No. 619,497. Patented Feb. 14, 1899.

I. E. PALMER.

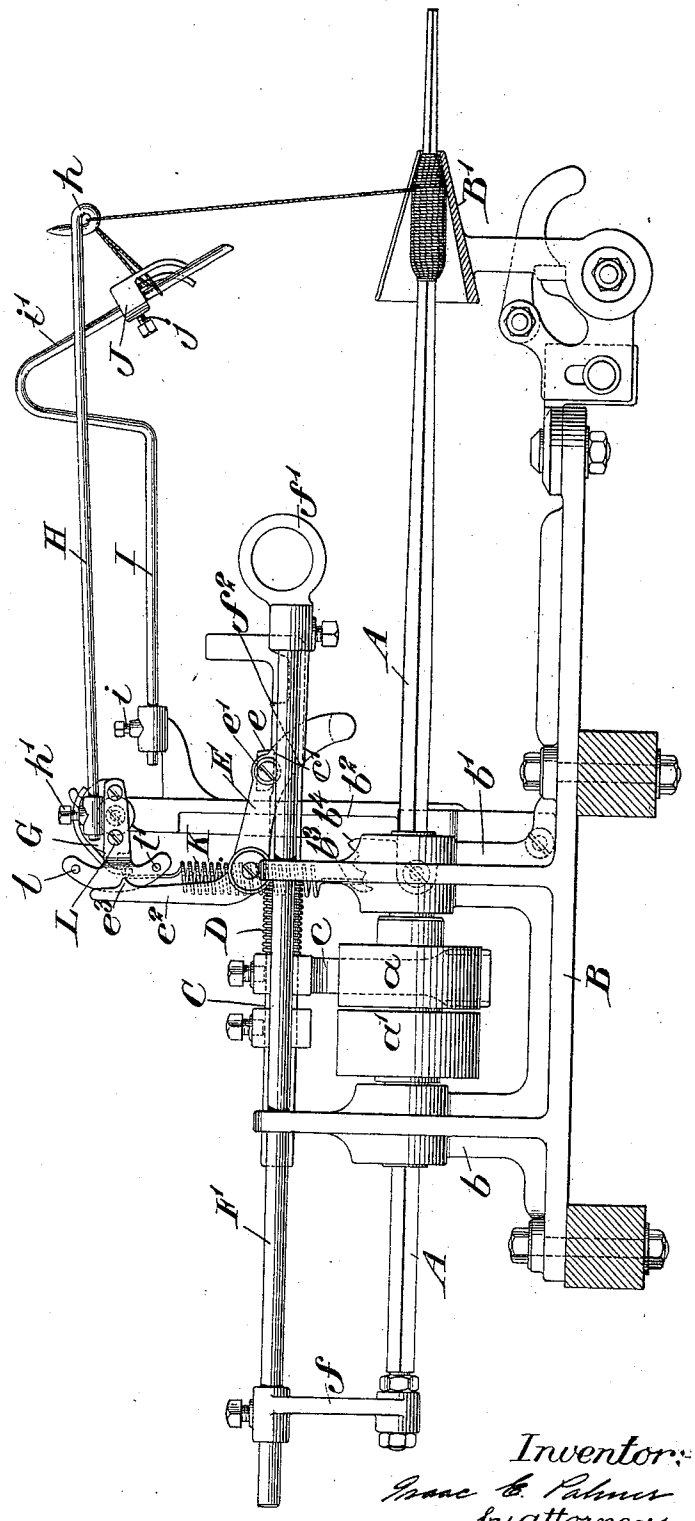
AUTOMATIC STOP AND TENSION DEVICE FOR WINDING MACHINES.

(Application filed June 5, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 5.



Fig. 4.

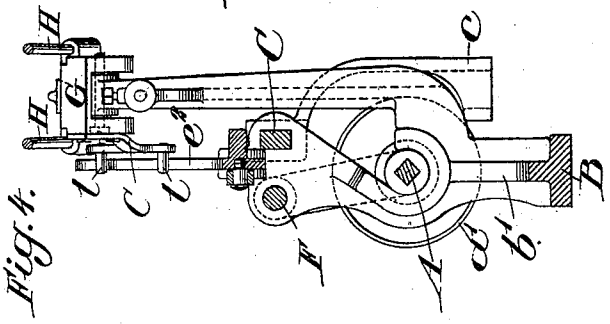


Fig. 3.

