

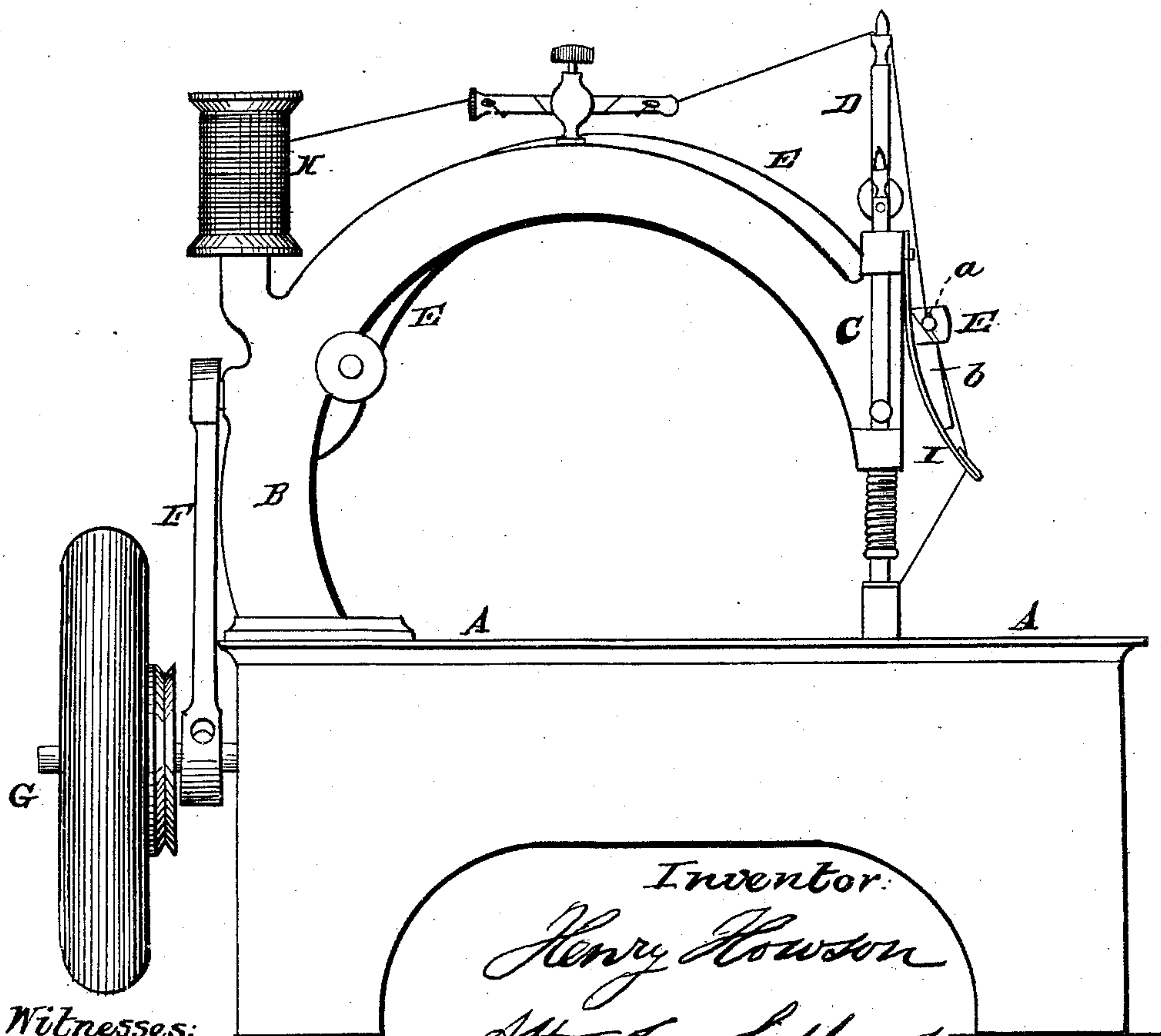
LATHROP & JUSTICE.  
Sewing Machine.

