

(No Model.)

4 Sheets—Sheet 1.

V. WITTE.
SEWING MACHINE.

No. 569,441.

Patented Oct. 13, 1896.

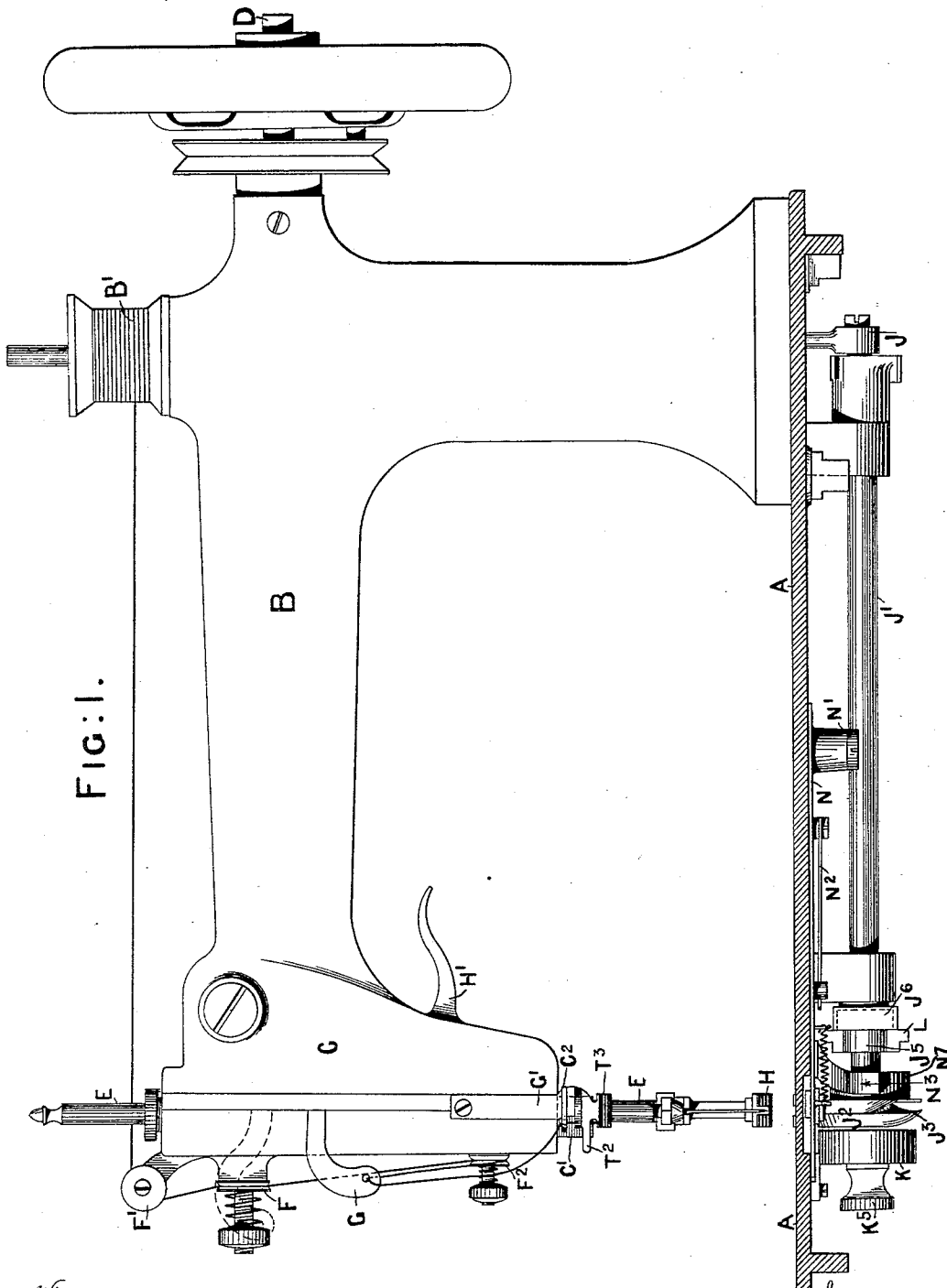


FIG: 1.

Witnesses

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(No Model.)

