June 19, 1928. 1,673,815

H. E. ELLSWORTH

THREAD WINDING MACHINE

Filed April 12, 1927

Fig. 1.

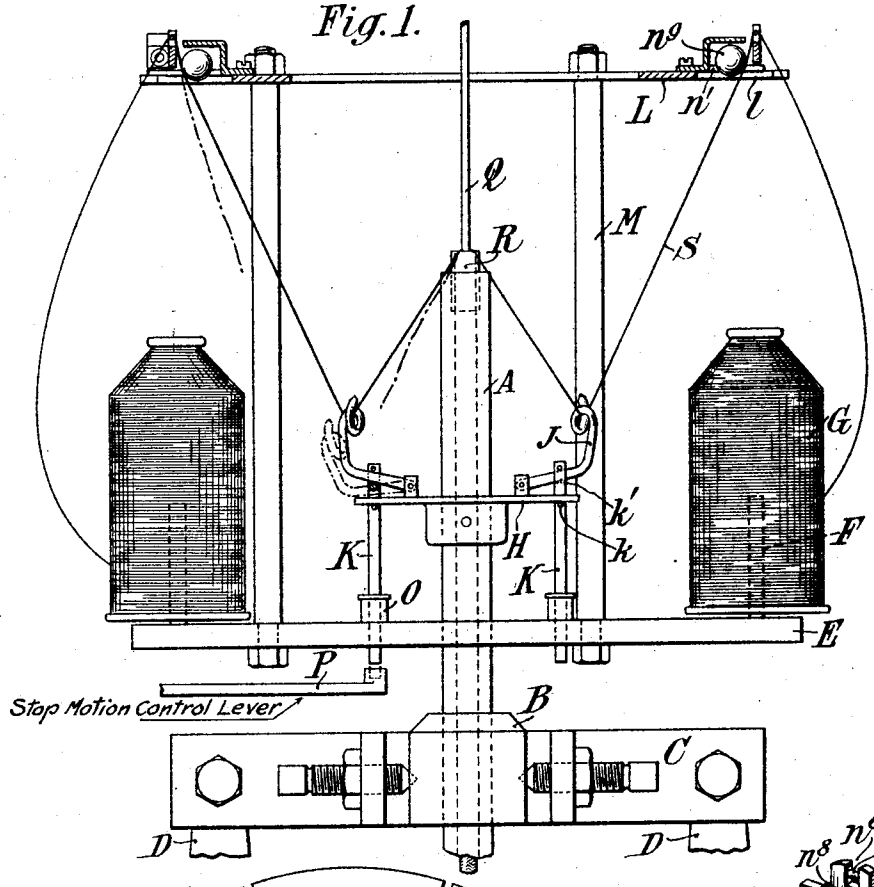
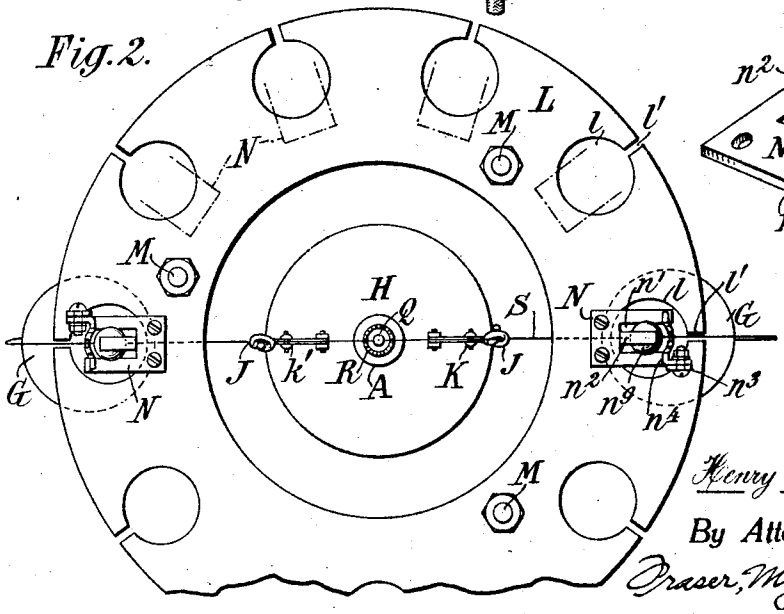


Fig. 2.



