L. T. HOUGHTON.

YARN TENSION DEVICE.

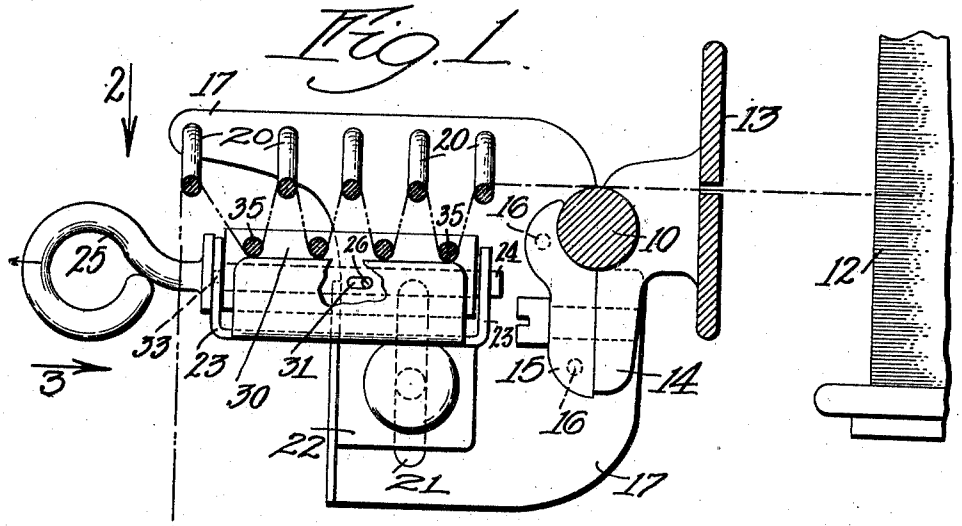
APPLICATION FILED JULY 1, 1918.

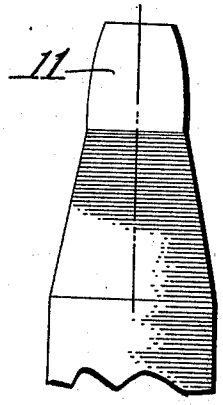
1,303,320.

Patented May 13, 1919.

2 SHEETS—SHEET 1.

Fig. 1.





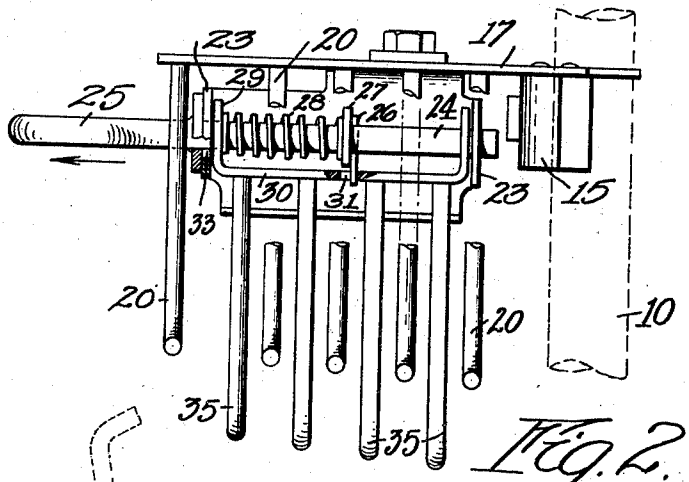


Fig. 2.

Fig. 4.

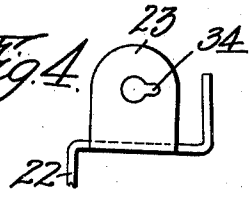
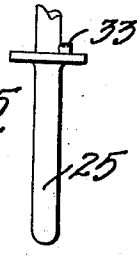


Fig. 5.



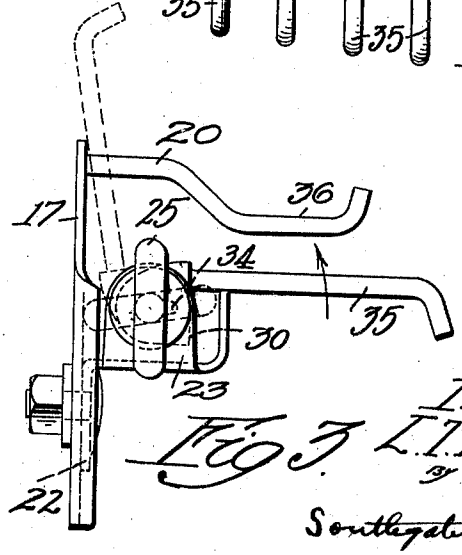


Fig. 3.

