

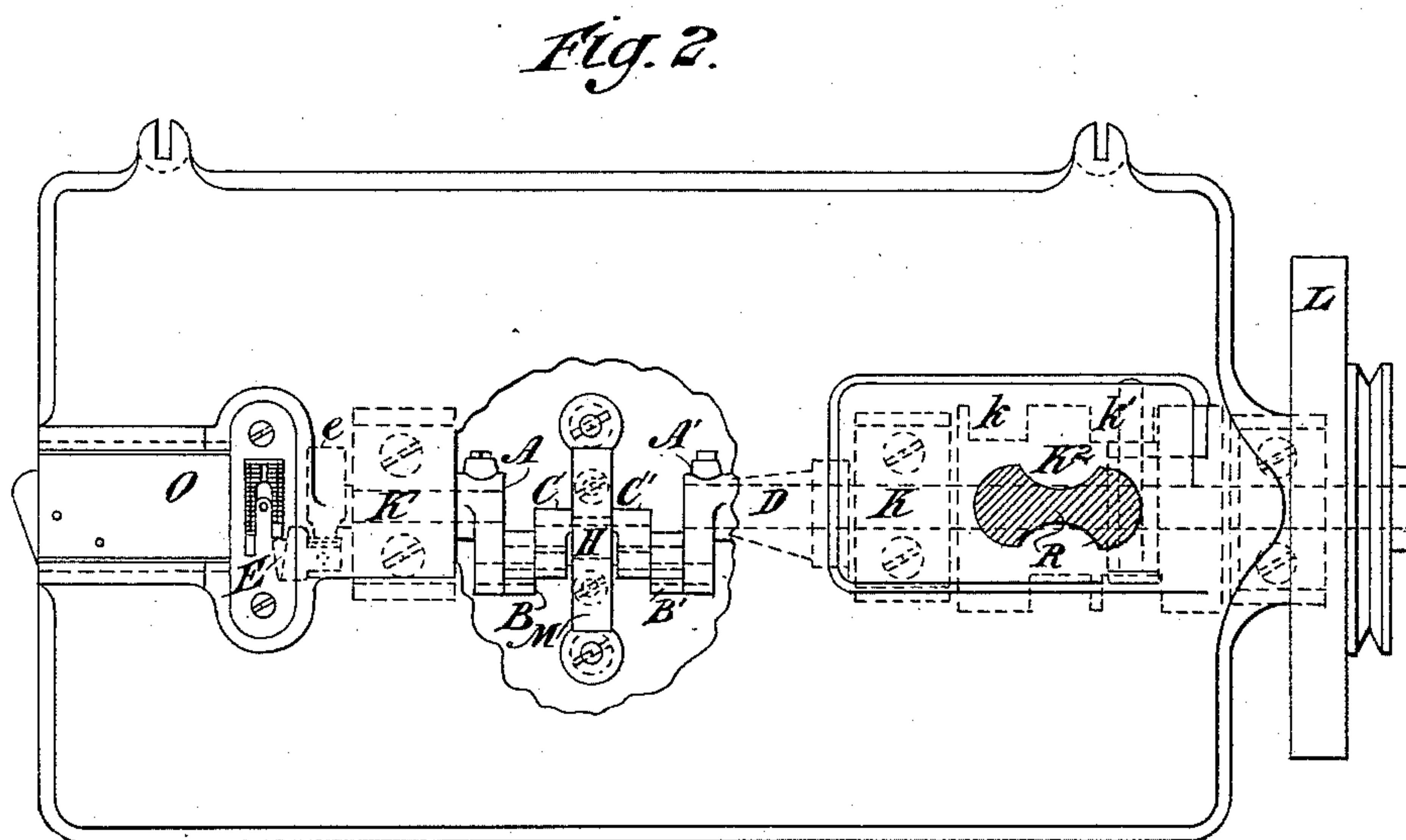
