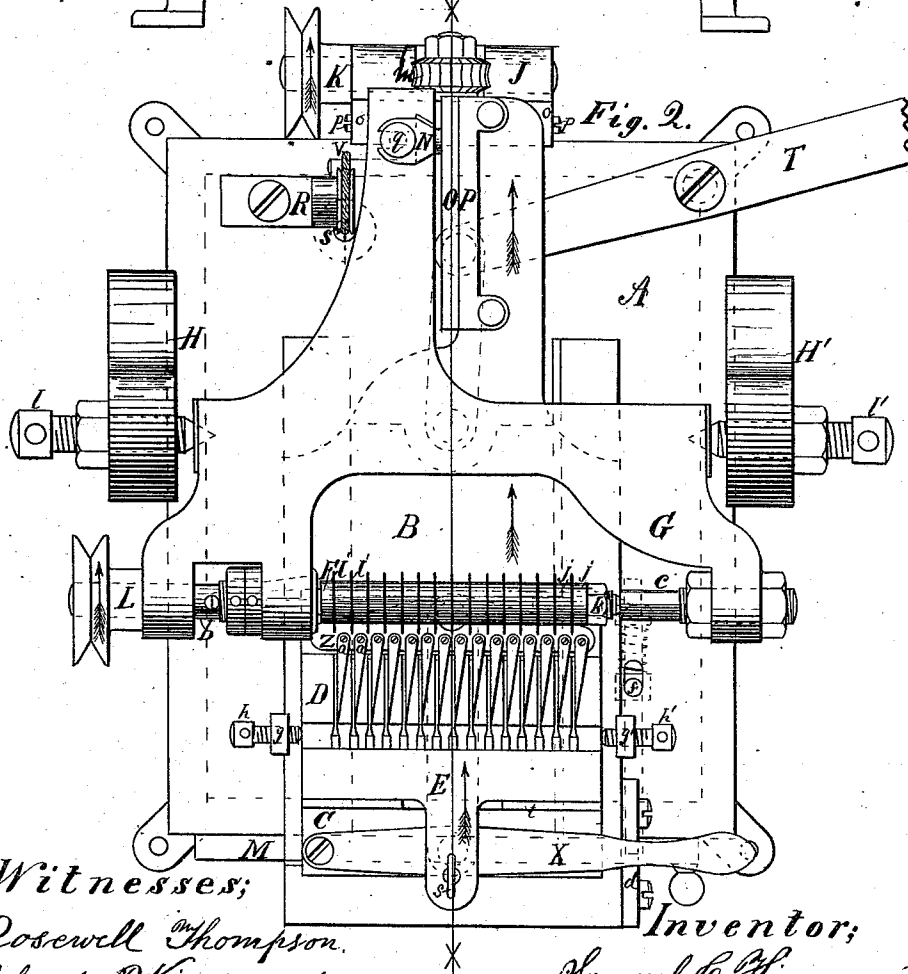
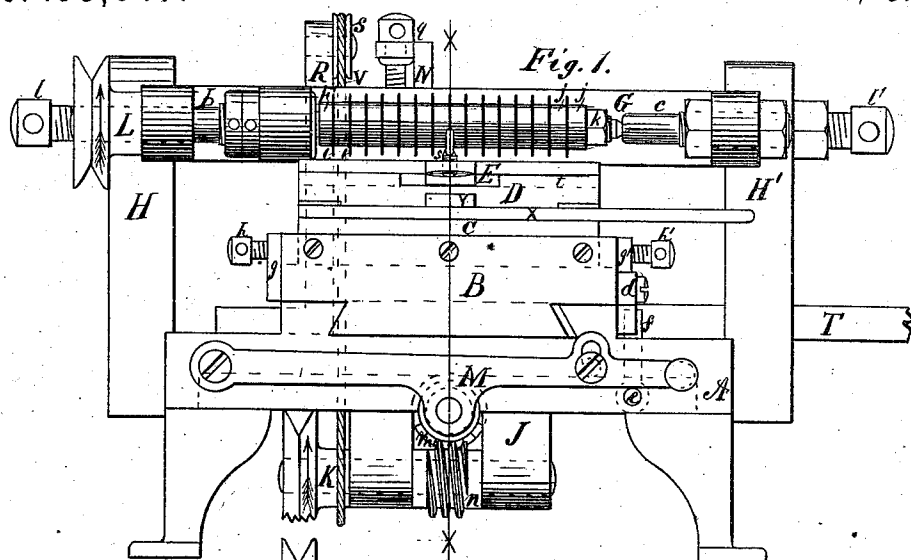


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No. 158,947.

