No. 649,088. Patented May 8, 1900.

S. W. WARDWELL, JR.

AUTOMATIC THREADING DEVICE FOR WINDING MACHINES.

(Application filed Nov. 14, 1898.)

(No Model.) 3 Sheets—Sheet 1.

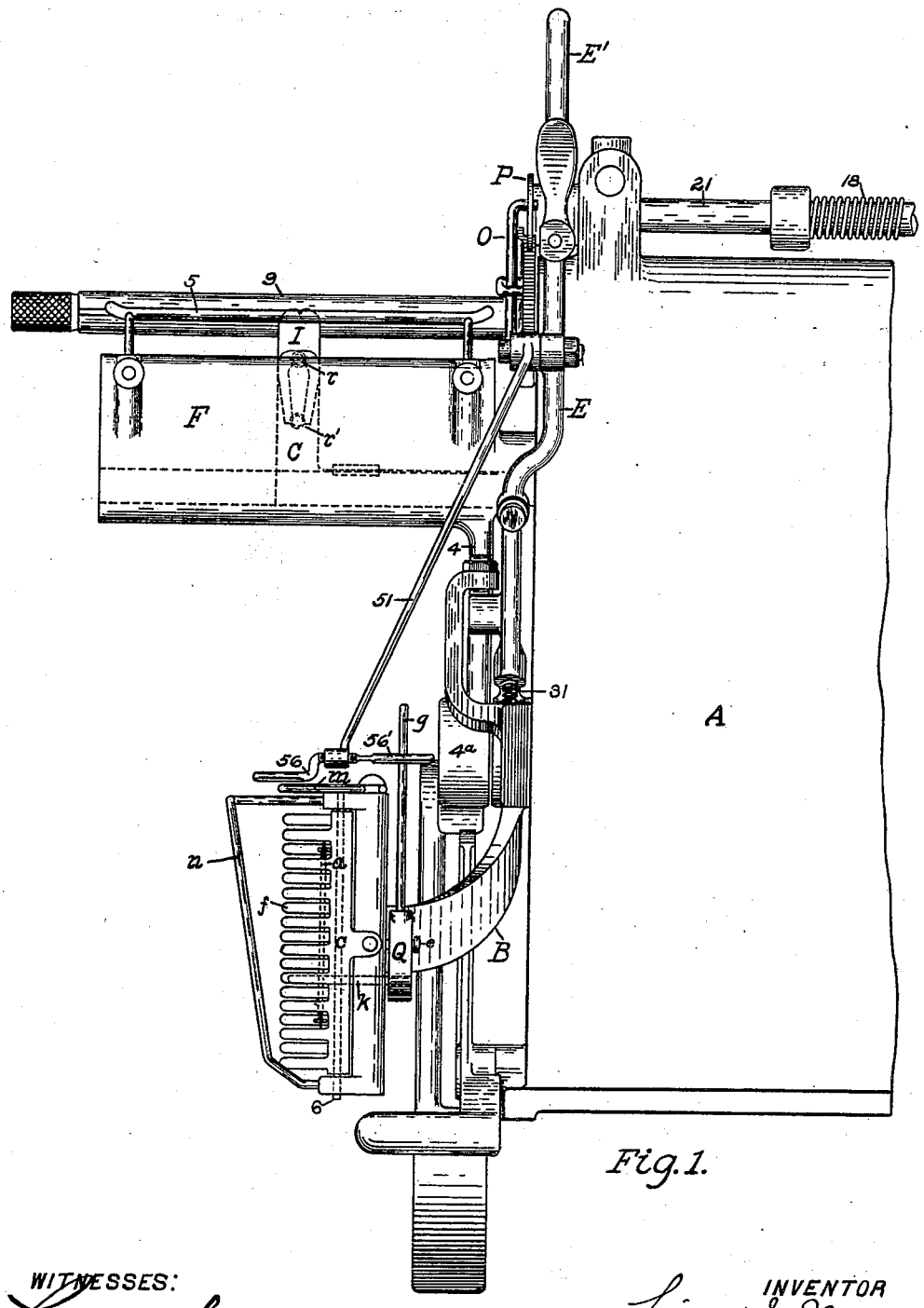

Fig. 1.