3 Sheets—Sheet 1.

No. 31,644.

Patented March 5, 1861.

*Fig. 1.*



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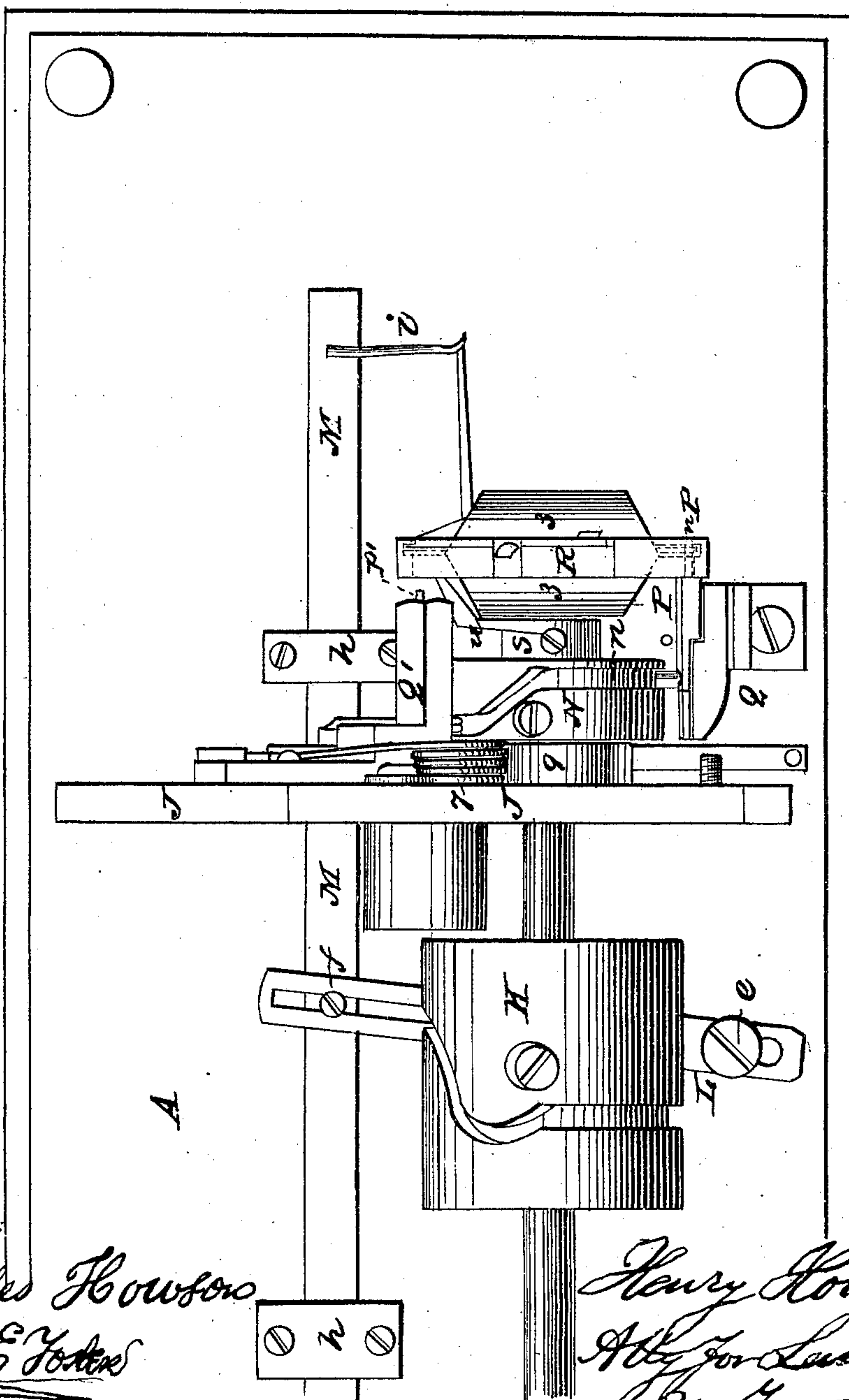
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Sewing Machine.

