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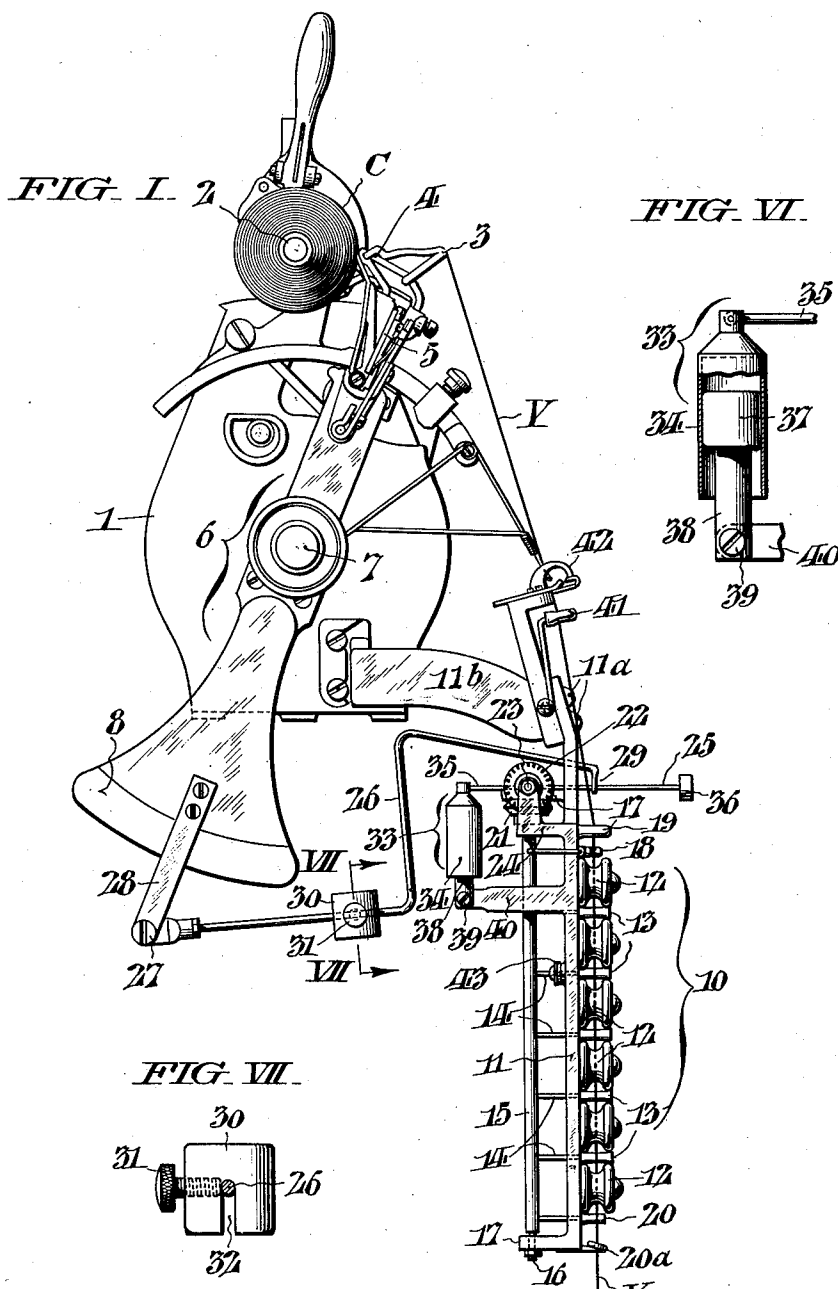
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A. M. PIGEON

YARN TENSIONING DEVICE

Filed Dec. 19, 1923

2 Sheets-Sheet 1



WITNESSES:
John C. Bergner
Alfred C. Schinger

Inventor:
Albert M. Pigeon.
Dec'd.
by Anna M. Pigeon.
Administratrix.
 BY *Frany Paul*
 ATTORNEYS.