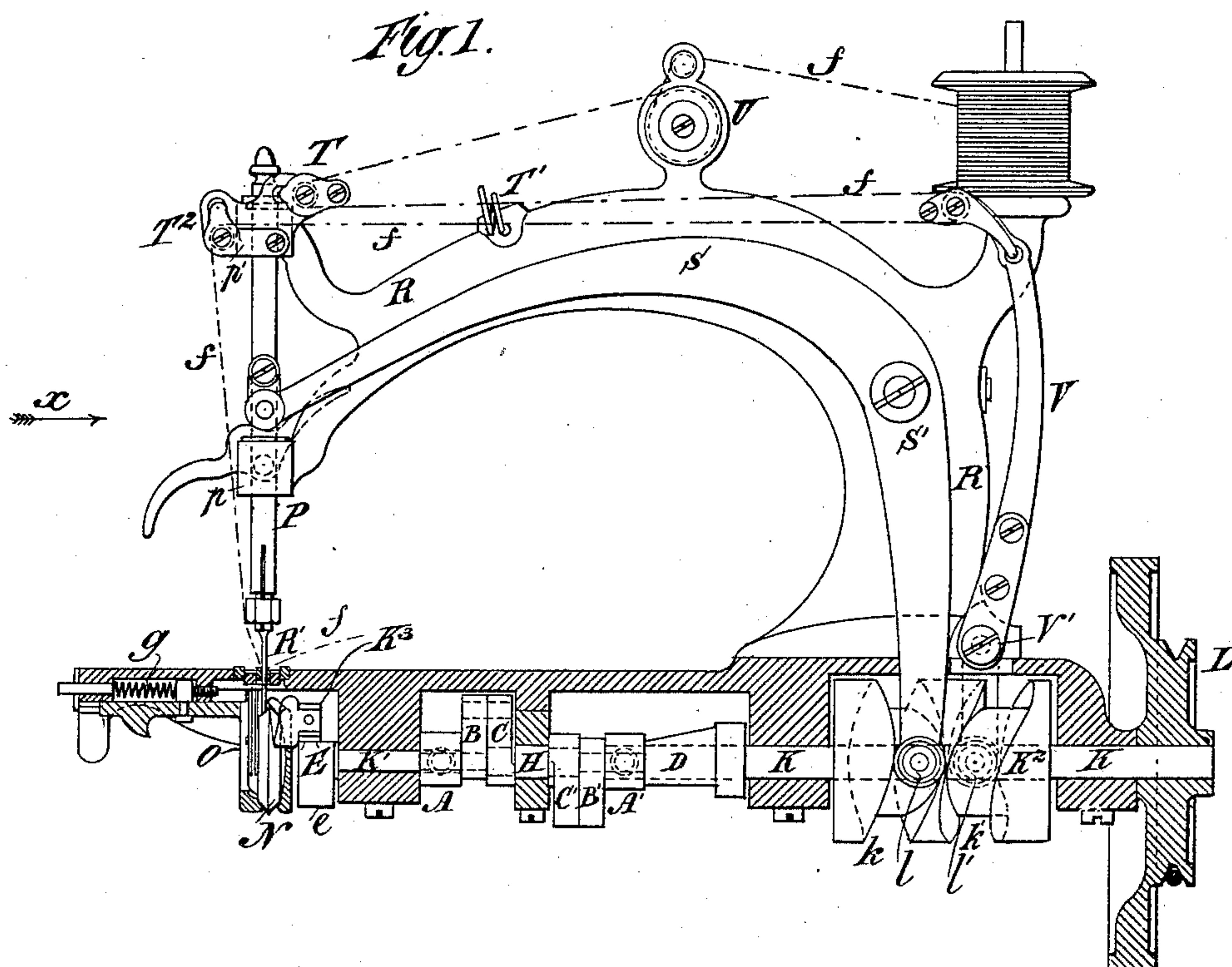
(Model.)

