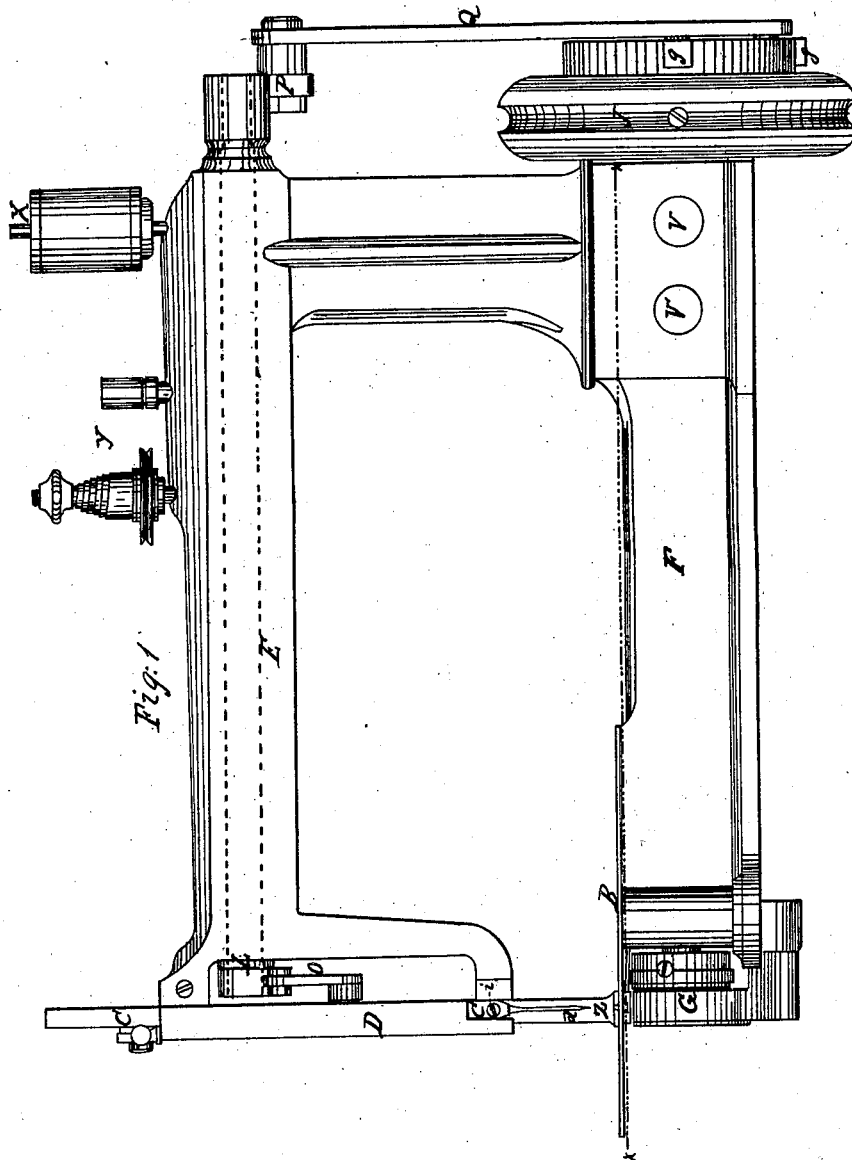


J. S. McCURDY.
SEWING MACHINE.

No. 46,303.

Patented Feb. 7, 1865.



