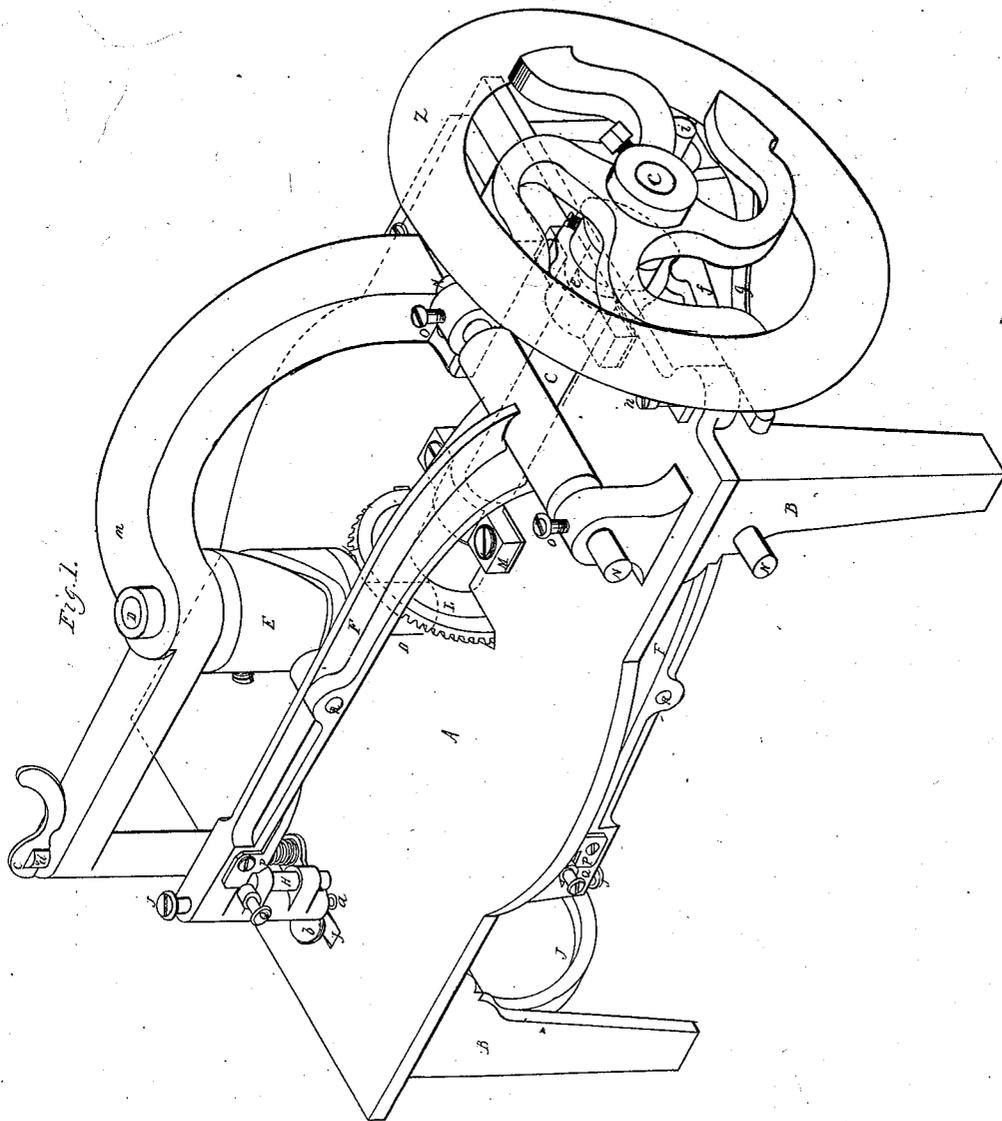


H. B. Smith.
Sewing Machine.

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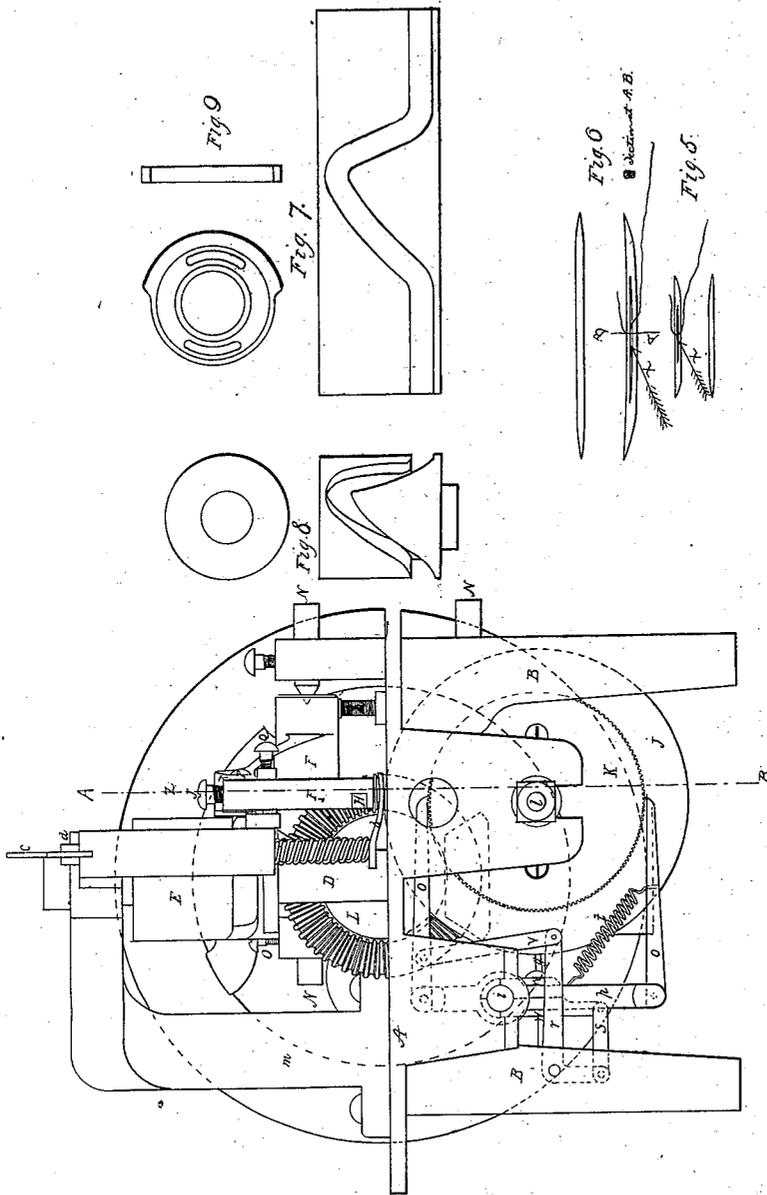
