

No. 621,760.

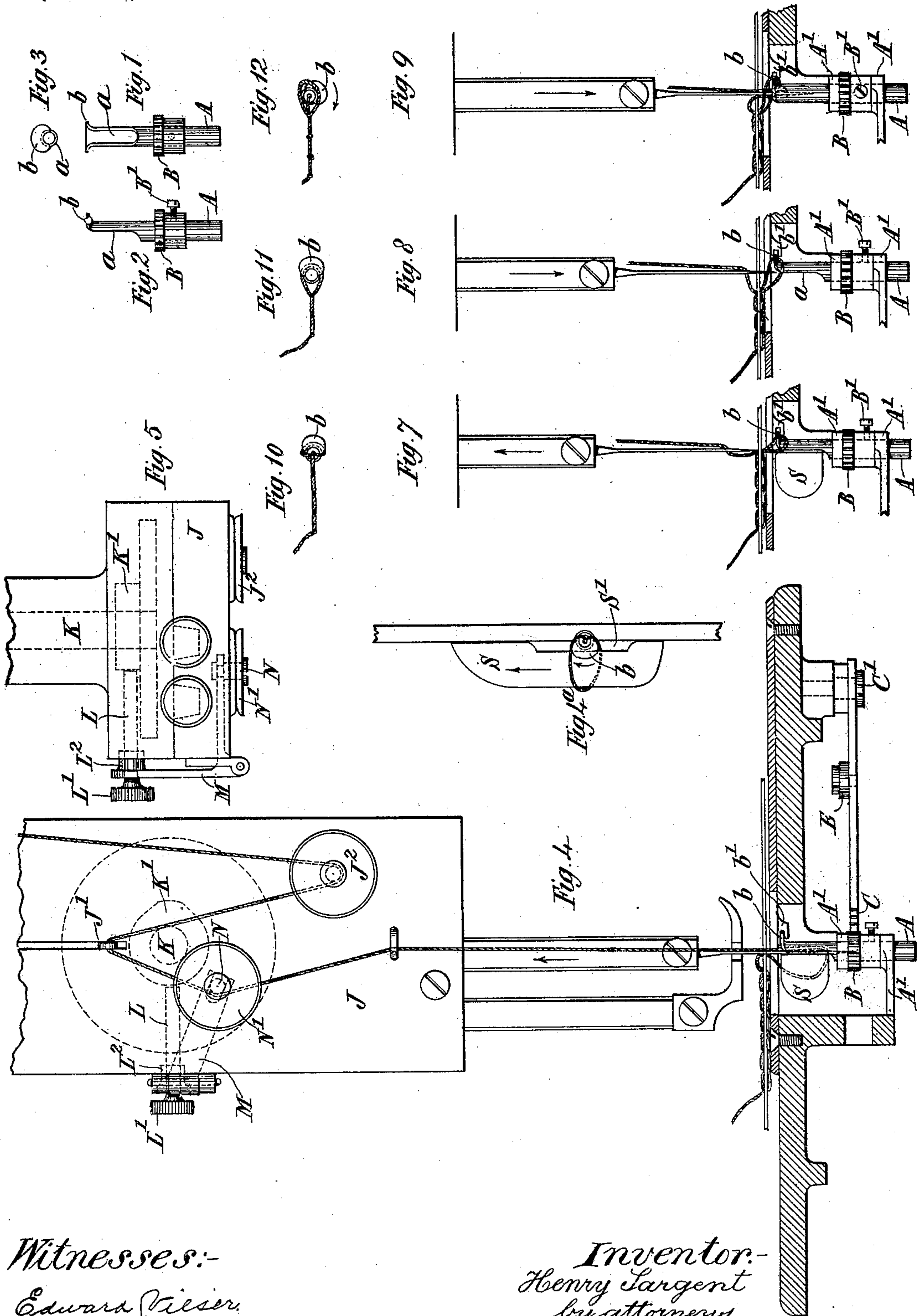
Patented Mar. 21, 1899.