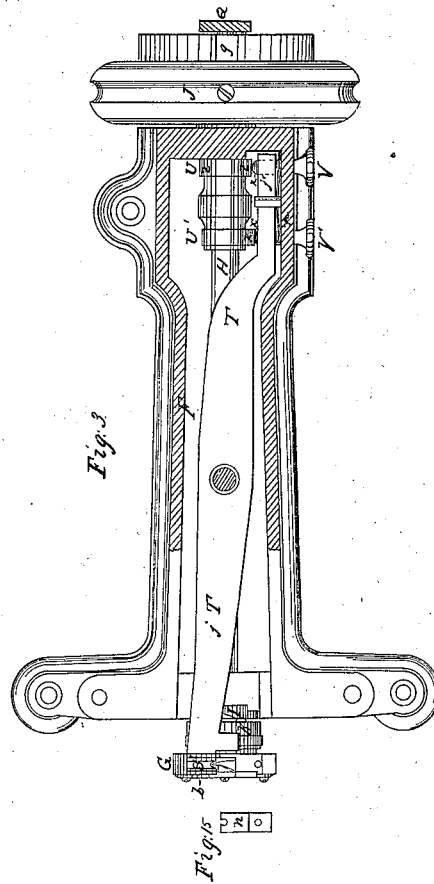
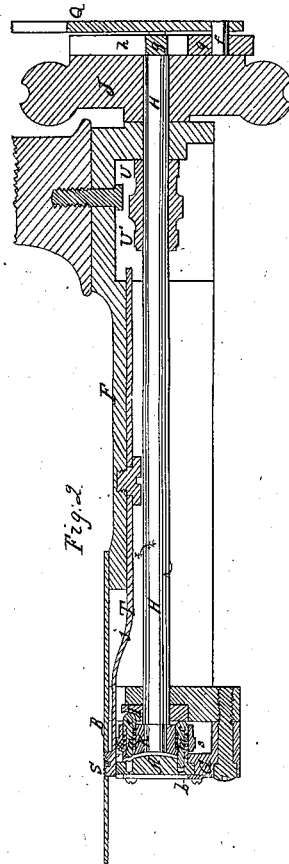
Witnesses.
Melville Biggs
W. L. Bennett.

Inventor.
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C. S. Remick

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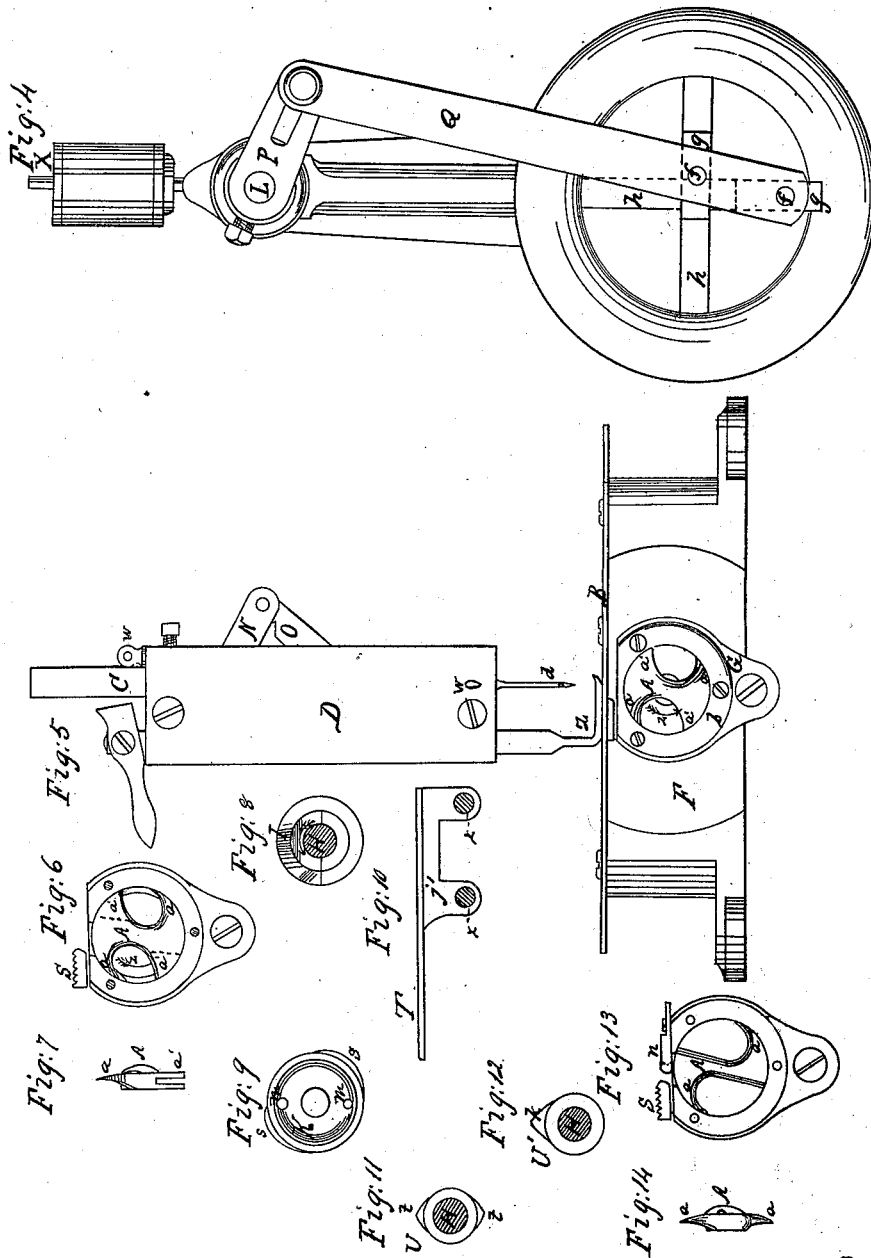
Witnesses.
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UNITED STATES PATENT OFFICE.