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*Fig. 2.*



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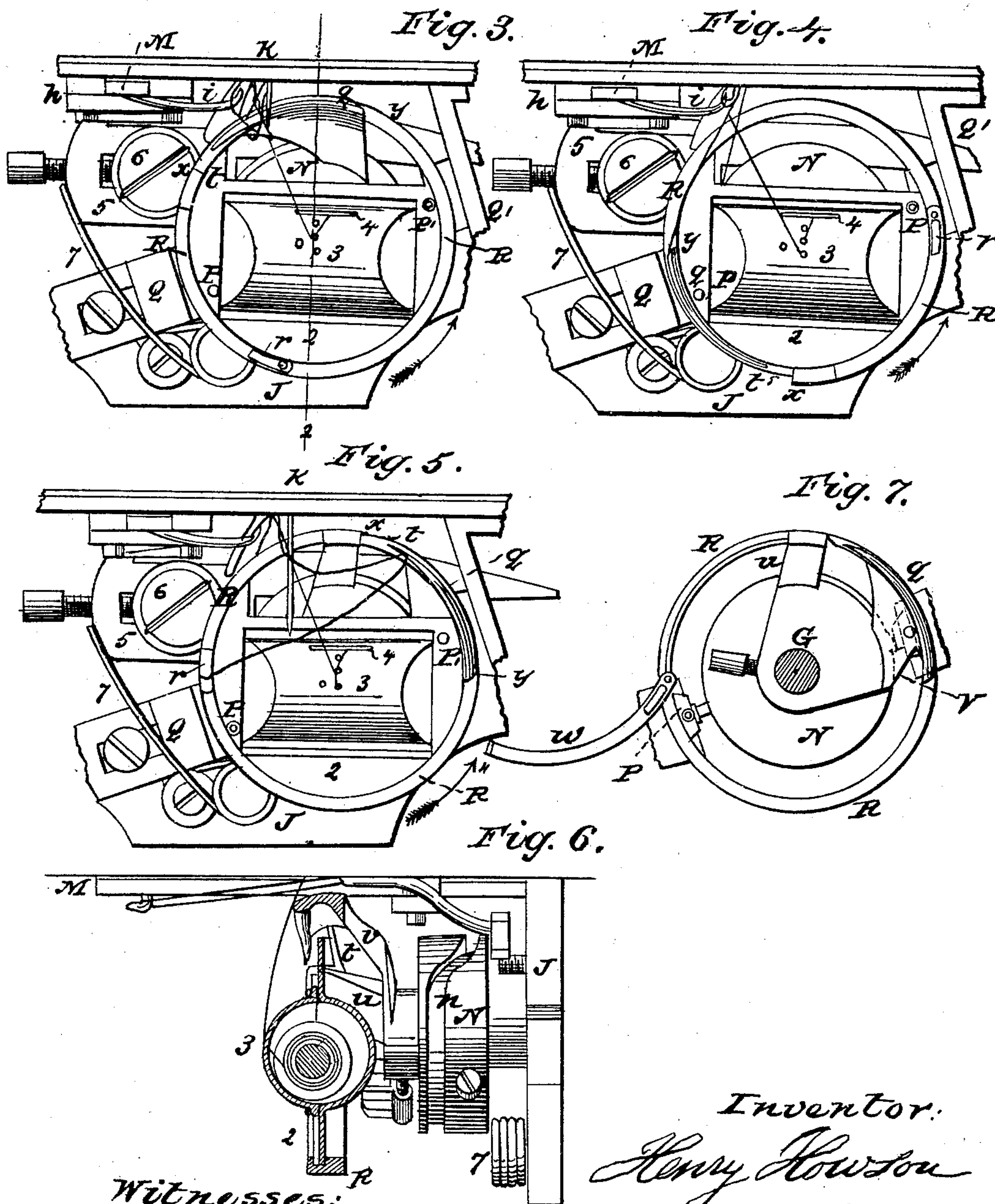
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3 Sheets—Sheet 3.

