S. C. KINGMAN.

Machine for Polishing the Eyes of Machine-Needles.

No. 163,384. Patented May 18, 1875.

Fig. 1.

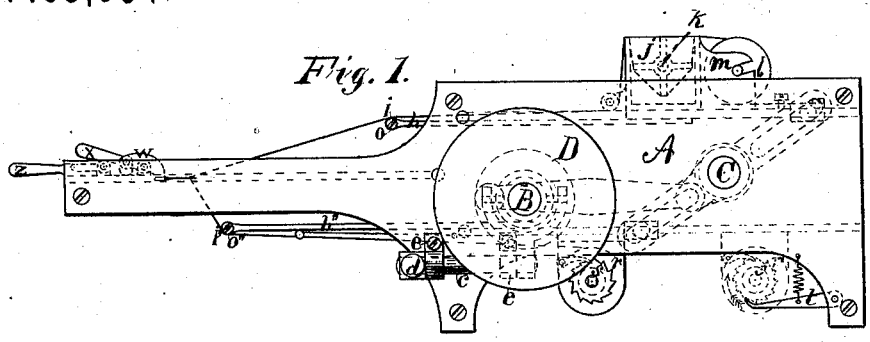


Fig. 4.

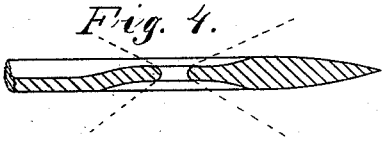


Fig. 2.

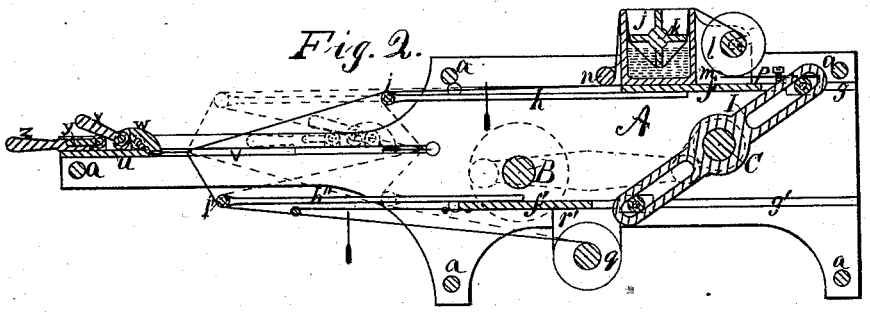
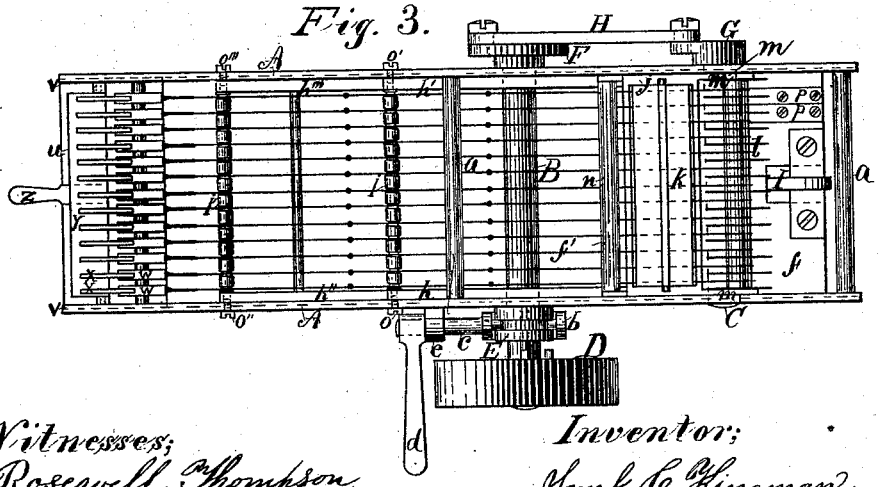


Fig. 3.



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UNITED STATES PATENT OFFICE.

SAMUEL C. KINGMAN, OF BRIDGEPORT, CONN., ASSIGNOR TO WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR POLISHING THE EYES OF MACHINE-NEEDLES.