WITNESSES:

Laurence Stevens

T. Philip Farnsworth

INVENTOR

Simon W. Wardwell Jr.

BY

Foster Freeman

ATTORNEYS

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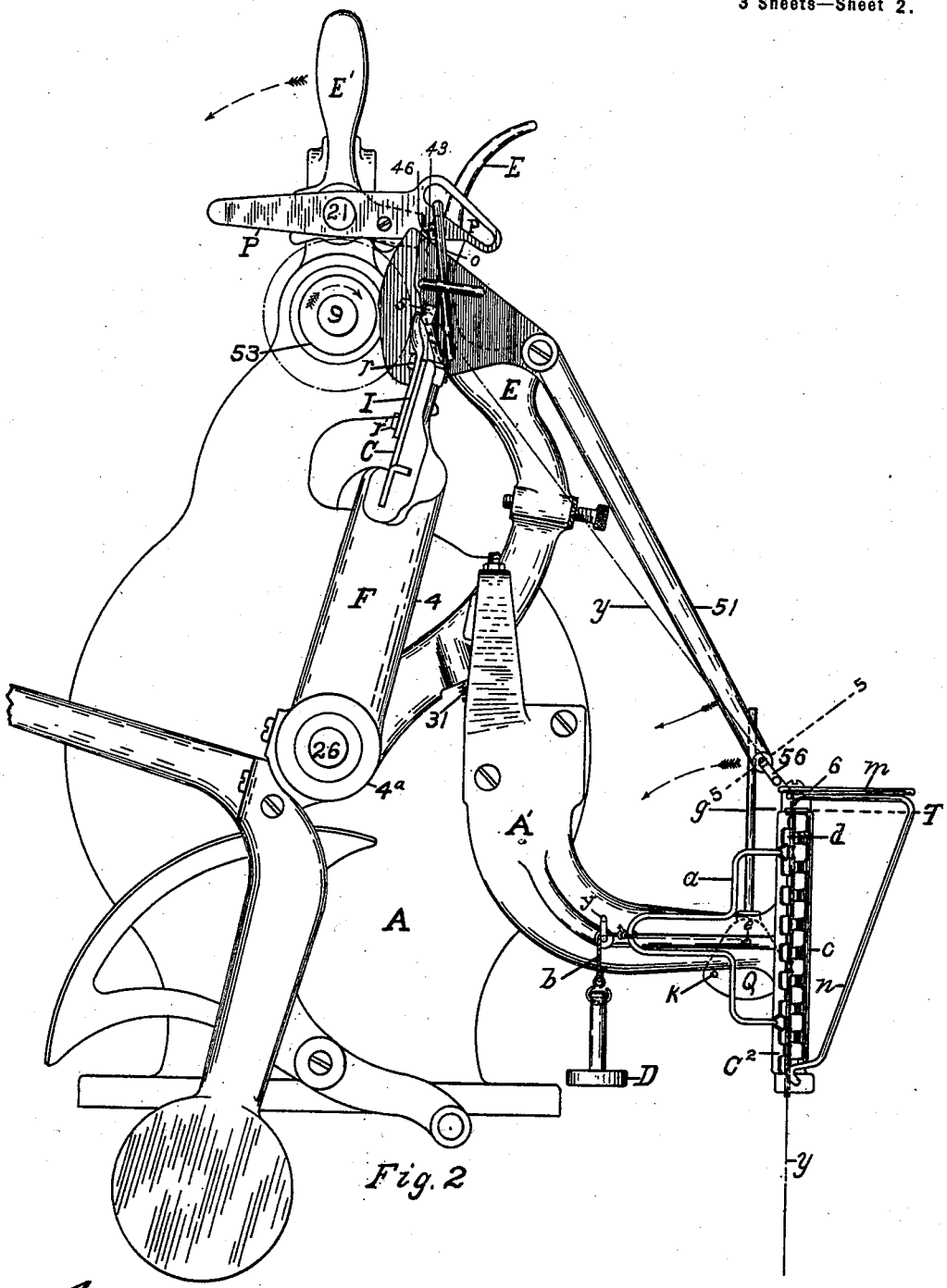

Fig. 2

WITNESSES:

Fanes. Stevens

F. Philip Farnsworth

INVENTOR

Simon W. Wardwell Jr

BY

Foster Freeman

ATTORNEYS.

