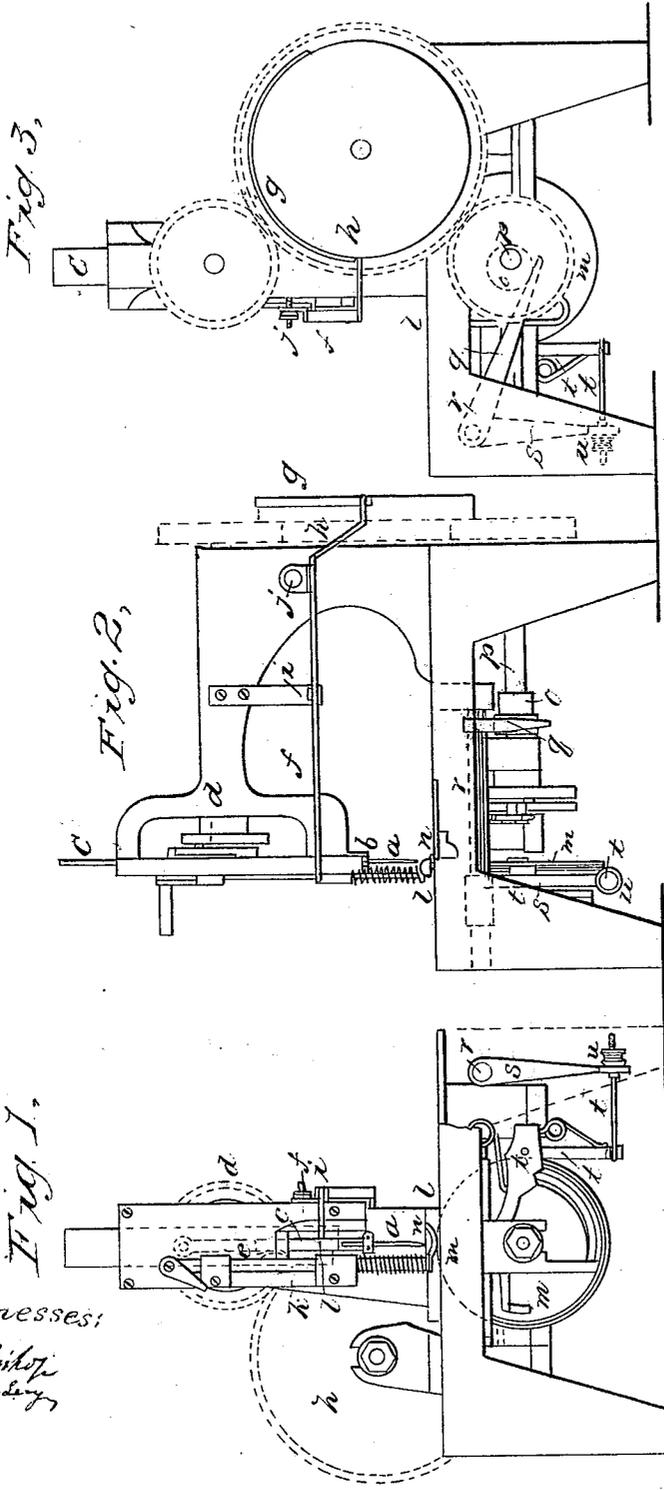


I. M. SINGER.
Sewing Machine.

No. 13,966.

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Witnesses:
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IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 13,966, dated December 18, 1855.

To all whom it may concern:

Be it known that I, ISAAC M. SINGER, of the city, county, and State of New York, have invented a new and useful Improvement in the Method of Sewing Seams with a Reciprocating Eye-Pointed Needle, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation of the machine with part of the frame removed; Fig. 2, a side elevation, and Fig. 3 a back elevation.

The same letters indicate like parts in all the figures.

The object of my invention is to make a seam with an eye-pointed needle which shall not be so liable to be raveled and opened when the thread or threads is or are cut as seams heretofore formed with an eye-pointed needle; and to this end the nature of my invention consists in a mode of operation by which the needle is made to puncture the substance to be sewed, and, after the thread has been interlaced on the under side of the said substance, withdrawing the needle, and then puncturing the said substance with the said needle at any required distance back of the first, and again interlacing on the other side of the said substance, and when the needle is drawn back again, puncturing the said substance forward of the last place or punctures, and, after interlacing again, withdrawing the needle, with its thread, to repeat the series of operations, whether the said spacings, first in advance, and then back, and then again in advance, be effected solely by the feed-motion, or partly by the feed-motion and partly by the vibration of the needle, which mode of operation results in forming a seam somewhat resembling what is termed the "back stitch" in sewing with a needle which carries the thread entirely through the substance at each stitch, thereby so interlacing the thread or threads as to produce a seam of much greater strength than can be produced by any other mode of operation with an eye-pointed needle, which simply carries part of the thread through the substance to be sewed, and then withdraws to tighten the stitch.

The accompanying drawings represent a sewing-machine like many in extensive public use, and known as the "machines manufactured by I. M. Singer & Co.," with my present invention connected therewith.