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2 SHEETS—SHEET 2.

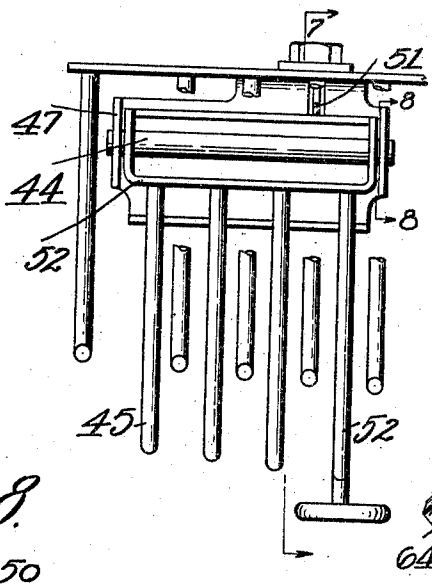


Fig. 6.

Fig. 8.

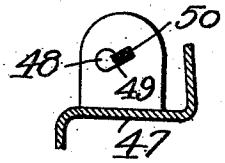
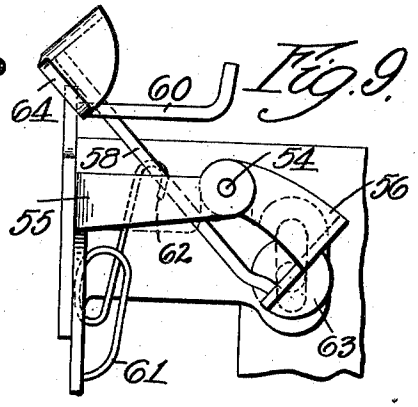


Fig. 9.



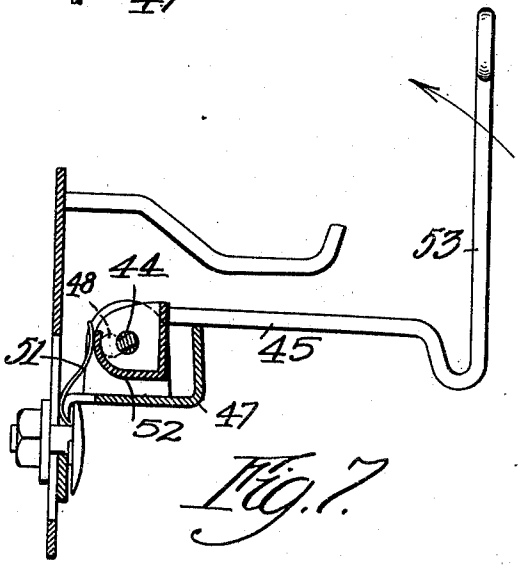
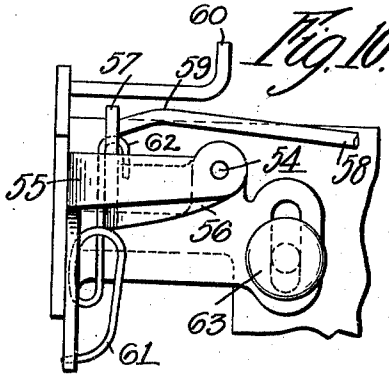


Fig. 7.

Fig. 10.



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UNITED STATES PATENT OFFICE.

LEWIS T. HOUGHTON, OF WORCESTER, MASSACHUSETTS.

YARN-TENSION DEVICE.

1,303,320. Specification of Letters Patent. **Patented May 13, 1919.**

Application filed July 1, 1918. Serial No. 242,704.

To all whom it may concern:

Be it known that I, LEWIS T. HOUGHTON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Yarn-Tension Device, of which the following is a specification.

This invention relates to a device for applying tension to yarn, and although capable of general use is especially adapted to act on the yarn as it passes from the bobbin to a spool on a spooler or other rewinding machine.