2 Sheets—Sheet 1.

A. J. HURTU.  
SEWING MACHINE.

No. 315,037.

Patented Apr. 7, 1885.



*Witnesses*  
*Geoffradman*  
*E. J. Roche*

*Inventor*  
*Auguste J. Hurtu,*  
*by his attorney,*  
*Edwin H. Brown.*

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2 Sheets—Sheet 2.

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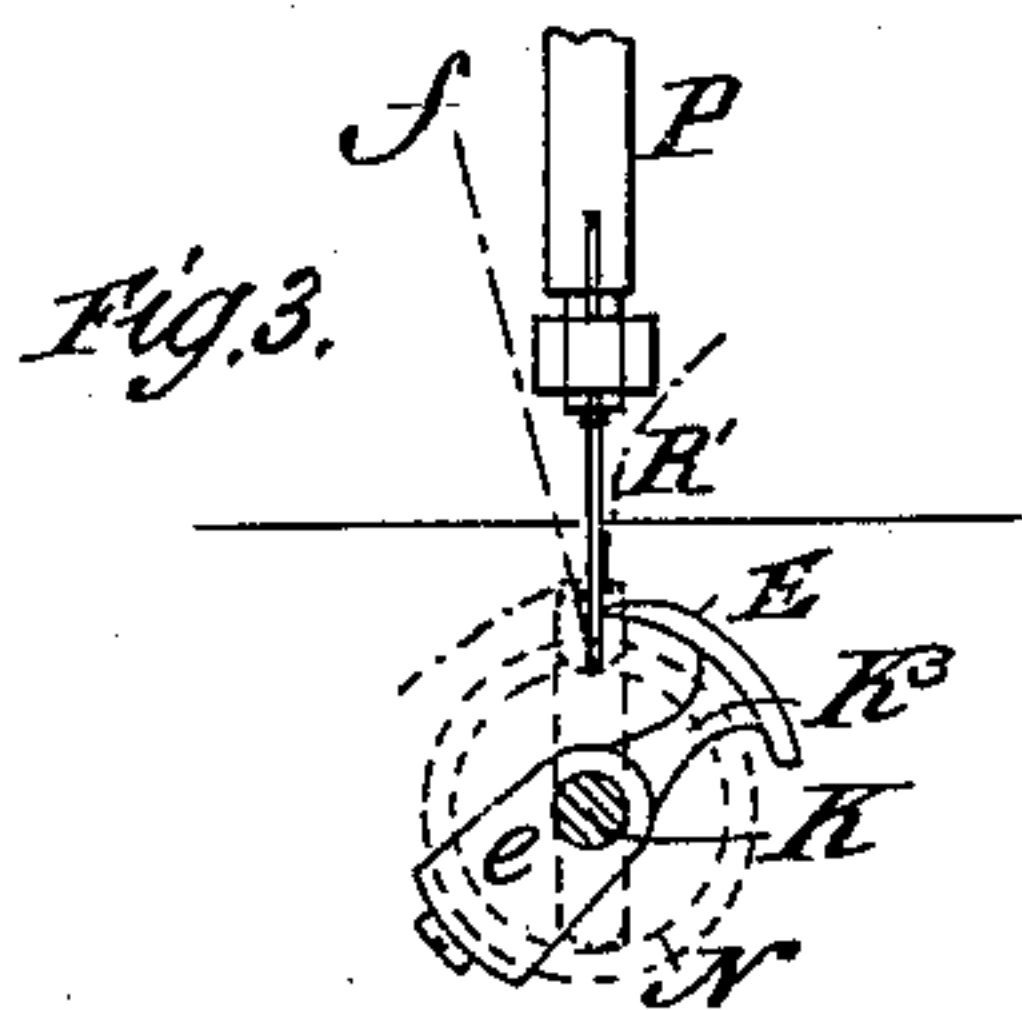


Fig. 3'.