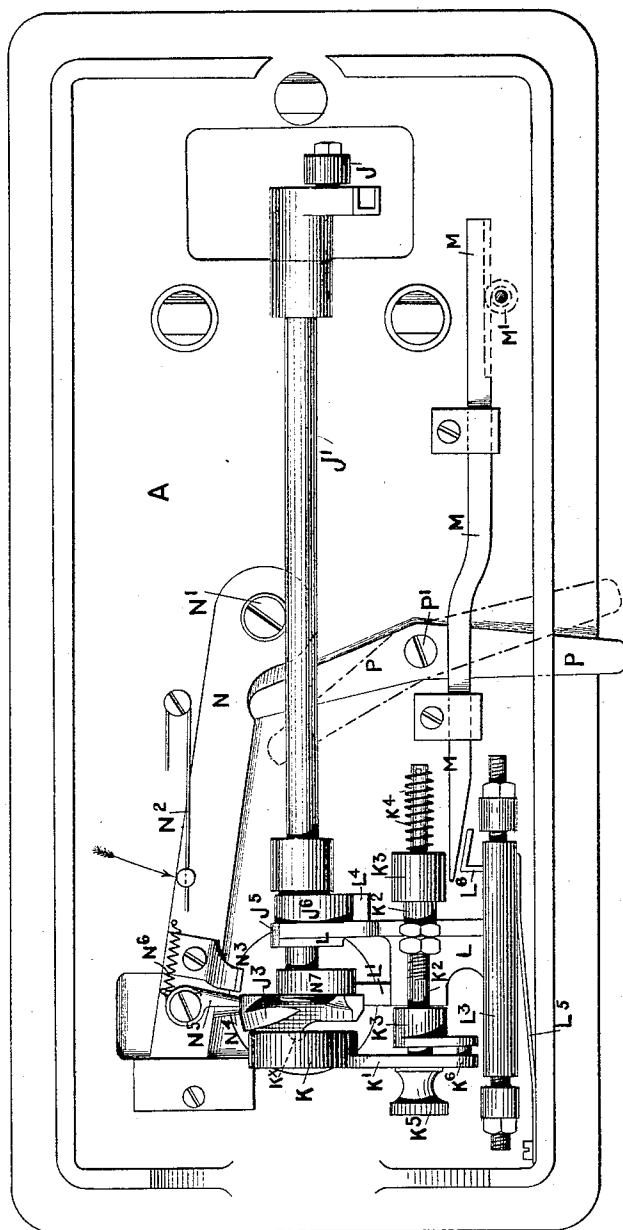
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FIG:2.