JAMES S. McCURDY, OF BRIDGEPORT, ASSIGNOR TO ELIAS HOWE, JR., OF FAIRFIELD, CONNECTICUT.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **46,303**, dated February 7, 1865; antedated January 28, 1865.

To all whom it may concern:

Be it known that I, JAMES S. McCURDY, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of a sewing-machine embodying the improvements. Fig. 2 represents a vertical longitudinal section of a part of the same. Fig. 3 represents a plan of the same with the parts above the line *xx* of Fig. 1 removed. Fig. 4 represents a view of one of the ends of the machine. Fig. 5 represents a view of the other end of the machine; and Figs. 6 to 15 represent certain parts of the machine detached from the remainder and placed in different positions, which they occupy during sewing, and designated by the same letters of reference as are applied to the same parts in the other drawings.

The object of the invention is to sew a looped seam with a loop of needle-thread passed through two preceding loops, and also to enable the machine to form stitches alternately long and short or all of equal lengths at pleasure.

To this end the first part of the invention consists of the combination of the reciprocating needle-bar or other needle-carrier of a sewing-machine with a rotating double-headed looping-hook having one or both of its heads so formed that when rotated in combination with a reciprocating-needle it will draw the loop of needle-thread through the two loops preceding it, so as to produce a compound chain embroidery-stitch upon the fabric.

The second part of the invention consists of the combination of the double-headed looping-hook with the shaft that imparts motion to it by means of two pins controlled by a cam in such manner that each pin is withdrawn alternately during a small portion of the revolution of the looping-hook to permit the loop of needle-thread to escape from the hook.

The third part of the invention consists of the combination of the feeding-instrument with a shaft making one revolution to two perforations of the needle through the interven-

tion of two cams of unequal projection, so that the movements of the feeding-instrument are alternately long and short.

The fourth part of the invention consists of the combination of the feeding-instrument with a shaft making one revolution to two perforations of the needle through the intervention of two cams and two adjustable wipers, one of said cams having two protuberances of equal projection arranged at its opposite sides and the other cam having a single protuberance of greater projection than the other two, so that by adjusting the cam-wipers the feeding-instrument may be caused to make alternate movements of different lengths, or equal movements, as desired, whereby the machine can be set to sew stitches alternately long and short or of equal length at pleasure.

All the improvements are embodied in the machine represented in the accompanying drawings. The double-headed rotating hook *A* in this machine is arranged to operate beneath the table-plate *B*, on which the material to be sewed is placed, and the needle-bar *C* is arranged to slide up and down in a head, *D*, which is sustained above the table-plate *B* by means of an arm, *E*, extending from the bed-frame *F* of the machine. The double-headed looping-hook has two hook-heads, *a a*, placed diametrically opposite to each other and projecting in opposite directions from the body of the hook, and the back *a' a'* of each head of the hook is extended so far that it does not let off the loop of thread seized by the hook until the needle has entered it in its descent to deliver a loop of thread to the hook-point following the back of the head which lets off the loop. In order that the back of the head of each hook may not prevent the descent of the needle for this purpose each is slotted, as shown at Fig. 7, so as to form a groove in which the needle can descend. The double-headed looping-hook is arranged to revolve in a circular groove formed in a ring-support, *G*, which projects from the bed-plate of the machine, and it is held in the said groove by means of a ring-cap, *b*.