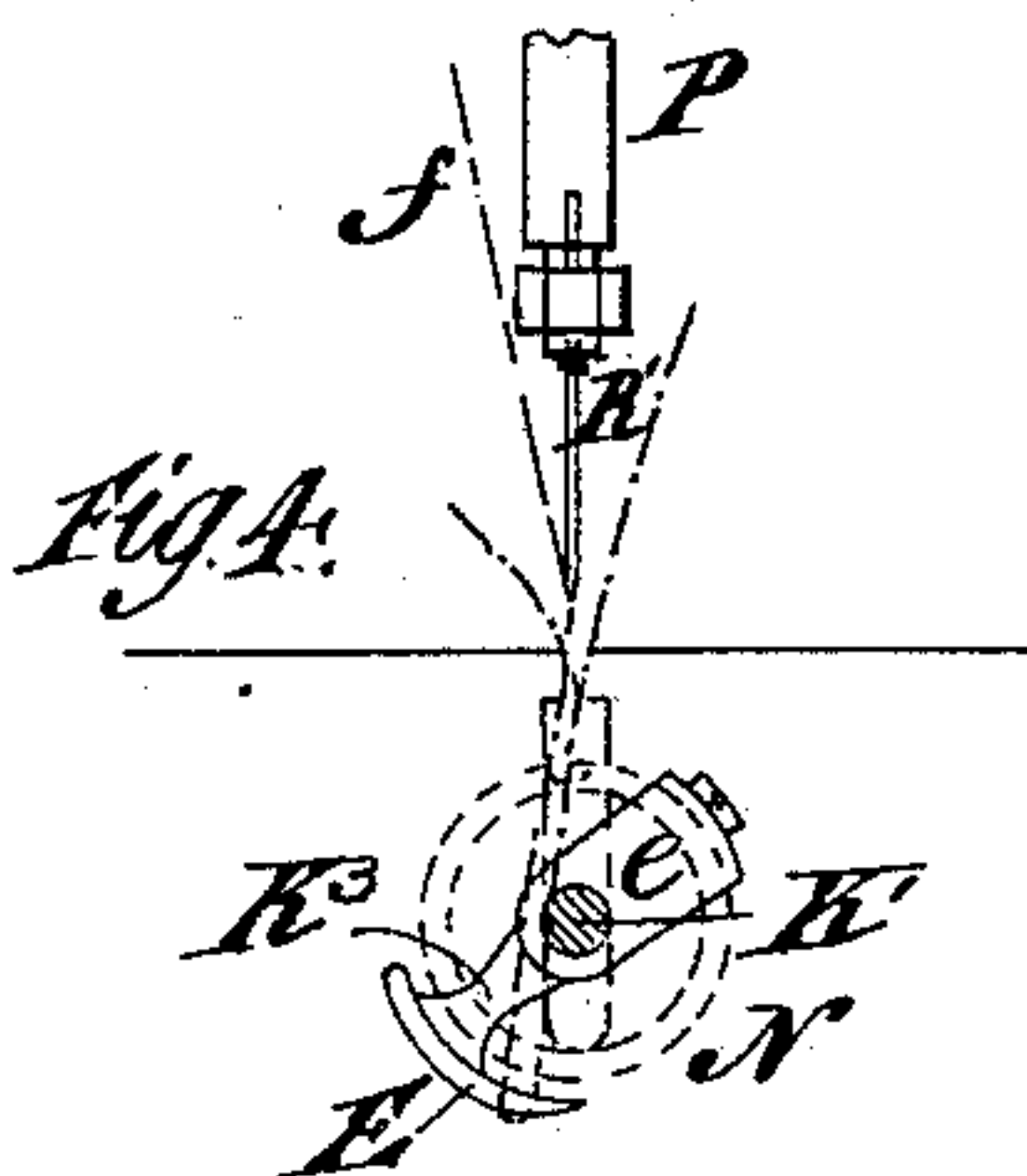
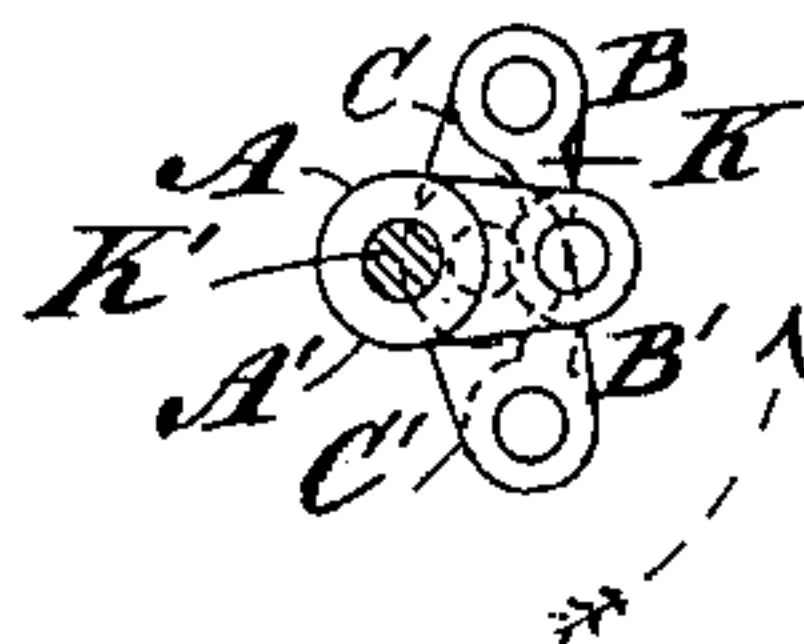