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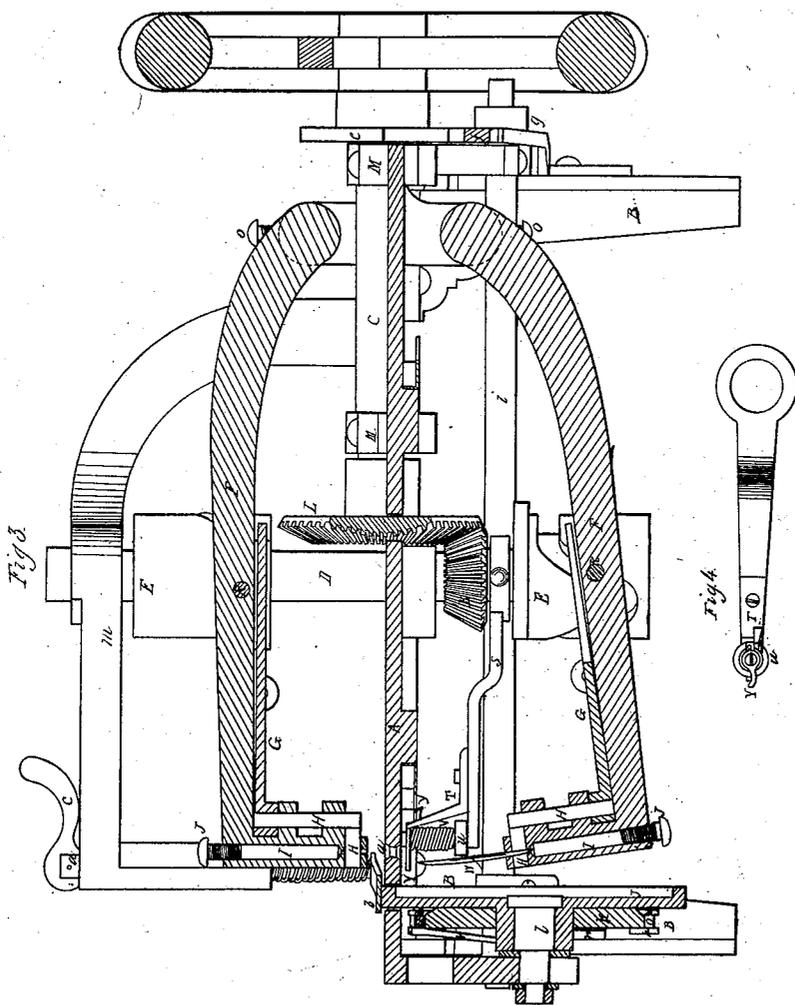
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UNITED STATES PATENT OFFICE.