Specification forming part of Letters Patent No. **163,384**, dated May 18, 1875; application filed March 13, 1875.

To all whom it may concern:

Be it known that I, SAMUEL C. KINGMAN, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new and Improved Machine for Polishing the Eyes of Sewing-Machine Needles; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings making a part of this specification.

The object of my invention is to round and polish the end walls of the eyes of sewing-machine needles, in order to prevent the cutting of the thread by the same, when said needles are in practical operation in sewing-machines; and my improvement consists in controlling a series of two or more needles, and applying certain mechanical devices and movements to a machine in such a manner as to round and polish the end walls of the eyes of said needles with accuracy and rapidity.

To enable others skilled in the art to make and use my invention, I will now proceed to describe the construction and operation of the same, with reference to the accompanying drawings.

Similar letters of reference indicate corresponding parts.

Figure 1 is a side elevation of my improved machine. Fig. 2 is a longitudinal section of the same through the center of the machine. Fig. 3 is a plan of the machine, and Fig. 4 is an enlarged sectional view of a portion of a sewing-machine needle, made in order to clearly show the form of the end walls of the eye in the same.

A is the frame of the machine, constructed with two plates of metal, secured parallel to and at a proper distance from each other by means of the five rods or bolts, *a a a a a*. B is the revolving driving-shaft fitted to bearings in the frame. C is a rock-shaft also fitted to bearings in the frame. D is the driving-pulley running freely on the end of the driving-shaft B. E is a shipper also fitted to the shaft B, but so as to slide freely on the same, with a spline fitted between them. F is a circular disk secured to the opposite end of the shaft B. G is a lever secured to the end of the rock-shaft C. *b* is the shipper-lever. *c* is the shipper-shaft. *d* is a handle secured to the end of the shipper-shaft. *e e* are the shipper-shaft bearings secured to the side of the frame A. *f f'* are plates fitted to the grooves *g g'* in the frame A, but so as to slide freely in the same. *h h' h'' h'''* are elastic arms secured at one end to the plates *f f'*. *i i'* are rolls fitted to revolve freely in bearings in the free ends of the elastic arms. *j* is a pan secured to the top of the plate *f* for the purpose of receiving a mixture of oil and emery. *k* is a paddle wheel or agitator fitted to revolve freely in the pan *j*. *l l* are the spools for receiving the polishing threads, and are fitted to revolve freely on the spool-stand *m*. *n* is a rod fitted to ears on the side of the pan *j*. *o o' o'' o'''* are screws fitted to the bearings in the free ends of the elastic arms *h h' h'' h'''*, the points of which strike the ends of the rolls *i i'* for the purpose of regulating the tension of the same upon the polishing-threads, which are wound once around said rolls.

As the several threads are wound once around in the grooves of the rolls *i* and *i'*, respectively, there is sufficient friction of the threads upon said rolls to cause the same to revolve as the threads are wound upon the reel *g*, and as the screws *o o' o'' o'''* pass through the ends of the elastic arms *h h' h'' h'''*, opposite the end bearings of said rolls, the points of said screws can be forced against the ends of the rolls in a greater or less degree, and cause more or less friction upon the rolls by the points of said screws, and allow said rolls to revolve freely or otherwise, as desired, thus regulating the tension of the working portions of the threads between the rolls *i* and *i'*.

p p are tension-springs, secured at one end to the plate *f*, the free ends of the same pressing against the edges of the spools *l l*. *q* is a reel fitted to revolve freely in the bearings *r r'* on the under side of the plate *f'*. *s* is a ratchet-wheel secured to the end of the reel *q*. *t* is a pawl pivoted to the frame A for the purpose of intermittingly revolving the reel *q*, near the termination of the right-hand stroke of the same. *u* is the needle-plate fitted to slide in the grooves *v* in the frame A. *w w*

are a series of lever-clamps for the purpose of securing the shanks of a series of needles to the plate *u*. *x x* are a series of cam-levers for the purpose of operating the lever-clamps *w w*. *y* is a swinging plate pivoted to ears on the top side of the plate *u* for the purpose of operating the series of cam-levers *x x* simultaneously, when desired. *z* is a handle for controlling the swinging plate *y*.

