June 3, 1930. H. D. CLINTON 1,762,049

TENSION DEVICE

Filed June 6, 1929

Fig. 1.

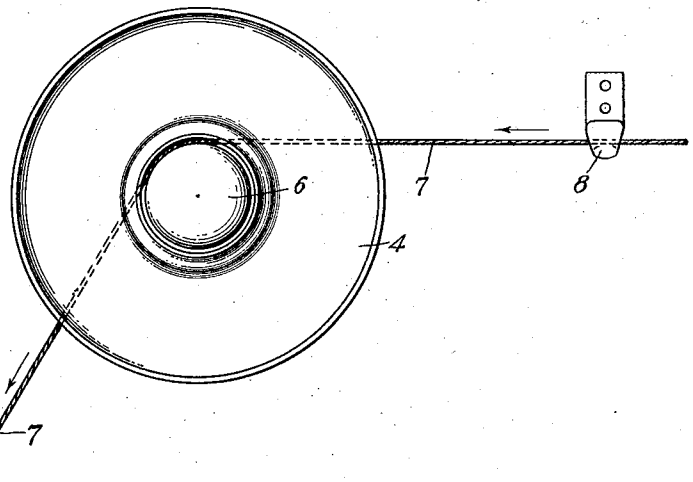


Fig. 2.

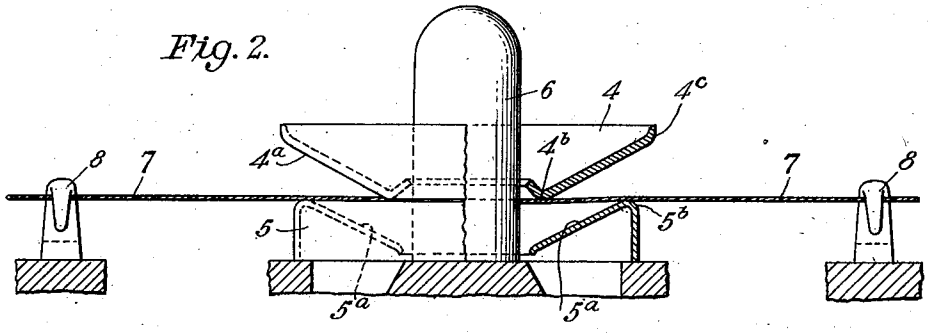
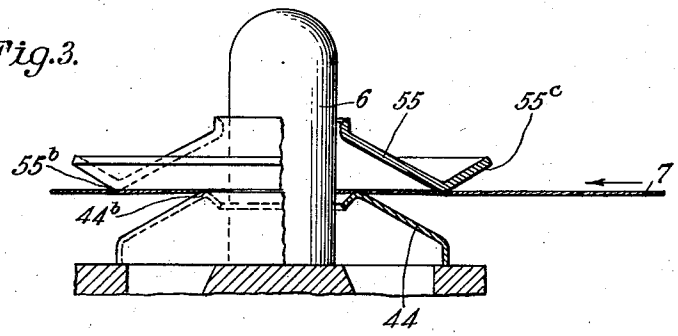


Fig. 3.



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TENSION DEVICE

Application filed June 6, 1929. Serial No. 368,948.

This invention relates to tension devices and aims to provide improved means for tensioning yarn in rapid feed operations, such for example as warping, where a plurality of yarn strands are fed from loaders onto warp-beams or cylinders at a high rate of speed.

The invention will be best understood from description with reference to the accompanying drawings wherein two practical embodiments thereof are illustrated.

In said drawings:

Fig. 1 is a plan view representing a strand of yarn passing around a deflector and between tensioning elements of the improved device;

Fig. 2 is a parti-sectional elevation of one embodiment showing a yarn strand feeding between the tensioning elements; and

Fig. 3 is a similar view of another embodiment.

The illustrative device comprises a pair of centrally apertured discs or plates 4 and 5 of dish-like form movable coaxially one from the other on a retaining member or post 6 serving as deflector for a feeding strand of yarn drawn tensionally therebetween.

The use of discs yielding one from another against weight or spring action on a deflecting post is of course an old expedient in tensioning yarn or thread and there are many prior art devices employing such elements in various forms and arrangements. However, the majority of prior art devices were designed for tensioning yarn feeding at the moderate rates of speed then attainable and are wholly unsatisfactory in certain high speed practices of recent development. This is especially true of warping in which operation has been advanced from a speed rate of 100 to approximately 600 feet per minute within the past few years. The present invention provides means for properly tensioning yarn feeding at this high as well as the lower rates of speed.

In prior devices generally the tensioning discs are concavo-convex in form and engaged on retaining posts with their convex surfaces in opposed relation, or where only one such disc is used the convex surface thereof is opposed to the surface against which it works. Accordingly, yarn drawn between the discs or between a disc and other opposing surface will bear frictionally upon portions thereof which meet in a bite. While such discs serve admirably to tension yarn at moderate feed rate, they wabble and reboundingly hit together so violently with rapid feed as to jerk and cause the yarn to whip or vibrate on passing therefrom. Where two or more feeding ends or strands of the yarn are brought in close relation as in warping operations, such whipping or vibration is of course liable to result in twisting snags and breakage.

