

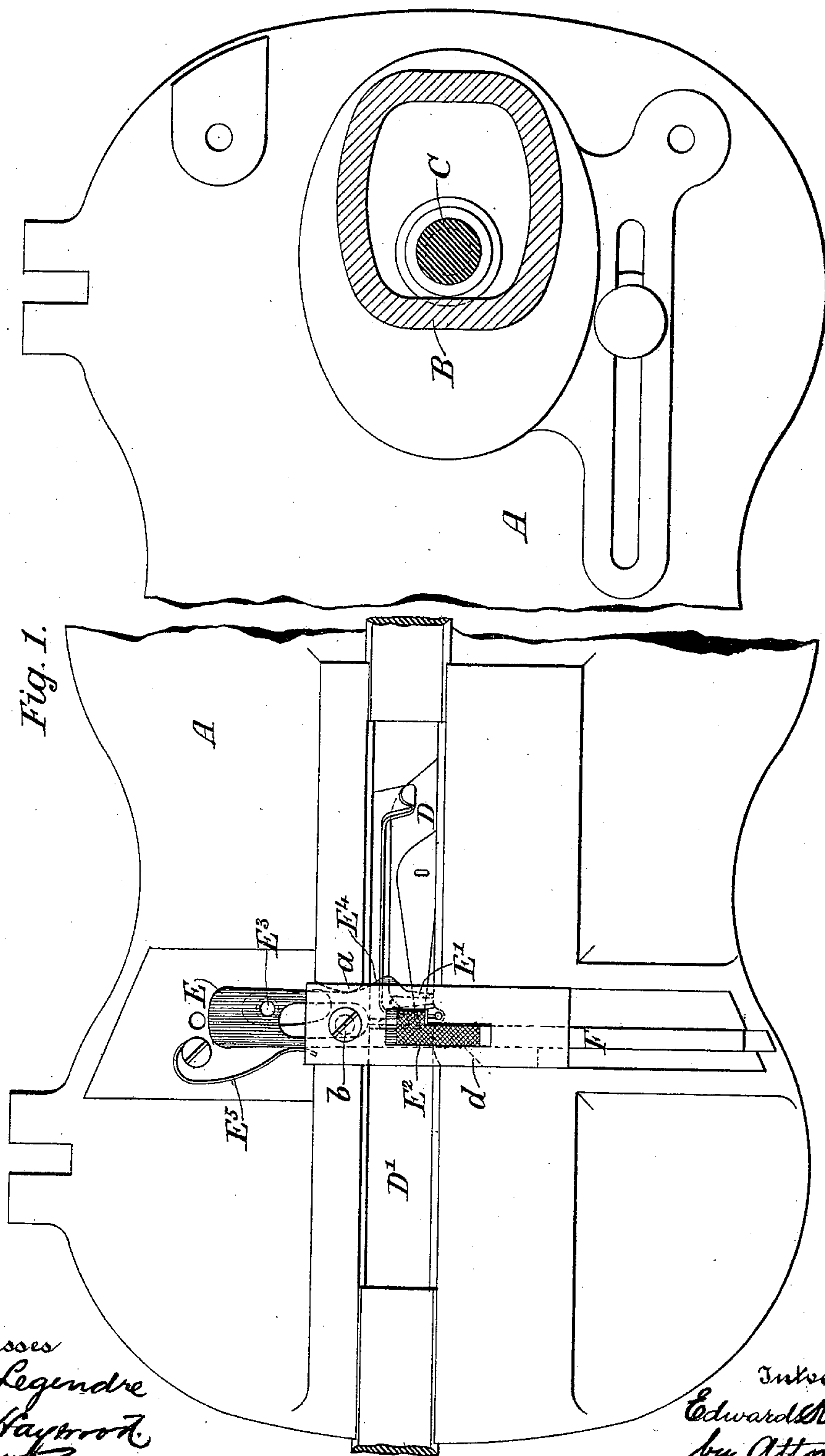
(No Model.)