The principal objects of this invention are to provide a device of this character which will operate efficiently with yarn of either the finest or coarsest character, and especially to provide means for normally holding the tension fingers positively locked down in their operative position for tensioning when they are moved thereto so that any tension that the yarn may put on these fingers will not swing them back toward the coöperating guide rods which support the yarn; to provide means for automatically rendering the locking means effective whenever the tension fingers are moved into the position for applying tension to the yarn; to provide means coöperating therewith whereby when the fingers are moved back they will have no natural tendency to swing down into operative position, but will remain back out of the way; to provide a construction in which the operative shall be free after having once adjusted the device to open and close it as often as necessary without giving any attention whatever to holding it in either position; to provide for holding the fingers down in operative position without applying any spring tension to them or weights; and to provide means whereby when the tension device is located in horizontal position the tension fingers will be pivoted below the yarn supporting and guide rods at a position intermediate of their ends so that when raised they move back substantially to the rear ends thereof and project up from them so as to constitute a limit for the yarn, thus preventing the operative from carelessly placing the yarn too far back to engage the rods and facilitating the threading by avoiding entanglement of the yarn. The invention also involves in some of its forms means whereby the tension device will be so formed as to be capable of application directly to the longitudinal supporting rod on the spooler thus simplifying it and also the ordinary yarn guide which is always present.

The invention also involves improvements in details of construction and combinations of parts as will appear hereinafter.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a side elevation of a preferred embodiment of this invention;

Fig. 2 is a plan of the same with parts shown in section;

Fig. 3 is an end elevation showing the two extreme positions of the tension fingers;

Fig. 4 is an end view of the bracket on which the tension fingers are pivoted;

Fig. 5 is a plan of the releasing device;

Fig. 6 is a plan of another form of the invention;

Fig. 7 is a sectional view of the same on line 7—7 of Fig. 6;

Fig. 8 is a sectional view of the same on the line 8—8 of Fig. 6;

Fig. 9 is an end view of a third form in which the invention can be employed, and

Fig. 10 is a similar view showing the parts in operative instead of inoperative position.

In previous yarn tension devices which I have invented, I have provided yielding means for holding the tension fingers in their operative position at all times so as to assure sufficient tension, but also allow the tension fingers to be released from control of the spring and swing up whenever the tension gets too great, thus absolutely releasing all tension. In that way when changing from light to heavy yarn the necessary adjustments were made of course but the size and strength of the yarn that could be run was limited by the resistance of the spring which could not be changed readily. Therefore those devices if designed to run with light yarn could not always take the coarsest grades.

But in this case I have dispensed with the releasing spring for the purpose of securing the necessary tension and provided means for positively preventing the tension being released even when it reaches a maximum although the tension fingers are capable of a slight free play. As my tension fingers are adjustable toward and from the rods which support the yarn, I can adjust the tension to a lower degree when I am oper-

ating on fine yarns and the coarseness and strength of the yarn that can be run is not limited in any way.

The form of the invention illustrated on the first sheet of drawings involves a construction in which the yarn tension device is mounted upon a longitudinal supporting rod 10 on the spooler, and the yarn is guided from a bobbin 11 to a spool 12 as usual. I have shown the ordinary yarn guide 13 provided with a downwardly projecting portion 14 and a semi-circular recess just above the same. This is provided for clamping the yarn guide to the rod 10 with the aid of a complementary member 15 ordinarily clamped to it by a bolt. These usual parts I have retained, but I have made a modification by casting two pins 16 into the member 15, passing them through a plate 17 and heading them over on the other side. In this way the member 15 is formed as a part of the plate 17, and this and the yarn guide are securely clamped directly to the rod 10. Thus I do away with several elements of expense.

The plate 17 constitutes the support for the tension device. As I have heretofore shown in my prior applications, this support is provided with a plurality of stationary wire rods 20 constituting a series of guides presenting a substantially horizontal supporting surface for the yarn to be tensioned. The plate 17 is provided with a slot 21, and adjustably mounted along this slot is a bracket 22. On this bracket are two opposite integral walls 23, the same preferably being formed of a single piece of sheet metal, and these walls are perforated to provide bearings for a pivot rod 24. This pivot rod is provided with a handle 25 fixedly secured thereto for turning it. The pivot rod is capable of a slight longitudinal motion in its bearings, and is provided with a pin 26 and collar 27 against which collar bears the end of a spring 28. The other end of this spring bears on one end 29 of a sheet metal frame 30 which is mounted on the rod inside the walls 23. This frame is provided with a horizontal slot 31 into which the end of the pin 26 projects so that this pin serves the additional purpose of causing the frame 30 to swing with the rod always.

