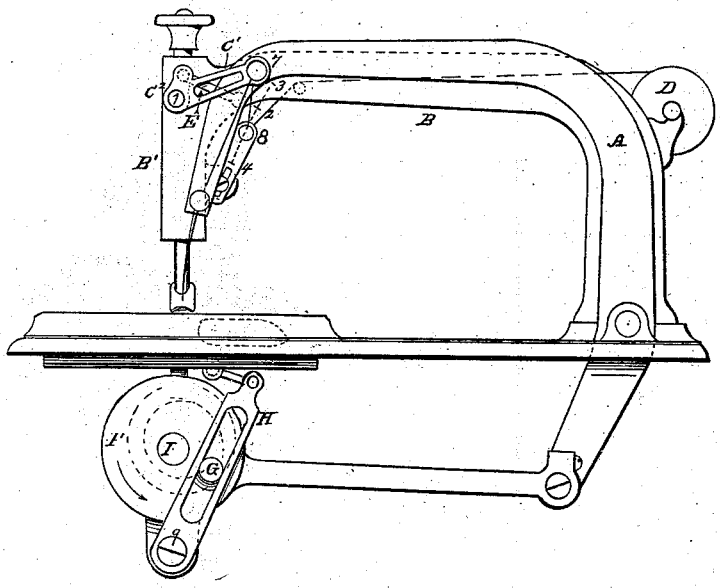
E. H. SMITH.

SEWING-MACHINE.

No. 187,564. Patented Feb. 20, 1877.



Witnesses.

M. E. R. Smith

Wm. Munch.

Earle H. Smith

UNITED STATES PATENT OFFICE.

EARLE H. SMITH, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 187,564, dated February 20, 1877; application filed July 28, 1869.

To all whom it may concern:

Be it known that I, EARLE H. SMITH, of the State, city, and county of New York, have the invented certain new and useful Improvements in Sewing-Machines, whereof the following is a specification:

This invention relates to the thread-controller in shuttle sewing-machines. It consists of the combination, with the shuttle, the fixed arm of the machine, and the needle-carrier, of a thread-controlling lever and a link, substantially as hereinafter set forth.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same.

Referring to the annexed drawing, wherein I have shown a sewing-machine possessing the elements, functions, and combinations comprised in my invention—

A represents a needle-arm, receiving motion from a revolving crank or eccentric, F, on the main shaft I. B′ is the head of the fixed arm B. Upon a pivot, 1, is a lever, C, for manipulating and controlling the needle-thread, which thread, after passing through or over a suitable tension, D, to a fixed eye, 8, on the arm B, goes through the end of the thread-lever C and an eye on the needle-arm, and thence to the eye of the needle. The thread-lever C has a long arm, C^1, and a short arm, C^2. At the end of the long arm there is an eye, 7, for receiving the needle-thread, and at the end of the short arm there is attached by a pivot a link or shackle-bar, E, the office of which is to govern the motions of the thread-lever C, and impart a special movement thereto quite different from that of the needle-bar, whereby said lever is adapted to operate as a take-up to the needle-thread, and also serve to draw the loop from the shuttle and to the cloth, as hereinafter specified.

The shuttle is driven by a revolving crank, G, through a vibrating lever, H. The length of the needle's stroke is indicated by the distance from 3 to 4 in the drawing.

The operation is as follows: As the driving-shaft is revolved (to the left) during the upward movement of the needle-arm from 2 to 3, the thread-lever remains nearly stationary, or drops slightly. When the needle commences to descend, the thread-lever holds up the needle-thread in the form of a "bight," and prevents any slack below the point of the needle until the position in which those parts are represented is again reached and passed in the downward stroke of the needle, and the needle is about to strike the cloth. On reaching the cloth it requires slack thread to carry with it, and the arm C^1 of the lever now swings down rapidly, giving up its bight of thread, to allow the needle to take it into the cloth. In the downward movement of the lever-arm C^1 it passes the eye 8 on the fixed arm B, after which it ceases to act on the thread until the rising of the needle after the shuttle has passed through the loop. Up to this time the thread-lever has been acting in connection with the needle chiefly. Now, the eye 8 on the fixed arm is so located in the path of the eye 7 of the thread-lever arm C^1 that just as the heel of the shuttle leaves the loop of needle-thread in passing out, the eye on said lever, in swinging upward, passes the eye 8 on the fixed arm, and, in so doing, quickly pulls the loop from the heel of the shuttle, and draws it into the cloth against the shuttle-thread. The movement of the shuttle is so related to that of the take-up or thread-lever as to complete its forward stroke, and draw its own thread tight, at about the same time that the thread-lever draws the loop of needle-thread into the cloth. This is the position of all the parts, as represented in the drawing, where the thread-lever, operated and governed as aforesaid, and the shuttle driven by the crank G, are seen in the act of completing the upward and forward strokes, respectively, without reference to the final upward movement of the needle, which is not then accomplished. During said final movement, and also the first part of the needle's descent, the take-up lever C has little or no motion, nor until the needle strikes the cloth, as before specified, when the movements previously described are repeated, and so on.

It will hence be apparent that the movements of the thread-lever, though derived from the needle-stock, are special, and differ from that of the needle in completing an upward movement in advance of that of the needle, and also in having a period of rest while the needle is out of the cloth. This va-

riation of the movement of the thread-lever from that of the needle is due to the variation of the arcs described by the connections of the thread-controller with reference to the line of movement of the needle stock or arm.

The above-described mechanism for the needle, shuttle, and thread-controller embraces a combination of devices positive in their action, adapted to high speed, and not liable to rapid wear.

In the drawing I have represented the thread-lever as applied to the sewing-machine, wherein the needle, as moved by an eccentric, has no "rest" during the journey of the shuttle through the loop. The invention is adapted, however, to machines otherwise constructed; and if there be such rest in the motion of the needle, the extent of motion of the thread-lever would be somewhat less.

I claim as my invention—

The combination, with the shuttle, fixed arm of the machine, and needle-carrier, of the thread-controlling lever C and link E, substantially as and for the purposes described.

EARLE H. SMITH.

Witnesses:

H. B. BROWN,

WM. H. JOHNSON.