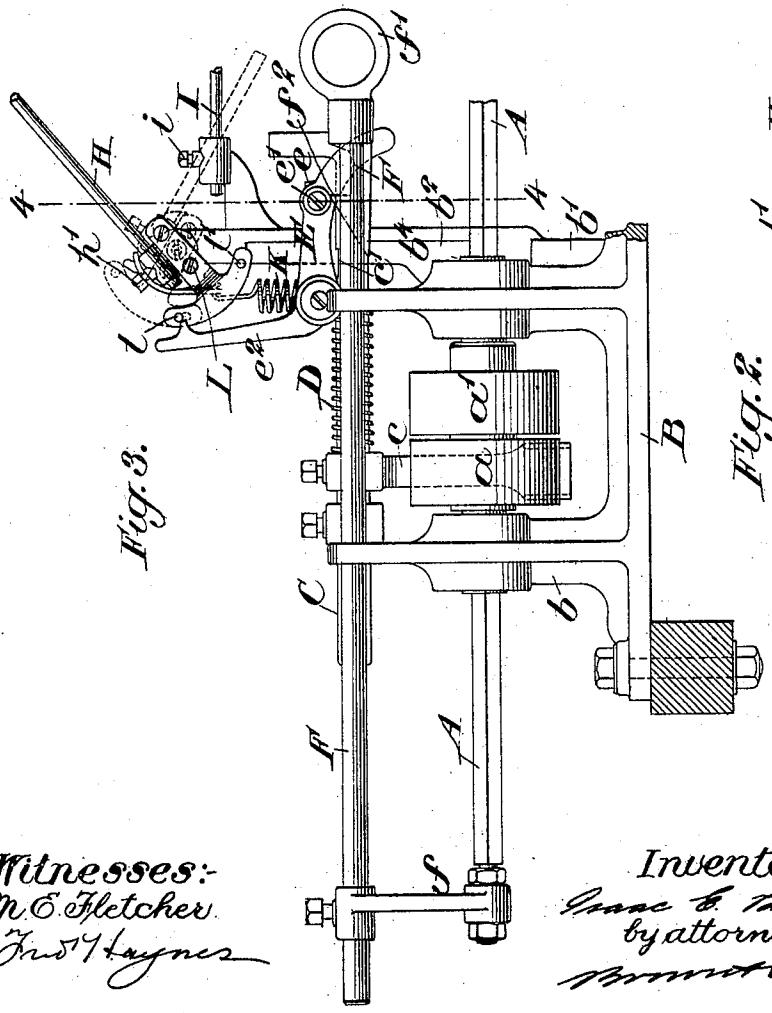
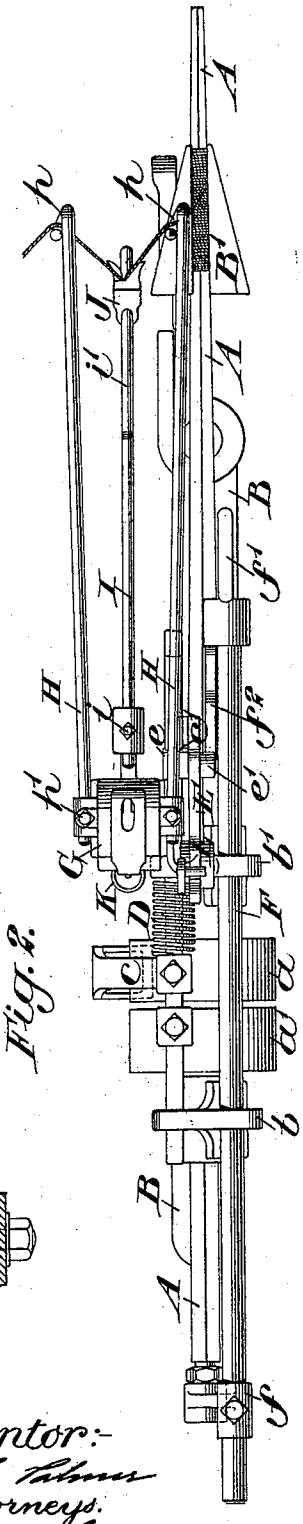


Fig. 2.



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UNITED STATES PATENT OFFICE.

ISAAC E. PALMER, OF MIDDLETOWN, CONNECTICUT.

AUTOMATIC STOP AND TENSION DEVICE FOR WINDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 619,497, dated February 14, 1899.

Application filed June 5, 1897. Serial No. 639,558. (No model.)

To all whom it may concern:

Be it known that I, ISAAC E. PALMER, of Middletown, in the county of Middlesex and State of Connecticut, have invented a new and useful Improvement in Automatic Stop-Motion and Tension Devices for Winding-Machines, of which the following is a specification.