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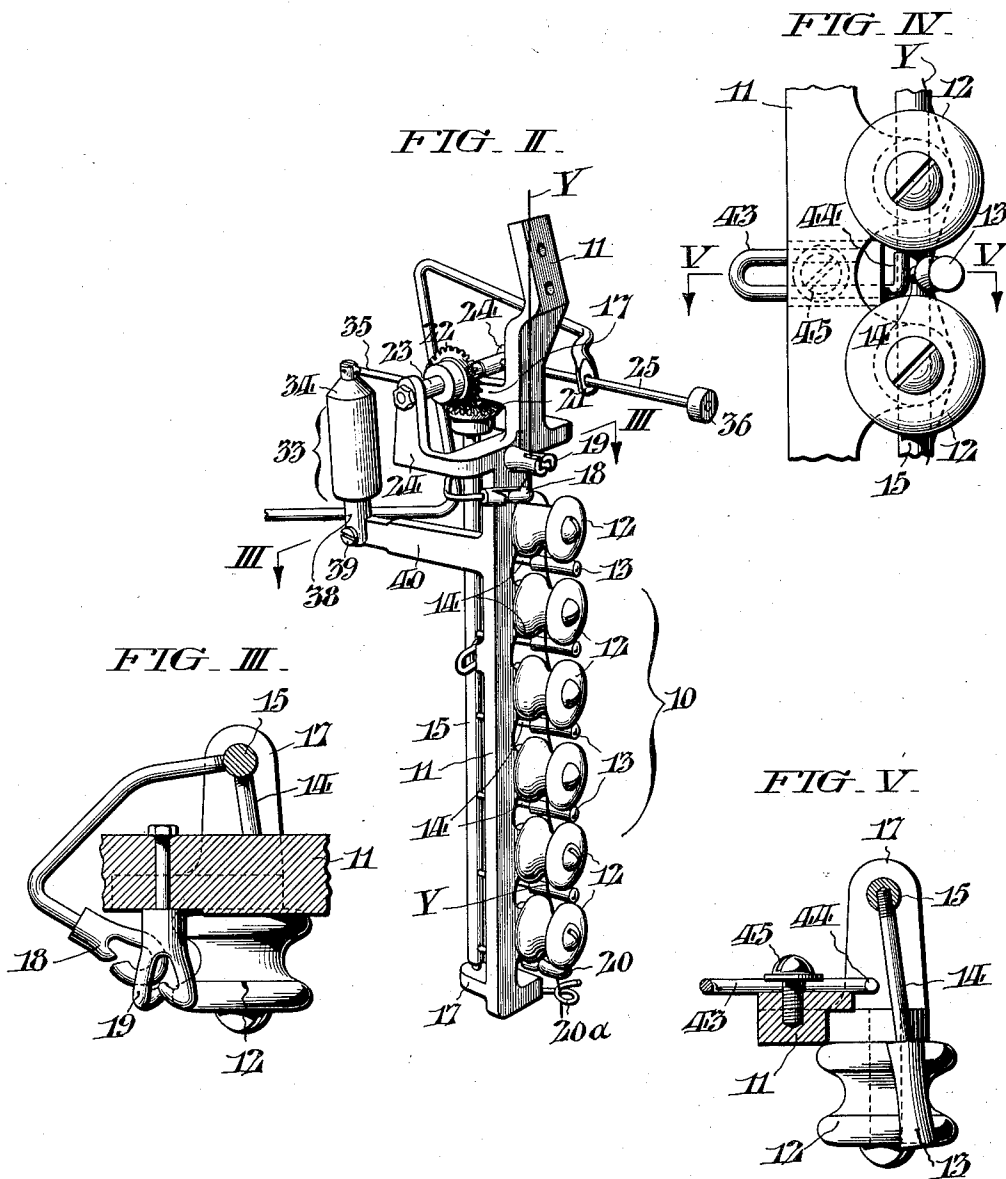
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2 Sheets-Sheet 2



Inventor:
Albert M. Pigeon, Deceased.
by Anna M. Pigeon.
Administratrix.

WITNESSES:
John C. Berger
Alfred C. Ischinger

BY *Fraser & Paul*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

ALBERT M. PIGEON, DECEASED, LATE OF NORRISTOWN, PENNSYLVANIA; BY ANNA M. PIGEON, ADMINISTRATRIX, OF NORRISTOWN, PENNSYLVANIA.

YARN-TENSIONING DEVICE.

Application filed December 19, 1923. Serial No. 681,572.

