posts of ceramic material mounted on and extending perpendicularly away from a holder 5, which has a neck portion 6 terminating in a threaded end 7 extending through an opening 8 in the support, while 9 is a shoulder between the neck portion 6 and the threaded end 7, the shoulder 9 bearing against the adjacent front surface of the support 1, while 11 is a washer surrounding the threaded end 7 and held against the back surface of the support 1 by the adjusting nut 12. By loosening nut 12 and turning the holder 5 on the support, the cylindrical friction posts 3 and 4 can be adjusted from a normal tension position, as shown in Fig. 1, to a position where they are in horizontal or vertical alinement, or to any other position, depending on the amount of normal tension desired.

13 designates a carrier in the form of a disk journaled on the neck portion 6 of the holder 5 and rotatable thereon, while 14 and 15 designate arms extending radially in opposite directions from the periphery of the carrier 13 and terminating in angularly bent extremities 16 on which are secured by solder or otherwise the oppositely disposed ceramic guide members or hooks 18 and 19, arranged as shown and acting to guide a strand of yarn or other material around the cylindrical friction posts 3 and 4. 21 and 22 designate pins or stops mounted on the support 1 in the path of the arms 14 and 15 respectively and acting to limit movement of the carrier 13 and arms in opposite directions.

Movement of the carrier 13 is controlled by a threaded bar 23 extending radially from carrier 13 and located slightly beneath the arm 14, while 24 designates a weight having threaded adjustment on the bar 23 and acting to control movement of the carrier and guide members.

The weight 24 acts to turn the carrier 13 in an anti-clockwise direction and to move arm 14 downwardly, and as weight 24 is adjusted toward carrier 13, it exerts less downward pull on the carrier 13 and arm 14.

Fig. 1 shows the weight 24 and cylindrical friction posts 3 and 4 in positions for normal tension, and if maximum normal tension on the strand is desired, the weight 24 is adjusted outwardly to the limit of its movement and holder 5 is adjusted until friction post 3 is directly over friction post 4.

With the parts in the positions shown in Fig. 1, as tension on the yarn increases, the carrier moves clockwise toward the position in which the strand travels in approximately a vertical direction between the friction posts, as in Fig. 2, the yarn traveling upwardly from eye 2 around guide hook 19, thence around friction post 4 clockwise and friction post 3 anti-clockwise, thence around guide hook 18 and to eye 2. Thus a substantially constant predetermined tension is maintained on the yarn by automatically increasing or decreasing the extent of friction surfaces over which the yarn passes, as the friction on the yarn decreases or increases respectively.

In Figs. 4 to 6 inclusive, there is shown a modified form of the invention in which the friction post holder is movable in accordance with changes in tension and automatically controlled in such movement by the carrier on which the arms and guide members are moved, the friction post holder being moved in a direction opposite

to the movement of the carrier and arms, thereby increasing or decreasing the tension quickly and maintaining a constant and delicate tension.

In this form of construction, there is provided a crown gear 26 cast as a part of or fixedly mounted upon the support 1, see Figs. 4 and 6, while guide members 27 are mounted on arms 28 fixedly supported on the carrier or collar 29 which is rotatable on a bearing 31 of a stud that is provided with a reduced threaded portion 32 which receives a nut 33 to hold the stud and bearing 31 fixedly on support 1. 34 and 35 designate bevel pinions rotatably mounted on the arms 28 and adapted to turn freely thereon as the carrier turns on the bearing 31. The bevel pinions 34 and 35 being engaged with the crown gear 26 are rotated and cause a corresponding movement of the friction post holder in a direction opposite to the direction of movement of the guide member carrier.

The friction posts in this form of the invention are indicated at 36 and 37, being mounted upon a suitable holder 38 which has cast therein or fixedly attached thereto a crown gear 39 arranged to engage the aforementioned pinions 34 and 35, the friction post holder 38 being rotatable on a bearing stud 41 which is fixedly secured to the stud or bearing 31.

With this modified construction, assuming the parts to be in the position for minimum tension as illustrated in Fig. 4, as tension increases, the guide members and arm carrier turn in a clockwise direction, and the bevel pinions 34 and 35 rotating on the arms 28, against crown gear 26, turn crown gear 39 and friction post holder 38 in an anti-clockwise direction, thus moving the friction posts 36 and 37 from approximately the position illustrated in Fig. 4 to approximately the position illustrated in Fig. 5, decreasing the tension on the yarn both by the position of the guide members and by the position of the friction posts. Movement of the arms 28 in opposite directions is limited in this form of the device by the stops 42 and 43, and as friction on the yarn decreases, the arms 28 and carrier move in an anti-clockwise direction toward the position illustrated in Fig. 4 and the friction posts and their holder move in a clockwise direction, also toward the position illustrated in Fig. 4, until the position of normal tension is reached.

While the invention has been described with reference to the structures shown, it is not confined to the details herein disclosed and this application is intended to cover such further modifications or departures as may come within the purposes of the improvements or the scope of the following claims.

I claim:

1. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, spaced cylindrical friction guide posts arranged in parallelism and extending perpendicularly to the support, a carrier rotatively mounted on the support and movable about an axis parallel to said guide posts through an angle of approximately 165° , arms mounted on the carrier extending radially in opposite directions therefrom perpendicularly to said guide posts, stops located in proximity to each other on said support, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions, and guide members at the outer ends of said arms.

2. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder rotatively adjustable on the support, fastening means engaging the holder and support and acting to retain the holder in adjusted position on the support, spaced cylindrical friction guide posts mounted on the holder in parallelism to each other extending parallel to the axis of adjustment of the holder, a carrier rotatively mounted on the holder and movable about the axis of adjustment of the holder through an angle of approximately 165° , arms mounted on the carrier

extending radially in opposite directions therefrom perpendicularly to said posts, stops located in proximity to each other on said support, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions, and guide members arranged at the outer ends of said arms.

3. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, spaced cylindrical friction guide posts arranged in parallelism and extending perpendicularly to the support, a carrier rotatively mounted on the support and movable about an axis parallel to said guide posts through an angle of approximately 165° , arms mounted on the carrier extending radially in opposite directions therefrom perpendicularly to said guide posts, stops located in proximity to each other on said support, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions, guide members arranged at the outer ends of the arms, and a weight mounted on said carrier and located therebeneath when the carrier is in normal position, said weight being adjustable radially toward and from the carrier.

4. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder rotatively adjustable on the support, fastening means engaging the holder and support and acting to retain the holder in adjusted position on the support, spaced cylindrical friction guide posts mounted on the holder in parallelism to each other extending parallel to the axis of adjustment of the holder, a carrier rotatively mounted on the holder and movable about the axis of adjustment of the holder through an angle of approximately 165° , arms mounted on the carrier extending radially in opposite directions therefrom perpendicularly to said posts, stops located in proximity to each other on said support, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions, guide members arranged at the outer ends of said arms, and a weight mounted on the carrier and located therebeneath when the carrier is in normal position, said weight being adjustable radially toward and from the carrier.

5. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, spaced cylindrical friction guide posts arranged in parallelism and extending perpendicularly to the support, a carrier rotatively mounted on the support and movable about an axis parallel to said guide posts through an angle of approximately 165° , arms mounted on the carrier extending radially in opposite directions therefrom perpendicularly to said guide posts, guide members arranged at the outer ends of said arms, a bar on the carrier extending radially therefrom, a weight adjustable endwise of said bar, and stops located in proximity to each other on said support, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions.

6. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder rotatively adjustable on the support, spaced cylindrical friction guide posts mounted on the holder in parallelism and extending parallel to the axis of adjustment of the holder, fastening means engaging the holder and support and acting to retain the holder in adjusted position on the support, a carrier rotatively mounted on the holder and movable about the axis of adjustment of the holder through an angle of approximately 165° , arms mounted on the carrier extending in opposite directions radially therefrom perpendicularly to said guide posts, stops located in proximity to each other on said support, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions, guide members arranged at the outer ends of the arms, a bar on the car-

rier extending radially therefrom, and a weight adjustable endwise of said bar.

7. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder rotatable on the support, spaced cylindrical friction guide posts mounted on the holder in parallelism to each other and to the axis of movement of the holder, a carrier rotatively mounted on the support coaxially with said holder and movable through an angle of approximately 165°, operative connections between said carrier and holder acting to move them in opposite directions, arms mounted on the carrier extending radially in opposite directions therefrom perpendicularly to said posts, stops located on the support in proximity to each other, each of said stops engaging one of said arms and limiting movement of said carrier in opposite directions, and guide members at the outer ends of the arms.

8. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder rotatable on the support, spaced cylindrical friction guide posts mounted on the holder in parallelism to each other and to the axis of movement of the holder, a carrier rotatively mounted on the support coaxially with said holder, and movable through an angle of approximately 165°, a crown gear on the support, arms mounted on the carrier extending radially in opposite directions therefrom perpendicularly to said posts, stops mounted on the support in proximity to each other, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions, guide members at the outer ends of the arms, bevel pinions rotatively mounted on said arms and engaging said crown gear, and a crown gear on said holder engaging said bevel pinions.

9. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder rotatable on the support, spaced cylindrical friction guide posts mounted on the holder in parallelism to each other and to the axis of movement of the holder, a carrier rotatively mounted on the support coaxially with said holder and movable through an angle of approximately 165°, a crown gear on the support, arms mounted on the carrier extending radially in opposite directions therefrom perpendicularly to said posts, stops mounted on the support in proximity to each other, each of said stops engaging one of said arms and thereby limiting movement of said carrier in opposite directions, guide members at the outer ends of the arms, bevel pinions rotatively mounted on said arms and engaging said crown gear, a crown gear on said holder engaging said bevel pinions, a bar on the carrier extending radially downward away from the carrier beneath one of said arms when said carrier is in normal

position, and a weight threaded on and adjustable endwise of said bar.

10. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder comprising a base including a neck portion terminating in a reduced threaded end extending through an opening in the support, a shoulder at the inner end of said neck portion engaging said support, a nut on said threaded end engaging the opposite side of the support and securing the holder adjustably thereon, spaced cylindrical guide posts mounted on the holder in parallelism to each other and to the axis of adjustment of the holder, a carrier rotatively mounted on said neck portion of the holder through an angle of slightly less than 180°, arms mounted on the carrier and extending in opposite directions therefrom perpendicularly to said posts, stops located in proximity to each other on said support in the path of said arms and limiting movement of said arms and the carrier in opposite directions, and guide members at the outer ends of said arms.

11. Strand tensioning means comprising a vertically extending plate support, guide members at the top and bottom of the support, a holder comprising a base including a neck portion terminating in a reduced threaded end extending through an opening in the support, a shoulder at the inner end of said neck portion engaging said support, a nut on said threaded end engaging the opposite side of the support and securing the holder adjustably thereon, spaced cylindrical friction guide posts mounted on the holder in parallelism to each other and to the axis of adjustment of the holder, a carrier rotatively mounted on said neck portion of the holder through an angle of slightly less than 180°, arms mounted on the carrier and extending in opposite directions therefrom perpendicularly to said posts, guide members at the outer ends of said arms, a bar on said carrier extending radially downward away from the carrier beneath one of said arms when said carrier is in normal position, stops located in proximity to each other on said support in the path of said arms and limiting movement of said arms and the carrier in opposite directions, and a weight threaded on and adjustable endwise of said bar.

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