The objects of my invention are to provide a machine in which the tension of the thread or cord being wound is automatically regulated and also to provide means for automatically shifting the belt from the spindle-driving pulley to a loose pulley for stopping the rotation of the winding-spindle when one of the following contingencies arise, viz: the exhausting or breaking of the thread, the catching or the preventing of the thread being fed to the winding-spindle, and the completion of the cop.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents a side view of one of the cop-winding spindles, its driving mechanism, the stop-motion device, and the tension device, the parts being represented in their normal position when the cop is being wound. Fig. 2 is a top plan view of the same. Fig. 3 is a partial side view of the same, showing the position of the parts when the belt has been shifted to the idle pulley upon the winding-spindle by the breakage or exhausting of the thread, the thread-guiding arms being shown in dotted lines rocked to a position which they would assume when the thread is caught or prevented from being freely fed in any manner. Fig. 4 is a cross-section in the plane of the line 4 4 of Fig. 3, and Fig. 5 is an enlarged detail view of the tension-clip.

The thread-winding spindle is denoted by A, and it is mounted in suitable bearings in a pair of arms *b b'*, uprising from a suitable base-plate B, so as to freely rotate and at the same time be freely reciprocated longitudinally. The winding-spindle A is provided with a driving-pulley *a* and a loose pulley *a'*, the said pulleys being located between the supporting-arms *b b'*.

A hollow cone shell B' of usual construction is hinged to the front of the base-plate B in position to embrace the forward end of the spindle A at the point where the cop is to be wound and is adapted to engage the cop as it is being wound to force the spindle rearwardly.

The device for shifting the driving-belt (not shown) back and forth between the driving-pulley and the loose or idle pulley comprises a shifter-bar C, mounted in suitable bearings in the arms *b b'*, so as to slide forwardly and backwardly therein, the said bar carrying the shifter-arm *c*, adapted to engage said driving-belt. This shifter-bar C is held normally with its arm *c* in position to guide the belt upon the idle pulley *a'* by means of a spring D, interposed between the arm *b'* and the shifter-arm *c*.

The belt-shifter is held with the arm *c* in position to guide the belt upon the fast pulley *a* and against the tension of the spring D by means of a pawl-lever E, mounted to rock in a vertical plane in suitable bearings in the arm *b'*. This pawl-lever E is provided with a projection *e*, which is adapted to engage an abutment on recess *c'* in the shifting-bar C. The lever E is further provided with a projection *e'* opposite the projection *e*. The lever E is further provided with an upwardly-extended arm e^2, which is adapted to be engaged by the tripping device carried by the thread-guide arms, to be hereinafter more fully described.

A releasing-bar F is mounted to slide forwardly and backwardly within suitable bearings in the arms *b b'*, the said bar F being connected by a short rod *f* with the rear end of the winding-spindle A, so that the releasing-bar F and the spindle A are caused to be simultaneously slid forwardly or backwardly. The releasing-bar F is provided with a suitable handle *f'* at its forward end for use in operating the said bar.

A releasing-hook f^2 is carried by the bar F near its forward end in position to engage the lug *e'* upon the rocking lever E for lifting its projection *e* out of engagement with the shifter-bar C for permitting the spring D to shift the belt onto the idle pulley *a'* as the bar F is slid rearwardly.

A rocking head G is mounted in suitable bearings at the upper end of an upwardly-

extended arm b^2, carried by the base-plate B. This arm b^2 may be secured permanently to the said plate B or formed integral therewith, as may be desired. The rock-head G is provided with a pair of forwardly-extended guide-arms H, having eyes h at their outer or forward ends, through which the thread is caused to pass on its way to the winding-spindle.

A tension-arm I extends forwardly from the arm b^2 and is adjustably secured thereto by means of a suitable clamping-screw i. This arm I is provided with a downwardly-extended portion i', located in proximity to the eyes h in the ends of the guide-arms H and in a plane between the said arms. A tension-clip J is adjustably secured by means of a clamp-nut j along the downwardly-extended portion of the arm I, the said clip being provided with a pair of downwardly-extended horns j' j^2. These horns are located in different planes and extend outwardly from each other, and also have their ends extending downwardly into position at each side of and in close proximity to the downwardly-extended portion i' of the tension-arm I.

A tension-spring K is engaged with the rocking head G at one end and has its other end engaged with a lug b^3 upon the arm b^2, the tendency of the said spring being to rock the head G rearwardly to swing the arms H upwardly. This spring K, in connection with the guide-arms H, the tension-arm I, and its clip J, serves to keep the thread which passes through the eyes h and in engagement with the clip between the eyes under proper tension.

