3 Sheets—Sheet 1.

J. W. WEST.

Machinery for Spooling Thread.

No. 220,555. **Patented Oct. 14, 1879.**

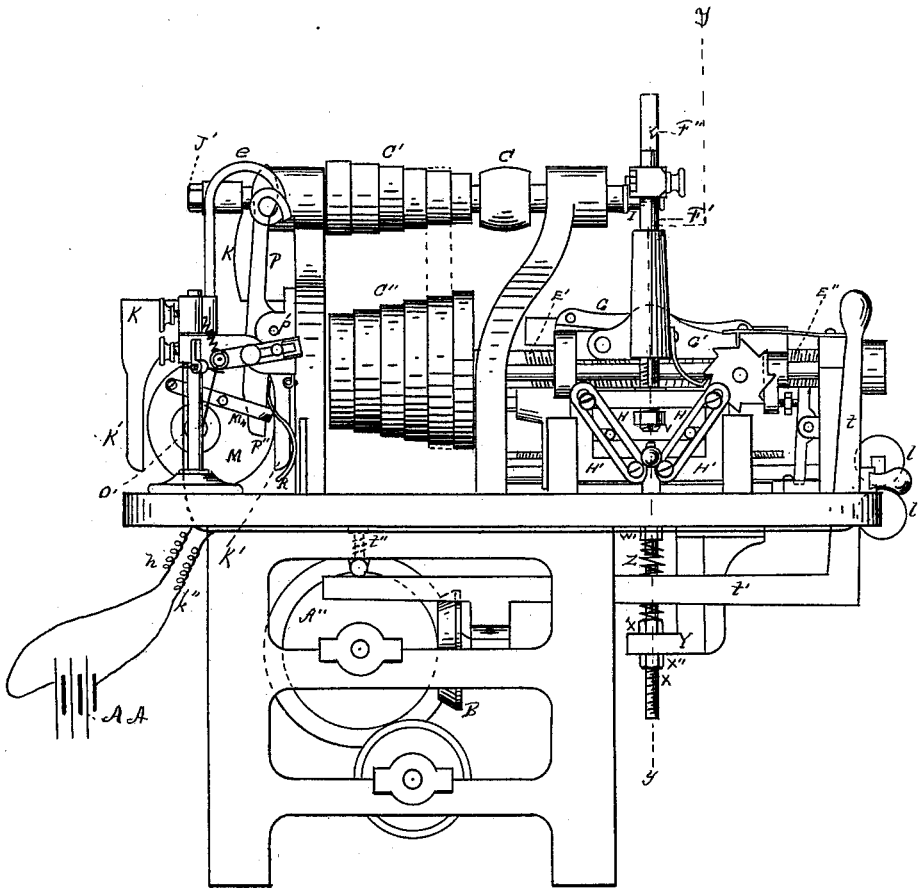

Fig. 1.

Witnesses
Jas. W. Reid Jr.
B. M. Williams

Inventor
John W. West
By his Attys:
Henry W. Williams & Bro.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 2.

J. W. WEST.

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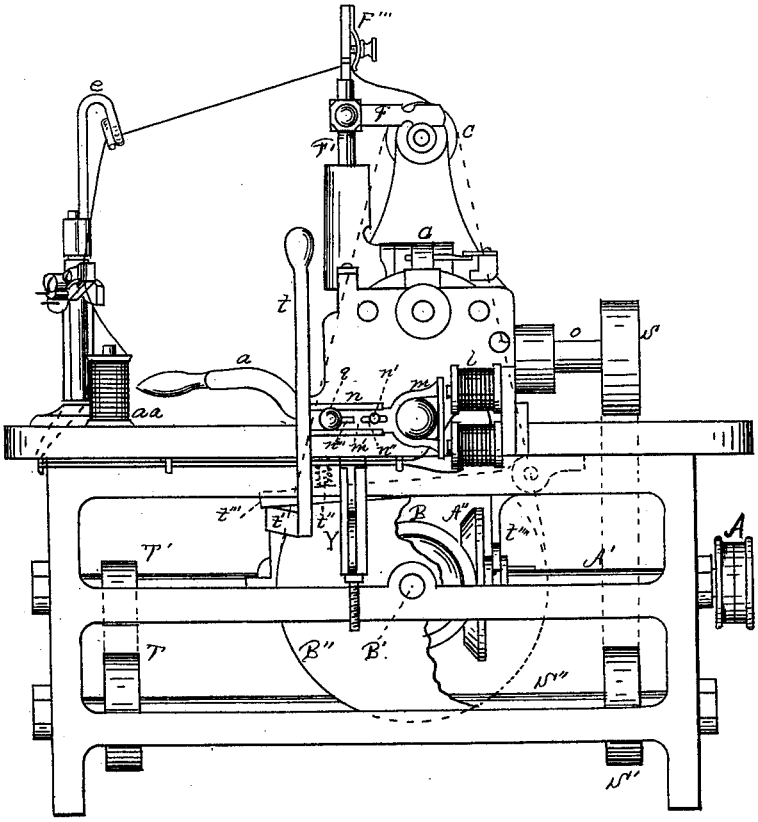