4 Sheets—Sheet 1.

E. KOHLER.  
SEWING MACHINE.

No. 449,818.

Patented Apr. 7, 1891.



Witnesses  
L. N. Legendre  
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Edward Kohler  
by Attorneys  
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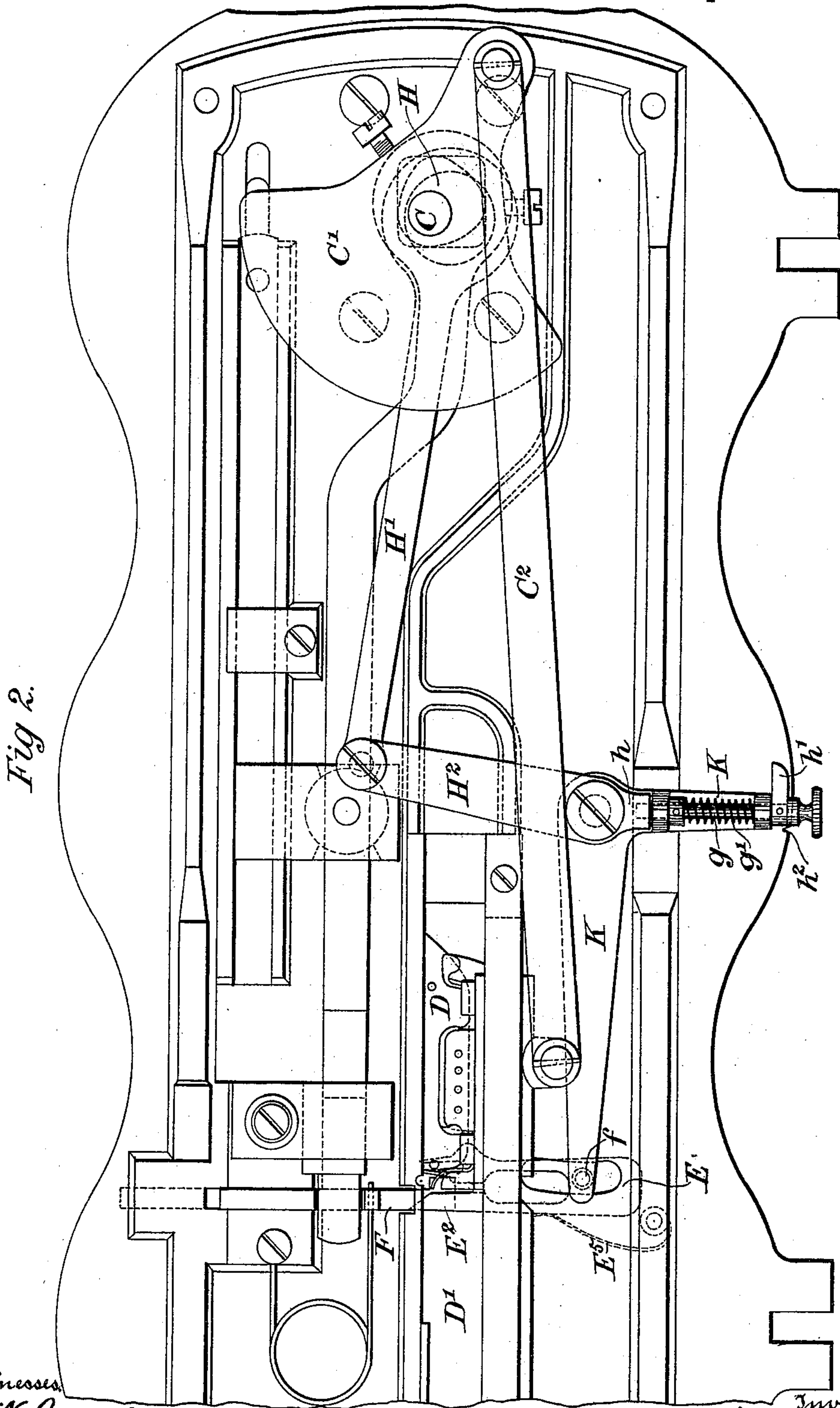
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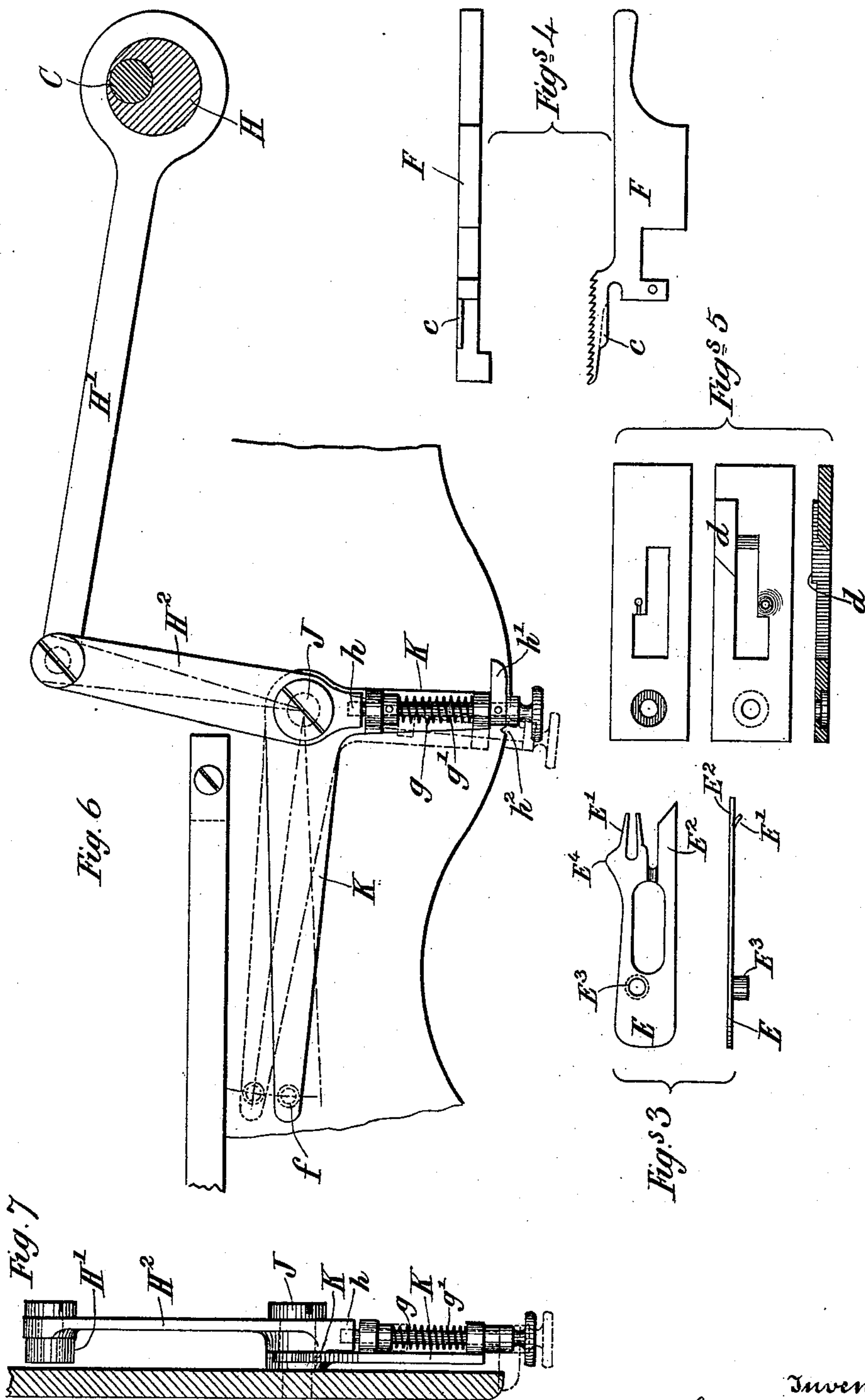