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S. W. WARDWELL, JR.

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3 Sheets—Sheet 3.

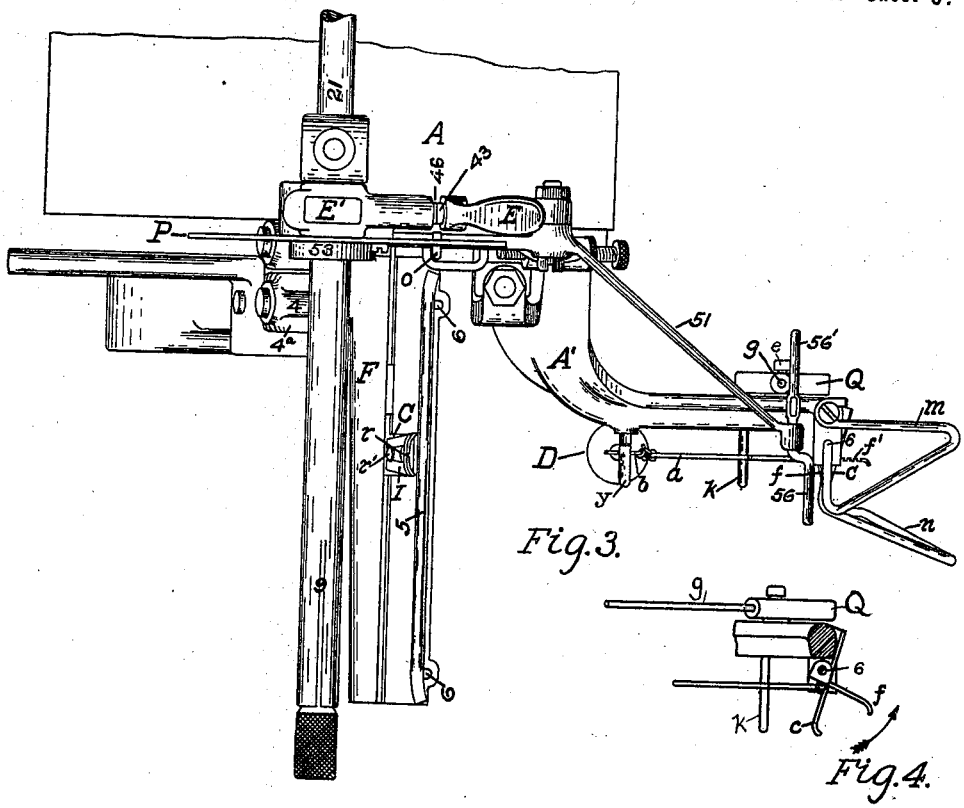


Fig. 3.

Fig. 4.

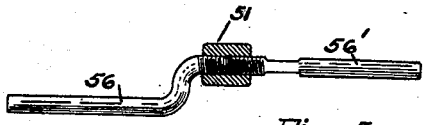
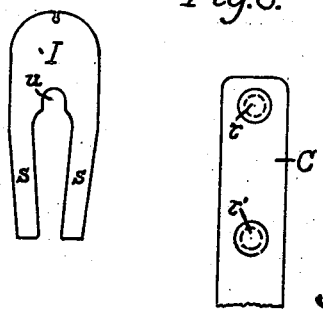


Fig. 5.

Fig. 6.



WITNESSES:

James A. Stevens

F. Philip Farnsworth

INVENTOR

Simon W. Wardwell Jr.

BY

Louis Freeman

ATTORNEY.

UNITED STATES PATENT OFFICE.

SIMON W. WARDWELL, JR., OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE UNIVERSAL WINDING COMPANY, OF PORTLAND, MAINE.

AUTOMATIC THREADING DEVICE FOR WINDING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 649,088, dated May 8, 1900.

Application filed November 14, 1898. Serial No. 696,461. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing in the city and county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Automatic Threading Devices for Winding-Machines, of which the following is a specification.

