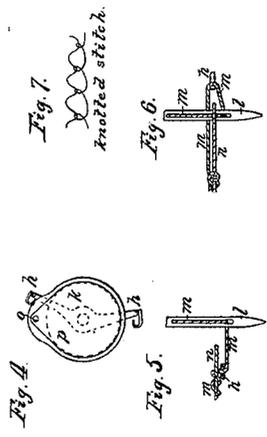
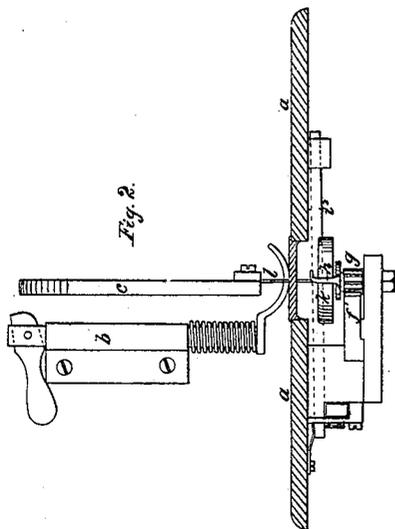
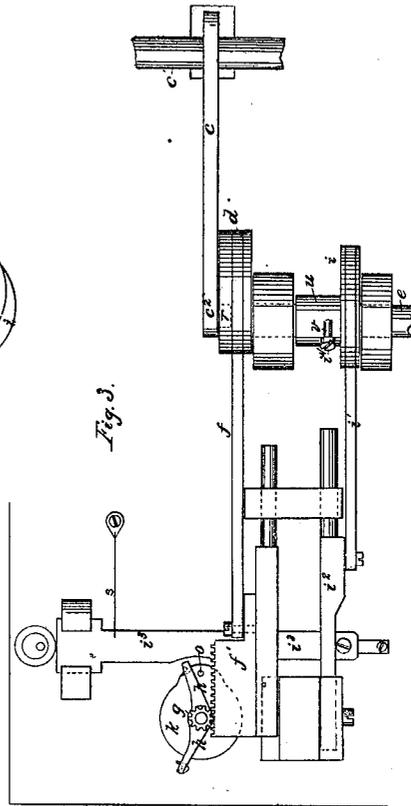
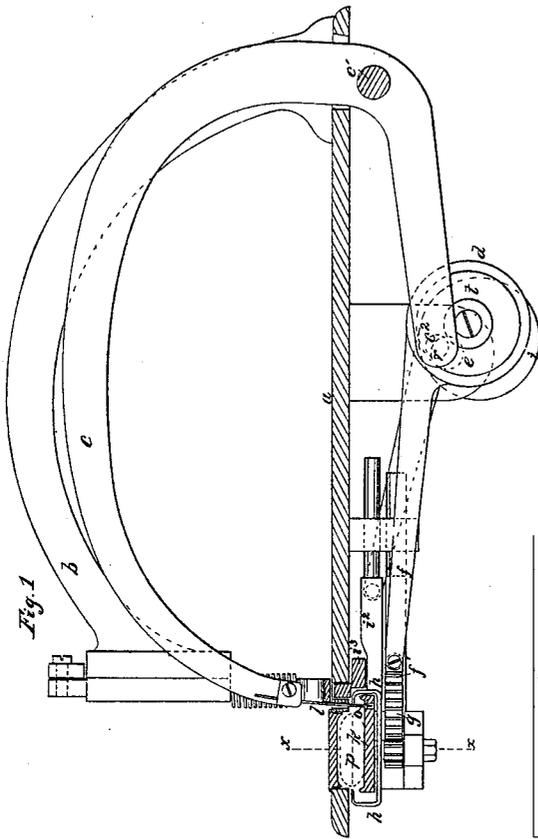


J. W. HARDIE.
SEWING MACHINE.

No. 25,331.

Patented Sept. 6, 1859.



Knotted stitch.

Inventor:
Jason W. Hardie

UNITED STATES PATENT OFFICE.

JASON W. HARDIE, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 25,331, dated September 6, 1859.