Fig. 2.

WITNESSES.
Jas. U. Reid Jr.
D. W. Williams

INVENTOR
John W. West
By his Attys
Henry W. Williams & Co.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

3 Sheets—Sheet 3.

J. W. WEST.

Machinery for Spooling Thread.

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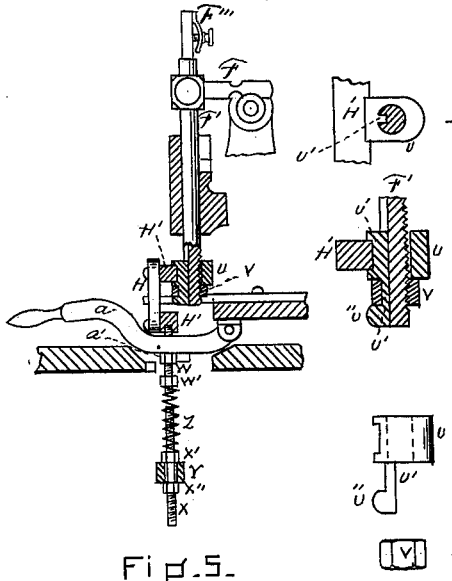

Fig. 5.

Fig. 9.

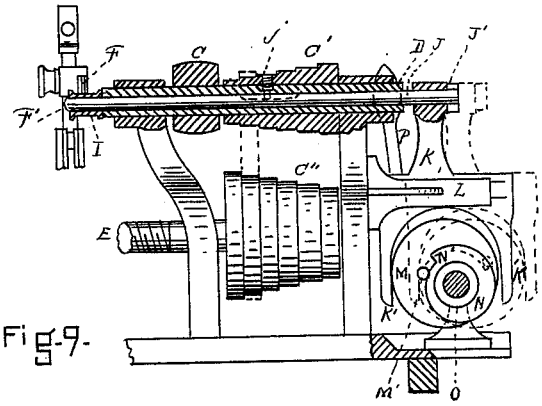

Fig. 3.

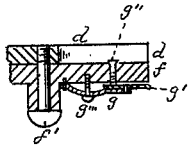

Fig. 10.

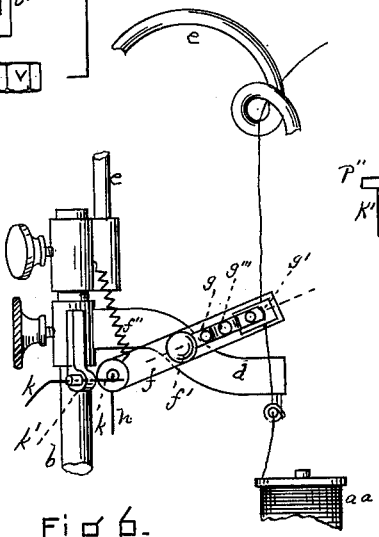

Fig. 6.

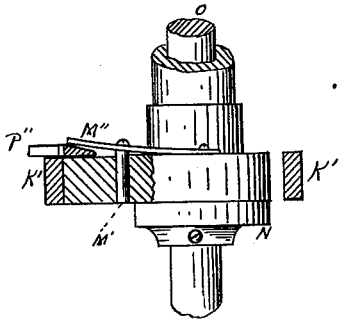

Fig. 4.