Sewing Machine.

No. 31,644.

Patented March 5, 1861.



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# UNITED STATES PATENT OFFICE.

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ASSIGNOR TO L. W. LATHROP.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 31,644, dated March 5, 1861.

*To all whom it may concern:*

Be it known that we, LEBBEUS W. LATHROP and LEMUEL B. JUSTICE, both of the city of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Sewing-Machines; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention relates to improvements in that class of sewing-machines in which a spool-case containing an ordinary spool and a revolving hook for carrying the loop round the spool-case are used; and our improvements consist in passing a loop of needle-thread over a stationary spool-case containing an ordinary spool by means of a continuously-revolving hooked ring adapted to receive the said spool-case, the latter, as well as the ring and its hook, being so constructed and so operating that the loop, on being passed over the case, shall be free from contact with the edge of the said case, as well as with the inside edge of the ring, thereby preventing that abrasion of the needle-thread which has hitherto formed the principal objection to sewing-machines of this class.

Secondly, our invention consists of a reciprocating hook, arranged and operating, as described hereinafter, so as to control the loop of needle-thread after it has passed over the spool, and so as to prevent the said loop from becoming twisted, knotted, or otherwise disarranged as it is being drawn into the fabric.

In order to enable others skilled in the art to make and use the invention, we will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a side view of our improved sewing-machine, drawn to a reduced scale; Fig. 2, an inverted plan view, full size; Figs. 3, 4, and 5, face views of the hooked spool-case holder in different positions; Fig. 6, a transverse section of part of the machine on the line 1 2, Fig. 5, a portion of the view being in elevation; Fig. 7, a face view of the hooked spool-case holder without the spool-case.

Similar letters refer to similar parts throughout the several views.

A is the base-plate of the machine, to which is secured the stationary arm B, the latter hav-

ing at its outer end the spring pressure-pad C and needle-bar D, which is connected to the outer end of the needle-arm E, the latter being hung to a pin on the stationary arm B, and the necessary vibrating motion being imparted to this arm by an eccentric on the driving-shaft G through the medium of a connecting-rod, F.

The above-mentioned parts are common to other sewing-machines, and are too well understood to require further description.

The needle-thread passes from the spool H, which is allowed to swing on a pin on the stationary arm B, thence to any suitable tension device, thence through an eye on the top of the needle-bar D, thence through an eye in the pin *a*, secured to the end of the needle-arm E, thence through an eye in the end of the curved spring I, and thence through the eye of the needle to the fabric. A block, *b*, is secured to the curved spring I, the block being of such a form and occupying such a position in respect to the pin *a* on the end of the needle-arm that the said pin shall traverse in contact with the block, and thereby impart such a vibrating motion to the spring that the latter will tighten the stitch, as described hereinafter.

The driving-shaft G turns at one end in a projection at the rear end of the base-plate A and at the opposite end in a plate, J, secured to or forming a part of the said base. On the driving-shaft is a scroll-cam pulley, K, into the groove of which projects a pin on the lever L, the latter having its fulcrum on a pin, *e*, secured to the under side of the base-plate. The outer end of this lever L is slotted, and through the slot passes a pin, *f*, on the bar M, which moves in guides *h h*, secured to the under side of the base-plate, the outer end of this bar being furnished with a projecting pin, *i*, having a hooked end, the object of which will be described hereinafter.

To the driving-shaft, and in front of the plate J, is secured a scroll-cam pulley, N, into the groove *n* of which fits a pin projecting from a dovetailed block, P, which is adapted to a dovetailed groove in a bracket, Q, secured to the under side of the base-plate, and in the same groove, *n*, of the scroll-cam pulley N fits a pin projecting from a similar dovetailed block, P', adapted to a dovetailed groove in a bracket, Q', secured to the plate J. The groove



of the cam is of such a form that, as the driving-shaft revolves, an intermittent reciprocating motion will be imparted to both blocks, one block being moved outward while the other is moved inward, as and for an object explained hereinafter. Each block is provided at its outer end with a pin, the position of the pins in respect to each other and to the center of rotation of the driving-shaft being pointed out by the letters P and P' in the several views, 3, 4, and 5.