The needle *a* is attached to the lower end of the needle-carrier *b*, which is jointed at its upper end to a vertical slide, *c*, working in suitable ways, and receiving an up-and-down motion from a cam, *d*, in the usual manner. This needle-carrier is moved, for the purpose of vibrating the needle, in one direction by the tension of a spring, *e*, (see dotted lines, Fig. 1,) and in the opposite direction by a lever, *f*, one end of which bears against the said needle-carrier, and the other is acted upon by a cam, *g*, on the periphery of the driving-wheel *h*, which makes one revolution to two of the cam that moves needle up and down. This lever *f* turns on a fulcrum-pin at *i*, and at *j* it is provided with a set-screw that bears against the frame to regulate the extent of vibratory motion of the needle in one direction, while in the other direction it is limited in its movement by striking against a stop, *k*, on the slide *c*. In this way the extent of vibration of the needle can be regulated at pleasure and with accuracy.

The substance to be sewed is placed on the table *l* and held onto the periphery of the feed-wheel *m* by the usual spring pressure-pad, *n*, and the feeding motion for advancing the substance to be sewed is imparted to the feeding-wheel in the usual manner by a cam, *o*, on the shuttle-cam shaft *p*, which acts on an arm, *q*, of a rock-shaft, *r*, which said shaft has another arm, *s*, connected by a link, *t*, with the lower end of a gripping-jaw, *u*, and this gripping-jaw grips the rim of the feed-wheel to impart the required intermittent feed motion, the extent of which is regulated by an adjusting-nut, *v*, tapped on the end of the link *t*.

The mode of imparting the intermittent feed motion to the feed-wheel is well known, and any other suitable arrangement may be substituted as an equivalent, as the means for imparting the feed motion makes no part of my present invention.

The shuttle and the mechanism for operating it are similar to the machines in public use, before referred to, and therefore do not require to be described.

The substance to be sewed having been placed on the feed-wheel and under the pressure-pad, and the needle and shuttle threaded, the needle punctures the said substance and carries its thread to the under side, where it forms a loop for the passage of the shuttle, with its

thread, and the needle then rises, drawing its thread, which is looped around the shuttle-thread, forming what is usually termed a "stitch." The feed motion then takes place, by which the cloth or other substance to be sewed is advanced, and at the same time the cam *g* acts on the lever *f*, by which the needle-carrier is moved until it strikes the stop-pin *k*, thus vibrating the needle in the direction of the feed motion, but to a greater extent—say one-half more than the distance that the cloth has been moved by the feed-wheel—and then the needle descends, puncturing the cloth back of the place where it was previously punctured, by which a back stitch is formed. The shuttle, as in the first instance, passes through the loop of the needle-thread to interlace it, and the needle then rises to complete this back stitch. The cam *g* then liberates the lever *f*, so that the tension of the spring *e*, acting on the needle-carrier, vibrates the needle back to its original position, and at the same time the cloth is again advanced by the motion of the feed-wheel, and then the needle again punctures the cloth to make a third stitch, which is completed by the passage of the shuttle through the loop of the needle-thread and the withdrawing of the needle. This is again followed by a short back stitch, and that in turn by a long forward stitch, and so on in succession throughout the seam. In this way it will be seen that the seam is formed by carrying the needle-thread from the cloth first forward over the surface of the cloth, then through the cloth, to be interlaced with the shuttle-thread below, then out again and back over the surface, and again through the cloth, again to be interlaced with the shuttle-thread, and out and again forward on the surface, and again forward and through the cloth, to be interlaced with the shuttle-thread.

The series of operations last above described complete a threefold stitch, in which the thread is threefold on the upper surface of the cloth for the length of the back stitch, while it is interlaced or concatenated with the shuttle-thread on the under surface three several times, making a seam which possesses more strength and is less liable to be pulled open or unraveled than any other seam with which I am acquainted, whether made by machinery or with the hand-needle.

By regulating the length of the feed-motion and the vibration of the needle, the length of the forward part of each stitch and the length of the lap of the back stitch can be regulated at pleasure, and it will be obvious that in-

stead of imparting the required motions for my improved mode of operation, as above described, the mode of application can be varied by suspending the feed-motion which moves the cloth for the back stitch, so that a less extent of vibrating motion will be required for the spacing of the back stitch than when the cloth is moved forward at each of the operations; or instead of vibrating the needle the same mode of operation can be applied by dispensing with the vibratory motion of the needle and giving to the feed-wheel alternately a long forward feed motion for the forward part of the stitch, and then a short back motion for the short back stitch, and then again a long forward motion for the next forward part of the entire stitch; but I prefer the first-described mode of operation, for the reason that by simply taking off or suspending the operation of the lever which vibrates the needle-carrier the machine can be used as an ordinary sewing-machine.

It will also be obvious that instead of using a shuttle or equivalent therefor to interlace or concatenate two threads, as above specified, the mode of operation of my said invention is equally applicable to that class of machines in which the stitches are formed by concatenating the needle-thread with itself below the surface of the cloth by causing the needle-thread to pass through its own loops; and therefore I wish it to be distinctly understood that I do not limit myself either to the described means for giving the required motions or to imparting the required motions partly to the needle and partly to the cloth or other substance to be sewed. Nor do I limit myself to the making of such seams by means of two threads operated by a needle, in combination with a shuttle or equivalent therefor.

What I claim as my invention, and desire to secure by Letters Patent, is—

The mode of operation, substantially as described, for forming seams by alternately making a long forward and then a short back stitch by means of an eye-pointed needle, which merely carries a part of its thread through the cloth or other substance, that it may be interlaced or concatenated, as set forth, whether the said mode of operation be applied by the means herein specified or any equivalent therefor, as set forth.

ISAAC M. SINGER.

Witnesses:

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