H. B. SMITH, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 12,247, dated January 16, 1855.

To all whom it may concern:

Be it known that I, HEZEKIAH B. SMITH, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Sewing-Machine for Sewing a Through-and-Through or Back Stitch; and I hereby declare that the following specification and the drawings accompanying it constitute a full, clear, and exact description of my invention and the manner of constructing and using the same.

In the said drawings the letters of reference refer to like parts in each of the several figures, and in referring to them—

Figure 1 denotes a perspective view; Fig. 2, an end elevation; Fig. 3, a longitudinal and vertical section at A B of Fig. 2, and showing the parts beyond. Fig. 4 denotes a top view of the arm and finger for pulling through the thread. Fig. 5 denotes two views of a full-sized needle. Fig. 6 denotes a needle of double the full size, as shown at Fig. 5. Fig. 7 is a view of the plane of the periphery of one of the driving-cams. Fig. 8 is a plan and elevation of one of the driving-cams as disconnected from the machine. Fig. 9 shows a plan and edge view of one of the cams that operate the needle-levers, one of these cams being attached by adjustable set-screws to each of the driving-cams, as hereinafter described.

The nature of my invention consists of a sewing-machine which is hereinafter fully described, it being so constructed and operated that it will sew in cloth or other substances what is termed the "through-and-through" or "back" stitch, using for that purpose a two-pointed needle, this needle having a slit or its equivalent at or near its center for the purpose of inserting, holding, and carrying the thread during the sewing operation, the needle being carried through the cloth by levers or other means, so that they will pass the needle and thread through the cloth or other substance to be sewed, and then passing this needle and thread back through the cloth, and so on, the thread having a knot tied or formed on its out end at the commencement of sewing in each thread, and this thread being drawn in to form the stitch by the elastic finger, which is revolved on an arm, or otherwise moved so as to take the thread and carry it forward sufficient to draw up the stitches, and then let go of the thread after the needle has been carried

through the cloth at every stitch or every other stitch, as may be required.

To enable persons skilled in the art of making and using sewing-machines to make, construct, and carry out my invention, I will describe the same as follows:

I construct a table of iron, as seen at A A, and properly support it upon iron legs, as seen at B.

To the table A, I attach two substantial iron bearings or boxes, as seen at M, and to them is fitted a wrought-iron driving-shaft, as seen at C, to one end of which is fitted and fastened a crank-wheel, as seen at Z, to which the power is applied to drive the machine. At the opposite end of the shaft C is fitted a bevel-gear, as seen at L, which gears into another bevel-gear one-half its size, as seen at K, which is fitted and fastened to the upright shaft, as seen at D. The upper end of this shaft revolves in the iron stand, as seen at *m*, which constitutes the upper bearings for it, and the lower bearing for this shaft D is in the plate A.