To all whom it may concern:

Be it known that I, JASON W. HARDIE, of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a longitudinal vertical section of the machine in the flange of the needle's motion; Fig. 2, a transverse vertical section in the plane indicated by the line *x x*, Fig. 1; Fig. 3, a plan of the under side thereof, showing the working parts; Fig. 4, a plan of a part detached; Figs. 5, 6, and 7, diagrams illustrating the methods of forming the stitches.

Like letters designate corresponding parts in all the figures.

The parts are all mounted on a base-plate, *a*, of any suitable construction, to be attached to a table or stand. The pressure-arm *b* may be of any ordinary construction, and requires no description. The needle-arm *c* also may be of usual construction. It works on a fulcrum, *c'*, situated beneath the base-plate *a*, so as to enable it to be actuated by means of an extension, *c''*, projecting forward under said base-plate. The power is applied to a driving-shaft, *e*, and the vibratory motion is communicated therefrom to the needle-arm by means of a circular groove, *t*, in the face of a disk, *d*, secured eccentrically on said driving-shaft, in which groove a wrist-pin, *r*, situated on the end of the under extension, *c''*, of the needle-arm, and provided with a friction-roller, is moved. The arrangement of the eccentric circular groove *t* in relation to and its action upon the needle-arm are peculiar, and such as to produce, in a very simple and superior manner, the precise movement of the needle-arm desired. The point of least eccentricity in the central line of the groove, or that in which the center of the wrist-pin *r* travels, is only a very little distance outside of the center of the driving-shaft, as indicated at *e*, Fig. 1, and the said center of the driving-shaft or of the eccentric groove's motion is situated nearly or exactly in the line of the arc in which the said central point of the wrist-pin *r* vibrates on the fulcrum *c'*. The result of this arrangement is that the wrist-pin can never pass below the hub of the

groove, and that it remains almost stationary during a considerable portion of each revolution of the eccentric groove, thus enabling the needle to remain in nearly a fixed position while the stitch is forming; and by this arrangement there is no "dead-point" to pass in any part of the movement of the eccentric groove. Another advantage is that the whole construction of the groove is circular, and consequently simple and cheap. The center of the wrist-pin should never quite reach the center or axis of the driving-shaft, for, if so, the groove would pass continually round the wrist-pin and give no motion to it; but the eccentricity is to be as slight as practicable, in order to produce as little motion of the needle as may be at the time specified. The disk *d*, in which the eccentric groove *t* is formed, is also employed as the eccentric to communicate the vibratory motion to the hooks *h h* for forming the stitches through the means of a shackle-bar *f* and sliding rack *f'*, which works in a pinion, *g*, on the axis of said hooks. The axis of the hooks is hollow, and is mounted on the standard of a bobbin-holder, *k*, around which the hooks move, and which is supported by a suitable step beneath. Directly above the bobbin-holder *k* is an aperture in the base-plate *a*, through which the bobbin *p* (shown by red lines in Fig. 1) is inserted, and rests loosely on the top of said bobbin-holder. Back of the position of the bobbin is a hole, *o*, in the bobbin-holder, of suitable size just to receive the point of the needle *l*, which descends into it, and is thereby retained without the possibility of swerving from place exactly in the right position to enable the hooks to seize its thread and carry it around the bobbin. There are two hooks, *h h*, situated nearly opposite to each other on their axis, and at about the same height as the central edge of the bobbin *p*. The points of the hooks are at such a distance apart as not only to pass around the bobbin, but also to pass just behind the needle *l*, so close thereto as to catch the thread a little above its eye, and they project in opposite directions in respect to their motion, so that one may carry the thread-loop when caught in one direction, and the other carry the loop in the opposite direction. In order that these hooks may always be made to pass just as close to the needle, as desired, the step on which the bobbin-holder and hooks