Fig. 4'.

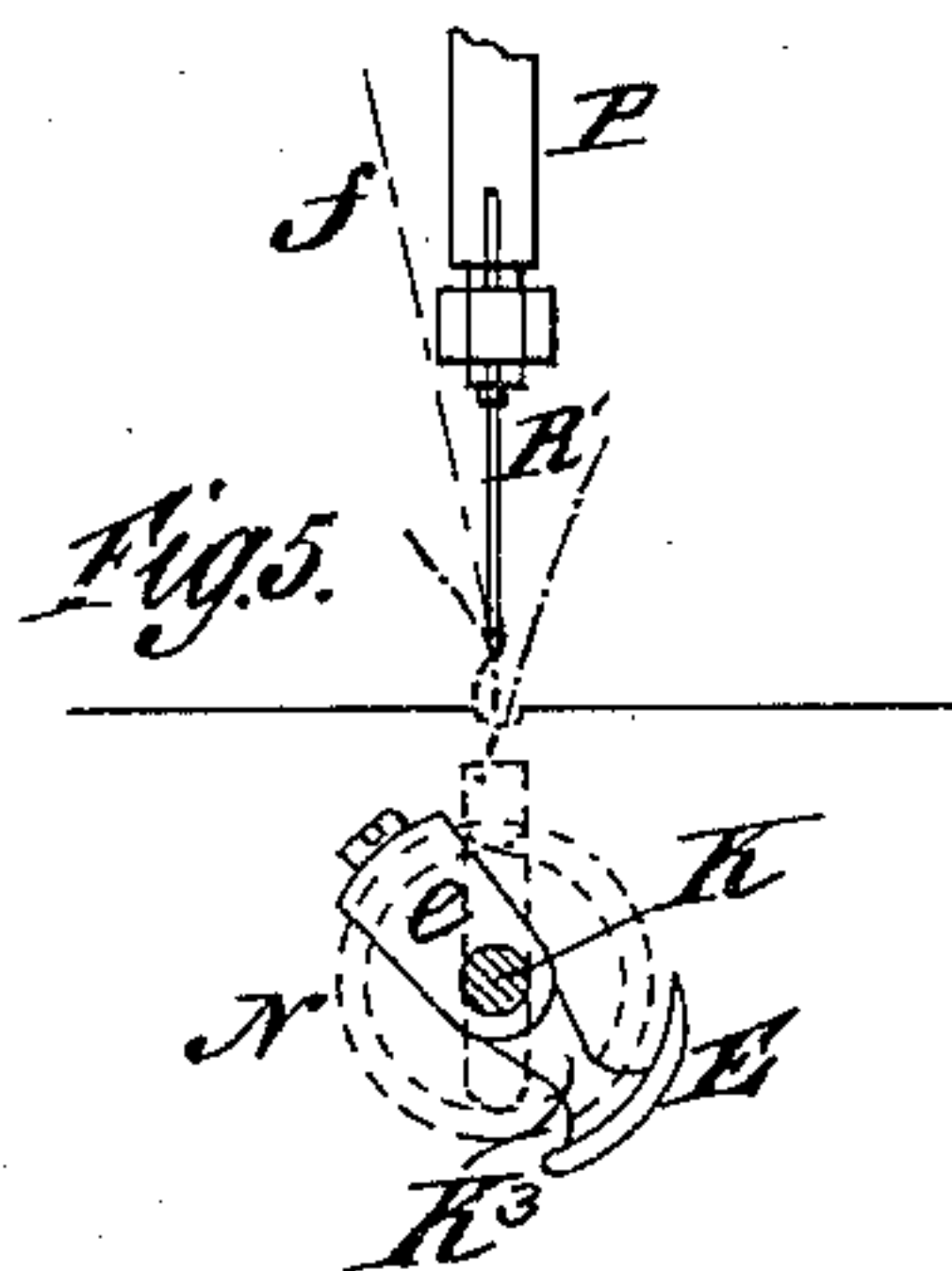
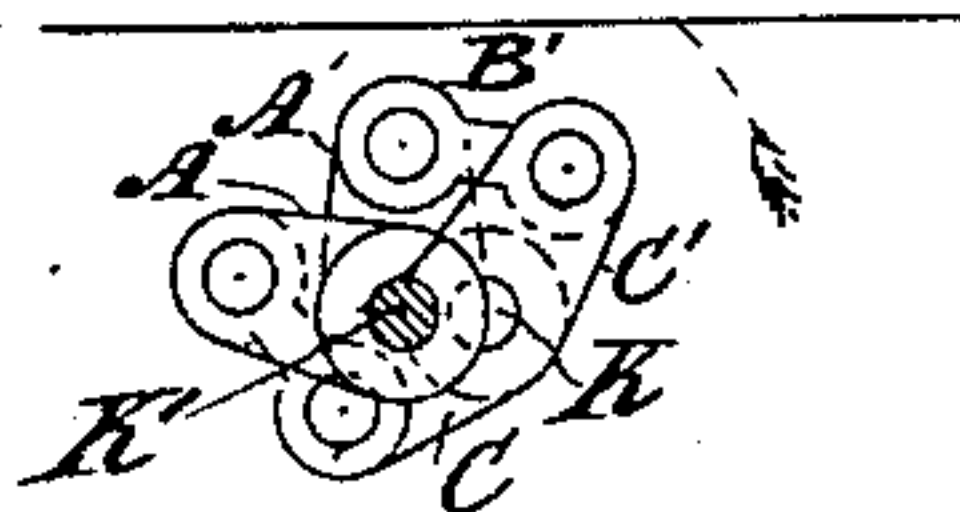


Fig. 5'.