To all whom it may concern:

Be it known that I, ANNA M. PIGEON, a citizen of the United States, residing at Norristown, in the county of Montgomery and State of Pennsylvania, administratrix of the estate of ALBERT M. PIGEON, deceased, do hereby declare that he invented certain new and useful Improvements in Yarn-Tensioning Devices, whereof the following is a specification, reference being had to the accompanying drawings.

This invention relates generally to yarn tension devices, and more particularly to a type especially useful in connection with cone winding machinery.

In such machinery, the yarn is wound into cones upon spindles usually driven at a constant rate of speed. It consequently follows therefore, that the rate of linear speed of the yarn must increase in the course of the building of a cone owing to the gradually enlarging diameter of the same. As a result, in the absence of any compensative provisions, the tension or drag on the yarn is proportionately magnified, thus causing uneven winding, and in most cases, distortion of the cones.

This invention is directed primarily to overcoming the difficulties noted, and to the provision of means capable of maintaining uniform drag or tension on the yarn notwithstanding changes in its linear speed during cone building.

Other subsidiary objects, together with their attendant advantages, will become readily apparent from the description which follows of a typical embodiment of the invention; while the scope thereof, in so far as it comes within present knowledge, is clearly defined in the appended claims.

In the drawings Fig. I is an illustration of a standard cone winding machine showing the manner in which my improved yarn tension device is associated therewith.

Fig. II is a perspective view of the tension device on a somewhat larger scale than represented in Fig. I.

Fig. III is a detail cross sectional view of the device taken as indicated by the arrows III—III in Fig. II.

Fig. IV is a fragmentary elevation showing the details of a stop which functions to limit the movements of the yarn engaging instrumentalities.

Fig. V is a detail cross sectional view taken as indicated by the arrows V—V in Fig. IV.

Fig. VI is an illustration partly in elevation and partly in section of the dash-pot means provided for stabilizing the movements of the yarn engaging instrumentalities; and

Fig. VII is a detail cross sectional view on the line VII—VII in Fig. I, showing the adjustable weight means whereby the extent of drag induced in the yarn may be initially regulated and determined.

Referring first to Fig. I, the winding machine there shown will be observed to be of standard construction in that it comprises a mounting 1 which affords a suitable bearing for a spindle 2 upon which the cones are formed. Such a cone is represented at "C" in the course of its building, and means (not shown) are provided for driving the spindle 2 at a uniform rate of speed. The yarn indicated at "Y" is directed to the spindle over a threading bail 3, and laid by a yarn guide 4 adapted to be shifted back and forth in a direction longitudinally of the spindle 2. This guide 4 is supported by a suitable carriage 5 horizontally reciprocable in a frame 6, said frame being arranged to swing about a shaft 7 journaled in the mounting 1. The frame 6 it will be furthermore noted, is counterweighted at 8 and thus stabilized when it recedes as the diameter of the cone "C" increases. The brief description given will suffice to make clear the operative relation hereinafter disclosed of my improved thread tension device to the winding machine.

Attention is now directed more particularly to Figs. I, II and III of the drawings wherein the tension device is comprehensively indicated by the numeral 10, and shown as comprising a frame 11 which is secured by means of screws 11^a, to a bracket 11^b projecting laterally from the mounting

1 of the winding machine. Arranged in spaced relation vertically of the frame 11 are a series of immovable yarn engaging instrumentalities in the form of circumferentially grooved spool-like elements 12 which are preferably made of vitreous material such as glazed porcelain affording a smooth, hard, wear resistant surface for frictional passage of the yarn. Cooperating with the fixed elements 12 and adapted to move horizontally in the intervals between them, is a complementary series of movable yarn engaging instrumentalities in the form of fingers 13 also preferably constructed of vitreous material with their surfaces slightly concaved as shown to assist in guiding the yarn as it passes thereover. These fingers 13 are attached to the free ends of arms 14 of stout wire extending in a common plane from a vertical shaft 15 which is supported for rotation by adjustable pivot screws 16 set in lateral lugs 17, 17 of the frame 11. Accordingly, as the shaft 15 is rotated under the influence of means to be presently described, the fingers 13 will be bodily moved relative to the fixed elements 12 so as to define a more or less zig-zag path for the yarn as shown in Fig. II, and in this way vary the drag thereon. In addition to the finger elements 13, the shaft 15 carries a guide eye 18 adapted to swing horizontally within the interval between a companion guide eye 19 secured to the frame 11, and the uppermost stationary yarn engaging element 12, to effect a greater deflection of the yarn "Y" from the straight course than that imposed by the movable finger elements 13. The shaft 15 also carries at its lower end, another guide eye 20 which functions with a companion fixed guide eye 20^a in a manner similar to that described with reference to the guide eyes 18, 19. The several guide eyes just described are mutually cooperative in defining a true central course for the yarn "Y" in its movement alternately between and about the engaging elements 12, 13, said yarn passing directly to the guide eyes 20, 20^a from the original bobbin or other source of supply (not shown).