In different classes of machines in which there are thread carriers and tension devices difficulty has been experienced in connection with the operations from the fact that it is necessary to manually open and hold open the tension devices during the adjustments or insertion of the thread while passing it to the thread-carrier. This has been specially the case with some forms of thread-winding machines, and in such machines where reciprocating thread-guides are employed it has heretofore been necessary to place thread in the notch of the guide before the starting of the machine, as otherwise the thread would run onto the spindle in belts or ridges instead of being evenly laid or would be thrown beyond the limits of the cop or package in a shapeless mass, ruining the package and wasting the material and the time of the attendants. To avoid these difficulties and secure other advantages, I have devised certain means, fully set forth hereinafter and illustrated in connection with a winding-machine in the accompanying drawings, in which—

Figure 1 is a front elevation of part of a winding-machine embodying my improvements. Fig. 2. is a side elevation. Fig. 3 is a plan view. Fig. 4 is a detached sectional plan on the line T, Fig. 2. Fig. 5 is a section on the line 5 5, Fig. 2, drawn upon an enlarged scale. Fig. 6 is a detached view of the thread-guide and part of the guide-carrier.

My invention is adapted for use in different classes of machines in which are combined thread-carriers and tension devices.

According to the character of the machine the thread carrier may be a thread-guide, needle, or spindle or other part to which the thread passes after passing through the tension device, and the latter may be constructed in any suitable manner so as to provide two or more separable parts, between which the thread must pass. While I shall refer to these devices as a thread-carrier and thread-tension, it must be understood that the material operated upon may be rope, thread, yarn, wire, &c. With such carrier and separable or two-part tension I combine devices of any suitable character which will insure the opening of the tension device to receive the thread when the machine stops and close the said device to apply the proper tension to the thread when the machine is started. These various parts will be differently constructed in different machines or different characters of machines; but I have in the drawings illustrated a construction with the thread-winding machine shown in my Letters Patent No. 567,871, dated September 15, 1896, and with separable thread-tensions substantially like that of my Letters Patent No. 577,337, dated February 16, 1897.

I have used in most instances the same letters and figures of reference in connection with the machine illustrated in the drawings in this case as are employed in my aforesaid Letters Patent No. 567,871, and will therefore not describe in detail all the parts, but will refer to the main features thereof.

In the frame A turns a spindle 9 and shaft 26, and concentrically with the latter swings the guide-frame F, in which reciprocates the guide-carrier C, supporting the guide I. There is also a stopping device (not shown) connected with the shaft 21, which is adapted to be turned by the spring 18 in the direction indicated by the arrow in Fig. 2 to cause the said stopping device to operate to stop the machine.

Extending from the shaft 21 is an arm provided with a detent-shoulder 46, which, engaging a corresponding shoulder 43 on the detent-lever E, resists the rotative tendency of the spring 18, leaving the machine free to run until such time as the aforementioned device is caused to operate to stop the machine. Pivoted to E is a member which I please to term the "end stop-bar" 51, having at its lower end the thread bearing-bar 56 and at its upper end a cam-face adapted to engage the periphery of a disk 53 on the shaft 9.

When the machine is winding, the thread

bearing-bar 56 bears against the portion of the thread Y which is between the tension device and the thread-carrier and under such tension as to hold down the thread-bearing bar 56, thereby restraining the cam end of the end stop-bar 51 from coming into contact with the rotating disk 53. When the thread breaks, the cam end of the stop-bar 51 being the heavier drops into contact with the disk 53, which, rotating in the direction of the arrow, carries it downward, pushing outward the lever E, releasing the shoulders 43 46 from contact, when the spring 18 will turn the shaft 21 and stop the machine. The parts are reset by means of a hand-lever E', by means of which the shaft 21 may be rocked back until the shoulders are engaged, the lever E being thrown upward by a spring 31.