H. SARGENT.  
SEWING MACHINE.

(Application filed Dec. 21, 1896.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:-  
Edward Vieser.  
George Barry Jr.

Inventor:  
Henry Sargent  
by attorneys  
Brown & Howard

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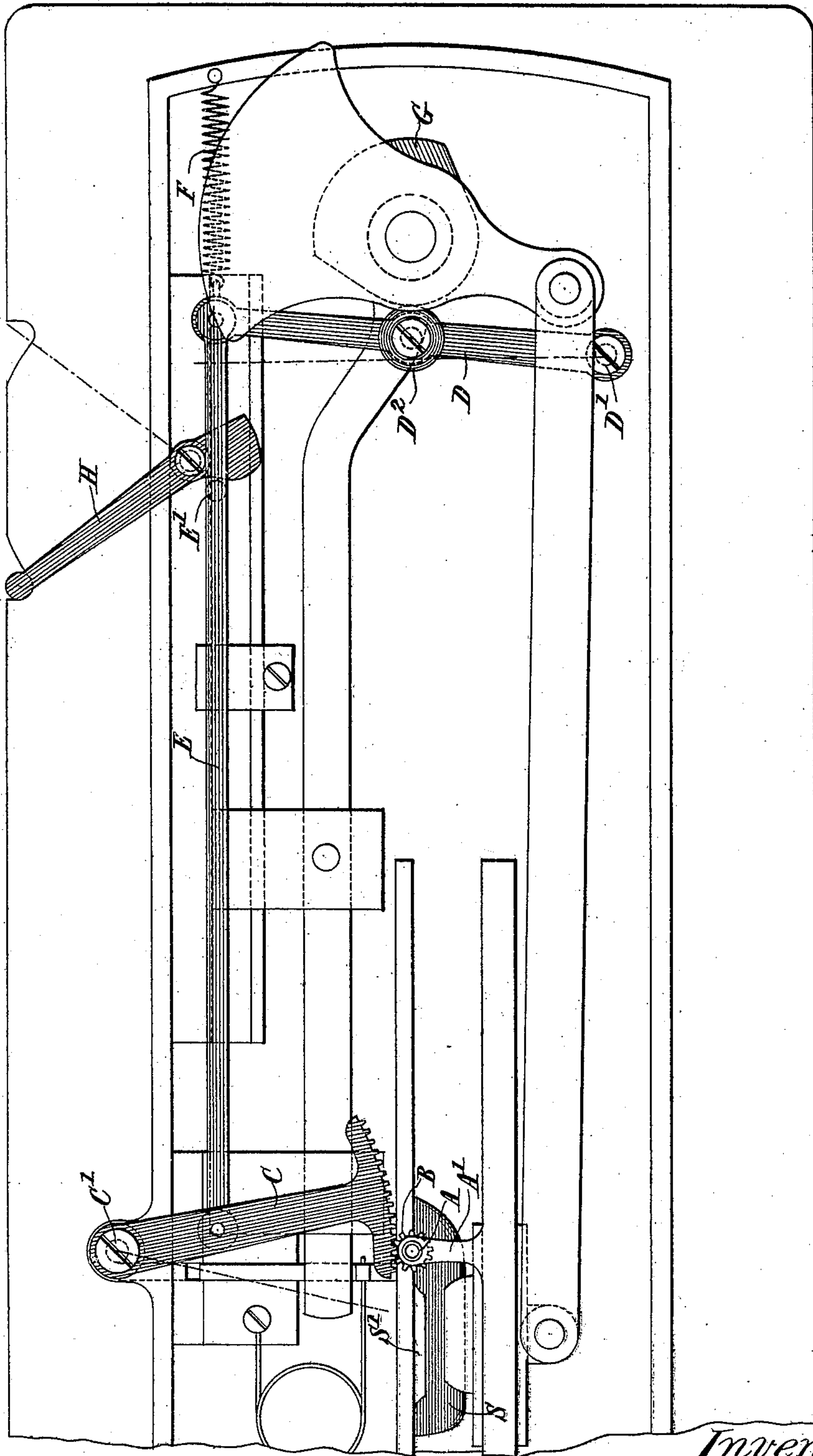
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2 Sheets—Sheet 2.