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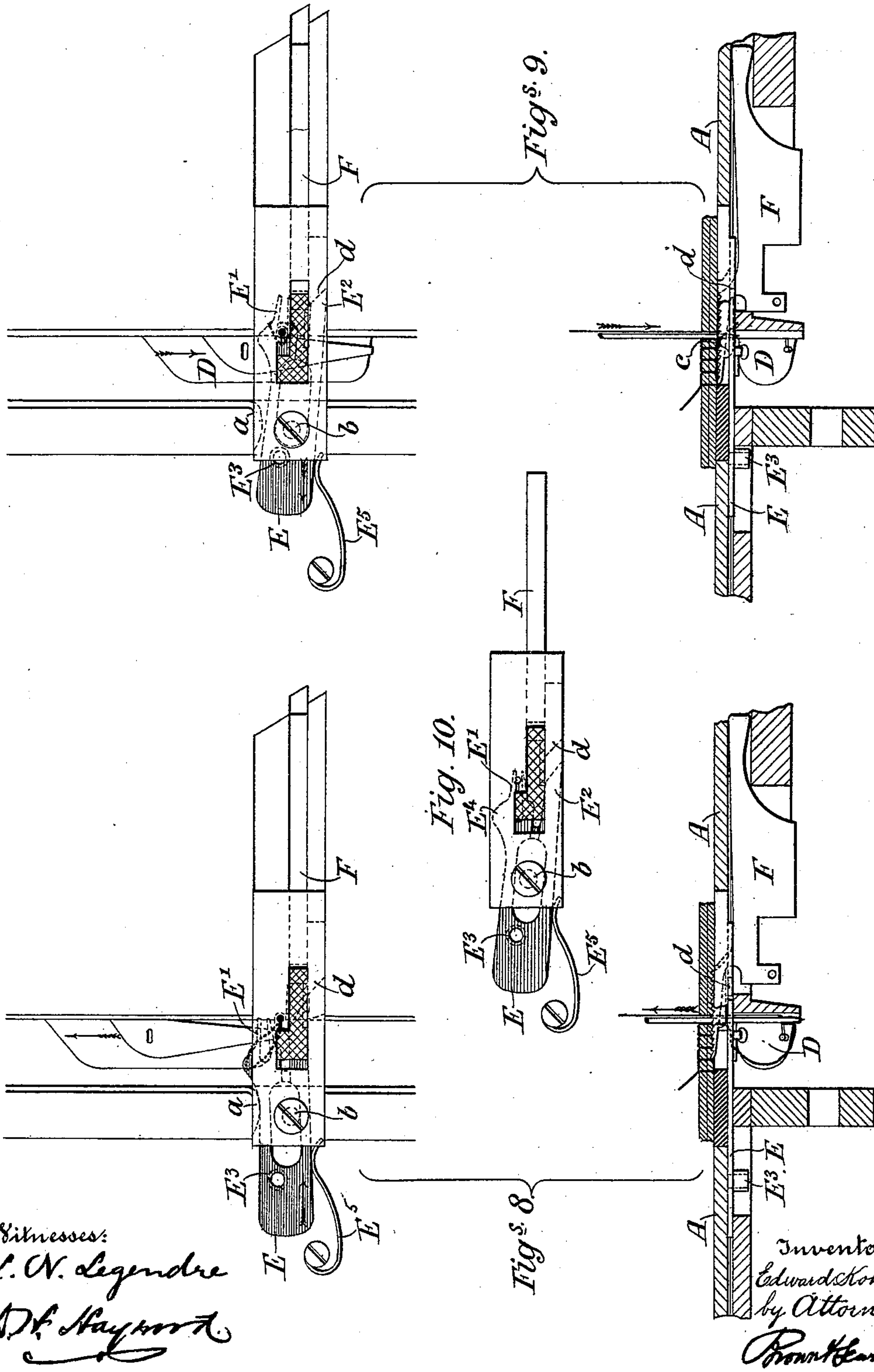
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# UNITED STATES PATENT OFFICE.