Patented Jan. 19, 1875.



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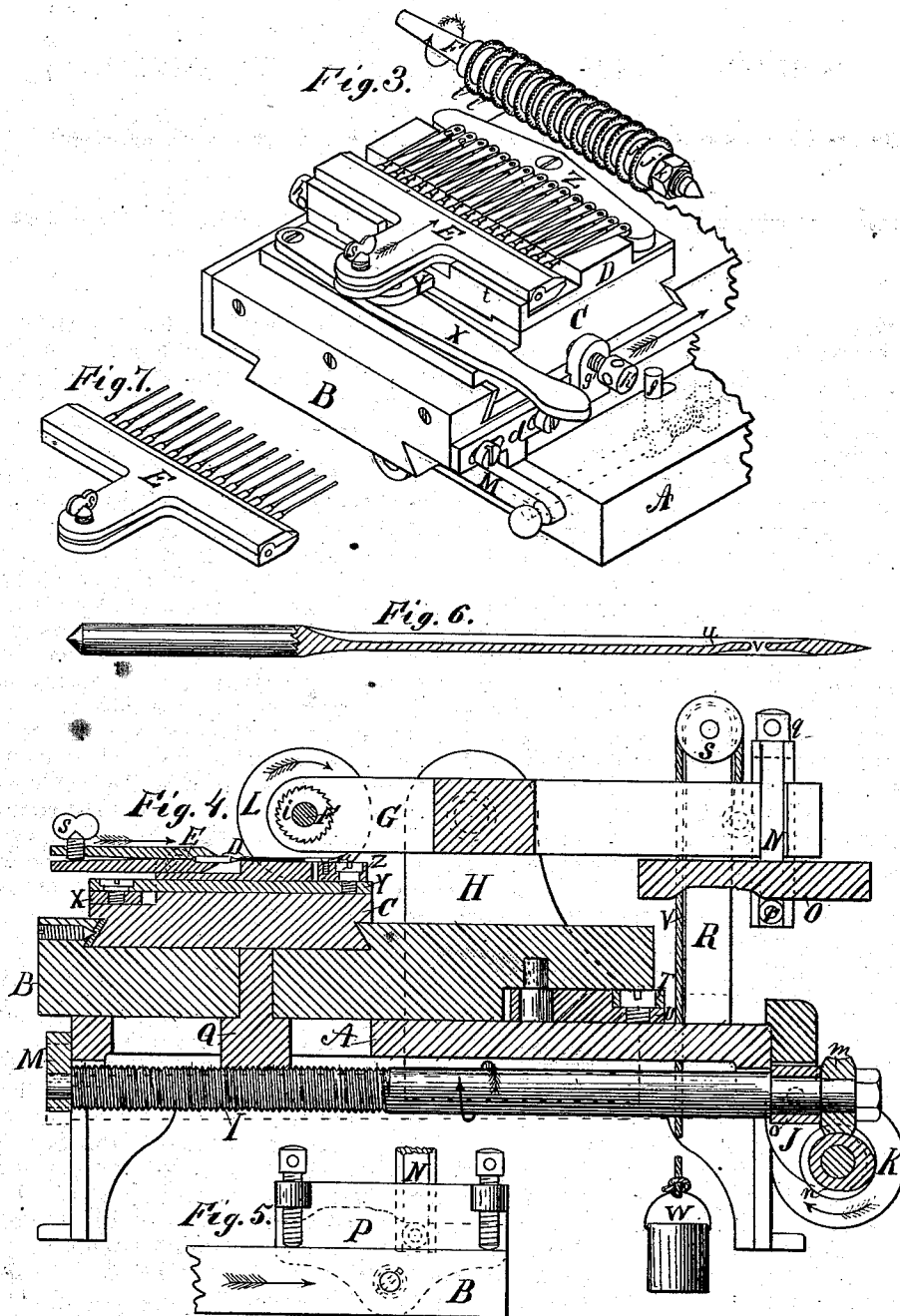
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UNITED STATES PATENT OFFICE.

