

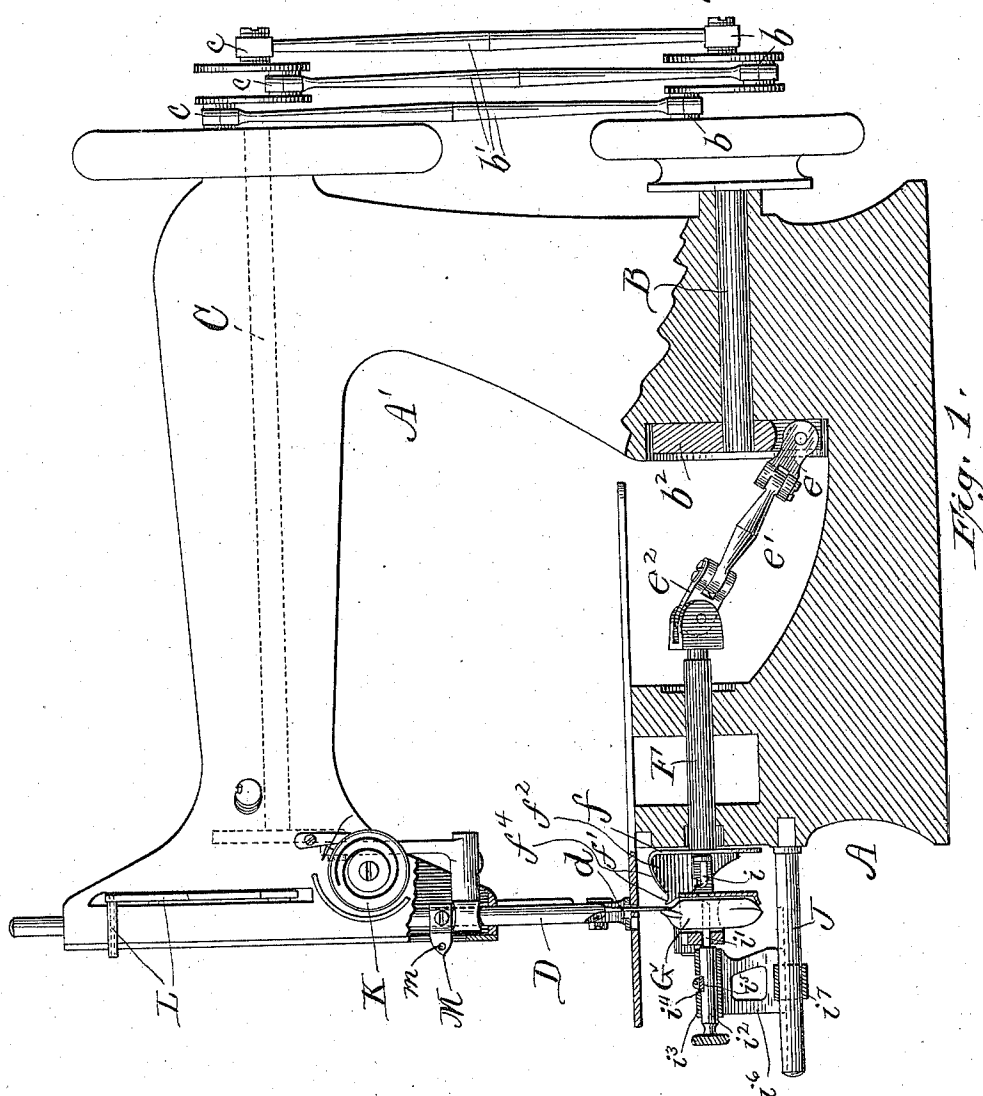
(No Model.)

3 Sheets—Sheet 1.

E. B. ALLEN.
SEWING MACHINE.

No. 575,315.

Patented Jan. 19, 1897.