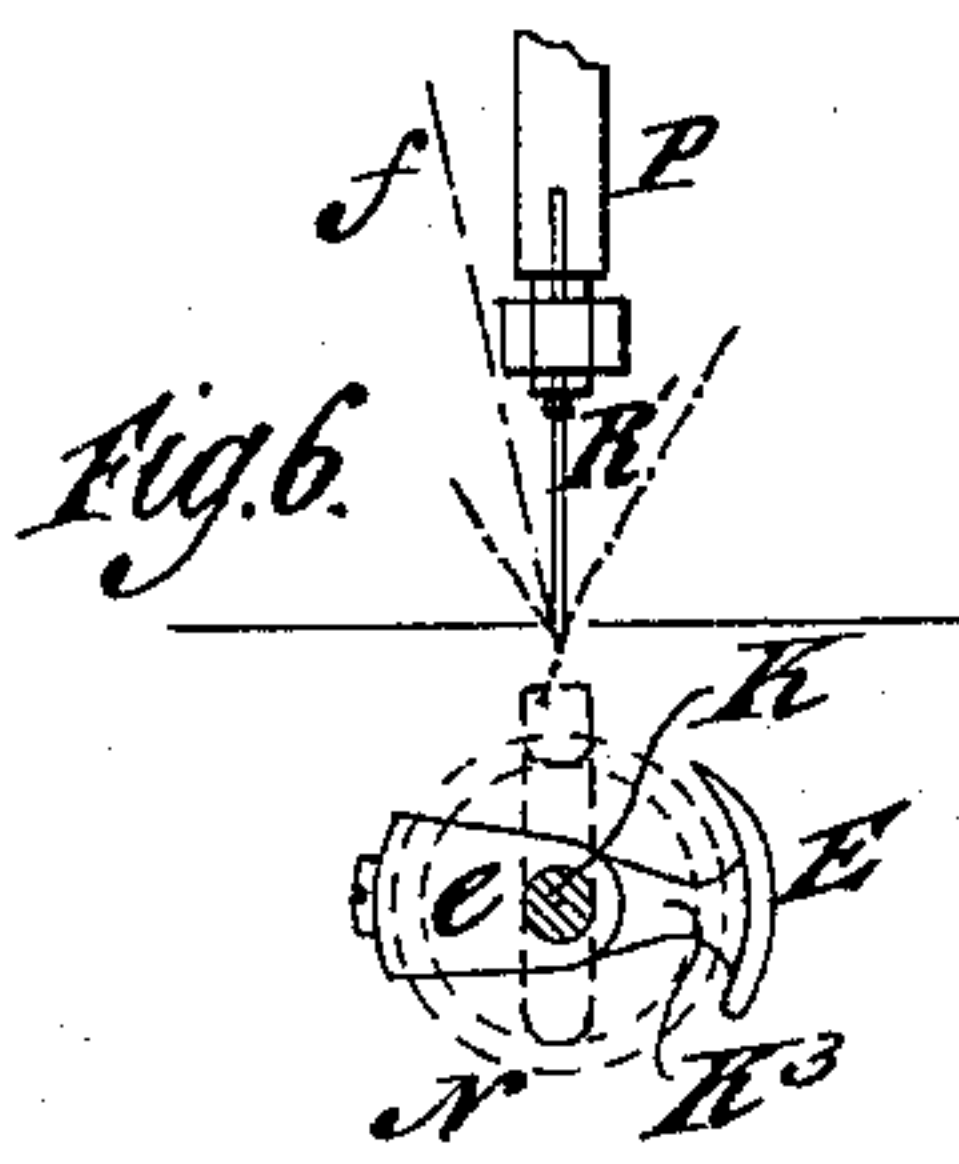
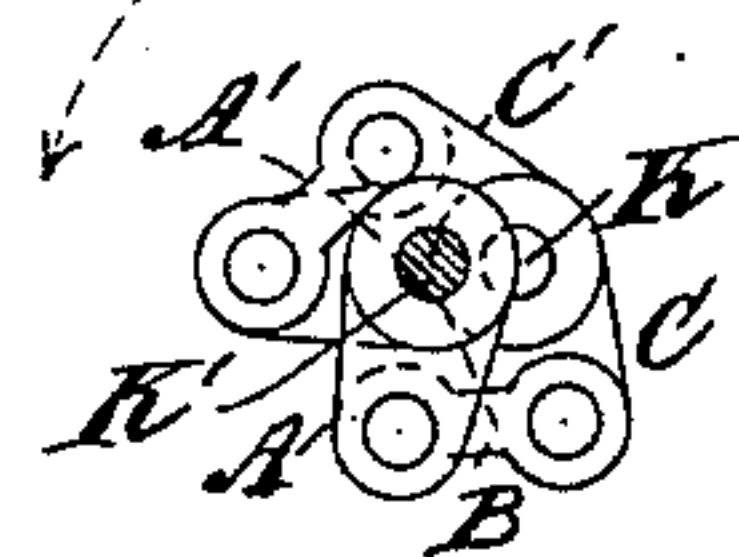