SAMUEL C. KINGMAN, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR GROOVING SEWING-MACHINE NEEDLES.

Specification forming part of Letters Patent No. 158,947, dated January 19, 1875; application filed December 26, 1874.

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 Grooving the Blades 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.

In grooving the blades of sewing-machine needles the usual custom has been to use one milling-cutter upon an arbor, and operate upon one needle only at the same time, thus making it a very slow and expensive process to groove the large quantities of needles now in demand; and the object of my invention is to more rapidly cut the grooves in a given quantity of needles; and my present improvement consists in applying certain devices for securing and controlling two or more needles in such a manner that all of them may be operated upon at the same time, with as much accuracy and rapidity as has heretofore been accomplished upon one needle only by the process above mentioned.

I will now proceed to describe the construction and operation of my improved machine, with reference to the accompanying drawings.

Similar letters of reference indicate corresponding parts.

Figure 1 is a front-end elevation of my improved machine. Fig. 2 is a plan of the same. Fig. 3 is a perspective view of the milling-cutters and arbor for the same, and of the devices for securing the series of needles in their several positions on the die-seat, with small portions of the slide and bed of the machine. Fig. 4 is a longitudinal section of the machine through the line *x x*, Figs. 1 and 2. Fig. 5 is a view of the former and parts connected therewith, with a portion of the slide to which the same is attached. Fig. 6 is an enlarged view of a sewing-machine needle, with the blade shown in section, in order to clearly show the form of the bottom of the grooves in the same. Fig. 7 is a detached perspective view of the clamp in which the shanks of the several needles are placed previous to secur-

ing the blades of the same in their respective positions on the sliding bed of the machine.

A of the accompanying drawings is the bed of the machine. B is the slide. C is an adjustable bed fitted to slide crosswise the slide B. D is the die-seat, on which are made a series of grooves for the blades of the needles. E is the clamp in which are placed the shanks of the needles previous to placing the blades of the same in their respective grooves on the die-seat D. F is the milling-cutter arbor. G is the swinging beam, to which are attached the bearings for the milling-cutter arbor F. H H' are uprights secured to the sides of the bed A. I is the feed-screw for operating the slide B and parts connected therewith. J is a bearing secured to the rear end of the bed A for receiving the mechanism for driving the feed-screw I. K is the pulley for driving the mechanism which operates the feed-screw I. L is the pulley for driving the milling-cutter arbor F. M is the lever for receiving the front bearing of the feed-screw I. N is an adjustable slide fitted to the rear end of the swinging beam G. O is the former for controlling the positions of the swinging beam and milling-cutters while the latter are in the act of grooving the needles. P is an adjustable plate secured to the rear end of the slide B, and to which is secured the former O.

Q is the feed-nut attached to the slide B, and in which works the feed-screw I. R is an upright bar secured to the bed A. S is a pulley, which plays freely on a stud in the upper end of the upright bar R. T is a lever attached to the bed A, and is designed to operate the slide B when the feed-screw I is detached from the feed-nut Q. U is a connecting-bar, attached at one end to the slide B, and at the other end to the lever T. V is a cord attached to one end of the swinging beam G, and runs over the pulley S. W is a pail for receiving scraps of iron or other material, and is designed to act as a weight, and to which one end of the cord V is attached. X is a lever, secured to the adjustable bed C. Y is a connecting-bar attached to the lever X, and is fitted to slide in a groove under the die-seat D. Z is a cross-bar attached at the center to the connecting-bar Y. *a a* are a series of ta-

