Dec. 10, 1940. H. HOWORTH 2,224,298

YARN TENSIONING DEVICE

Filed Feb. 19, 1938

Fig. 1.

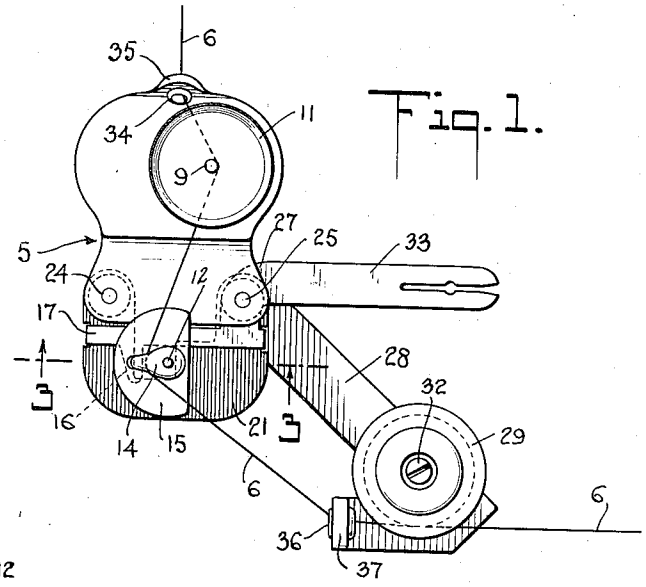


Fig. 2.

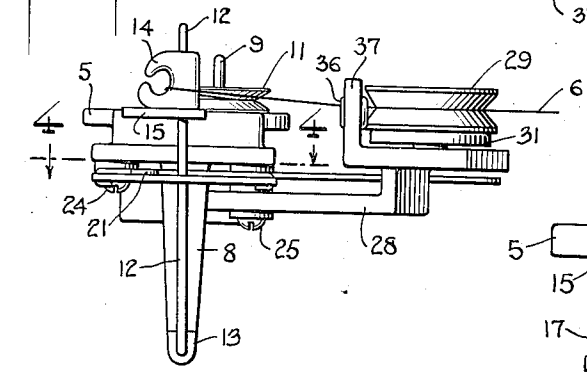


Fig. 3.

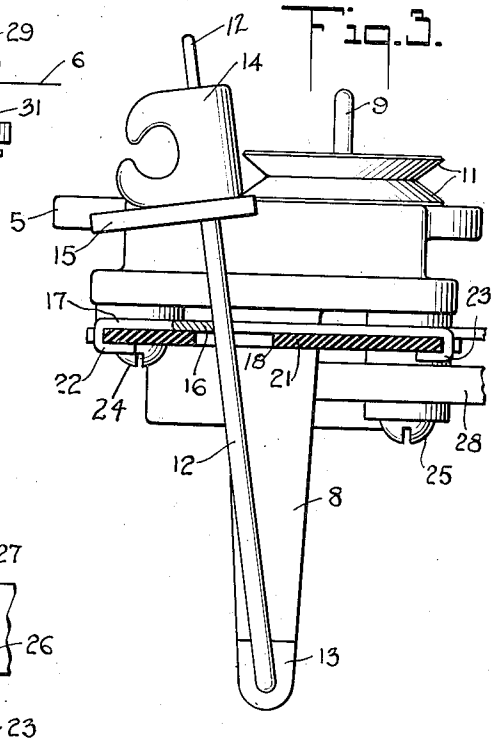
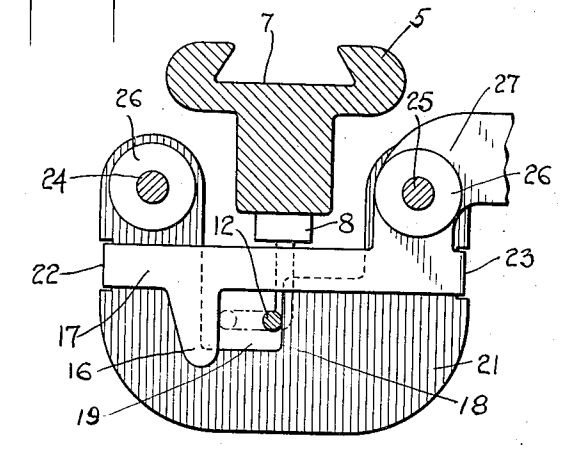


Fig. 4.