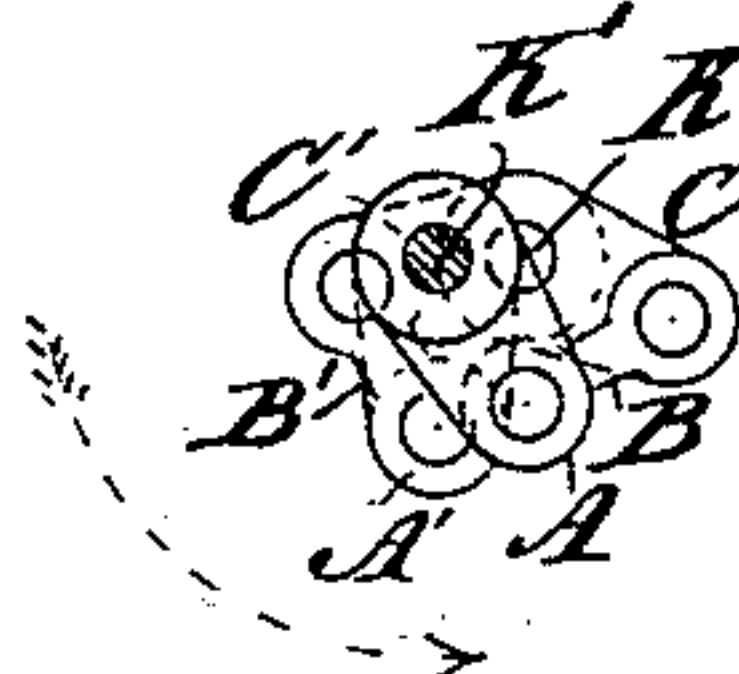