pering keys, (in the present case fifteen in number,) secured at one end to the cross-bar Z, and are designed to secure the several needle-blades in their respective grooves on the die-seat D. *b* is the spindle to which is fitted the shank of the milling-cutter arbor F. *c* is a bearing for the opposite center of the cutter-arbor F. *d* is an adjustable stop secured to the side of the slide B. *e* is a shipper-rod under the bed A, the end of which passes through the front end of the same to act as a support for the lever M. *f* is a stop-pin, which passes through a slot in the bed A, and is secured to the shipper-rod *e*. *g g'* are short bars, secured to the sides of the slide B. *h h'* are screws passing through the bars *g g'*, and are designed to adjust the die-seat D and posts connected therewith to a proper position with respect to the milling-cutters. *i i* is a series of milling-cutters, (in the present case fifteen in number,) fitted to the cutter-arbor. *j j* are washers, (fifteen in number,) fitted to the cutter-arbor F, and are designed to fill the spaces between the cutters *i i*. *k* is a nut on the end of the cutter-arbor F, and is designed to secure the milling-cutters *i i* and washers *j j* rigidly to the cutter-arbor F. *l l'* are screws passing through the uprights H H', the points of the same entering the swinging beam G to act as centers. *m* is a worm-wheel, secured to the end of the feed-screw I. *n* is an endless screw, which works into the teeth of the worm-wheel *m*. *o* is a bearing for the feed-screw I, and is held in position by means of two screws, *p p'*, the points of which enter the sides of the bearing *o* to support the same, and at the same time allow said bearing and feed-screw to oscillate sufficiently to disconnect the latter from the feed-nut Q, when desired. *q* is a screw for adjusting the position of the slide N with respect to the beam G. *r* is a roll, fitted to play freely on a pin at the lower end of the slide N, and is designed to follow the uneven surface of the former O.

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

It is to be understood that two of the clamps E are to be made to accompany the machine, with jaws of sufficient width to receive the number of needles for which the grooves on the die-seat are designed to accommodate—fifteen, more or less. After filling the clamp E with the shanks of said number of needles, and securing the same rigidly between the jaws of the clamp by means of the thumb-screw *s*, or its equivalent, the clamp, with the needles in the same, is then placed on the top of the die-seat, with the needles resting in their respective grooves. The rear edge of the clamp is now brought against the stop *t* on the front edge of the die-seat D, in the manner shown in the plan of the machine, Fig. 2, and perspective drawing, Fig. 3. When in this position the series of tapering keys *a a*, which are fitted to slide in the grooves by the sides of the needle-blades, are now brought against

the blades of the needles by pulling the lever X, which is connected to said keys by means of the connecting-bar Y and cross-bar Z, which operation rigidly secures all the needle-blades in their respective grooves by wedging them between the tapering keys and vertical walls of the grooves on the die-seat D, as the opposite walls of the grooves, in which the needles and keys are placed, are made at an angle to correspond with the tapering edges of the latter, so that the act of pulling the lever X and keys *a a* forward necessarily forces the latter against the blades of the needles and limits their motion, thus binding the needles very securely in their respective places. Having thus secured the blades of the needles in the manner described, they are now ready to be grooved by the series of milling-cutters *i i*, which correspond in number to the needles. Said cutters are understood to revolve in the direction indicated by the arrow drawn upon the driving-pulley L, and the operation of grooving to commence near the point of the blade, and finish at the shank for the long groove, which is made on one side of the blade.

By referring to the enlarged drawing of the needle, Fig. 6, it will be noticed that the long groove between the shank and the point *u*, just above the eye *v*, is made deeper than the remaining portion of the groove. This form of groove is generally adopted in order to give perfect freedom for the thread to pass between the cloth or other material and the bottom of the groove while the shuttle is taking up the slack thread, and at the same time the center-stock of the needle, between the long and short grooves, (which is below the work at the time above mentioned,) is thick enough at the eye to prevent the cutting of the thread by the end walls of the eye.