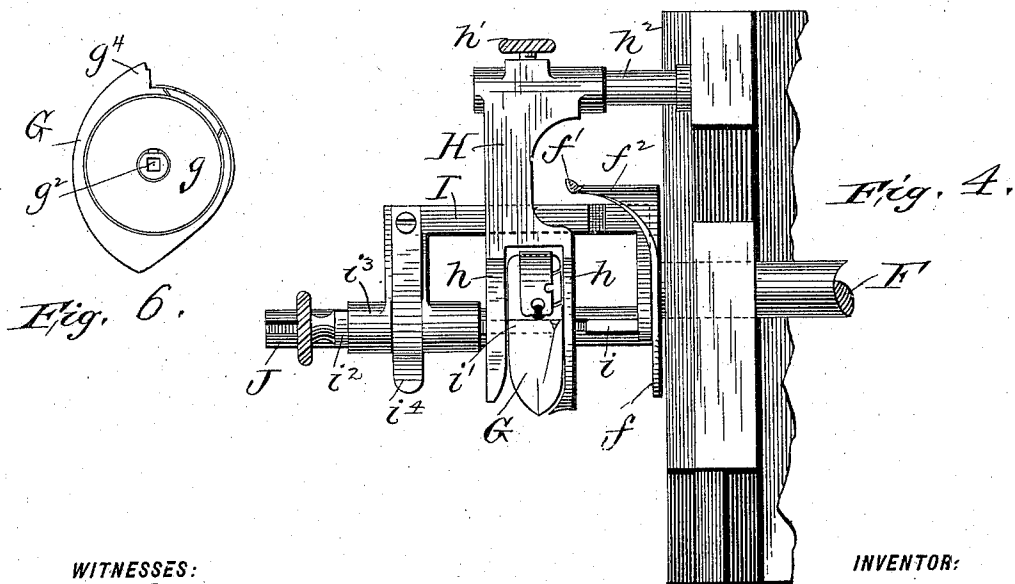
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3 Sheets—Sheet 2.

No. 575,315.

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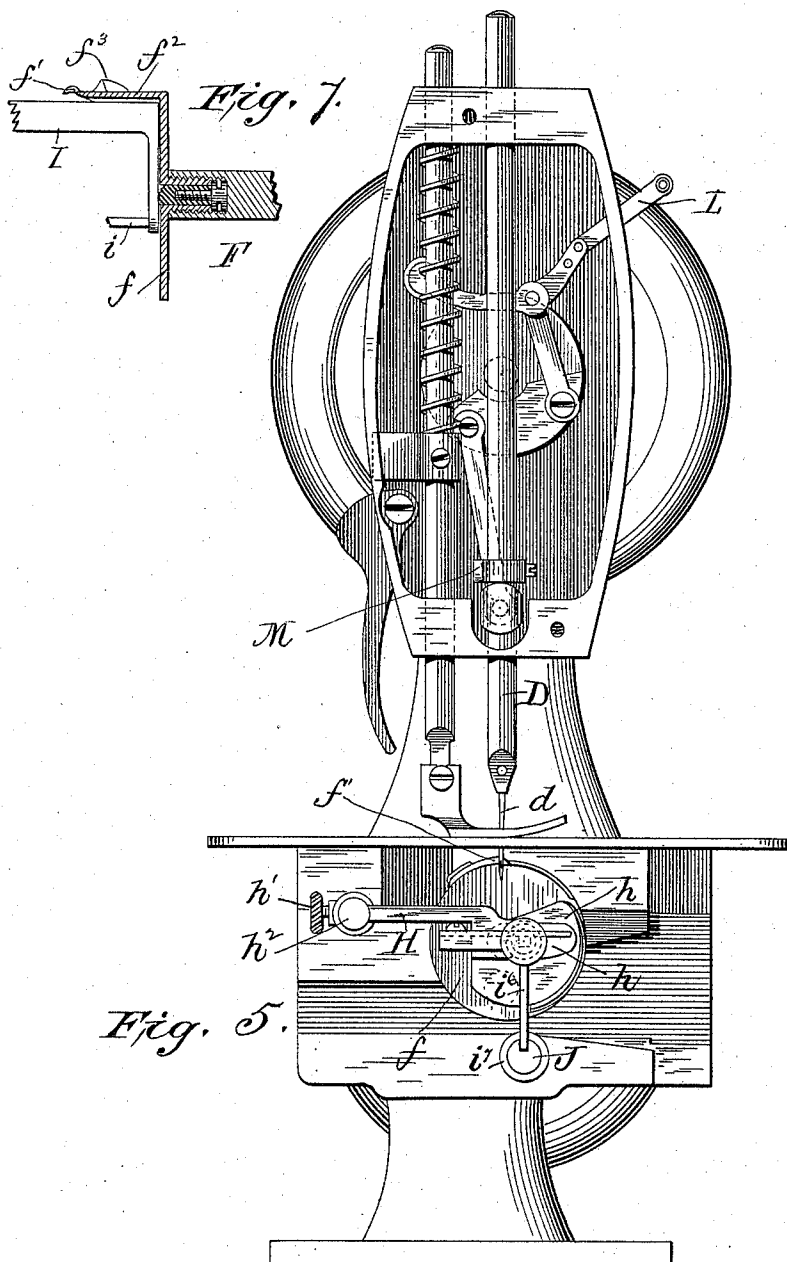
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INVENTOR:

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UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE
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SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 575,315, dated January 19, 1897.

Application filed September 18, 1894. Serial No. 523,378. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of lock-stitch sewing-machines in which the loops of needle-thread are carried around the lower or locking thread by a rotating hook; and my invention has for its object to provide a machine of the class referred to which is adapted for high speeds and which will be light-running and comparatively noiseless.