are mounted may be adjustable backward and forward sufficiently for the purpose. The extent of reciprocating movement communicated to the hooks is sufficient to enable either to seize the thread and carry it around over the bobbin in its own direction. The hooks, thus arranged, do not at one time both take the thread alternately and loop it over the bobbin; but when the driving-shaft is driven in one direction one of the hooks takes and loops the thread exclusively, and when the shaft is driven in the opposite direction the other hook seizes and loops the thread exclusively; and each hook thus forms its own peculiar stitch quite different from that of the other. The action of the two hooks in making two kinds of stitches is explained by reference to the diagrams 5 and 6, which indicate on an enlarged scale the respective positions of the threads in the formation of the two different stitches. Let *l*, in each figure, indicate the end of the needle; *h*, the hook, (the one, the right and the other the left hook;) *m*, the needle-thread, and *n* the bobbin-thread, the right-hand termination of which, in each figure, may indicate the position of the bobbin. Suppose, in both instances, that the bobbin-thread *n* is at the left hand of the needle, or on that side thereof toward which the cloth is fed along. If the hook, passing toward the left, seizes the thread *m*, as in Fig. 5, it will simply carry it round over the bobbin, thereby forming the simple twist with the bobbin-thread, or that interlocking of the threads which produces the ordinary shuttle-stitch; but if the other hook takes the needle-thread and carries it to the right, as in Fig. 6, it first carries it around behind the needle *l*, thereby doubling it over itself around the needle, and then carries the loop, thus formed, around the bobbin and bobbin-thread *n*, with which it makes a knot each time, as indicated in Figs. 6 and 7. If the bobbin-thread were at the right of the needle, then the action of the hooks would be the reverse—that is, the left-hand hook would make the knot-stitch, and the right-hand hook would make the common shuttle-stitch. The bobbin-thread is ordinarily situated on that side of the needle toward which the cloth is fed along; but it might be purposely arranged so as first to incline on the opposite side of the needle; but this is an immaterial matter, since my invention has reference to forming the two kinds of stitches with the two hooks by reversing the motion of the driving wheel or shaft; and it is of no consequence which hook makes the knot-stitch or which makes the common shuttle-stitch.

The advantages of the addition of the knot-stitch are that while, if desired, the common shuttle-stitch may be used, yet, when a very strong stitch is desired, the knot-stitch may

be employed, which also is not only much stronger than the other stitch, on account of the more secure interlocking of the threads, but by being far more elastic obviates all liability of the threads breaking by the stretching of the cloth, a fault to which the shuttle-stitch is peculiarly liable. The knot-stitch is very useful, also, for fastening or confining the threads at the end of a seam, for by continuing the sewing two stitches over the edge of the cloth it ties the threads fast together, and when the other stitch is used, by reversing the motion of the driving-shaft, so as to make two such stitches over the edge of the cloth, in like manner, the same result is accomplished.

The feeding arrangement may be constructed in any way desired; but in order to enable one device to feed the cloth along, when the driving-shaft is driven in either direction, for forming either kind of stitch, and at the same time to cause the feeding to take place just as the needle is descending and before it reaches the cloth, (the only proper time for making the feed,) the feeding apparatus is actuated by means of a shackle-bar, *i'*, and eccentric *i*, which is attached to a loose sleeve, *u*, on the driving-shaft *e*, and in this sleeve there is a transverse slot, *v*, in which works a pin, *i'*, projecting from said driving-shaft. This slot is of just sufficient length to enable the sleeve to become fixed on the shaft at that moment when it is required to operate the feeding device, as desired, in turning the shaft either way.

I claim—

1. The method of making a knot-stitch herein described—namely, by taking the needle-thread at the back of the needle, (or at the side opposite to the position of the bobbin,) and first doubling it upon itself around the needle, and then looping it over the bobbin-thread, substantially as specified.

2. The employment of two hooks, *h h*, acting in opposite directions when they take the thread at the back of the needle (or at the side opposite to the position of the bobbin) for the purpose of forming either the knot-stitch or the ordinary shuttle-stitch by simply reversing the motion of the driving-shaft, as herein set forth.

3. Making the feed-eccentric *i* self-adjusting by means of the loose sleeve, *u*, slot *v*, and pin or stop *i'*, so that the feeding shall take place during the descent of the needle, whichever way the driving-shaft may be turned, as herein described.

In testimony whereof I have hereunto set my hand.

JASON W. HARDIE.

In presence of—
M. G. WEBB,
S. WILLIAMS.