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YARN TENSIONING DEVICE

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4 Claims. (Cl. 242—154)

This invention relates to a tensioning device, and relates more particularly to a device for applying tension to individual yarns, threads and like filamentary textile materials.

It is an object of this invention to provide an improved tension device which is simple and durable in construction, efficient in operation and inexpensive in cost.

A further object of this invention is the provision of an improved tension device for use in warping from coned or cheesed cap-spun packages of yarn or thread.

Another object of this invention is to provide a tension device suitable for use with low twist yarn or thread.

Other objects of this invention, together with certain details of construction and combinations of parts, will appear from the following detailed description and the appended claims.

Tension devices of the type contemplated by the instant invention, as heretofore commonly constructed, included a pulley around which the yarn or thread was bent and which the yarn or thread tractively engaged. Such tension devices were unsuitable for use with low twist yarns or threads, i. e., yarns or threads lacking sufficient twist to bind the filaments, since they would be trapped and stripped by the pulley. The tension device of the present invention is so constructed and arranged that no wrapping of the yarn or thread about the tension pulley is necessary to apply the desired uniform tension thereto for the purpose of levelling out any tension irregularities in the yarn or thread.

The tension device of the present invention is adapted to be mounted on a creel or other suitable support for the yarn or thread package, one for each yarn or thread to be drawn therefrom. According to the instant invention the tension device comprises a plate on which are supported the means for applying the desired tension to the yarn or thread, one of said tension applying means being a pulley which is adjustably mounted with respect to the other tension applying means and which is carried on ball-bearings for free running under all atmospheric conditions.

The invention will now be described in greater detail, particularly with reference to the drawing wherein the preferred embodiment of my invention is shown. It is to be understood, however, that this description is given by way of example only and is in no way limitative.

In the drawing:

Fig. 1 is a top plan view of my tension device;

Fig. 2 is a front elevational view of the same;

Fig. 3 is a view taken along line 3—3 in Fig. 1 but drawn on a larger scale, and

Fig. 4 is a cross-sectional view taken on line 4—4 in Fig. 2 but drawn on a larger scale than Fig. 2.

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

Reference numeral 5 designates a plate made of any suitable metal. This plate is supported on a creel or the like (not shown), carrying the packages from which the yarn or thread 6 is drawn, by means of a bracket (not shown) so designed as to fit with a wedge-fit into slot 7 formed in the bottom of plate 5. The plate 5 has depending therefrom and integral therewith a leg 8, the purpose of which will hereinafter be set forth.

In the top of plate 5 is fixed an upright pin 9 on which are threaded frusto-conical disks 11 which are centrally apertured. The disks are arranged on pin 9 so that their lesser faces are in abutting relationship, and their margins are diverging which facilitates the entry of the yarn or thread between the said disks.

A spindle 12 is provided at its lower end with a portion bent at right angles thereto, which portion is pivotally mounted in a bearing 13 in the lower extremity of leg 8. The free end of the spindle carries a guide 14 of porcelain or other suitable material, and a weight 15 which tends to force the spindle and guide to the left as shown in Fig. 3. The spindle 12 is adapted to rock in bearing 13, this rocking being limited on one side by a projection 16 on a metallic strip 17, and on the other side by a side-wall 18 of a cut-out portion 19 in an insulator 21. The metal strip 17 is held in position by being clamped around insulator 21 at the points 22 and 23, and the insulator 21 is attached to the underside of plate 5 by screws 24 and 25, washers 26 of rubber or any other suitable material being inserted between the insulator 21 and plate 5 to space the same from each other. Screw 25 also passes through an extension 27 of metal strip 17.

The screw 25 also serves to attach a bracket 28 to plate 5. This bracket is arranged to be at an angle to plate 5 and carries at its free end a pulley 29. The pulley 29 is mounted on a ball race 31 which is fastened to bracket 28 by means of a screw 32.

The projection 16 may act as one terminal of a stop motion device being connected through arm 33, integral with metallic strip 17 and its extension 27, to means (not shown) for stopping the rotation of the device for drawing the yarn or

thread from the supply thereof when the spindle 12 is allowed to fall to the position shown in Fig. 3.