EDWARD KOHLER, OF LONDON, ENGLAND.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 449,818, dated April 7, 1891.

Application filed August 15, 1890. Serial No. 362,065. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD KOHLER, of 81 Guilford Street, Russell Square, London, county of Middlesex, England, have invented  
5 certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

The object of this invention is to render shuttle sewing-machines of any type capable  
10 of producing either a lock-stitch or a chain-stitch at will.

In carrying out my invention I combine with the shuttle-machine a reciprocating loop-holder, which is operated by suitable mechanism (when it is desired to make a chain-stitch) to take the loop off the shuttle, (the spool-thread being removed,) to hold it open,  
15 and to bring it while open into position to receive the needle at its next descent.

In the accompanying drawings, Figure 1 is a plan view of the table of a shuttle sewing-machine with loop-holder adapted thereto. Fig. 2 is an under side plan view showing the mechanism for actuating the loop-holder.  
20 Fig. 3 shows in plan and elevation the loop-holder detached. Fig. 4 shows in plan and elevation the feed-dog detached. Fig. 5 shows the throat-plate in plan, under side view, and section. Fig. 6 is an under side plan view,  
25 and Fig. 7 an edge view, of the loop-holder mechanism detached. Figs. 8 and 9 show, respectively, a plan and elevation of the parts in two positions while making the chain-stitch; and Fig. 10 shows the relative positions of the loop-holder and feed-dog after the feed has taken place.  
30

The invention may be applied to any shuttle sewing-machine; but the machine shown in the drawings and to which the invention has  
40 been adapted is that known in the trade as the "German Singer" machine, in which the shuttle reciprocates in a race placed longitudinally of the table of the machine.

This machine being well known, it is unnecessary to describe it or to show other than those parts to which my invention is applied.

To this end A is the table of the machine, and B is the pillar carrying the vertical needle mechanism, main shaft, and driving-wheel.  
50 (Not shown.)

C is a vertical shaft which receives rotary motion through bevel-gear from the main

shaft, and communicates a reciprocating motion to the shuttle D through a crank C' and connecting-rod C<sup>2</sup>. (See Fig. 2.) The shuttle  
55 D reciprocates in the race D', which is provided with sliding covers in the usual way.

E is the loop-holder, (shown detached at Fig. 3,) which consists of a flat plate having at its front end the prongs or fork E'. The  
60 loop-holder may be reciprocated from its rear end, near which is provided a socket E<sup>3</sup> to receive a pin of the driving mechanism to be hereinafter explained. On one side the plate is formed with a cam-surface E<sup>4</sup>, which under  
65 certain conditions bears against the shoulder a, under the influence of a spring E<sup>5</sup>, and it is also formed with a projecting cam-surface E<sup>2</sup>, to be presently explained. In the present instance the loop-holder works transversely of  
70 the table of the machine immediately below the throat-plate, which holds it down in position. The throat-plate is secured by a screw b, which may pass through the slot in the loop-holder E. On the under side of this  
75 throat-plate is a beveled shoulder d.

F is the feed-dog, which is actuated in the usual manner, and is of the usual construction, except that in the present case it has on the under side a rib or feather c, as shown in  
80 Fig. 4 and indicated by dotted lines in Fig. 9. This rib or feather c may not be necessary in all cases.