In my improved machine the lower thread is contained in a bobbin-case or stationary shuttle centrally supported by reciprocating pins placed on opposite sides of said bobbin-case or shuttle and alternately movable in and out of the latter to permit of the passage of the loops of needle-thread, one limb of each loop passing by the center of the bobbin-case earlier than the other limb thereof and one reciprocating supporting-pin entering the bobbin-case as the other is withdrawn therefrom, so that said bobbin-case is always sustained vertically by one or the other of said pins, suitable stationary supports on opposite sides of said bobbin-case holding the latter in place laterally. The rotating hook by which the loops of needle-thread are carried around the bobbin-case has lateral or horizontally-reciprocating movements, so that the loops of needle-thread which are taken from the needle at the rear side of the bobbin-case are spread laterally by the reciprocating movement of the rotating hook, so as to be suitably enlarged sidewise for easy passage around the bobbin-case.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved machine, the feeding mechanism being omitted for greater clearness. Figs. 2 and 3 show a portion of the lower part of the machine with the parts in different positions. Fig. 4 is a plan view of the hook, bobbin-case, and adjacent parts. Fig. 5 is a front end view of the machine. Fig. 6 is a side view of the bobbin-

case and bobbin, and Fig. 7 a detail to show connection of the bobbin-pin frame with the hook-shaft.

A denotes the base of the framework of the machine, and A' the bracket-arm thereof. Journalled in the base A is the rotating driving-shaft B, having, as herein shown, three cranks *b*, connected by three pitmen *b'* with three cranks *c*, with which the needle-operating shaft C is provided, so that the latter shaft will be rotated from the former. With this crank-and-pitman connection shown either shaft might be the driving and either the driven shaft, as will be understood.

D is the needle-bar, operatively connected in any suitable manner with the forward end of the shaft C and carrying the usual eye-pointed needle *d*.

The shaft B is provided with a disk *b*², in which is jointed a link *e*, and *e'* is a pitman jointed at its rear end to the forward end of the link *e*, said pitman being jointed at its forward end to a link *e*², which is in turn pivotally attached to the rear end of the sliding and rotating shaft F, supported in suitable bearings in the base A and carrying the hook-disk *f*. The pivots or joints by which the link *e* is connected to the disk *b*² and the pitman, as likewise the joints by which the link *e*² is connected with said pitman and with the shaft F, are at right angles to each other, thus affording universal-joint connections between the shafts B and F, which permit of a sliding or endwise movement of the latter in addition to its rotating movement, the said shaft F being higher than the shaft B, so as to be out of line from the latter to secure a sliding movement of the said shaft F of proper extent.

G is the bobbin-case or shuttle, and *g* is the bobbin inclosed therein and from which the lower or locking thread is supplied, said bobbin-case being loosely held between the arms *h* of a stationary holder H, secured by a set-screw *h'* to a fixed pin *h*². Connected with the shaft F to reciprocate therewith is a frame I, carrying two pins *i* and *i'*, placed on opposite sides of the bobbin-case G, the latter having through it and through the pin *g'*, on which the bobbin is journalled, a hole *g*² to receive said pins. The distance between the

adjacent ends of the pins i' is somewhat less than the thickness of the bobbin-case, so that in the operation of the machine one or the other of said pins is engaged with said bobbin-case to support the latter vertically.

To permit the bobbin-case to be placed in or removed from working position, the pin i' is attached to a slide i^2 , removably secured in position in a tubular portion i^3 of the frame I by means of a spring i^4 , which engages said slide by a notch i^5 , formed in the latter. When the spring i^4 is lifted, the slide i^2 may be drawn out to disengage the pin i' from the bobbin-case, and if this be done when the pin i is disengaged from the said bobbin-case the latter will be free to be removed from working position and may be inserted in place in the machine when the pin i' is thus withdrawn.

The frame I is in the form of my invention herein illustrated steadied by means of an arm i^6 , depending from the tubular part i^3 of said frame and having a sleeve i^7 , adapted to slide back and forth on a fixed rod J.

To hold the bobbin-case G from turning on the pins i and i' , the hole g^2 on the said bobbin-case is preferably made square or of any polygonal or irregular form, and the said pins are of corresponding form in cross-section to fit said hole.