Witnesses

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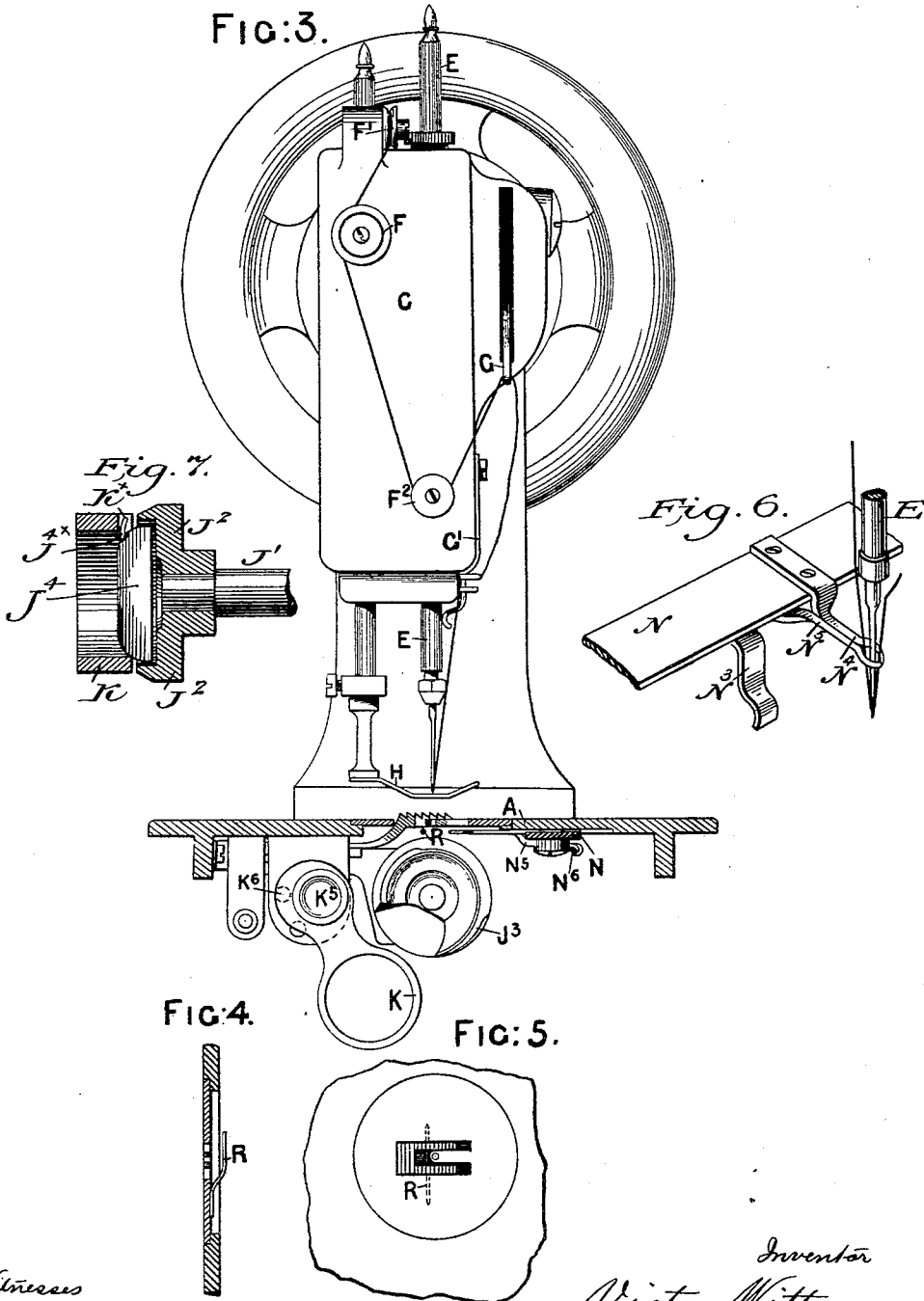
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V. WITTE.
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FIG. 3.



Witnesses
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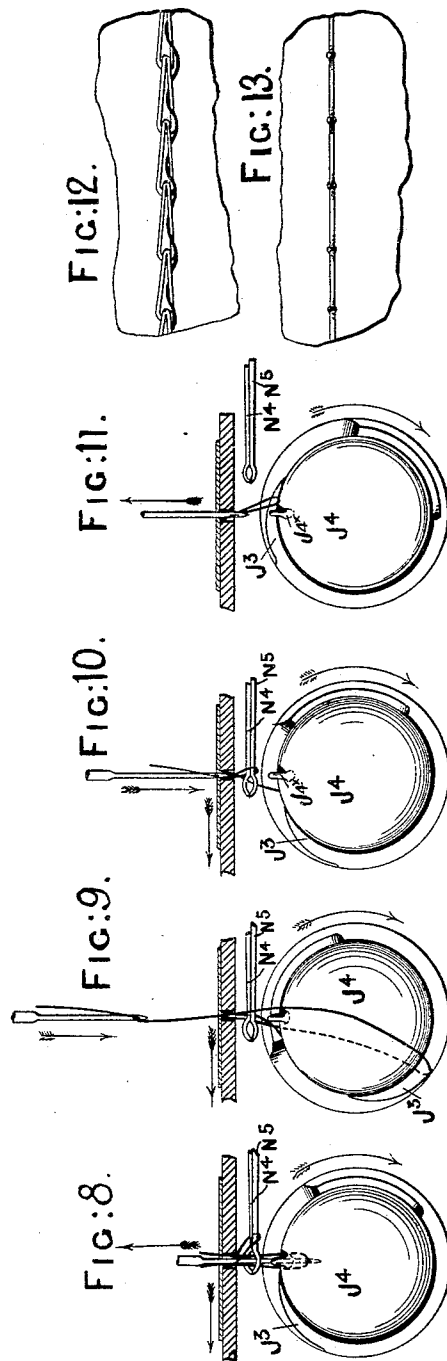
(No Model.)