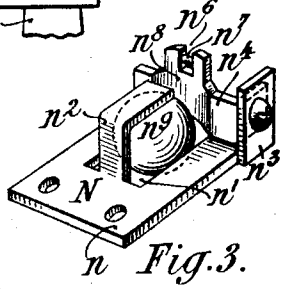


Fig. 3.

INVENTOR :
Henry E. Ellsworth,
By Attorneys,
Fraser, Myers & Manley

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UNITED STATES PATENT OFFICE.

HENRY E. ELLSWORTH, OF SIMSBURY, CONNECTICUT, ASSIGNOR TO THE ENSIGN-BICKFORD CO., OF SIMSBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

THREAD-WINDING MACHINE.

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This invention relates to improvements in thread-winding machines for covering wire, tape or the like, and more particularly to the means in such machines for tensioning the yarn during the application thereof to the material being covered. It also aims to provide certain improvements in the means for automatically operating the stopping mechanism of the machine upon the breaking of the yarn.

According to the present invention, the novel means which I have devised for accomplishing these results depend upon the action of the centrifugal force provided by certain rotating parts of the machine.

My improved yarn-tensioning means, in its underlying concept consists of a thread-guiding member and an element adapted to be moved and held by the action of the centrifugal force of a moving part of the machine against a thread passing through said guiding member, and thereby provide the requisite tension on said thread while at the same time permit knots, slubs or imperfections in the thread to pass without breaking the thread.

My means for automatically controlling the mechanism for stopping the machine preferably consists of a plurality of members having guides through which the threads pass, said members being mounted upon a rotatable part of the machine and adapted, when acted upon by the centrifugal force of said rotatable part, to assume positions of engagement with the mechanism for stopping the motion of the machine upon the breaking of one of the tensioned threads, and said members being held out of such engaging position with the stopping mechanism by the threads under tension passing through the guide members. The invention also embodies other features of novelty which will be hereinafter more fully described.

By way of example I have shown one embodiment of my invention in the accompanying drawings, wherein:

Figure 1 is an elevation partly in section of a portion of a thread-winding machine embodying my invention.

Fig. 2 is a top plan view of the machine.

Fig. 3 is a perspective view of the thread-tensioning device.

Referring to the drawings, let A indicate a hollow tube or barrel, which preferably extends in a vertical direction and is supported by a suitable bearing B, which, in turn, is carried by a supporting frame C mounted on standards D. Upon the barrel A is mounted a bobbin plate E provided with a plurality of vertical spindles F which carry the bobbins G. Also mounted on the barrel A is a second plate H which carries a plurality of pigtail guides J, which, in turn, control the movement of plungers K which pass through both the plates H and E, the function and operation of which will be presently made apparent. A third plate L is mounted in concentric spaced relation to the plates E and H and is supported by stud bolts M passing through the plates E and L. It will accordingly be seen that the barrel A and the three plates E, H and L are mounted to rotate as a unit.

The uppermost plate L has mounted thereon a plurality of thread-tensioning devices N, the number of said devices corresponding to the number of spindles F and pigtail guides J. Each of said devices N preferably consists of a frame or cage which comprises a base plate n adapted to be secured to the plate L by suitable fastening means, said plate n having a central elongated opening n' over which extends in spaced relation an integral bent lip n^2, and extending upwardly at right angles from the side of the plate at one end thereof is an integral ear or lug n^3. Mounted on the base plate n at one end thereof and extending at right angles thereto is an end plate n^4, one end of which is bent at right angles thereto and secured to the lug n^3 by a screw and nut connection or by other equivalent means. The end plate n^4 is formed with a pair of upstanding lugs which provide a guide opening n^6, within which may be mounted any suitable means, such as a spindle n^7, over which a thread can easily ride. The plate n^4 is also preferably formed with a concave face n^8 for cooperation with a ball n^9 which is confined within the frame or cage between the base n, tongue n^2 and end plate n^4, and free for longitudinal movement in the opening n'. The purpose of this ball will presently be made apparent. The plate L directly under each thread-tension device N is provided with a circular opening l as a clearance opening for

the ball n^9 mounted in the cage or frame, and a radial slot l' leading to the outer periphery of the plate L from the opening l, which slot is intended to permit easy threading of the guide for the thread which is led from the bobbin through the device N.

The pigtail guides J are pivotally mounted at one end of the plate H and free to move in a vertical plane, the extent of said movement in an upward direction being limited by a transverse pin k extending through the plunger K and adapted to engage the under side of the plate H. Movement of the plunger K is controlled by movement of the pigtail guide J, the lower portion of which extends through an elongated slot k' in the plunger K. The lower end of the plunger K is further guided in its movement by bushings O mounted on the plate E.