Fig. 6



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# UNITED STATES PATENT OFFICE.

HENRY SARGENT, OF LONDON, ENGLAND, ASSIGNOR TO FREDERIC  
GEORGE BATE, OF SAME PLACE.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 621,760, dated March 21, 1899.

Application filed December 21, 1896. Serial No. 616,539. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY SARGENT, of 76 Whitepost Lane, Victoria Park, London, England, have invented certain new and useful  
5 Improvements in Sewing-Machines, of which the following is a specification, and for which I have obtained Letters Patent of Great Britain, No. 8,396, dated April 27, 1894.

The object of this invention is to provide  
10 simple means whereby a lock-stitch sewing-machine may be rendered capable of producing a lock-stitch, a chain-stitch, or a locked chain-stitch at will without changing any of the parts; and the invention consists chiefly  
15 in the application to an ordinary lock-stitch sewing-machine of an axially-moving instrument destined to enter the needle-thread loop as it leaves the shuttle or loop-opener and hold it open in the path of the needle, so that  
20 the needle may pass through it at its next descent when it is desired to make a chain-stitch or a locked chain-stitch.

In the accompanying drawings, Figure 1 is a front elevation of the loop-holding instrument. Fig. 2 is a side elevation, and Fig. 3  
25 a top plan view. Fig. 4 shows in front view and partly in section so much of a Singer sewing-machine as is necessary to illustrate this invention. Fig. 4<sup>a</sup> is a plan view of the  
30 shuttle, shuttle-race, and loop-holding instrument detached; and Fig. 5 is a plan view of the head. Fig. 6 is an under side plan view of an ordinary Singer machine to which the invention has been applied and showing the  
35 arrangement of mechanism for working the looping instrument; and Figs. 7, 8, and 9 are diagrammatic views showing, with Fig. 4, the positions of the looper at various periods of making a stitch, Figs. 10, 11, and 12 being  
40 corresponding plan views.

In carrying out this invention the needle employed is an ordinary eye-pointed needle, which carries a loop of thread through the work from the same side thereof as it itself  
45 enters. The axially-moving looping instrument is made from a short length of steel tube, which is cut away on one side for about half its length, the end being splayed out, so as to form an overhanging lip. This instrument  
50 is mounted with the lip upward in socket-bearings in the line of the axis of the

needle and projects through a semicircular recess formed in the wall of the shuttle-race to receive it. Axial motion is communicated to this instrument by a toothed sector gearing  
55 into a pinion on the instrument and which receives a vibratory or reciprocating motion from a cam on the vertical shaft of the machine. As the instrument rotates, the lip or  
60 splayed-out portion enters the needle-thread loop before the loop leaves the shuttle or loop-opener, and the loop is held on the under side of the lip until the needle again descends through the open loop, when the return  
65 motion of the instrument takes place and the loop slips off onto the needle. In this way a chain-stitch is produced, the shuttle-thread being cut off short (or, which is more convenient, the bobbin may be removed)  
70 for the purpose. If the shuttle-thread be retained, the locked chain or embroidery stitch will be produced. When making the lock-stitch, the looping instrument is thrown out of action. The axially-moving instrument  
75 may also be applied to a chain-stitch machine to hold the loop open for the needle at its next descent.