The spool-case holder consists of an annular rim, R, of metal, the uniform continuity of which is interrupted between the points *x* and *y*, leaving an open space, in which is situated the hook *q*, between the point of which and the point *x* is space sufficient for the free admission of the loop of needle-thread, as best observed on reference to Fig. 5. The face of the hook projects beyond the face of the ring R, so that the latter may not drag the loop away from the range of the hook.

At the back of the hook *q*, and between the points *x* and *y*, is a curved bar, *t*, forming the only continuation of the circumference of the ring R. The object of this bar will be alluded to hereinafter. The ring R, which has a second hook, *r*, is connected to the hub S by two arms, *u* and *v*, the hub being secured to the end of the driving-shaft, the situation of these arms in respect to each other and to the hook *q* and the sliding blocks P and P' being best observed on reference to Fig. 7. In the inside of the ring is cut a groove (seen in Fig. 6) for the reception of the spool-case, which consists of a circular disk, 2, of thin metal, a portion of the disk being cut away at the point represented in Figs. 3, 4, and 5, and a circular chamber, 3, being formed on the disk for the reception of an ordinary spool of sewing-thread, as seen in Fig. 6, the front part of the chamber being arranged to slide to and fro on the face of the disk, in order to allow for the ready admission and withdrawal of the spool. It will be seen that the opposite ends of the spool-chamber are beveled, for a purpose which will appear hereinafter.

In order that the spool-case may be readily withdrawn from and reinserted into the spool-case holder, a portion of the front of the ring R is cut away, forming a recess, to which is fitted a curved gate, *w*, (seen in Fig. 7,) the gate being hinged at one end to the edge of the ring, and secured at the opposite end to the ring by any suitable turn-buckle, so that the gate may be opened for the withdrawal and closed after the reinserting of the spool-case. It will be observed that the center of the chamber for receiving the spool is situated some distance below the center of rotation of the driving-shaft, and away from the point of the needle *k* when the latter is at the limit of its downward movement. The thread passes through a slot, 4, in front of the spool-chamber, and through one or more holes in the same to the fabric.

A feed-lever, 5, is hung to a pin, 6, attached

to the plate J in such a manner as to be moved horizontally as well as vibrated on the said pin, this feed-lever being furnished with the usual serrated projection passing through the base-plate and being operated by the combined action of a cam, 9, and spring 7. As this feeding device is equivalent to others used on sewing-machines, and as it forms no part of my present invention, further description of its construction and operation will be unnecessary.

Operation: A rotary motion being imparted to the driving-shaft, the following movements of the different parts of the machine will take place: first, the vibrating motion of the needle-arm, and consequently the vertical reciprocating motion of the needle; secondly, the intermittent reciprocating motion of the bar M and its hooked end *i*, caused by the scroll-cam pulley K through the slotted lever L; thirdly, the rotary motion of the hooked spool-case holder round the spool-case; fourthly, the alternate reciprocating motion of the sliding blocks P and P', caused by the scroll-cam wheel N; and, fifthly, the requisite movement of the feed-bar 5.