The spring 28 forces the rod to the right in the form shown in the drawings so that when it is turned down to the operative position as indicated in Figs. 1 and 2 and in full lines in Fig. 3, an eccentric pin 33 on the handle 25 will enter a perforation 34 in the end wall 23 and positively lock the rod in that position as far as swinging motion is concerned.

This frame 30 has fixed to it a series of yarn guides 35 which constitute tension fingers and alternate with the rods 20. The device is shown in full lines in Fig. 3 in operative position and also in Figs. 1 and 2. When it is desired to thread the device, the handle 25 is pulled forward so as to release the pin 33 from the perforation 34 and turned to the position indicated in Fig. 3 in dotted lines. This swings the tension fingers back through the spaces between the supporting and guide rods 20 and leaves the space above the latter entirely free and unobstructed so that the operative will have no difficulty in placing the yarn in proper position along these rods. They are depressed at points 36 between their bases and ends to facilitate this operation, and it is further facilitated by the fact that the fingers 35 extend upwardly at the rear ends of the rods 20 and form a stop so that the yarn cannot be placed too far back. This is a feature of some importance especially when green hands are operating the machine, and it is brought about by the fact that the fingers 35 are pivoted at a point below the rods 20 and slightly in front of their rear ends.

It will be seen, of course, that after the thread is laid over the rods 20 the fingers 35 are moved down either by manipulating the handle 25 or by swinging them down by taking hold of their outer ends. However they are brought down, as soon as they reach their full operative position, the pin 33 is automatically pulled into the perforation 34 by the spring 28 and from then on the tension fingers are positively locked in their operative position. I provide a slight play so that they may move slightly under different conditions of tension. This is provided by making the perforation 34 a little larger than the pin 33.

In this way it will be seen that no matter what the tension, the tension fingers will not give or be displaced, and the device therefore is capable of use with the heaviest yarn. As explained in my prior applications, the vertical adjustment of the bracket 22 enables me to regulate the device so that it can be used for yarns of the weakest character also, but even in that case the locking feature is employed in this form of the invention.

A further feature of this construction is that the spring 28 puts enough pressure on the rod so that in addition to the fact that the fingers 35 are held in their inclined inoperative threading position by gravity, there is also a frictional force due to the bearing of the pin 33 on the outer surface of the wall 23 to prevent their accidental dropping back into operative position, so that the operator having placed them in either position has no fear that they will ever get out of it accidentally.

In the form of the invention shown in Figs. 6, 7 and 8 most of the construction above described is also present and will not be described in detail, but the pivot rod 44

on which the tension fingers 45 are adapted to swing is pivoted to the frame 47 at its left end in the ordinary way simply by passing the cylindrical pivot rod through a circular hole in the end wall thereof. At the right hand end thereof, however, the circular hole 48 is provided with a flat offset 49 in the form of a slot, and the pivot rod at that end is flattened as shown at 50 so as to be capable of moving into this slot, and on the back there is a spring 51 which presses on the frame 52 which supports the fingers 45 and therefore tends to move the flat end 50 into the slot 49 whenever these parts are turned to a position permitting it. Therefore when the tension fingers are brought down to operative position, they are automatically locked there by the action of the spring 51 causing this motion, and when it is desired to thread the device that is accomplished merely by pressing, preferably suddenly, on an upwardly extending end 53 of one of the fingers 45 so as to release the end 50 from the slot 49. This pressing action naturally takes effect in an upward motion so that one motion unlocks the device and swings the fingers up to the threading position, which is substantially the same as that illustrated in Fig. 3. In this case, aside from many of the advantages mentioned in connection with the form shown in Figs. 1 to 5, the arm 52 extends up over the device when in threading position and furnishes a counterweight to hold the fingers up as well as a rest for the left arm of the operator which is the natural position the operator takes in piecing. This is done at the right with the left arm extending over the tension device. With the hand thus restricted, the yarn is simply dropped on the supporting rods and the guide fingers then brought down by a singe motion of the left arm. As stated, the device automatically locks in that position.

