Willis & Rice,

Thread-Winding Machine.

No. 91,891. Patented Jun. 29. 1869.

Fig: 1

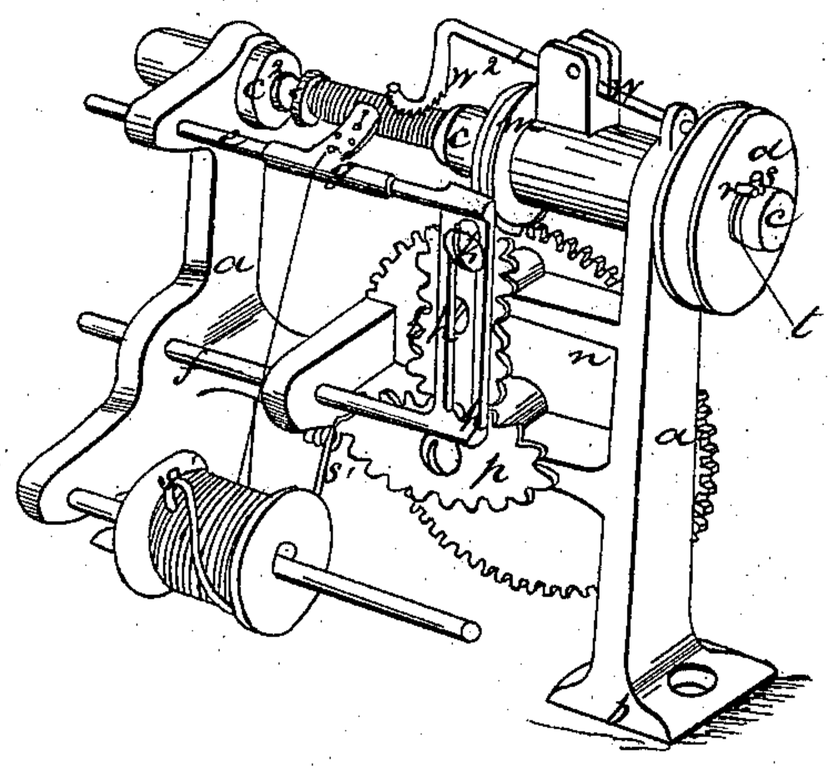
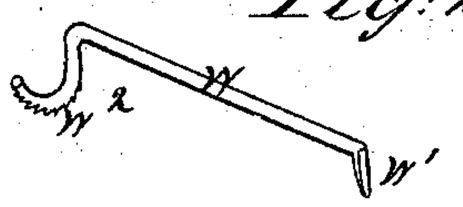


Fig: 2.



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HENRY WILLIS AND GEORGE RICE, OF WORCESTER, ENGLAND.

Letters Patent No. 91,891, *dated June* 29, 1869.

IMPROVEMENT IN MACHINES FOR WINDING THREAD, &c.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that we, HENRY WILLIS and GEORGE RICE, of Worcester, England, have invented certain new and useful Improvements in Winders for Sewing-Machines; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

Our improvements relate to winders for sewing-machines, and their object is to guide the thread, while being wound on the spool, so as to cause the said thread to be wound uniformly on the spool.

Winders made according to our invention may either be used in connection with sewing-machines, so that the winding of one spool may be effected by the machine itself, while the thread on a previously-wound spool is being used, or the said winders may be used apart from sewing-machines.

To enable those skilled in the art to understand and use our invention, we will now proceed to describe the same by reference to the accompanying drawings, in which—

Figure 1 represents, in perspective, a winder constructed in accordance with our invention.

a a are the uprights of the winder, fixed to the base-plate or support *b*.

c is the axis or spindle of the winder, between which and the centre, c^2, (which may be made adjustable in the ordinary manner,) the spool, upon which the thread is to be wound, is fixed.

Motion is given to the spindle *c* by a band or cord from the sewing-machine, or other convenient source of power, passing over the pulley, *d*, on the said spindle.

On a sliding bar, *e*, which passes through one of the uprights *a*, and is arranged in a line parallel with the spindles $c\ c^2$, carrying the spool, is fixed the guide and tension-plate *g*, through one or more of the holes in which plate, according to the degree of tension desired, the thread being wound passes.

The said tension-plate *g* has a reciprocating sliding motion given to it in the following manner:

Below, and parallel with the bar *e* is another sliding bar, *f*, mounted in the frame of the winder; and the two bars are connected by the slotted arm *h*.

In the slot is held the head of a crank-pin, *k*, mounted on the face of a toothed wheel, *l*, which receives motion from the toothed wheel *p*.

Motion is transmitted from the axis or spindle *c*, which gives motion to the spool, to the toothed wheel *p*, by the worm *m*, gearing with the worm-wheel *n*, upon the axis of which worm-wheel *n* the toothed wheel *p* is situated.

The toothed wheel *p* is of a nearly-elliptical figure, the longer diameter of the said wheel being somewhat less than twice its shorter diameter.

The wheel *l*, with which the said elliptical wheel *p* gears, has nearly the shape of the figure 8, or an hour-glass shape.

By the rotation of the toothed wheel *l*, a nearly-uniform reciprocating sliding motion is given to the carrying-frame of the guide and tension-plate *g*, and the thread is wound upon the spool with great uniformity, the shape of the toothed wheels *p* and *l* causing the movement of the tension-plate arm or frame to be reversed quickly, and the crank-pin to rotate with a speed quickest when the tension-plate *g* is about being reversed, and slowest when the tension-plate is in the middle of each stroke.

Tension on the thread being wound on the spool may be produced by means of pressure on the large reel of thread, in addition to that produced by the tension-plate, this pressure being produced by a spring, *s'*, arranged as shown in the drawings, or by other suitable means.

In order to arrest the revolution of the spool when filled with thread, I mount the driving-pulley *d* loosely on the spindle *c*, and so that it may have a limited sliding motion thereon, sufficient to cause the pin *r*, which it carries, to engage with or be disengaged from the pin *s*, on spindle *c*, according as the pulley is moved toward or away from the latter pin.

It is held away from the pin by a spring, *t*, and is forced up, to engage with the pin, by means of an arm, *w*, shown in Figure 2, mounted upon the sleeve or bearing, in which the spindle *c* is held, so that its end, w^1, may be turned, when desired, down between the upright *a* and the contiguous face of the pulley *d*, so as to force the latter outward, to engage with the pin *s*.

The other end, w^2, of the arm *w*, is bent to a hook-form, and hangs over the spool, so that when the latter has received the proper quantity of thread, and is of the desired size, it will come in contact, while revolving, with the teeth formed on the under side of the hooked end, and thus turn the arm *w*, so as to throw the part w^1 out from between the pulley and the upright *a*.

The spring *t* will now throw back the pulley, thus disengaging it from the pin *s*, and the spindle *c* will, consequently, cease to revolve.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, with the guide and tension-plate, and the frame or arm to which the same is attached, of the elliptical and 8-shaped gear-wheels, as described, connected with said slotted frame or arm by a crank-pin, so as to communicate to the frame a reciprocating movement, and receiving motion from the shaft of the winder, substantially in the manner and by the means herein specified.

2. The device for arresting automatically the rotation of the spool, in combination with the winder-spindle and its driving-pulley, arranged and connected together substantially as and for the purposes specified.

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