The shaft 15 is arranged to be actuated through the medium of miter gears 21, 22, from a horizontal rock shaft 23 appropriately supported by bearing lugs 24 on the frame 11. Projecting radially outward from the shaft 23 is a lever arm 25 which is coordinated with the movable member 6 of the winding machine through a link 26 best shown in Fig. I. This link 26 is pivotally connected at one end as indicated at 27 to an extension piece 28 suitably attached to the member 8, and its opposite end 29 is pierced for sliding movement along the lever arm 25. Said link 26 there-

fore acts in effect as a pressure weight capable of being automatically shifted to different leverage positions along the arm 25 in accordance with the movements of the member 6, thereby imposing, through the various interposed elements already described, variations in the drag upon the yarn "Y" in the course of the passage of the latter to the cone "C". In case greater pressure effect than that imposed by the weight of a lever itself is required, an auxiliary weight such as shown at 30 in Fig. I and in detail on a larger scale in Fig. VII, may be employed, said weight being adjustable along the link 26 and equipped with a set screw 31 whereby the same can be secured in the desired adjusted position. The auxiliary weight 30 is preferably slotted as at 32 enabling the same to be quickly attached and removed when necessary. The link 26 is given the angular configuration shown so that in its movements it may clear the frame 11 and its appendages.

For the purpose of preventing sudden or spasmodic movements of the yarn engaging instrumentalities 13, there is provided a stabilizing means in the form of a pneumatic dash-pot means 33 which is coordinated with the shaft 23 and therefore directly operative upon the lever arm 25. From Fig. VI it will be noted that the dash-pot 33 includes as one component thereof, a cylinder 34 which is pivotally suspended from the end of an arm 35 serving virtually as an extension of the lever arm 25, and the weight of said cylinder 34 is counterbalanced so as to be uninfluential upon said arm, by a collar 36 set upon the end of the latter. Operative within the cylinder 34 of the dash-pot 33 with sufficient clearance to permit slow air leakage is a piston plunger 37 having an integral depending rod extension 38 pivotally attached at 39 to a fixed anchorage projection 40 of the frame 11. After leaving the fixed guide 19 the yarn "Y" will be observed to pass through an auxiliary directional guide 41 secured to the bracket 11^b previously referred to, and from the guide 41 through a slub catcher generally indicated at 42 and forming part of the standard equipment of the winding machine.

The motion of the shaft 15 is restricted by an adjustable stop 43 which may be conveniently made of wire as shown in Figs. IV and V, bent to afford an abutment 44 for one of the arms 14 attached to said shaft. The adjustments of the stop 43 are fixed by a screw 45 provided for this purpose.

In operation it will be seen that as the upper end of the movable frame 6 of the winding machine recedes during the building of the cone "C" upon the spindle 2,

movement thus derived is transmitted directly to the link 26 with the result that the weight of the latter concentrated at its end 29 is shifted along the lever arm 25 in a direction toward the left as considered in Fig. 1, or, in other words, toward the shaft 23. The weight leverage effect is thereby decreased and the drag on the yarn "Y" relieved, or reduced in a corresponding degree, to compensate for increasing linear speed incidental to cone building so that uniform tension is in this wise at all times maintained. In the course of the operation of the tension device, spasmodic movement of the lever arm 25 is obviously counteracted by the stabilizing influence of the dash-pot means 33 so that sudden tension changes on the yarn "Y" cannot possibly take place.