In the form shown in the last two figures, the automatic locking of the device in a positive manner is secured by locating the pivot rod 54 considerably forward of the position shown in the other figures, it being mounted on a bracket 55, details of which need not be described. Furthermore, a frame 56 is pivoted on the rod 54 and extends rearwardly therefrom toward the supporting plate. From a projection 57 at its extreme end the tension rods 58 extend. These are bent at 59 to receive the yarn, and it will be seen that the point at which the yarn engages the under sides of these fingers is at the rear of the pivot rod 54. Therefore any pressure exerted by the yarn will be exerted in a direction to hold the fingers 58 in their tensioning position and cannot possibly act to swing them over to the threading position or dislodge them from the position for proper operation. Supporting rods 60 are shown extending forward only a little beyond the point 59. A spring 61 is illustrated for holding the frame 56 in its operative position and provided with a stop 62 for limiting its motion in that direction. The adjustment 63 is shown similar to that in the other views.

By referring to Fig. 9, the position of the parts when they are turned back for threading will be obvious. I have shown the fingers 58 as connected at the end by a sheet metal member 64 constituting a handle for operating the device and also a weight for assisting in holding it in either extreme position.

The remarks made in connection with the other forms of the invention are in general applicable here too. In this case, as in those, a strong pull on the yarn will not have any tendency whatever to release the tension fingers from their operative position. This is the principle on which all of these devices operate. At the same time in all forms the tension fingers can be very easily released from this condition and thrown back into the threading position where they all act to limit the position in which the yarn can be applied, and although in the other cases they are held back both by gravity and by spring pressure or friction, in this case they are held back only by gravity which is all that is necessary in view of the position of the pivot rod 54.

Although I have illustrated and described only three forms of the invention, I am aware of the fact that many other modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims.

Therefore I do not wish to be limited to all the details of construction herein shown and described, but what I do claim is:—

1. A yarn tension device comprising two series of spaced guides for receiving and tensioning the yarn between them, one series of guides being movable bodily through the spaces between the others, and means for automatically locking the movable guides positively in tensioning position when moved thereto.

2. A yarn tension device comprising two series of guides for receiving and tensioning the yarn between them, one series of guides being pivoted on a transverse axis, and readily releasable means for automatically and positively locking the pivoted guides in the tensioning position when turned thereto.

3. A yarn tension device comprising two series of guides for receiving and tensioning the yarn between them, one series of guides being pivoted on a transverse axis, and releasable means for automatically locking the pivoted guides in the tensioning posi-

tion when turned thereto, but giving them a slight play.

4. A yarn tension device comprising a frame, two series of guides for receiving and tensioning the yarn between them, one series of guides being pivoted on said support, and a projection and notch adapted to come into engagement for automatically locking the pivoted guides in the tensioning position when turned thereto.

5. A yarn tension device comprising two series of guides for receiving and tensioning the yarn between them, one series of guides being pivoted on a transverse axis, a projection and notch adapted to come into engagement for automatically locking the pivoted guides in the tensioning position when turned thereto, and a spring for moving the notch and projection together.

6. A yarn tension device comprising two series of guides for receiving and tensioning the yarn between them, one series of guides being pivoted on a transverse axis, readily releasable means for automatically locking the pivoted guides in the tensioning position when turned thereto, said means comprising a projection and notch adapted to come into engagement at that time, and a handle for disengaging the projection and notch operable independently of any action of the yarn.

7. A yarn tension device comprising two series of spaced thread guides arranged in juxtaposition, one series being movable back beyond the other to permit threading and down through the other series to bring them into position for tensioning the yarn, and means whereby said movable series of guides will be held positively against movement toward the other whenever it has reached tensioning position, said means being arranged to allow them a slight play.

8. A yarn tension device comprising rods for supporting the yarn while threading, tension fingers alternating with said rods adapted to pass up and down between them for providing the tension to two positions, one for threading the device and the other for tensioning, and means whereby when the fingers are moved to tensioning position with the yarn threaded through them they will be held positively against any lifting action of the yarn.

9. A yarn tension device comprising rods for supporting the yarn while threading, tension fingers alternating with said rods adapted to pass between them for providing the tension, means whereby said fingers can be moved back beyond the rods to a position crossing them so as to leave an unobstructed space above the rods and in front of the fingers for threading purpose and means for automatically and positively locking said fingers positively in one extreme position when turned thereto.

10. A yarn tension device comprising two series of guides for receiving and tensioning the yarn between them, one series of guides being pivoted on a transverse axis, means for automatically locking the pivoted guides in the tensioning position when turned thereto, said pivoted guides being arranged to be held back in threading position by gravity, and additional means for preventing their being accidentally moved away from that position.

In testimony whereof I have hereunto affixed my signature.

LEWIS T. HOUGHTON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."