P indicates a lever, the movement of which in a horizontal plane operates a mechanism of any well-known design (not shown), for disengaging the driving mechanism or stopping the rotation of the thread-winding machine.

Q is the material to be covered, and is fed through the barrel A of the machine at a uniform rate by any well-known mechanism (not shown). At the top of the barrel A is a jack R which functions to guide and distribute the threads S onto the material Q as it is fed through the barrel A.

Operation.—Rotation of the machine provides unitary rotation of the barrel A and plates E, H and L. The threads S are carried from the bobbins G through the guide slots l' and n^6, then down through the opening n' and l through the pigtail guides J, and then upwardly to the jack R. The machine rotating upon its vertical axis produces in the various parts a certain amount of centrifugal force, and said force, acting on the balls n^9, causes them to move radially outwardly against the threads S and exert a pressure thereon which tensions the threads between the balls n^9 and the jack R. This tension on the threads causes the pigtails J to lift to the position shown in full line in Fig. 1 and draw with them the plungers K to clear the top of the stop motion lever P. The instant any one of the threads S breaks, the pull upon the particular pigtail through which said thread passes is removed, whereupon the pigtail drops to the position indicated in dotted lines in Fig. 1 and carries with it the plunger K to its dotted line position, in which it strikes the lever P, causing it to operate the mechanism for stopping the machine. It will be noted that the movement of the plunger K downwardly will result from the action of gravity upon it and upon the pigtail which controls it. It will also be noted, however, that the centrifugal force produced by the rotation of the plate H which carries the pigtails J, operates upon the pigtails to throw them outwardly, that is to say, into a horizontal plane or the plane of the plate H, which action, it will be apparent, assists the action of gravity in moving the plungers K downwardly. It will be understood, however, that the tension on the threads S provided by the centrifugal force acting upon the balls n^9 is sufficient to counteract the centrifugal force which tends to move the pigtails downwardly, and therefore the effective action of centrifugal force on any one of the pigtails to move it downwardly will come into play only when the tension on a particular thread is withdrawn.

While I have shown and described a preferred embodiment of my invention, it will be understood that I do not wish to be limited to the details of construction herein disclosed, since various modifications thereof may be resorted to without departing from the concept or spirit underlying the present invention.

What I claim is:

1. A thread-winding machine comprising a thread-tension device having a thread passing therethrough, said tension device being mounted upon a rotating carrier, and an element adapted to be moved by the action of centrifugal force into engagement with said thread to tension the same.

2. A thread-winding machine comprising a rotating member having a thread passing therethrough, and an element carried by said rotating member adapted to be moved by the centrifugal force of said rotating member into engagement with said thread to subject it to tension.

3. A thread-winding machine having a thread-tension device mounted on a rotating part of the machine, said thread-tension device comprising a thread guide and an opening through which a guided thread can pass, a movable element capable of limited radial movement within the thread opening, and said element being adapted to be moved in said opening by the centrifugal force of the rotating part of the machine upon which it is mounted.

4. A thread-winding machine having a thread-tension device mounted on a rotating part of the machine, said thread-tension device comprising a frame or cage having an opening through which a thread may pass, and a ball within said opening capable of being moved outwardly by the centrifugal force of the rotating part of the machine upon which the thread-tension device is mounted.

5. A thread-winding machine comprising a rotatable bobbin plate having bobbins thereon, a second plate in spaced relation to the bobbin plate and rotatable therewith, thread-tension devices on said second plate, one for each bobbin on the bobbin plate, and centrifugally-governed means within said

thread-tension devices for tensioning the threads passing from the bobbins through said thread-tension devices.

6. A thread-tensioning device comprising a frame or cage having a thread-guide, an opening through which a thread can pass, and an element in said frame adapted to be moved by the action of centrifugal force from one position to another, in which latter position it will act upon a thread passing through said frame to subject said thread to tension.

7. A thread-tensioning device comprising a frame or cage having a thread guide, an elongated opening through which a thread can pass, and a ball in said frame adapted to be moved by the action of centrifugal force from one position to another in the direction of the elongated opening, in which latter position it will act upon a thread passing through said frame to subject said thread to tension.

In witness whereof, I have hereunto signed my name.

HENRY E. ELLSWORTH.