The tension device, as shown, consists of a stationary comb or series of fingers *c* and a similar comb or series of fingers *f*, which is pivoted on a vertical rod 6. The fingers in these two series or combs are so disposed that in order to open the tension for threading the movable comb *f* is rocked on the rod 6 in the direction indicated by the arrow in Fig. 4 until its fingers, passing between those of the fixed series on comb *c*, assume the position indicated in Fig. 4, as well as by the dotted lines in Fig. 3 at *f'*. The thread Y is passed vertically between the two sets of fingers, so that when the tensions close the fingers of the movable series *f* close upon it and by forcing it between the fingers of the fixed comb and causing it to travel in a more or less devious path imparts an amount of tension dependent upon the force applied to the movable series of fingers. As shown in the drawings, in this case a yoke *a* is pivoted to the movable fingers at its ends and is connected by a small cord *b*, passing through an eye Y, with a weight D, which may be increased or decreased, according to the character of the thread or other material and the amount of tension desired.

With the above-described parts I have provided means whereby the lower end of the end stop-bar 51 is thrown forward to open the tension after the lever E' has been pushed back and as the machine is stopped. Various appliances and connections may be employed for this purpose. As shown, an arm P, having an inclined slot *p*, is secured to the shaft 21, and the slot *p* receives the bent end of a rod *o*, pivoted to the cam end of the end stop-bar 51, so that after the shoulders 43 46 are released and the slotted end of the arm P rises the lower end of the end stop-bar 51 will be swung in the direction of its arrow, Fig. 2. In thus moving a prolongation 56' of the thread-bearing bar 56 makes contact with the upper arm *g* of a lever Q, pivoted at *e* and carrying a finger *k*, which as the arm *g* moves in the direction of its arrow makes contact with the yoke *a* and carries back the movable fingers of the tension device, which are thus held open, so as to readily permit the thread to be drawn between the two sets of fingers or to allow another thread to be inserted.

When the lever E' is turned to start the machine, the arm *p* is also moved, thereby allowing the rod *o* to take any position to which the end stop-bar 51 may drag it as the heavy or cam end thereof falls. This latter motion causes the opposite end of 51, which carries the thread bearing-bar 56, to rise, thus relieving the pressure on the lever Q and permitting the tension to close.

In order to avoid delays incident to adjusting the thread in the tension device, I provide the latter with suitable thread-guiding devices—as, for instance, with guide-wires *n m*, converging toward the point where the thread is to remain and allow its ready insertion, when the draft upon the thread will carry it to its position to be caught between the two parts of the tension device, whence it will be carried over the thread bearing-bar 56 on its way to the thread-guide I.

The machine being stopped is threaded as follows: The operator simply draws the thread between the guide-wires *m n*, which guide it to its appropriate position in the tensions and attaches it to the spindle for winding. To obviate the necessity of placing the thread in the notch of the traversing thread-guide I and to avoid the waste and damage already pointed out, due to the thread being pushed over the end of the cop, I use a traversing guide of special structure. This guide I has its top so formed that it will pass under the thread until the latter reaches the notch provided for the purpose, into which it falls.

In order to support the thread so that it shall be readily and properly picked up by the traversing guide, I provide a longitudinal thread-supporting bar 5, adjacent to the traversing thread-guide I and parallel to the path of traverse of said guide.

The traversing thread-guide I will usually pick up the yarn without difficulty at any point on the bar 5; but it sometimes occurs when the yarn is dropped near the extremity of the bar that the edge of the guide tends to push the yarn over the end of the cop before the guide can pick the yarn up. In the construction shown the yarn remains on the bar 5, and the upturn at the end of the bar raises the yarn, so that the edge of the guide can push the yarn no farther; but its elevated position allows the guide to slide under it, when it will draw into the slot in the guide.

The guide I is shown as separable from the carrier C. To secure a ready attachment and detachment of the guide, I provide the latter at the bottom with a spring-fork *s* and with an intermediate socket *u* to receive a stud *r* upon the carrier C, having inclined edges so arranged as to bear upon the sides of the lower stud *r'* and tend to draw down the guide,

so that when the latter is applied to the studs it will be held firmly under tension without any tendency to become loose and rattle and yet capable of being readily withdrawn by the application of a comparatively-slight upward pressure.