The driving mechanism for the loop-holder is shown in Figs. 6 and 7. On the vertical  
85 shaft C is mounted an eccentric H, which works in a strap at one end of a connecting-rod H'. This rod is pivoted to a rocking arm H<sup>2</sup>, mounted loosely on an axle or pivot J, and provided with a socket h, extending beyond  
90 the axle J and forming a catch. Mounted loosely on the same axle by the side of the arm H<sup>2</sup> is the bell-crank lever K, which carries at the end of the longer arm the pin f, which projects through a slot in the table of  
95 the machine and takes into the socket E<sup>3</sup> of the loop-holder E. The other arm of this bell-crank lever K is provided with bearings, in which is mounted a locking pin or bolt g, around which is a coiled spring g' for giving  
100 the locking-pin motion in the direction of the axle or pivot J and causing it to enter the socket h on the end of the rocking arm H<sup>2</sup> in order to lock the arms K and H<sup>2</sup> together.



This locking-pin  $g$  is also provided with a tongue  $h'$  for taking into a notch  $h^2$ , made in the edge of the table of the machine, by which it can be retained in an unlocked position when the pin has been withdrawn from the socket  $h$  and axially turned by means of the button at its outer end. The locking-pin  $g$ , when in the drawn position, will take into the socket  $h$  and lock the parts  $K$  and  $H^2$  together, so that the motion of the eccentric will be communicated to the part  $K$ ; but when the pin  $g$  is in the dotted position the part  $H^2$  will be free to oscillate without the part  $K$ .

The above is a simple and convenient mechanism for throwing the loop-holder-driving mechanism in and out of gear, according as it may be desired to employ a lock-stitch or a chain-stitch without the necessity for tilting the table of the machine and so disarranging the work.

Let it be supposed that it is desired to produce a chain-stitch. The loop-holder-driving mechanism will be locked and the spool may be removed from the shuttle or the shuttle-thread cut off and secured by slipping it under the tension-spring of the shuttle. The shuttle will now not have the function of a shuttle, but will constitute simply a device for taking and expanding the loops made by the needle, and the operations of producing the chain-stitch will be as follows: The vertical needle having descended to its lowest position, will as it rises throw out a loop in the usual manner, which the nose of the advancing shuttle will enter. While the shuttle is passing through the loop the loop-holder  $E$  is advanced, the spring  $E^5$  causing its front end to swing over to the right, looking from the front of the machine. The loop-holder will thus advance in a diagonal direction and pass to the right-hand side of the needle, the fork  $E'$  entering the loop (which is dragged to one side by the friction of the shuttle) just before it leaves the heel of the shuttle, as will be seen in Fig. 8. By this time the ends of the prongs of the fork  $E'$  will reach beyond the shuttle-race, so that the loop cannot escape from the loop-holder. The needle all this time has been rising and the loop-holder advancing, the "take-up" drawing up the slack thread as the shuttle passes out of the loop. So soon as the point of the needle is above the work the feed-dog is raised and commences to feed forward the work, and the loop-holder advancing the end of the projecting cam-surface  $E^2$  of the loop-holder strikes the beveled shoulder  $d$  on the under side of the throat-plate. (See Fig. 5.) The loop-holder as it advances is pushed by the beveled shoulder  $d$  to one side—i. e., the left—the feed-dog passing inside the projecting cam-surface  $E^2$  of the loop-holder when feeding. As the loop-holder is pushed over to the left it carries with it on its prongs the new loop and brings the opened loop directly in the line of descent of the needle, as will be seen at Fig. 9. This lateral motion of the loop-holder takes place

at the time the feed-dog is raised, so that the projecting portion  $E^2$  of the loop-holder can pass below the rib or feather  $c$  on the under side of the feed-dog. The feed of the work having taken place, the feed-dog is lowered while the loop-holder is in its advanced position and the longitudinal rib of the feed-dog drops down inside the cam finger or surface  $E^2$ . This position of the parts is shown at Fig. 9. During the return motion of the shuttle the needle descends and enters between the prongs of the loop-holder and through the open loop, the loop-holder commencing to withdraw from the loop as soon as the needle has passed sufficiently far to securely hold the loop. The back motion of the loop-holder takes place at right angles to the shuttle-race in consequence of the cam-finger  $E^2$  of the loop-holder sliding on the outside of the longitudinal rib  $c$  of the feed-dog  $F$ , (now in its lowered position,) which will resist the tendency of the spring to throw it over to the right until the cam-finger is withdrawn from the feather and the loop-holder completes its back motion, being guided by the cam-surface  $E^4$  bearing against the shoulder  $a$ .