I will now describe the practical operation of my improved machine with reference to the accompanying drawings.

It is to be understood that a series of threads are first to be wound upon the spools *l l*, said spools having divisions for each thread. The ends of the several threads are then passed over the right-hand top edge of the pan *j*, then under the agitator *k* to cause said threads to pass through the mixture of oil and emery, which partially fills the pan *j*, then over the left-hand top edge of the pan *j*, then under the rod *n*. A series of needles with unpolished eyes are now strung upon the threads, between the rod *n* and roll *i*, in the manner shown in the drawings, Figs. 2 and 3. One row of said needles is now moved to the needle-plate *u*, the shanks of the same being secured to said plate by means of the series of lever-clamps *w w* in the manner shown in the drawings, said plate having a series of semicircular grooves made in the same, corresponding in diameter to the size of the shanks of said needles. The threads are now passed around the roll *i'* and then secured to the reel *q*. Motion is now communicated to the driving-pulley D in either direction, when the shipper *b* is brought in contact with the said revolving pulley by means of the handle *d*, which imparts a revolving motion to said shipper, splined shaft B, and disk F. An oscillating motion is now imparted to the rock-shaft C by means of the connecting-rod H and lever G, which in turn imparts reciprocating motions to the plates *f* and *f'* and parts connected therewith by means of the oscillating double-slotted lever I. The movements of the reciprocating plates *f* and *f'* in opposite directions now cause the series of polishing-threads to be rapidly drawn to and fro through the eyes of the several needles which are secured to the plate *u*, and the position of said plate and needles with respect to the reciprocating rolls *i* and *i'* is such as to cause said threads to present various angles to said needles during said movements, as shown in the drawing, Fig. 2, thus causing the corners of the end walls of the eyes in the same to be ground off and rounded by the polishing-threads which are charged with the mixture of oil and emery from the pan *j*, leaving the form shown in the enlarged drawing of the eye, Fig. 4. It is to be understood that the plate *u* is secured in the position shown in the drawings during the operation of rounding and polishing the lower end walls of the eyes. Said plate and needles are to be moved to the position of the broken outlines of the same, Fig. 2, during the operation of rounding and polishing the opposite end walls of said eyes, the polishing-threads presenting the various angles with respect to the needles as before described, and leaving the upper end walls of the eyes rounded and polished in the form shown in the enlarged drawing, Fig. 4.

After finishing both end walls of the eyes in the manner described, the several needles are released from their confined positions on the plate *u* by means of the swinging plate *y*, which operates the series of cam-levers *x x* and lever-clamps *w w* simultaneously, when said needles are moved past the roll *i'*, and left in about the position shown in the drawing, Fig. 2, and another row of needles taken from between the roll *i* and rod *n*, and the shanks of the same secured to the plate *u*, and the end walls of the eyes in the same rounded and polished, as before described, for the preceding set of needles.

The device shown in the drawing, between the roll *i'* and reel *q*, under which the threads pass, is for the purpose of acting as a weight upon said threads, and take up the slack thread and keep the same taut during the change of the plate *u* to the two positions specified, and thus prevent the threads from being removed from the grooves in the rolls during said change.

In order to renew the working portions of the several threads as the same become worn by use, I attach the pawl *t* to the frame of the machine in such a manner as to cause the point of said pawl to enter one of the teeth of the ratchet-wheel, which is secured to the reel *q*, near the termination of the right hand reciprocating motion of said ratchet-wheel and reel, in the manner shown in the broken outline of the ratchet and reel, Fig. 1, and revolve the same the distance of one tooth during the remaining portion of said motion, thus causing the worn portions of the several threads to be automatically wound upon said reel, and renewed on the working portions of said threads as the same pass through the eyes during the operation of rounding and polishing said eyes.

It is to be understood that two spool-stands, together with the emory-pan and set of spools attached to said stand, are to be made to accompany the machine, but only one set to be secured to the reciprocating plate *f* at the same time, thus allowing a set of unpolished needles to be strung upon the unoccupied threads during the operation of polishing the eyes of the needles in the machine with the other set of threads.