In the device of this invention, the discs are formed with frusto-conical surfaces 4^a and 5^a of corresponding pitch adapting one to fit substantially within the other and are engaged in that relation on the retaining post after the manner of stacked dishes. These discs have annular rounded ridges 4^b and 5^b respectively formed in this instance by turning or beveling the edge portion at the inner periphery of one and the outer periphery of the other and providing concentrically related shoulders for a purpose to appear. Said ridges may of course be otherwise formed as for example by stamping out or moulding them in the discs. In some cases it may be desirable to have more than one ridge on either disc or to recess either to receive the ridge on the other.

A strand 7 of yarn from a loaded spool or bobbin (not shown) is represented passing between the discs and around the deflector post to a warp-beam or other element rotated to draw it thereonto. The strand may advantageously be led to and from the discs by guide-means represented at 8 in the drawings.

Like those of the prior art forms, the discs serve to hold up a strand of yarn when slack and to tension it during feed. Likewise, one of said discs (in this instance the upper one) will be moved away from the other by the yarn bearing on or under the annular ridge thereof during feed. While moving said one from the other however, the tautened yarn is held yieldingly against the annular ridge of said other, or in other words bears against the concentrically related ridges of the two

on opposite sides. The yarn will of course bend or sag between peripherial points of the receptive disc according to the speed at which it is fed, and the tension thereon may be increased by placing a light depressing weight or spring on the movable disc.

Thus in a manner similar to that of straightening wire, the yarn is tensioned smoothly between the discs so as to leave them without vibration or whip however rapidly it may be fed. It is thought the improvement over old forms which allow whipping and vibration in high-speed feed will be readily appreciated.

In the modification of Fig. 3, discs 44 and 55 of form differing slightly from the aforedescribed discs (4 and 5) are shown in a reverse arrangement. These discs are essentially the same as the others and have annular ridges 44^b and 55^b respectively corresponding with the ridges 4^b and 5^b of said others. In this modification as in the form first described, the yarn drawn between the discs bears on the concentrically related ridges thereof and so is smoothly tensioned in the manner of straightening wire.

Another important advantage of this invention is that lint from the feeding yarn will not accumulate in or between the discs. It is well known of course that lint accumulations between the discs will tend to separate them and reduce the tension on the yarn, while lint accumulations within the upper disc will be periodically thrown out by centrifugal force of rotation with friction of the yarn, causing "slubs" or imperfections in the yarn. The discs of this invention are effectually cleared of lint by rotation under centrifugal force before there is any accumulation. This results from the fact that the upper or movable disc is given a gradual bevel or inclination at its outer periphery as indicated at 4^c in Fig. 2 and at 55^c in the modification of Fig. 3, thereby enabling lint to be thrown out by centrifugal force of rotation as fast as it enters the disc so that there is no chance of slub formations in the yarn. Such lint particles as may pass between the deflector post and the inner periphery of the lower disc will cause no trouble and may drop clear if the disc is rested on a perforated base such as represented in the drawings.

As the invention may be embodied in various forms of tensioning devices without departing from the spirit and scope thereof, it is not intended to be limited by the appended claims to the specific forms and relation of elements shown and described.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A yarn tensioning device embodying a post member and a pair of centrally apertured discs engaged loosely thereon, said discs being of dish-like form fitting one within the other between which and in bending contact with said post member a feeding strand of yarn is drawn for frictional resistance.

2. A yarn tensioning device embodying a post member and a pair of apertured discs of dish-like form engaged loosely thereon in fitting relation one within the other, said discs having annular ridge portions on which a strand of yarn threaded between the discs will bear frictionally when drawn in feed operation.

3. In a yarn tensioning device, a pair of disc members of dish-like form fitting one within the other and having annular rounded ridges disposed toward each other on which a strand of feeding yarn passed between the discs will bear under tension, and means coaxially guiding the disc members in independent free-play movement.

4. In a yarn tensioning device, a pair of apertured discs of dish-like form fitting one substantially within the other and having each an annular rounded edge disposed toward the other on which a strand of yarn passed between the discs will bear under tension during feed, and post guide-means on which the discs are coaxially slidable in free-play movement.

5. In a yarn tensioning device, a pair of discs of dish-like form fitting one substantially within the other and having each an annular rounded edge disposed toward the other in spaced relation providing concentric shoulders on which a strand of yarn passed between the discs will bear under tension during feed, and means coaxially holding and guiding the discs for independent free-play movement.

6. In a yarn tensioning device, a pair of circular plate members formed with frusto-conical surfaces adapting one to fit substantially within the other and having annular oppositely rounded edges providing concentrically related shoulders on which a strand of yarn drawn resistively between and diametrically of the members will bear while yieldingly moving one of the members away from the other, together with means coaxially holding and guiding the members for independent movement.

In testimony whereof I affix my signature.

HARRY D. CLINTON.