It will thus be seen that the loop-holder has first to advance on one side of the needle—namely, that on which the loop is formed—so that the fork may enter the loop and hold it as it slips off the heel of the shuttle; next, to move to one side to bring the loop into position to receive the needle on its next descent, the needle then passing between the prongs of the fork and through the loop kept open thereby, then to withdraw from the loop on the line of its new position while the loop is held by the needle and while the new loop is being formed to receive the nose of the shuttle, and, finally, to return to its former position preparatory to advancing to take up the new loop.

For some constructions of shuttle sewing-machines the form of loop-holder may have to be slightly modified; but in every case it will be provided with a fork at its front end, and it will be moved in the manner described in the preceding paragraph, irrespective of the means for operating it.

When it is desired to use the lock-stitch, the loop-holder is brought into the position shown at Fig. 9, in which position it is retained by bringing the tongue  $h'$  of the locking-pin  $g$  into the dotted positions of Figs. 6 and 7. The bolt  $h$  having been withdrawn, the lever or rocking arm  $H^2$  will now be free to vibrate without communicating any motion to the bell-crank  $K$ . Then by replacing the spool in the shuttle or disengaging the shuttle-thread from the tension-spring the machine will be ready to produce the lock-stitch. It will thus be seen that the only change required to convert the lock-stitch machine to a chain-stitch machine, and vice versa, will be the adjustment of the locking-pin  $g$  or other equivalent contrivance in either of its two positions and the severing



or otherwise of the shuttle-thread. The advantage of my invention is that the affixing of detachable appliances to the machine to change the stitch is obviated; also that besides the locking and unlocking of the levers K and H<sup>2</sup> the only other change necessary is the removing and replacing of the spool—a matter of almost hourly occurrence with sewing-machinists, and one that is well understood—or to cut off the shuttle-thread, as before described.

What I claim as my invention is—

1. In a sewing-machine, the combination, with the needle and a device for taking and expanding the loop made thereby, of a longitudinally-reciprocating loop-holder provided with a fork to receive the loop as it leaves the said device and hold it open for the next descent of the needle, means for oscillating the loop-holder in a direction transverse to its reciprocating movement and transverse to the movement of the needle during its reciprocation, and means for reciprocating the loop-holder permitting of the said oscillation, substantially as and for the purpose herein set forth.

2. The combination, for driving the loop-holder, of the vertical rotary shaft C, the eccentric H on said shaft, the rocking arm H<sup>2</sup>

and bell-crank lever K, and a pivot on which said arm and lever are separately pivoted, the said arm and lever being connected the one with the rod H' and the other with the loop-holder, and the spring locking-bolt *g* for locking the said arm and lever together, substantially as herein described.

3. The combination, with the needle of a sewing-machine, a device, substantially as herein described, for expanding the loops made thereby, and a reciprocating loop-holder having a fork and a cam-extension and means of reciprocating the same, of a throat-plate formed on its underside with a beveled shoulder *d* and a spring E<sup>5</sup>, secured to the table of the machine, as and for the purposes herein set forth.

4. In a shuttle sewing-machine, the combination of a reciprocating loop-holder formed with a fork and a cam-extension arranged parallel with the fork, of a feed-dog having on the under side a rib or feather which at a suitable moment enters between the fork and the cam-extension to regulate the direction of return motion of the loop-holder, as described.

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