In order that the double-headed looping-hook may be caused to revolve, it is combined with a shaft, *H*, to which a grooved pulley, *J*, is secured that receives the round belt extending from the treadle motion or other driving mech-

anism; and in order that the loops of thread seized by the hook-heads may escape the combination with this shaft is formed by means of two pins, *m m*, which enter sockets formed in the body of the double-headed looping-hook. Each of these pins is contained in a separate socket in a hub, *K*, secured to the revolving shaft *H*, and each has a head, *c*, which is borne against a stationary face-cam, *I*, by means of a helical spring placed in the pin-socket. The upper part of the cam recedes from the double-headed looping-hook, as seen at Figs. 2, 3, and 8, so that, as each pin is carried by the revolution of the shaft *H* along this receding portion its head is compelled by the spring to follow the inclination of the cam, and its point is withdrawn from the socket in the double-headed looping-hook to permit the loop of thread to escape. As the receding portion of the cam extends but a short distance and then approaches the double-headed looping-hook the withdrawn pin is caused to re-engage with the hook before the other pin is withdrawn in turn, so that the double-headed hook is always driven by the shaft. This mode of controlling the driving-pins by a cam permits the looper to be arranged so that its points may revolve in a plane perpendicular to the axis of the shaft which carries the pins.

The needle-bar *C* is caused to move up and down by means of a rock-shaft, *L*, which passes through the hollow needle-arm *E*. The front end of this rock-shaft is fitted with an arm, *N*, which is connected with the needle-bar by means of a link, *O*, so that as the rock-shaft rocks to and fro the needle-bar and the needle *d* carried by it are alternately depressed and raised. In order that the needle-bar may make two descents for each revolution of the double-headed looping-hook, the rock-shaft *L* is connected with the revolving shaft *H* by means of an arm, *P*, a connecting-rod, *Q*, two pins, *ff*, and two slides, *g g*, moving in cross-slots *h h*, formed in the hub of the pulley fly-wheel *J*, these devices constituting one of the well-known mechanical movements for obtaining two double reciprocations for one revolution of a shaft.

The needle *d* is secured in a socket in the needle-bar *C* by means of a clamp-screw, *i*. When it is depressed its point passes down through a hole in the table-plate *B*, and carries the loop of thread in its eye within the range of motion of the hooked points of the double-headed looping-hook, and the motions of the needle-bar and double-headed looping-hook are so timed that one hooked point of the latter passes by the needle and enters the loop of thread carried by it as the needle rises, and permits the loop to swell outward from its side. The hook-points of the double-headed looping-hook are arranged to pass close to the stem of the needle at the side nearest the cam *I*.

The feeding-instrument of the machine consists of a toothed plate, *S*, secured to one end of a lever, *T*, which is pivoted near the middle of its length to the frame of the machine. The

feed-plate is arranged to rise and sink and to move to and fro in a slot in the table-plate *B* of the machine. It is raised once for each depression of the needle-bar by means of the hub *K*, which is secured to the shaft *H*, and has two protuberances, *s s*, at its sides diametrically opposite each other. The feed-bar is depressed by the spring of the arm *j* of the lever *T*, which acts antagonistically to the cams *s s*, and holds the feed-plate out of contact with the cloth, except when it is raised by the protuberances of the cams.

In order that the feed-plate may be moved to and fro to feed the cloth forward and to retrograde previous to each feeding movement, the butt-end *j* of the feed-lever is fitted with two adjustable wipers, *x* and *x'*, operating in connection with two cams, *U* and *U'*, secured to the shaft *H*. These cams, acting upon the wipers, move the feed-plate in one direction to feed the cloth forward past the needle, and the feed-plate is moved backward, antagonistically to the cams, by means of a spring, *r*, applied to the butt of the feed-lever. One of the cams, *U*, has two protuberances, *t t*, which project equal distances at the opposite sides of the cam. The other cam, *U'*, has a single protuberance, *k*, of about double the projection of those of the first cam, *U*. The shanks of the wipers *x x'* are screwed through bosses secured to the feed-lever *T*, and pass through holes in the frame of the machine to its exterior, where they are formed into milled heads *V V'*, by turning which the positions of the wipers may be adjusted relatively to the cams which act upon them. The cam *U'* is so set with reference to the cam *U* that the protuberance of the former is in position to act upon its wiper *x'* at the same time that one of the protuberances of the latter is in position to act on its wiper *x*. Hence if the wiper *x'* be adjusted by screwing its shank outward or from the cam, so that the cam in its revolution cannot touch it, the feed-plate *S* will be moved by the alternate action of the two protuberances of the cam *U* on its wiper *x*, and as these protuberances are of equal projection the movements of the feed-plate will all be equal, and the stitches will be of uniform length, which, however, may be regulated by adjusting the wiper *x*. If, on the other hand, the wiper *x'* be adjusted by screwing its shank inward toward the cam, so that the cam *U'* in its revolution acts upon it, the feed-plate will be moved alternately by the action of one of the protuberances of the cam *U* on its wiper *x* and by the action of the protuberance of the cam *U'* on its wiper *x'*, and as the protuberance of the cam *U'* is double that of those of the cam *U* the movement of the feed-plate may be made alternately long and short, and the stitches may be alternately long and short, the relative lengths of the long and short stitches being regulated by the adjustment of the wipers.