Referring now to the drawings, A is the loop-holding instrument, which consists of a tube the upper half *a* of which is cut away  
80 for half its diameter and the outer end is splayed out to form a lip, as shown at *b*. This cut-away portion at the right moment will enter and catch the needle-thread loop, which is drawn up under the lip by the take-up.  
85 The lower part of this instrument carries a pinion B, which receives a reciprocatory movement, so as to give an axial motion to the instrument A in the manner following:

Referring now to Fig. 6, C is a toothed sector  
90 which gears with the pinion B and is mounted on a conveniently-placed pivot-pin C', tapped into the under side of the table. D is a lever or arm mounted at one end on a pivot-pin D', also tapped into the under side  
95 of the table and carrying a bowl D<sup>2</sup> at about the center of its length. At its outer end this arm D is connected by the rod or bar E with the sector C and also to one end of a  
100 spring F, the other end of the spring being attached to the table. G is a cam on the vertical shaft of the machine, against which the



bowl D<sup>2</sup> is pressed by the action of the spring F. This cam is formed with two concentric parts having a different radius, each extending to about one-third of the whole circumference, so that there will be a considerable dwell in the movement of the lever-arm D, and consequently in the movement of the sector and the looping instrument A at two distinct parts of the rotation, the acting surfaces of the cam being equal to about one-sixth each of the circumference of the cam and consisting of the difference between the two radii.

The movement of the sector is sufficient to give the looping instrument A one complete rotation in each direction.

When the looping instrument A is not required to be in operation, the lever H is thrown over into the dotted position, and by means of the cam on its end pressing against a pin E' on the bar E the lever-arm D is pulled forward and the bowl D<sup>2</sup> is withdrawn from contact with the cam G, and thus the sector mechanism becomes inoperative.

In a machine of the type shown (Singer family) the cam G may be fitted onto the boss of the shuttle-operating cam or crank.

The above-described mechanism is convenient and simple and has been devised with a view to make as little alteration as possible in the construction of the machine and to be clear of the other working parts. It will, however, be obvious that given the necessity for producing an axial movement of the instrument the particular means for producing the same are of secondary importance.

The looping instrument A is carried in bracket-bearings A', conveniently attached to or formed on the under side of the table of the machine, and the pinion B, which is provided with a boss, is mounted on the instrument A between the bearings A' and is secured by the clamping-screw B' in the boss. By this mode of mounting the exact position or height of the tubular instrument A can be regulated to a nicety in a simple and convenient manner.

S is the shuttle, which, as will be seen from Figs. 4<sup>a</sup> and 6, is formed on its flat side, which slides against the vertical wall of the race, with a recess S', for a purpose to be presently explained.

Referring now to Figs. 4 and 5, J is the front plate of the head. J' is the take-up, and J<sup>2</sup> represents the ordinary tension-disks. It has been found necessary to the proper working of the present invention that additional tension is required at a given moment, and I have therefore designed an automatic tension device, which will be now described.

On the horizontal shaft K is mounted a disk-cam K', which works in contact with and operates a pin L. This pin L, which projects through the side plate of the head, is provided with a milled head or button L', and for a short distance below the button is threaded. Between the button and the side plate the pin passes through a threaded socket L<sup>2</sup>, car-

ried by one arm of a bell-crank lever M, which is conveniently pivoted to the side plate. The other arm of the bell-crank projects inside the head and is loosely connected to a pin N, which projects through the front plate J and carries two tension-disks N'. As the cam K' rotates it pushes out the pin L and rocks the bell-crank M, which pulls the pin N inward, thus drawing the two disks N' closely together and against the plate J. The disks N' are thus caused to grip the needle-thread, which is passed between them more or less tightly, according to the amount of tension required, which is regulated by turning the pin L in the socket L<sup>2</sup>, so that more or less rocking motion can be given to the bell-crank M.

As before indicated, the semicircular portion of the looper A lies in a vertical semicircular recess in the wall of the shuttle-race, so that it will present no obstruction to the free movement of the shuttle, as will be seen on reference to Figs. 4, 4<sup>a</sup>, and 7. As the instrument rotates, however, it will come out of the said recess, and to allow room for it to rotate while the shuttle is passing the recess is formed in the shuttle. This recess is of such a length as to allow the looper to turn completely around while the recessed portion of the shuttle is passing, as illustrated in Fig. 4<sup>a</sup>, whether the shuttle is going forward or backward, and the depth of the recess in the shuttle will be at least equal to that of the recess in the race or half the diameter of the looper-tube A.