A tripping device L is carried by the rocking head G, the said tripping device being provided with a pair of lugs or pins l l', which extend laterally into position to engage the arm e^2 of the pawl-lever E for releasing the lever from its engagement with the belt-shifting mechanism when the guide-bars H are rocked to the limit of their movement in either direction. The arm e^2 is preferably provided with a suitable nose e^3, which is adapted to be engaged by one or the other of the said pins l l'.

The tension of the spring K may be increased or diminished at pleasure in the present instance by causing its lower end to engage any one of a series of notches b^4 along the end side of the lug or branch b^3 upon the arm b^2. The guide-arms H may be slid forwardly and backwardly and then clamped by suitable screws h', so as to properly adjust the eyes h relatively to the clip J.

When it is desired to thread the machine, the thread is passed directly through the eyes h in the guides H and from thence is passed downwardly and caused to engage the forward end of the spindle A. The guide-arms H are then depressed against the tension of the spring K until the eyes h are at a point below the end of the tension-arm I. The bars H are then permitted to swing upwardly. As the bars swing upwardly the end of the tension-arm I will engage the thread between the eyes h and draw the same upwardly between the horns on the clip J, when the thread will be properly threaded for winding. In this position the guide-arms H are held at a point intermediate the limits of their upward and downward movements.

Supposing the machine be threaded in position to wind the cop upon the spindle and the belt is upon the drive-pulley a, the operation of my invention is as follows: As the cop is being wound it will, because of its engagement with the shell, gradually force the spindle A rearwardly, thereby also drawing the shifting-rod F rearwardly with it. As the winding of the cop is completed the hook f^2 is caused to engage the abutment e' upon the pawl-lever E, thereby releasing the lever from its engagement with the shifting mechanism and permitting the shifting mechanism to automatically shift the belt onto the idle pulley a', and thereby stop the machine. If the thread should become caught in any manner, as by knotting, the winding of the spindle A will draw the guide-arms H downwardly until the pin l' upon the tripping-plate L is caused to engage the nose e^3 upon the arm e^2 of the pawl-lever E, and thereby automatically release the shifting mechanism for stopping the machine. Again, if the thread should break or become exhausted the arms H will be released and will fly upwardly, causing the pin l to engage the nose on the arm e^2 and in that manner release the shifting mechanism and cause the machine to stop.

The starting and stopping of the machine are at all times under the control of the operator. When it is desired to start the machine, the shifter-bar C is drawn forwardly until the belt is shifted onto the drive-pulley a, and the bar is automatically held by the pawl-lever E. To stop the machine, the operator may force the releasing-bar F rearwardly, and thereby cause the hook f^2 to engage the pawl-lever E and raise it, thereby releasing the shifting mechanism and permitting the belt to be shifted back to the idle pulley a'.

It will thus be seen that all of the contingencies which are liable to arise and cause the improper winding of the cop are provided for because of the automatic stopping of the winding, as above described. Furthermore, it will be seen that the tension upon the thread may be very accurately adjusted and also that the machine may be threaded very quickly and easily.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but

What I claim is—

1. In a cop-winding machine, the combination with a winding-spindle, means for driving it and a tension device through which the thread is fed to the spindle, of a stop-motion

comprising a belt-shifter and a mechanically-operated trip mechanism comprising a single device under the direct control of the thread being wound when its tension is abnormally increased or decreased and independent means for operating the trip mechanism under the direct control of the wound cop, substantially as set forth.

2. The combination with a winding-spindle, means for driving it and a tension device through which the thread is fed to the spindle, of a stop-motion comprising a belt-shifter, a pawl-lever normally engaging the shifter, a tripping device consisting of a rocking head carrying guide-arms engaged by the thread being wound and a tripping-plate adapted to engage the pawl-lever to release it from the belt-shifter when the guide-arms are raised or lowered to a considerable degree beyond their normal position by the abnormal decrease or increase of tension, substantially as set forth.

3. A tension device for winding-machines comprising a pair of swinging guide-arms having eyes for the passage of the thread therethrough, a tension-arm having a downwardly-extended portion located in a plane between the paths of the swinging movements of the guide-arms and in proximity to their eyes, a clip secured to said downwardly-extended portion of the tension-arm, the said clip having a pair of prongs adapted to engage the thread and retain it upon the tension-arm and a spring tending to swing the guide-arms upwardly for holding the thread under tension, substantially as set forth.

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