The machine is fitted with a standard, *X*, for the spool of needle-thread, a thread-tension, *Y*, and thread-guides *w w*, to direct the needle-

thread on its way to the needle. It is also provided with a presser-foot, Z, of the usual construction, and its appurtenances.

The machine is put in operation by turning the shaft II in the direction of the arrow *z* in the figures. When it is sewing, the needle is caused to descend, perforate the material to be sewed, carry the loop of needle-thread through it, present it to the action of the double-headed looping-hook, and rise again, preparatory to a succeeding descent. As the loops of needle-thread are presented by the needle, they are seized alternately by the hooked points of the looping-hook, and are extended by them. The body of the hook is wider than its points, so that as each loop of thread is extended by the revolution of the hook-point that has seized it it is spread laterally, so that the succeeding hook-point can draw the succeeding loop of thread through its predecessor, and as the loops are not twisted by this mode of operation the chain of loops forming the under side of the seam, when completed, lies flat against the surface of the cloth. As the backs of the hook-heads of the double-headed looping-hook extend backward for a considerable distance, (as shown in the drawings,) the loop of needle-thread seized by each hook-point is not given up or let off until the succeeding hook-point has seized and is extending a succeeding loop of needle-thread presented by the needle, and the needle has descended a second time and entered the loop of thread let off, so that the loop of needle-thread seized at this last descent of the needle is drawn by one of the hooks through the two preceding loops, thereby producing a double-chain embroidery-stitch resembling braid upon the under face of the fabric.

When the machine is used for sewing ordinary seams it may be made to produce an ordinary single-thread-chain-stitch in which each loop of needle-thread is drawn through the next preceding loop alone (instead of the preceding two loops) by substituting the double-headed looping-hook represented at Figs. 13 and 14 for that represented in Figs. 5, 6, and 7. This second looping-hook differs from that first described in the form of the hook-heads, the backs of which do not extend as far as those of the looping-hook first described. Hence, as the hooked points of the double-headed looping-hook are at opposite sides of the circle described by it, the loop extended by one hooked point is given up as the next one is extended, so that each loop of needle-thread is drawn through the loop next preceding it, and there need be no surplus loose thread to embarrass the operation of the machine. In using this second looping-hook a perforated guard, *n*, may be placed under the table-plate in such position relatively to the needle that the latter in its descent almost touches the side of the perforation of

the guard farthest from the cam I, so that said guard prevents the swell of the loop of needle-thread at that side of the needle and causes it to swell out to a greater extent at the other side than it otherwise would, thereby insuring its seizure by the hook-point of the looping-hook.

The invention has thus far been described as embodied in a machine sewing with a single thread. It may, however, be embodied in a machine sewing with two threads by arranging a bobbin of thread in the double-headed looping-hook in such manner that the loops of needle-thread will pass over such bobbin. In this case, if the machine be fed in the same direction as the machine before described, a chain-stitch with a second thread running through its loops on the underside of the cloth will be produced. If, on the other hand, the machine were constructed and arranged to feed in a direction opposite to that in which the before-described machine feeds, a two-threaded lock-stitch would be produced. In all cases each loop of needle-thread is drawn up to the cloth by the extension of the succeeding loop.

Having thus described a machine embodying my improvements, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a sewing-machine, of the reciprocating needle-bar with a double-headed rotating hook so formed that when rotated in combination with a reciprocating needle it will draw a loop of needle-thread through the two preceding loops, substantially as set forth.

2. The combination of the double-headed looping-hook with the shaft that imparts motion to it by means of two pins, which are controlled by a cam, the whole operating substantially as set forth.

3. The combination of the feeding-instrument of the sewing-machine with a shaft making one revolution to two descents by the needle-carrier through the intervention of two cams of unequal projection, the whole operating substantially as set forth.

4. The combination of the feeding-instrument with a shaft making one revolution to two descents by the needle-carrier, through the intervention of two cams and two adjustable wipers, one of said cams having two protuberances of equal projection and the other one having one protuberance of greater projection than those of the other cam, the whole operating substantially as set forth.

In witness whereof I have hereunto set my hand.

J. S. McCURDY.

Witnesses:

S. A. HOWE,
F. M. TOWER.