I have shown and described the spool-holder, as arranged in a horizontal position, with tension-springs secured to the plate *f*, the free ends of which springs press against the peripheral flanges of the spools; but a modified and equally serviceable arrangement would be to place the spools upon vertical spindles with coiled springs pressing upon

their tops, the tensions of which springs are regulated by nuts which engage with the threaded portions of the spindles.

A machine constructed upon the hereinbefore-described principle rounds and polishes the end walls of the eyes of the sewing-machine needles in a very perfect and rapid manner.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine for polishing the end walls of the eyes of sewing-machine needles, the double reciprocating plates *f* and *f'*, and double slotted lever I, said plates fitted to slide freely in the grooves *g* and *g'*, respectively, and made to reciprocate in opposite directions at the same time by means of the oscillating motion of said lever, substantially as shown and specified.

2. In combination with the reciprocating plates *f* and *f'*, the elastic arms *h h' h'' h'''* secured in pairs at one end to said plates, respectively, and the free ends of said arms extending from said plates, substantially as shown and specified.

3. In combination with the elastic arms *h h' h'' h'''*, the grooved rolls *i* and *i'*, fitted to revolve freely in bearings in the free ends of the said elastic arms, substantially as shown and specified.

4. In combination with the elastic arms *h h' h'' h'''* and rolls *i* and *i'*, the screws *o o' o'' o'''* passing through the free ends of said elastic arms, and against the ends of said rolls, for the purpose of regulating the tension of the working portions of the polishing-threads between said rolls, substantially as shown and specified.

5. In combination with the reciprocating plates *f* and *f'*, elastic arms *h h' h'' h'''* and rolls *i* and *i'*, the plate *u* and the series of two or more lever-clamps, *w w*, and series of two or more cam-levers, *x x*, attached to said plate for the purpose of securing a series of two or more sewing-machine needles to said plate, said plate fitted to slide freely in the grooves *v v* in the frame A, and secured in the two positions in said grooves during the operations of rounding and polishing the upper and lower end walls of the eyes in said needles respectively, substantially as and for the object specified.

6. In combination with the reciprocating plate *f*, the spool-stand *m*, with the spools *l l*, pan *j*, and agitator *k* attached to said spool-stand, all constructed so as to be attached to or removed from said plate simultaneously, for the purpose specified.

7. In combination with the reciprocating plate *f'*, reel *q*, and ratchet-wheel *s* attached to said reel, the pawl *t*, so pivoted to the frame A or other stationary portion of the machine as to cause the point of said pawl to enter one of the teeth of said ratchet-wheel near the termination of the right-hand reciprocating motion of said ratchet-wheel, and revolve the same the distance of one or more teeth during the remaining portion of said motion, substantially as and for the object set forth.

8. In combination with the plate *u*, series of two or more lever-clamps, *w w*, and the series of two or more cam-levers, *x x*, the swinging plate *y*, so pivoted to said plate as to operate the said lever-clamps and cam-levers simultaneously, when it is desired to release the series of needles from said plate, substantially as and for the object specified.

9. In combination with the double lever I and reciprocating plates *f* and *f'*, the rock-shaft C, lever G, connecting-rod H, disk F, and revolving shaft B, constructed and arranged for the purpose of imparting an oscillating motion to said double lever, and reciprocating motions to said plates, substantially as and for the object specified.

10. The combination of the frame A, revolving shaft B, disk F, connecting-rod H, lever G, rock-shaft C, double lever I, reciprocating plates *f* and *f'*, elastic arms *h h' h'' h'''*, rolls *i* and *i'*, plate *u*, series of lever-clamps *w w*, series of cam-levers *x x*, swinging plate *y*, spool-stand *m*, pan *j*, agitator *k*, spools *l l*, reel *q*, ratchet-wheel *s*, and pawl *t*, all constructed and arranged for the purpose of rounding and polishing the end walls of the eyes of sewing-machine needles, substantially as and for the object set forth.

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