In operation, for the purpose of applying the desired tension on the yarn or thread for, say, the subsequent warping operation, the yarn or thread 6 is drawn from the supply package through a guide eye 34, of porcelain or any other suitable material, set in an upstanding ear 35 integral with plate 5. The yarn or thread is passed between frusto-conical disks 11 in contact with pin 9, then through guide 14, through guide eye 36, of porcelain or any other suitable material, fixed in an upstanding portion 37 integral with bracket 28, and finally in contact with the groove in pulley 29 from which it goes into the warping machine. The bracket 28 is arranged to be adjustable in a horizontal plane about screw 25 for the purpose of adjusting the position of pulley 29. Tension is applied to the yarn or thread by means of the uppermost of disks 11 (more disks may be added to increase the tension) and this tension is increased by the subsequent contact of the thread successively with the guide 14, the guide eye 36, and the pulley 29. The total angle of contact of the thread 6, with these three elements is not substantially altered by the adjustment in the horizontal plane of the bracket 28. However, the proportionate parts of that angle belonging, on the one hand to the guides 14 and 36, and on the other to the pulley 29, will vary with the adjustment of the bracket 28. Since the increase in tension imparted by a given angle of contact with the pulley 29 is much less than that imparted by an equal angle of contact with the guides 14 and 36 the ratio by which the tension originally imparted by the disks 11, is increased by the time the thread 6 leaves, the device may be varied at will by the adjustment of the bracket 28. Thus, a clockwise motion of the bracket from the position shown in Figure 1 produces an increase of the angle of contact of the thread 6 with the pulley 29 and correspondingly increases the tension due to contact with the pulley. Simultaneously however, the angle of contact of the thread with the guides 14 and 36 is decreased by an equal amount, and this produces a much larger decrease of the tension in the thread.

While the yarn or thread is under draft, the spindle 12 is in the position shown in Fig. 2. However, upon breakage or failure of the yarn or thread the weight 15, due to its construction and position on spindle 12, causes the spindle to tilt to the left, as shown in Fig. 3, contacting projection 16 thus closing the stop-motion circuit and effecting stoppage of the warping device.

It is to be understood that the foregoing detailed description and drawing are 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 desire to secure by Letters Patent is:

1. In a tensioning device, a plate, means mounted on said plate for applying tension to a travelling yarn or thread, a guide adapted to act as a stop motion pivotally mounted on said plate, a bracket adjustably attached to said plate and a pulley adapted to contact the yarn or thread mounted on said bracket, the construction and arrangement being such that said guide and said pulley apply further tension to the yarn or thread and the adjustability of said bracket permits of the adjustment of the angles of contact of the yarn or thread with said guide and said pulley respectively and thereby of the tension applied to the yarn or thread by said guide and said pulley.

2. In a tensioning device, a plate, means mounted on said plate for applying tension to a travelling yarn or thread, a guide adapted to act as a stop motion pivotally mounted on said plate, a bracket having one end adjustably attached to said plate and a pulley adapted to contact the yarn or thread mounted on the free end of said bracket, the construction and arrangement being such that said guide and said pulley apply further tension to the yarn or thread and the adjustability of said bracket permits of the adjustment of the angles of contact of the yarn or thread with said guide and said pulley respectively and thereby of the tension applied to the yarn or thread by said guide and said pulley.

3. In a tensioning device, a plate, a pair of frusto-conical discs for applying tension to a yarn or thread travelling therebetween, a guide adapted to act as a stop motion pivotally mounted on said plate, a bracket adjustably attached to said plate, a ball race carried by said bracket and a pulley adapted to contact the yarn or thread mounted on said ball race, the construction and arrangement being such that said guide and said pulley apply further tension to the yarn or thread and the adjustability of said bracket permits of the adjustment of the angles of contact of the yarn or thread with said guide and said pulley respectively and thereby of the tension applied to the yarn or thread by said guide and said pulley.

4. In a tensioning device, a plate, means mounted on said plate for applying tension to a travelling yarn or thread, a guide adapted to act as a stop motion pivotally mounted on said plate, a bracket adjustably attached to said plate, a pulley mounted on said bracket and adapted to contact the yarn or thread, and a second guide between said first mentioned guide and said pulley, said second guide being fixed on said bracket so as to conduct the yarn or thread to said pulley, the construction and arrangement being such that said guides and said pulley apply further tension to the yarn or thread and the adjustability of said bracket permits of the adjustment of the angles of contact of the yarn or thread with said guides and said pulley respectively and thereby of the tension applied to the yarn or thread by said guides and said pulley.

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