In order to avoid the necessity of machining the end stop-bars 51 to make them of uniform length, I make the thread bearing-bar 56 adjustable upon the bar 51. This may be done in different ways. As shown in Figs. 2, 3, and 5, the bar 56 is offset, with a threaded stud or projection at one end extending into a transverse threaded opening in the bar 51, so that by turning the bar 56 to different positions it may be set as required. As a means of securing the bar 56 in its position I thread the end of the bar 56′ and pass it in the opposite direction into the same opening in the bar 51 until it bears against the end of the stud of the bar 56.

By the means above described I am enabled to properly place the thread in the tension device and secure its proper insertion in the eye of the guide without the necessity of any attention to these details upon the part of the operator. Further, the tension device is opened to permit the ready movement of the thread or the insertion of another portion of the same thread or another thread whenever the machine is brought to rest and is automatically closed when the machine is started.

I do not here claim any features set forth herein and also in my application, Serial No. 705,802, dated February 17, 1899.

Without limiting myself to the precise construction shown, I claim—

1. The combination with a thread-carrier, of a thread tension device having separable parts, means for bringing the parts together to impart tension to the thread, a bearing-bar bearing against the thread, and connections between the latter and the tension device whereby to open the latter from the movements of the bearing-bar, substantially as described.

2. In a machine provided with a thread-carrier, a two-part tension device and with a starting and stopping device; a bearing-bar bearing on the thread, and connections between the bearing-bar and the stopping and starting mechanism and the tension device, whereby the latter is opened on the shifting of the said mechanism to stop the machine, substantially as described.

3. The combination in a machine provided with a thread-carrier and stopping and starting device and tension, of connections between the tension and stopping and starting device arranged to relieve and put on the tension on shifting the stopping and starting device to stop and start the machine, substantially as described.

4. The combination with the reciprocating thread-carrier, of a winding-machine and with the stopping and starting device thereof, of a two-part tension device, and connections between the stopping and starting device and the tension for relieving and applying the latter on the shifting of the stopping and starting device to stop and start the machine, substantially as described.

5. The combination with the lever 51 and thread-bearing bar 56, of a thread-winding machine, of a two-part tension, and a bar g, and connections whereby to open the tension on the contact of the bearing-bar and the bar g, substantially as described.

6. The combination with a two-part tension device and with a stopping and starting device, of connections whereby to open and close the tension device on the shifting of the stopping and starting device, substantially as described.

7. The combination with a reciprocating notched thread-guide, of a longitudinal thread-bearing, provided with upturned ends, the guide having the end rounded to lift the thread from the bearing into the eye, substantially as described.

8. The combination in a winding-machine, of a spindle, reciprocating notched thread-guide, and support for the thread arranged parallel to the line of traverse of the guide and adjacent thereto, said support having its ends upturned, the top of the guide rounded to lift the thread by the lateral contact of the guide, substantially as described.

9. The combination in a winding-machine of a spindle, reciprocating notched thread-guide having a rounded top edge and support for the thread arranged parallel to the line of traverse of the guide and adjacent thereto and the ends of said support inclined upward to lift the thread, substantially as described.

10. The combination with the separable parts of a tension device arranged vertically, of guides arranged in a horizontal plane above the tension device to direct the thread laterally to and between said vertical parts, substantially as described.

11. The combination of the vertical series of stationary and movable fingers d f, and horizontal guides m, n, above the said fingers substantially as described.

12. The combination in a winding-machine having a stopping and starting device, and a tension device provided with separable series of fingers, of the stop-bar 51, connected to be shifted from the stopping and starting device and connected to operate the movable fingers, substantially as described.

13. The combination of the stop-bar 51, a thread tension device having separable parts, lever Q and connections for actuating the movable part, and a thread bearing-bar 56 adjustable in relation to the lever Q, substantially as described.

14. The combination with a winding-spindle and reciprocating carrier C having studs r r', of a guide provided with spring-arms and adapted to engage said studs, substantially as described.

15. The combination with a winding-spin-

dle and tension device, of a finger bearing on the thread being wound, means for shifting said finger when a thread breaks, and means operated from said finger for shifting the parts of the tension device according to the position of said finger, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIMON W. WARDWELL, JR.

Witnesses:
E. C. SMITH,
A. B. BABBITT.