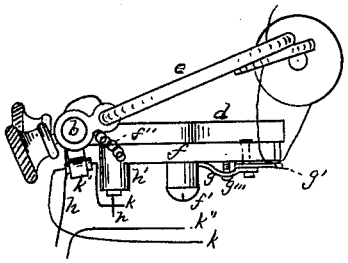

Fig. 7.

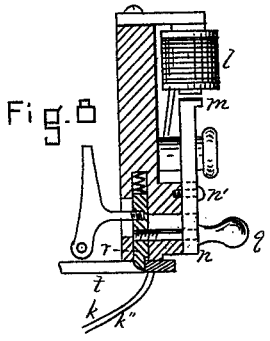

Fig. 8.

WITNESSES

Jas. W. Reid Jr.

B. N. Williams

INVENTOR

John W. West

By his Att'ys,

Henry W. Williams & Co.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN W. WEST, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINERY FOR SPOOLING THREAD.

Specification forming part of Letters Patent No. **220,555**, dated October 14, 1879; application filed June 6, 1879.

To all whom it may concern:

Be it known that I, JOHN W. WEST, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Machinery for Spooling Thread, of which the following is a specification.

This machine is an improvement upon the machines described and shown in the Letters Patent granted to me September 5, 1876, and April 17, 1877, and numbered 181,885 and 189,673, respectively.

In carrying out my present invention I have made additions to the machines shown and described in the above-named Letters Patent, such additions being an improved mechanism for doffing the spool after it has been loaded, mechanism for detecting the presence of knots or other inequalities in the thread supplied to the machine, and stopping the machine when such inequalities are found; mechanism for regulating the pressure of the guide upon the spool, and mechanism for exactly regulating the traverse of the guide-post.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a side elevation of my improved machine. Fig. 2 is an end elevation of the same. Fig. 3 is a part elevation and part longitudinal section, showing the doffing mechanism. Fig. 4 is a plan of the eccentric, cam, &c., used in doffing the spool, partly in section. Fig. 5 is a vertical section upon line *y y*, Fig. 1. Fig. 6 is an elevation of the detecter. Fig. 7 is a plan of the same. Fig. 8 is a plan of the electro-magnetic connection of the same with the machine. Fig. 9 embraces detail views, comprising a horizontal and a vertical section and side elevations of the device for regulating with exactness the position of the guide-rod and for adjusting the traverse of the guide on the spool. Fig. 10 is a horizontal section, enlarged, of a portion of the detecter.

Motion is communicated to the machine by means of pulley A, fixed to shaft A′, to which is also fixed the friction-gear A″, which actuates the friction-gear B upon shaft B′, to which shaft is also fixed the wheel B″, which is connected by a belt (indicated by dotted lines, Fig. 2) with the driving-pulley C upon the tubular rotary arbor D. The speed-pulleys C′ and C″, the former upon the arbor D, and the latter driving the shaft E, having the right and left screws E′ E″ cut upon it, are connected by a belt. (Indicated by dotted lines, Figs. 1 and 3.) F is the guide, and F′ the guide-rod; F″, the slot for the passage of the thread, and F‴ the tension-spring. G is the tilting-lever, pivoted to frame G′, and having female-screw projections at the ends to engage with the screws E′ E″ on the shaft E. H H are the slotted guides or bars in the frame H′, for the purpose of gradually increasing the traverse of the guide F.

All the above-named parts and their connections and operations have been described and shown in the said Letters Patent, excepting the pulleys, &c., for imparting motion, which, of course, are not new.

I will now proceed to describe the improvements or added mechanism in this machine.

It will be understood that the spool I rotates with the shaft J, which is secured by means of the screw or pin *j* to the pulley C′ and to the hollow shaft D, thus causing the three parts C′, D, and J to rotate together. A groove in the shaft J (indicated by dotted lines in Fig. 3) receives the end of the screw *j*, and is made long enough to allow of the retraction of the shaft J. None of these parts, however, are claimed as new in this improvement.

The doffing mechanism consists of the frame K, (see Figs. 1, 3, and 4,) separating into forks K′, and extending at its upper portion around the shaft J, but not preventing it from rotating. A nut, J′, prevents it from slipping off the shaft. This frame is grooved and slides in the tongued projection L. Placed loosely upon the shaft O, between the legs K′, is an eccentric, M, provided with a pin, M′, which passes through a corresponding opening therein and is fastened to a spring, M″, secured to the eccentric.