Having thus described my invention, I claim:

1. A yarn tension device comprising yarn-engaging instrumentalities capable of being influenced to vary the drag on the yarn, a lever associated with said instrumentalities, a weighted member with its end bearing on the lever, and means for automatically shifting the end of the member along the lever to compensatively vary the drag induced by the yarn-engaging instrumentalities in accordance with changes in linear speed of the yarn.

2. A yarn tension device comprising yarn-engaging instrumentalities relatively movable in inducing variable drag on the yarn, a lever influencing said instrumentalities, a pivoted weighted member with its end bearing on the lever, and means for automatically shifting the end of the member along the lever to compensatively vary the drag induced by the yarn-engaging instrumentalities in accordance with changes in the linear speed of the yarn.

3. A yarn tension device comprising two sets of relatively movable yarn-engaging instrumentalities, one set operative in the intervals between the other in deflecting the yarn from a straight course to induce drag thereon, a lever influencing the yarn-engaging instrumentalities, a pivoted weighted member with its end bearing on the lever, and means for automatically shifting the end of the member along the lever to compensatively vary the drag induced by the yarn-engaging instrumentalities in accordance with changes in the linear speed of the yarn.

4. A yarn tension device comprising yarn engaging instrumentalities capable of being influenced to vary the drag on the yarn, a lever associated with said instrumentalities, weighted means slidable on the lever, means for shifting the weighted means to compensatively vary the drag induced by the yarn engaging instrumentalities in accordance with changes in linear speed of the yarn,

and means for stabilizing the action of the yarn engaging instrumentalities to prevent abrupt variations in the drag.

5. A yarn tension device comprising yarn engaging instrumentalities relatively movable in inducing a variable drag in the yarn, a lever influencing the instrumentalities, a weight slidable upon the lever, means for shifting the weight to compensatively vary the drag induced by said instrumentalities in accordance with changes in the linear speed of the yarn, and means directly operative upon the lever for stabilizing the action of the yarn engaging instrumentalities to prevent abrupt variations in the drag.

6. A yarn tension device comprising yarn engaging guides relatively movable in inducing a variable drag in the yarn, a lever influencing the guides, a weight slidable upon the lever, means for shifting the weight to compensatively vary the drag induced by said guides in accordance with changes in the linear speed of the yarn, and dash-pot means directly operative upon the lever for stabilizing the action of the yarn engaging guides to prevent abrupt variations in the drag.

7. The combination with a cone winding machine having a movable member adapted to recede incidentally to the building of a cone, of a yarn tension device comprising yarn-engaging instrumentalities capable of yielding to vary the drag on the yarn, a lever associated with said device, a weighted member shiftable on said lever, and a direct connection whereby said weighted member is shifted concurrently with the movement of the movable member of the winding machine to influence the yarn-engaging instrumentalities for the purpose of effecting compensating variation of the drag in accordance with changes in the linear speed of the yarn.

8. The combination with a cone winding machine having a movable member designed to recede incidentally to the building of a cone, of a yarn tension device comprising yarn engaging instrumentalities capable of being influenced to vary the drag on the yarn, a lever associated with said yarn engaging instrumentalities, a weighted link pivoted at one end to the movable member of the winding machine and having its other end shiftable connected to the lever aforesaid whereby the drag induced by the yarn engaging instrumentalities is varied compensatively in accordance with changes in linear speed of the yarn.

9. The combination with a cone winding machine having a movable member designed to recede incidentally to the building of a cone, of a yarn tension device comprising yarn engaging instrumentalities capable of being influenced to vary the drag on the yarn, a lever associated with said yarn en-

gaging instrumentalities, a link pivoted at one end to the movable member of the winding machine and having its other end bearing on and adapted to be shifted along the lever to automatically vary the drag induced compensatively in accordance with changes in the linear speed of the yarn, and a weight adjustable along the link to regulate the effect of the latter upon the lever.

In testimony whereof, I have hereunto signed my name at 409 Chestnut St. Phila., Pa. this thirteenth day of December, 1923.

ANNA M. PIGEON,
Administratrix of the estate of Albert M. Pigeon, deceased.

Witnesses:

ROBERT EARL MACDOUGALL,
JOHN PUGH HENRIE.