4 Sheets—Sheet 4.

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Witnesses

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UNITED STATES PATENT OFFICE.

VICTOR WITTE, OF LONDON, ENGLAND.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 569,441, dated October 13, 1896.

Application filed July 28, 1893. Serial No. 481,703. (No model.) Patented in England February 28, 1893, No. 4,353.

To all whom it may concern:

Be it known that I, VICTOR WITTE, a subject of the German Emperor, residing at 4 Newgate Street, in the city of London, England, have invented certain new and useful Sewing Mechanism for Forming a Lock, Chain, or Locked-Chain Stitch, (for which a patent has been granted to me in Great Britain, No. 4,353, dated February 28, 1893,) of which the following is a specification.

This invention refers to loop-forming mechanism of sewing-machines having vertically-reciprocating needles and a rotating shaft carrying a hook, the latter being recessed centrally to carry a removable bobbin containing an under or second thread to form a lock-stitch. In such machines, where it is desired to form a chain or locked-chain stitch, a looping device has been employed which receives the loop of thread from the rotating hook, retains and holds the same, and presents the loop to the needle on its next descent in order to form the chain.

My present invention relates to the construction of the particular loop retaining and spreading device and its combination with the described mechanism for carrying and operating the same and for throwing the said looping device out of action when it is required to form an ordinary lock-stitch.

Suitable means, such as I have described and shown only by way of example, are provided, whereby the bobbin-case may be removed or replaced and held within the hollow of the rotating hook.

The feed mechanism described and shown herein is to more clearly illustrate the operation of the whole machine, but such feeding mechanism, being a separate invention, has been patented to me in the United States under date of March 5, 1895, No. 535,181.

In the drawings, Figure 1 is an elevation and partial section of the machine. Fig. 2 is an inverted plan showing the mechanism beneath the base-plate of the machine. Fig. 3 is an end elevation and section of the base-plate. Figs. 4 and 5 are respectively a central vertical section and a plan view of the throat-plate. Fig. 6 is a perspective view of a portion of a loop-spreading device. Fig. 7 is a vertical section showing the looper, with the bobbin-case, in position on a larger scale

than Figs. 1 and 2. Figs. 8, 9, 10, and 11 are diagrams illustrating the operation of the stitch mechanism. Fig. 12 illustrates the lock-chain stitch as it appears upon the under part of the material, and Fig. 13 shows the same stitch upon the upper part of the material.

Similar letters of reference indicate like parts in the several figures.

A is the base-plate of the machine.

B is the arm carrying the head-framing C.

D is the main driving-shaft.

E is the needle-bar receiving reciprocative motion from the main shaft D at proper times.

F is an ordinary thread-tension, and G is a thread-take-up arm.

H is the presser-foot, raised or lowered by finger-lever H'.

J, Figs. 1 and 2, is the lever for communicating rotary motion from the main shaft D to the looper-shaft J'.

I have not in the drawings considered it necessary to illustrate particularly the modes of communicating motion from the main driving-shaft to the needle-bar E, the thread-take-up arm G, and looper-shaft J', as such mechanism is well known to those skilled in the art and does not form any part of my invention.

The needle-thread passes from the spool B' over a thread-guide F' between the tension-plates F, down to the thread-guide F², up through the eye of the thread take-up G, through a thread-clamp G', and through the needle-eye. Upon the end of the looper-shaft J', below the needle, is fixed the rotary looper J², having a hook J³, and recessed centrally to receive a bobbin-case J⁴, Fig. 7, containing the under-thread spool.

According to my invention I fix a radius-arm N, pivoted at N', so as to be capable of horizontal motion, to the under side of the base-plate A, Fig. 2, this arm N being pressed in the direction of the arrow, Fig. 2, by a spring N². N³ is a bracket on arm N, which bracket, when the arm is in action, comes against a cam N⁷, fixed on the rotating looper-shaft J', the rotation of the cam N⁷ serving to give the arm N certain motions, as mentioned hereinafter when describing the action of the stitch devices. Near the end of the arm N and projecting laterally therefrom are

two fingers $N^4 N^5$, N^4 being fixed to the arm N and N^5 pivoted thereto and held by a spring N^6 , Fig. 2, in contact with the finger N^4 . These fingers $N^4 N^5$, when in contact with each other, form a nearly cylindrical bar, as at Fig. 6, throughout the greater part of their length, but are, nearly at their extremities, bent apart from one another and again closed together so that their extremities are again in contact, as shown at Fig. 6. It is through this bowed space between the fingers $N^4 N^5$ that the needle passes in its descent through the loop of thread carried by the spreader, and upon the retrograde motion of the latter the finger N^5 turns on its pivot and allows the needle to pass away from the bowed part.