When the needle is at its lowest point the spool-case holder will be in the position illustrated in Fig. 5, the loop of needle-thread which had been previously carried round the spool-case being in the act of escaping from the point of the hook *q*. When the spool-case holder has moved to the position shown in Fig. 3 its hook *q* will have caught the loop of needle-thread, and by the time the holder has been turned to the position shown in Fig. 4 the loop will have been partially stretched, one portion being in front and the other portion at the back of the spool-case. Prior to the holder again arriving at the position shown in Fig. 5 the hook *r* on the rim of the holder has caught the back of the loop, so that when the position shown in Fig. 5 is arrived at the back of the loop will be held in front of the hook *i* on the bar M, which bar is about being moved suddenly forward by the action of the cam-wheel K, thereby withdrawing the loop from the hook *q* and carrying it to such a distance that it shall be clear of the range of that hook as the latter approaches the needle preparatory to the formation of another loop. After the hook *q* has taken fairly hold of this second loop the hook *i* begins to recede, and is finally restored to its former position, ready to be again projected forward when its duties are again required. It will now be seen by those familiar with sewing-machines that at every revolution of the hooked spool-case holder a loop of needle-thread is carried round the spool-case and round the spool-thread for forming the required lock-stitch. It will also be seen that the hooked ring and the spool-case are so constructed and so operate in conjunction with each other that the loop, on being passed over the case, is not brought into contact either with the edge of the case or the inside edge of the ring. Thus the abrasion of the thread, which



forms the main objection to this class of machines, is obviated. The tightening of each stitch and the taking up of the slack needle-thread are accomplished as follows: The greater portion of the slack thread caused by the formation of one loop is taken up by being drawn through the cloth by the hook *q* as the latter forms the second loop, the hook *i* having receded to allow for this transferring of the first into the second loop. The whole of slack thread, however, is not thus taken up, there being a portion left before the stitch can be tightened into the fabric—this portion, which is about equal to the length required for each stitch, being taken up, and the stitch being tightened by the spring *I*, the operation of which by the action of the pin *a* on the end of the needle-arm has been already sufficiently described. In forming the loop of needle-thread and passing it over the spool-case it should be understood that the entire stretching and opening of the loop is not accomplished by the revolving hook alone, but by the hook in conjunction with the chamber of the spool-case. It has been already observed that the ends of this chamber are inclined or beveled, the inclination being best observed on reference to Fig. 2. Supposing the hooked spool-case holder to be in the position illustrated in Fig. 4, the loop being partly in front and partly behind the spool-case, on the movement of the holder from this point in the direction of the arrow the front of the loop will be pressed against the beveled end of the spool-chamber and gradually forced over the latter, which, thus acting as a wedge, extends the loop sufficiently to allow it to pass over the spool-case. By this arrangement the loop is stretched laterally to nearly the same extent on both sides of the needle, thus avoiding that excessive friction on the thread which would be caused by pulling the loop in an angular direction. The spool-case is retained in its proper lateral and vertical position by being retained in the groove formed on the inside of the rim *R* of the holder, and the case is prevented from turning on the holder by the ends of the reciprocating sliding blocks *P* and *P'*, one or other of which, having penetrated an

orifice of the case, serves to retain the same. The position of these blocks and their movements are such that, while one has receded, in order to allow the loop and the arms *u* and *v* of the holder to pass, the other is retaining the case, the arms themselves being of such form and dimensions that while they serve to connect the rim *R* to the hub of the holder they in no way interfere with the action of the sliding blocks or the passage of the loops over the spool-case.

The object of the bar *A*, which has been previously alluded to as forming the continuation of the rim *R* of the holder, is to prevent the back of the loop from being drawn behind the arms.

Having now described the construction and operation of our invention, we wish it to be understood that we do not claim broadly passing a loop of needle-thread over a stationary spool-case containing an ordinary spool by means of a revolving hook, such a device having been heretofore used; but

We claim as our invention and desire to secure by Letters Patent—

1. Passing a loop of needle-thread over a stationary spool-case containing an ordinary spool by means of a continuously-revolving hooked ring adapted to receive the said spool-case, when the latter as well as the ring and its hook are so constructed that the loop in passing over the case shall be free from contact with the edge of the case as well as with the inside edge of the ring, as set forth, for the purpose specified.

2. The reciprocating hook, arranged and operating as set forth, so as to control the loop of needle-thread after it has passed over the spool and prevent it from becoming twisted, knotted, or otherwise disarranged as it is being drawn into the fabric.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

LEBBEUS W. LATHROP.  
LEMUEL B. JUSTICE.

Witnesses:

HENRY HOWSON,  
JOHN WHITE.