The needle d is arranged to descend on the rear or right-hand side of the bobbin-case, at which position the loops of needle-thread are taken by the beak f' of the laterally-moving rotary hook f^2 , and as said hook continues its forward rotary movement after having taken a loop of needle-thread it will also move toward the left or toward the front end of the machine, and will thus open the loop laterally and carry the front or left limb thereof over the front side of the bobbin-case. The hook f^2 is provided at its front edge, rearward of the beak f' , with an inclined rib f^3 , which serves to hold the rear or right-hand part or limb of the loop of needle-thread toward the rear side of the bobbin-case while the beak f' is carrying the left part or limb of said loop around the front of said bobbin-case, and thus the loops of needle-thread are positively opened or spread for easy passage around the said bobbin-case, this action being assisted by a small loop-dividing flange or peripheral projection g^4 , with which the bobbin-case is preferably provided.

Owing to the arrangement of the shaft F out of line from and considerably above the driving-shaft B and the connection of said shafts by the links e and e^2 and pitman e' , I am enabled to impart an irregular or differential sliding or lateral movement to the shaft F. Thus when the parts are in the position shown in Fig. 1, with the free end of the link e swung upward or inward toward the center of the shaft B, the shaft F will be at its extreme inward position, and for about one-quarter of a revolution of said shaft B, both before and after the parts are in the position

just referred to, the endwise movement of the shaft F will be but very slight, owing to the nearness of the free end of the link e to the line of the center of the shaft B, and the parts are so timed that the loops of needle-thread are taken from the needle while this slow endwise movement of the hook-carrying shaft F is occurring and at about the end thereof, or, in other words, at about the termination of what may be termed the "dwell" in the lateral movement of the rotary hook, and thus any danger of collision of the laterally-moving rotary-hook with the needle is avoided, this danger being also provided against by the inclined or rearwardly or retreating front edge portion f^4 of the hook f^2 . After a loop of needle-thread has been taken by the beak f' of the hook the latter moves rapidly laterally to spread the said loop, said hook passing from the loop-seizing position (shown in Fig. 3) to its extreme outward position (shown in Fig. 2) during about one-third of a revolution of the driving-shaft B.

Any suitable feeding and thread-controlling devices may be employed in connection with the novel features of my machine hereinbefore described. For clearness of illustration the feeding mechanism of my machine has been omitted from the accompanying drawings. The thread-controlling devices of my machine as herein shown consist of an ordinary disk tension K, a take-up arm L, and a slack-controlling lug M, reciprocating with the needle-bar and having an eye m , through which the thread runs in passing from the eye of the take-up to the needle.

The operation of my machine is as follows: When the needle has descended to its lowest point and has risen slightly and thrown out a loop, the latter is seized by the beak of the hook, and one limb of said loop is, by the rotary and lateral movement of said hook, carried around the front side of the bobbin-case and past the center of the latter, the pin i' being at this movement withdrawn from the bobbin-case to let the thread pass, and the said pin i' is then engaged with the bobbin-case and the pin i withdrawn therefrom to permit the rear limb of the needle-loop to pass as the said loop is drawn up by the take-up. The bobbin-case G is preferably placed eccentric to the hook-carrying disk f , so that the loops of needle-thread will pass around the center thereof earlier than they otherwise would.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a lock-stitch sewing-machine, the combination with a needle and its operating mechanism, of a stationary device or bobbin-case from which the under thread is supplied, a laterally or endwise moving rotary shaft and a rotary hook carried by said shaft and provided with a loop-seizing beak and with an inclined peripheral rib rearward of said beak.

2. In a lock-stitch sewing-machine, the com-

5 bination with a needle and its operating mechanism, of an endwise-movable rotary shaft, a rotating hook carried by said shaft, a stationary bobbin-case or device from which the under thread is supplied and which is provided with a transverse hole, and two reciprocating supporting-pins placed on opposite sides of said bobbin-case or device and one or the other of which is, in the operation of the machine, in engagement with the said bobbin-case or device, to support the latter vertically.

10 3. In a lock-stitch sewing-machine, the combination with a needle and its operating mechanism, of a rotating and endwise movable shaft, a hook carried by said shaft, a stationary bobbin-case or device from which the under thread is supplied and which is provided with a transverse hole, and two reciprocating supporting-pins placed on opposite sides of said bobbin-case or device and one or the other of which is, in the operation of the machine, in engagement with said bobbin-

case or device, to support the latter vertically, said pins being of a form other than round, to hold said bobbin-case or device from turning. 25

4. In a lock-stitch sewing-machine, the combination with a needle and its operating mechanism, of the rotary and endwise movable hook-carrying shaft F, the shaft B having a crank or disk *b* and placed out of line from the shaft F, the link *e* pivoted to said crank or disk, the link *e*² pivoted to the rear end of said shaft F, and the pitman *e'* jointed to said links by pivots which are at right angles to the pivots by which links are connected to said crank or disk and said shaft F, respectively. 30 35

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD B. ALLEN.

Witnesses:

HENRY CALVER,
J. G. GREENE.