To the lower end of the upright shaft D, and near its upper end, are fitted and held by adjustable set-screws the two driving-cams, as seen at E. These cams are grooved, as shown in the drawings, for the purpose of operating the driving-levers by means of the friction-pulleys, which revolve on the pin R and turn in the grooves of the iron driving-cams E.

At G can be seen the needle-levers, which are firmly connected to the working arms or jaws H, which should be made of steel, for the purpose of seizing and holding the needle by the operation of the cam, as seen at Fig. 9, one of these cams being fitted to the lower end of the upper driving-cam, and another of them being fitted to the upper end of the lower driving-cam, as may be seen in the drawings.

There should be holes drilled in the front end of the driving-levers F of sufficient size to receive the needle, and the upper part of this hole should be drilled or reamed of a larger diameter than the lower part of it, and into which is fitted a piece of rawhide, as seen at I, and this can be set down, as it wears, by the set-screws J. This hide is placed in the lever for the purpose of receiving the shock of the point of the needle, and prevent dulling it as it carried from one driving-lever through the cloth and hole *a* in the plate A to the other lever, and so on. The driving-levers F turn

or swing on the pivots, as seen at N, these pivots being fitted to projections on the plate A, and held fast by the set-screws, as seen at O in the drawings. The cams which operate the needle-levers G, and one of which is seen at Fig. 9, are screwed to the under part of the upper driving-cam and to the top of the lower driving-cam. The screws passing through the slots in the cams, as seen at Fig. 9, are for the purpose of so adjusting them on the driving-cams as to operate the levers G in harmony with the other parts of the machine. The needle-levers G are firmly secured to the jaw H by means of the adjustable set-screws, as seen at Q.

In the lower part of the front of the driving-levers the metal is removed sufficient to admit the jaw H, for the purpose of holding and carrying the needle by pressing it between this jaw H and a portion of the driving-lever with which it comes in contact. The pressure on the jaw H for holding the needle is caused by the spring P pressing against the needle-lever G, which will be readily understood by inspection of the drawings, the spring being for the purpose of holding the needle when it is being drawn through the cloth, and the projection on the cams, as seen at Fig. 9, is for removing this pressure by the revolving of these cams just before the opposite driving-lever takes the needle from it.

The needles can be constructed by sawing a slit through a piece of steel plate of the thickness of the desired needle, then heating this plate and set the slit together, as seen at X, Figs. 5 and 6, and then rounding and pointing the needle at both ends, and afterward groove it nearly its entire length, as seen at the section A B of Fig. 6. This groove is made for the purpose of receiving the thread as it is carried through the cloth, so as to enlarge the holes in it as little as possible.

The needle W, as shown in the drawings, is curved, so as to be parallel with a curved line described from the center of motion of the driving-levers, which will be readily understood to be necessary for the purpose of operating the machine.

Having now described the construction of the parts for operating the needle and the needle itself, I will now describe the other parts of my machine.

At *d* can be seen a rod, which is so fitted to the front portion of the stand *m* that it may slide up and down when required. At the lower end of this rod is fitted a foot-piece, *b*, for holding the cloth down upon the feed-wheel as it is being fed forward and backward to be sewed.

Between the foot-piece and the lower end of the stand *m*, I place a spiral spring, to hold this foot-piece down, and in the top of the rod *d*, I place an eccentric lever, *c*, which turns on a pin near the top of the rod. By turning it back, as seen in the drawings, the spiral spring on the lower part of the rod *d* will force the foot *b* down upon the cloth, and by turning

the lever *c* forward the foot *b* is hoisted from the cloth, as before described.

At *j* can be seen the feed-wheel, made of brass. On one side of this I attach a steel ratchet or toothed wheel, *k*, and both of them revolve on the iron stud, as seen at *l*.