In order to cut the form of groove above described, I adopt a former, O, which governs and controls the position of all the milling-cutters while the latter are grooving the blades of the needles, the working-face of said former being shaped according to the desired form of the bottom of the grooves in the needles, the position of the milling-cutters being made to conform to the uneven surface of the former by means of the weight W, which, being attached to the cord V, which passes over the pulley S, causes the roll *r*, together with the swinging beam and milling-cutters, to which the roll *r* is connected, to conform to the uneven surface of the former O while the latter is in motion with the slide B, to which it is attached. The needle-blades being now secured in their respective grooves on the die-seat D, and the milling-cutters *i i* revolving in the direction indicated by the arrow drawn upon the driving-pulley L and the slide B, and parts connected therewith, in about the position, with respect to the milling-cutters, as shown in the drawings, and the feed-screw I revolving in the direction indicated by the arrow drawn upon the same in Fig. 4, the slide B, being connected to the feed-screw I by the

feed-nut Q, will be moved under the milling-cutters, and carry the several needle-blades in the plane of the cutters, the teeth of the latter being in the meantime forced into the needle-blades as deep as the surface of the former O will allow, the needles continuing to move under the milling-cutters automatically until the adjustable stop *d* on the right side of the slide B strikes the stop-pin *f*, which, being attached to the shipper-rod *e*, causes the end of the latter to move from under the lever M, and allows the latter, together with the feed-screw I, to drop sufficiently to disconnect the feed-screw I from the feed-nut Q, when the forward motion of the needles is discontinued, and the operation of grooving the same ceases, the adjustable stop *d* having previously been adjusted in such a position as to cause the forward motion of the slide B to cease when the shanks of the needles reach the milling-cutters. The long groove of the needles being now finished, the operator brings the needles and slide back to their original position by means of the lever T, after which the needles are released from their confined positions in the grooves on the die-seat D by means of the lever X, which operates the series of keys *a a* simultaneously. The needles, together with the clamp E, in which the shanks are secured, are now removed from the machine, and another clamp, similar to E, which has previously been filled with the shanks of another set of needles, in the manner before described, is placed in position on the die-seat D, and the needle-blades secured in their respective grooves on the die-seat, in the same manner as for the preceding set of needle-blades, after which the lever M is raised to its original position, which allows the end of the shipper-rod *e* to pass under and support the same, and causes the feed-screw I to again connect with the feed-nut Q, when the slide B and series of needles are again moved forward under the cutters and the grooving operation repeated, as before described.

The above description of former and motion of the slide is to be understood as applicable to grooving the long-groove side of the needle-blade only. The needles which have

just been removed from the machine are to remain in the clamp E and passed to another machine of the same general construction, but has a former attached which corresponds in shape to the bottom of the short groove to be made on the opposite side of the needle-blades, the needles being secured in their respective places in the same manner as for grooving the long groove on the opposite side of the blade, the motion of the slide being adjusted to suit the length of the short groove. The clamp E has semicircular grooves made on the face of each jaw, corresponding in size to the shanks of the needles, and at such a distance from each other as to coincide with the grooves made for the needle-blades on the die-seat D.

Thus I groove a series of needles with as much accuracy and with nearly as much rapidity as has heretofore been accomplished upon one needle only by the various methods and devices heretofore adopted.

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

1. The combination of the die-seat D, series of two or more tapering keys, *a a*, cross-bar Z, connecting-bar Y, lever X, adjustable bed C, and slide B with the series of two or more milling-cutters, *i i*, revolving upon one arbor, constructed substantially as and for the purpose specified.

2. The combination of the series of two or more milling-cutters, *i i*, cutter-arbor F, swinging beam G, adjustable slide N, roll *r*, and former O with the slide B, constructed substantially as and for the purpose specified.

3. The combination of the clamp E, die-seat D, series of two or more keys, *a a*, cross-bar Z, connecting-bar Y, lever X, adjustable bed C, slide B, feed-nut Q, feed-screw I, cutter-arbor F, spindle *b*, center bearing *c*, swinging beam G, adjustable slide N, roll *r*, and former O, constructed substantially as and for the purpose specified.

SAML. C. KINGMAN.

Witnesses:

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