The bobbin-case may conveniently be held within the looper-disk, so as to be capable of removal when required by a ring K , carried by arm K' on shaft K^2 , sliding in bearings K^3 on the under side of the base-plate A . The shaft K^2 is retained in position by a spring K^4 , Fig. 2. When it is desired to remove or replace the shuttle-spool case, the knob K^5 is seized by the operator and pulled, the spring compressed, and the shaft K^2 partially rotated, bringing the ring K into the position shown in Fig. 3, when the spool-case J^4 , Fig. 7, may be removed or placed in position as required. K^6 is a pin fixed onto the arm K' of the ring K , and this pin K^6 takes into an aperture in the extension of one of the fixed bearings K^3 when the ring is placed as in Figs. 1 and 2, and thereby insures accuracy of position. The shuttle-spool case J^4 has a fixed tongue J^{4x} , which takes into the recess K^x , Fig. 2, of the ring K when the latter is closed upon it, whereby the said shuttle-spool case is prevented from being rotated. The throat-plate, Figs. 4 and 5, is formed with the needle-aperture and is slotted to receive the bifurcated feed-jaw, as is common in such sewing-machines. Located beneath the throat-plate and attached thereto is a loop-guard R , consisting of a piece of wire extending transversely to the aperture in the throat-plate and serving to prevent the loops of needle-thread drifting toward the left hand of the stitch devices and out of the zone of their action.

The feed is actuated by two cams $j^5 j^6$ on the looper-shaft acting upon an arm L , upon which the feed-dog L' is fixed. The feed-arm L is pivoted at its rear end between two arms of a rock-shaft L^3 , carried in center bearings from lugs on the under side of the base-plate. Beneath the base-plate, Fig. 2, is provided a sliding bar M with a tapered end to coact with a part L^6 on the arm of the rocking shaft L^3 . By advancing the bar M toward the left hand in Fig. 2 the distance which the feed-lever will be returned by the spring L^5 will be limited, and consequently a shorter stitch will be produced, and by moving the bar M to the right hand, Fig. 2, a longer stitch is produced. Motion is communicated to the bar M through the rack-

teeth thereon gearing with a pinion M' , Fig. 2, operated by an ordinary knob upon the stem of the pinion, said knob being provided with means for effecting the desired length of stitch. The thread take-up arm, as is usual, is timed to rise from the full-line position, Fig. 1, to the dotted position therein at the commencement of the downward movement of the needle and draws thread from the needle-spool, the take-up G becoming again partially lowered before the needle has finished its descent.

I provide a thread-clamp device, (shown at Figs. 1 and 3,) to which I shall refer, although I do not lay claim to special novelty therein. A piece of spring metal is fixed to the machine-head, the thread passing from the eye of the take-up arm G over a fixed guide-arm C^2 on the frame and then between a finger T^2 and the lower part of the machine-head C' . The lower part of the spring-piece is formed with a bearing-piece T^3 , and there is a recess of suitable length formed in the bar E , so that when the recess comes opposite the bearing-piece T^3 the finger T^2 presses the thread between itself and the frame-head C' and produces a temporary stop upon the thread-supply.