On the shaft C, I fit a cam made of brass, as seen at *e*, which, as it revolves, operates the main feed-lever, which is made of brass, as seen at *f*, the out end of it being kept upward by the spring *g*, and the out end of the lever *f* is stopped in the right position to give the required stitch by the adjustable set-screw *h*. One end of the main feed-lever *f* is attached to the rocker-shaft, as seen at *i*, and near to the opposite end of this shaft is fitted the ratchet-lever *p*, in which are placed the upper and lower ratchets or dogs, *o*, for operating the wheels *k* and *j*.

For the purpose of raising the upper ratchet or dog, *o*, out of the toothed wheel when the lower dog is carrying forward this toothed wheel, I place on the rocker-shaft *i* a friction-lever, as seen at *v*, the lower end of which is connected to the rod *s*, and this rod being connected to one end of the secondary feed-levers *r*, and the other end of this feed-lever is connected to the lower end of the connecting-rod V, and the upper end of this rod V is connected to the upper ratchet or dog *o*, as seen in dotted lines at Fig. 2.

By referring to the drawings it can be seen that the steel finger Y is so constructed as to turn on a screw, as seen at Fig. 4. This screw is screwed into a part of the stand S, and under this finger I place a spiral spring, as seen at V, Fig. 3. This spring is coiled around the outside of the portion of the stand to which the finger Y is screwed, the upper end of this spring passing through the hole drilled through the inner end of the finger Y, and the lower end of it made fast to the ring U, this ring being adjustable by having a set-screw in it to set it in the required position to give the proper pressure on the finger Y.

At T, Figs. 3 and 4, can be seen a stop, the lower end of which is screwed to the arm S, and the upper end of it answers for the stopping of the finger Y as it is pressed forward by the spring V, Fig. 4.

Having thus described the construction of my machine, I will now describe the operation of it.

By placing the cloth or other substance to be sewed between the feed-wheel J and the foot *b*, then open the slit in the needle and insert one end of the thread, the other end having a knot tied or formed on it, then place the needle W, carrying the thread, in its position in the driving-lever, then apply power to the wheel Z, so as to revolve it in the direction that the arrow points, and every part of the machine is put in operation, and the needle will be passed from one driving-lever F to the other, carrying the thread with it; and the finger Y, revolving on the arm S, will draw in the thread, so as to form the through-and-

through or back stitch. Soon as the needle and thread passes up through the hole *a* in the plate A the finger Y, being revolved with and by the arm S, brings the outer and curved part of this finger in contact with the thread, carrying it around far enough to draw up the stitch sufficiently tight, and then releasing the thread by turning back far enough to allow the thread to slip off from the end of the curved part of this finger, which is accomplished by the thread requiring an increased power, to draw in the thread when the stitch is nearly drawn up, and this increased power, acting on the curved part of the finger, overcomes the power of the spring V and turns it sufficient to allow the thread to be released from the finger, and then the finger instantly regains its former position by the action of the spring V pressing it back toward the stop T, as will be seen by inspecting Fig. 4 of the drawings, the feed at the same time carrying forward and back the cloth, so as to give the required length of stitch, which will complete the operation of my machine.

Having thus described the construction and operation of my sewing-machine, I will state my claim as follows:

I do not claim a two-pointed needle having an eye in its center, as this has been patented

to J. J. Greenough. Neither do I claim any other part, device, or thing claimed or patented in said Greenough's patent; but

What I do claim as my invention is—

1. A slit or fissure formed in a needle, (so as to be opened by any proper-pointed instrument and the thread inserted in this fissure, and then moved near to one end of it, then by removing the pointed instrument the two elastic or spring sides of this fissure close together and pinch and hold the thread, so that the needle can be operated to sew a curved or straight seam and a through-and-through or back stitch,) essentially in the manner and for the purposes set forth.

2. The finger Y, so arranged and operated (on the arm S by means of the spiral spring, the ring to adjust this spring, and the stop T, or otherwise) as to draw the thread through the cloth, so as to draw up the stitch, and then let go of the thread by the revolving or moving of this finger and the arm S or its equivalent, essentially in the manner and for the purposes set forth.

HEZEKIAH B. SMITH.

Witnesses:

JOHN BENNETT,
A. N. BROWN.