N is a cam, fixed to the shaft O, and provided with the notch N′.

P is a lever, pivoted at P′, and extending into knife-blade shape at P″. The knife-blade portion P″ is pressed between the spring M″ and eccentric M by means of the spring R, Fig. 1, thus drawing the pin M′ into the eccentric, so that the cam N cannot engage it.

The shaft O, and consequently the cam N, is

rotated by means of the pulley S, which is belted to pulley S′ on shaft S″, the pulley T on shaft S″ being belted to pulley T′ on shaft A′.

To doff the spool quickly, draw the upper end of the lever P back, and the knife-blade end P‴ being then withdrawn from the spring M″, the latter forces the pin M′ through the eccentric M, so that the notched cam N catches it, and thus carries the eccentric, which, revolving, draws back the frame K, and with it the retracting-shaft J, thus dropping the spool. The spring R forces the lever P P‴ back into position. Of course, this operation is performed only when the spool is loaded.

The broken lines in Fig. 3 show the position of the mechanism when the spool is being doffed.

The guide-rod F′ is, in this improvement, provided with a screw-thread and nut, V. The slide U, sliding on the frame H′ and carrying the guide-rod and the upper portion of the frame H′, has a vertical tongue, U′, which fits into a corresponding groove in the guide-rod, and is provided with a teat, U″. The nut V lies above this teat, as seen in Figs. 5 and 9. By turning the nut V, so as to raise the slide U, the frame H′ is also raised, which, as explained in my Letters Patent of September 5, 1876, lengthens the traverse of the guide. Turning the nut down reverses this effect. This nut is to exactly adjust the traverse to the hundredth part of an inch. The general adjustment to different spools is described in the Letters Patent alluded to.

Extending downward from the frame H′ is a rod, W, provided with a screw-thread and a nut, W′, the lower end of which rod is near, but does not touch, a similar rod, X, having nuts X′ X″ placed, respectively, above and below the support Y. A spiral spring, Z, embraces the two rods W and X, and is confined between the nuts W′ and X′. The object of this device is to assist the guide-rod F′, thus somewhat relieving the friction of the guide F upon the thread which is being wound upon the spool. By means of this device the pressure of the guide F upon the spool is considerably relieved, as the spring Z has a tendency to raise the guide-rod F′, thus preventing it from pulling the guide down too heavily upon the spool. The spring presses the rod W upward and the frame H′, and also, by means of the slide U, the guide-rod supporting the guide.

The power of the spring Z is regulated by the nuts upon the rods. This device is valuable in preventing the guide from roughing or injuring silk thread while being loaded upon the spool, and is illustrated in Fig. 5.

The lever *a*, resting upon the nut *a′* on the rod W, is used to bring the guide down upon a fresh spool when it is about to be loaded.

The device for stopping the machine in case of knots or roughness appearing is shown in detail in Figs. 6, 7, and 8.

A standard, *b*, supports an arm, *d*, and an extension, *e*, each of which is secured to said standard by means of a set-screw.

f is a lever, hinged or pivoted to the arm *d* at *f′*, and having its rear end connected with the socket of the extension-rod *e* by a spiral spring, *f‴*.

Attached to the front end of the lever *f* is a spring, *g*, to which is riveted a plate, *g′*, which is held at a proper distance from the lever *f* by means of the set-screw *g*. The plate is set at the distance of the thickness of the thread from the lever by the set-screw *g″*, and the set-screw *g‴* holds the spring *g* down with the proper tension.

An electric wire, *h*, extends from an insulator, *h′*, upon the lever *f* to the battery A A, and a wire, *k*, from an insulator, *k′*, upon the socket of the arm *d* to a magnet, *l*, upon the front end of the machine, such magnet being connected with the battery by the wire *k″*.

m is an armature, (see Figs. 2 and 8,) having an extension, *m′*, which slides in the way *n*, and is held by a projection, *n′*, passing through the slot *n″*.

The handle *q*, connecting with the stop or dagger *r*, passes through the slot *n‴* in the extension *m′*.

t is the lever, whose horizontal arm *t′* is pressed by the horizontal portion *t‴* of a lever having a downwardly-extending-arm, *t⁗*, which engages the friction beveled gear A″.