It will of course be understood that the looper mechanism is only operative when a chain-stitch or an embroidery (locked chain) stitch is required and that when it is desired to make a lock-stitch the lever H is moved to the dotted position, and the looper is then inoperative.

To produce the chain-stitch, the shuttle without the bobbin is used; but for the embroidery-stitch the shuttle or bobbin thread is also required.

To prevent the needle-loop slipping off the looper before it is drawn tight on the looper, a notched finger-piece or plate b' is secured to the under side of the throat-plate. In its normal or stationary position the lip of the looper always lies in the notch, so that the loop cannot slip off.

The operation of the mechanism will be as follows: Referring to Fig. 4, the needle has descended through the work and is just commencing to rise, the needle-loop being thrown out in the usual way and the shuttle entering. The continued advance of the shuttle brings its recess S' opposite the looper, which now begins to rotate, (through the action of the cam G,) and as it rotates around the needle it, so to speak, twists or turns itself into the loop. This position is shown at Figs. 7 and 10, the shuttle having left the loop and the looper having made one complete rotation, while the take-up has drawn the loop up under



the lip of the looper. The feed now takes place, by which operation the loop is opened out to receive the needle at its next descent and the needle commences to descend. This position is shown at Figs. 8 and 11, the looper remaining stationary, because one of the concentric parts of its cam is passing the bowl  $D^2$  of the arm D. The needle now descends through the work, and through the open loop the shuttle returns preparatory to opening out the next loop. The looper rotates in the contrary direction to, so to speak, turn itself out of the loop, which will be left on the needle. This position is shown at Figs. 9 and 12, the looper just throwing off the loop onto the needle, which will continue its descent, while the looper completes its rotation. The automatic tension  $N'$  now comes into operation. As the loop leaves the looper there will be an amount of slack to be taken up, so as to bring the loop comparatively tightly around the needle. This is effected by the further descent of the needle. As, however, the needle in descending would draw thread from the bobbin in the usual way, it is necessary that the needle-thread be held so that no more thread can be drawn from the bobbin by the descending needle. For this purpose the disks  $N'$  are momentarily caused to grip the thread, and so the needle, which cannot draw from the bobbin, drags up the slack of the loop, and thus tightens up the stitch to such an extent as may be required in making a comparatively loose stitch like a chain-stitch. This automatic tension is only used for the chain or embroidery stitches. Having effected its purpose, the automatic tension releases the thread.

What I claim is—

1. The combination with a vertically-reciprocating needle, of a shuttle having a recess in that face which is toward the needle, a

tubular looping instrument turning about the path of the needle within the said recess and means for actuating said shuttle and looping instrument, as herein set forth.

2. The combination with a vertically-reciprocating needle, of a shuttle-race having a recess opposite the path of the needle, a shuttle in said race having a recess in that face which is next the needle, a looper turning about the path of the needle partly within the recess of the shuttle-race and partly within the recess in the shuttle, and means for actuating said shuttle and looper, substantially as herein described.

3. The combination with an eye-pointed needle for carrying a loop of thread through the work from that side thereof at which said needle enters and a shuttle, of a looping instrument turning about the path of the needle and consisting of a lower tubular portion and an upper half-round portion the upper edge of which is provided with a lip splayed outwardly beyond the circumference of the tubular portion, and means for actuating said needle, shuttle and looping instrument, substantially as herein described.

4. In a sewing-machine, the combination with the needle and the throat-plate through which it works, a tubular looping instrument having an outwardly-projecting lip and arranged to turn about the path of the needle, a shuttle, and means for actuating the needle and shuttle and said looping instrument, of a notched plate attached to the under side of the throat-plate and engaging with said lip to retain the loops thereon, substantially as herein set forth.

London, December 2, 1896.

HENRY SARGENT.

Witnesses:

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