The operation of the machine, when it is desired to produce a locked-chain stitch such as is shown at diagrams E and F , hereinbefore referred to, is as follows: The piece of work is placed in position, the presser-foot H lowered, the bobbin-case J^4 is inserted into the hollow of the rotating hook-disk J^2 and retained therein by allowing the guard-ring K to close upon the same, the tongue of the bobbin-case preventing its rotation. The operating-lever P is now placed into the dotted position shown at Fig. 2, thereby allowing the movements of the spreader to be controlled by its cam N^7 . Upon the machine being operated the needle descends through the material and through the closed eye of the spreader, as in diagrams Figs. 8 and 6, and then sheds its loop of needle-thread, the take-up lever G descending from its upper dotted position in Fig. 1. The loop of needle-thread is caught by the rotating hook J^3 . In the diagram Fig. 8 the hook is just about to catch a loop, and just as it has caught the loop and the needle commences to rise the spreader recedes to the right hand, Fig. 11, its articulated finger opening by contact with the needle, it immediately closing again by the action of the separate spring N^6 , and the fingers thus pass away from the needle while the latter completes its rise, and the fingers $N^4 N^5$ rapidly advance to the left hand to the position shown in diagram Fig. 9, the said fingers passing through the loop, while the hook J^3 carries the said loop of thread around the bobbin-case, casts it off, (as it is about to do at Fig. 9,) and the feed having now taken place the "take-up" brings the loop of thread up onto the fingers, Fig. 10. The fingers then move from position in Fig. 9 to

Fig. 8, and the needle having risen comes down again through the finger's eye, passes through the loop, (carried around the fingers,) as at Fig. 8, and the latter immediately receding the articulated finger opens, as before, to allow the instrument to pass away from the needle and immediately closing again by the spring N⁶. The hook then takes a fresh loop from the needle, and while doing this (taking the loop) the thread-clamp device arrests and holds the thread, and consequently the hook in the course of its rotation draws up or tightens the previously-caught loop. Thus the locking-thread contained in the bobbin is deposited within the loops formed by the chain-stitch and a stitch is produced as is shown in diagrams Figs. 12 and 13.

To produce the ordinary chain-stitch, all that is necessary is to remove the bobbin-case J¹, which may be readily done by releasing it from its guard-ring K, as previously explained. When the chain-stitch is being produced, the spreader carrying-arm N is left in action.

To produce the ordinary lock-stitch, the shuttle spool and case are placed in position, Fig. 7, and the spreader-arm N is thrown out of action by moving the finger-lever P into the position shown by full lines in Fig. 2.

I am aware that in forming a chain-stitch it is not new to employ a pointed bar or an open-forked instrument with rigid prongs, and I am aware that such a forked instrument has been made of spring metal to cause the prongs to be normally closed.

I am also aware that "thumb-and-finger" devices composed of two jointed parts have been employed to seize a thread between them and to aid in passing it around a bobbin-case, and similar contrivances have been employed as thread-laying instruments.

I am aware that it is not new to employ a looper having two fingers each hinged, actuated by tappets and carried by a sliding plate, such looper acting in conjunction with a

gripper and as described in Dimock's United States Patent No. 20,413.

I am also aware that it is not new to employ an arm pivoted at one end and carrying a looping instrument at the other end. Neither is it new to employ in combination with a slide a forked plate to act as a loop retainer and spreader, as described in Kohler's United States Patent No. 466,906; but I am not aware that the combination of a particularly-constructed looper composed of one fixed and one spring-hinged finger mounted and acting in conjunction with the parts described has before been produced and as hereinafter claimed.

I claim as my invention—

In loop-forming mechanism for sewing-machines, the combination with a rotating shaft, a hook carried thereby and adapted to receive a centrally-located detachable bobbin-case and a vertically-reciprocating needle, of a horizontal swinging arm N pivoted at one end beneath the base-plate and a bracket N³ on the arm N, a cam N⁷ on the rotating shaft of the hook to give motion to the bracket N³ and arm N, and a spring N² for moving the arm N toward the cam N⁷, a finger N⁴ rigidly fixed to and projecting laterally from the free end of arm N and an adjacent finger N⁵ pivoted to the arm N, a spring N⁶ to hold the finger N⁵ in contact with the finger N⁴, the fingers being bent in opposite directions near their extremities to form an eye with the extremities meeting for the passage of the needle and the fingers together forming a cylindrical neck rearward of the eye, and a lever P pivoted on the base-plate to throw the arm N and its fingers N⁴, N⁵ out of the region of the cam action when required, substantially as set forth.

Signed by me this 3d day of July, 1893.

VICTOR WITTE.

Witnesses:

E. G. BREWER,
E. W. ECAILLE.