When the stop *r* is withdrawn the spring *t″* forces down the arm *t‴* and the arm *t′* of the lever *t*, and forces back the lower arm, *t⁗*, and with it the gear A″, disengaging it from the gear B. These parts are shown in Figs. 1 and 2, partly in dotted lines. However, any ordinary stop-motion may be operated by the lever *t* in place of that shown and described.

Now, supposing a knot in the thread to leave the bobbin *a a*, it is drawn up until it reaches the plate *g* on the lever *f*, when, the said plate being set so as to allow the thread and nothing larger to pass through, the knot draws the lever up into the position shown in Figs. 6 and 7, thus causing the wire *h* on the lever *f* to come into contact with the wire *k* on the standard *b*, establishing a circuit.

The armature *m* (see Figs. 2 and 8) is attracted toward the magnet and draws the handle *q* in the slot *n‴* with it, and hence the stop or dagger *r*, thus releasing the lever *t*, which stops the machine.

When the knot has drawn up the lever *f* as far as it will go it forces back the spring *g* and the plate *g′*, and passes between said plate *g′* and the lever *f*, and stops between the rod *e* and the machine, and the lever *f*, being then released, is drawn back into its original position by the spring *f‴*.

The rod *e* may be placed or made as high as desirable, so that the knot may have space to stop in between the detecter and the machine.

Having thus fully described my improvement, what I claim, and desire to secure by Letters Patent, is—

1. In a thread-spooling machine, the combination of the shaft J, frame K, provided with legs K′ K′, shaft O, eccentric M, placed loosely

thereupon and provided with the spring M″ and pin M′, the cam N, fixed on shaft O and having notch N′, and the lever P, terminating in knife-blade shape P″, all arranged and constructed substantially as set forth, and for the purpose of doffing the spool.

2. In combination with the thread-guide of a spooling-machine, the grooved guide post or rod F′, provided with a screw-thread, the slide U, having tongue U′ fitting into the groove of said guide-post and terminating in the teat U″, and the nut V, placed around the tongue and guide-rod and above the teat, arranged and constructed substantially as described, for the purpose of finely adjusting the traverse of the guide on the spool.

3. The combination, with the main frame of the machine, of the guide-rod F′ and guide supported thereby, the frame H′, the rod W, having nut W′, and rod X, having nut X′, said rods being provided with the spring Z, for the purpose of relieving and adjusting the pressure of the guide upon the spool, substantially as specified.

4. In a spooling-machine, the hereinbefore-described mechanism for detecting knots and inequalities in the thread as it is being fed into the machine and automatically stopping the machine, consisting of the standard *b*, having electric wire *k*, lever *f*, having spring *g*, plate *g′*, set-screws *g″ g‴*, and electric wire *h*, the arm *d*, rod *e*, magnet *l*, armature *m m′*, having slot *n‴*, the handle *q*, dagger *r*, the lever *t t′*, the driving mechanism, and devices, substantially as shown, for connecting and disconnecting the parts thereof, and necessary electrical connections, combined and arranged substantially as described.

5. The combination of the lever *f*, plate *g′*, spring *g*, and set-screws *g″ g‴*, arranged and constructed substantially as and for the purpose set forth.

6. The combination of the lever *f*, provided with the plate *g′* and spring *g*, and having the insulator *h′* and wire *h*, the arm *d*, supporting said lever at *f′*, the standard *b*, provided with insulator *k′* and wire *k*, and spring *f″*, arranged and constructed substantially as and for the purpose described.

7. The combination of the lever *t*, stop or dagger *r*, and handle *q* with the armature *m m′*, having slots *n″ n‴* and way *n*, the driving mechanism, and devices substantially as shown for connecting and disconnecting the parts of the same, combined and arranged substantially as described.

8. The combination, with the stopping mechanism of a thread-spooling machine, an electric battery, and an armature, of a knot-detecter consisting of an arm or lever and a yielding plate, and suitable electrical connections, whereby the passage of a knot or bunch in the thread through such detecter instantly stops the machine, substantially as set forth.

JOHN W. WEST.

Witnesses:

HENRY W. WILLIAMS,

EDMUND TROWBRIDGE.