Fig. 6'.



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# UNITED STATES PATENT OFFICE.

AUGUSTE J. HURTU, OF PARIS, FRANCE.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 315,037, dated April 7, 1885.

Application filed October 2, 1883. (Model.)

*To all whom it may concern:*

Be it known that I, AUGUSTE JACQUES HURTU, of Paris, in the Republic of France, have invented an Improvement in Sewing-Machines, of which the following is a specification.

My improvement pertains to the class of sewing-machines known as "revolving-hook machines," which machines have, in combination with a revolving hook, fixed spools or shuttles.

The object of my improvement is to produce a sewing-machine which may be run at a higher rate of speed without injury to the machine than has heretofore been attainable; and the improvement consists, essentially, in a peculiar arrangement of cranks in pairs, combined with the driving-shaft and hook-shaft, and also with an intermediate eccentric shaft, by which combination of parts the rotation of the hook is caused at certain points in its circuit to be accelerated and at others retarded.

In the accompanying drawings, Figure 1 is a sectional elevation of a sewing-machine embodying my improvement. Fig. 2 is a plan view of the same, partly in section, and having a portion of the bed-plate broken away, showing the combination of cranks. Fig. 3 is a detail view showing the relative positions of the needle and the hook at the commencement of the first quarter of the rotation of the driving-shaft. Fig. 3' shows the relative position of the cranks at a corresponding point to that shown in Fig. 3. Fig. 4 shows the relative position of the hook and the needle at the beginning of the second quarter of the rotation of the driving-shaft. Fig. 4' shows the relative position of the cranks at a corresponding point to that shown in Fig. 4. Fig. 5 shows the relative positions of the needle and the hook at the commencement of the third quarter of the rotation of the driving-shaft. Fig. 5' shows the positions of the cranks at a corresponding point to that shown in Fig. 5. Fig. 6 shows the relative position of the needle and the hook at the commencement of the fourth quarter of the rotation of the driving-shaft, and Fig. 6' shows the position of

the cranks at a corresponding point to that shown in Fig. 6.

Similar letters of reference designate corresponding parts in all the figures.

A designates a crank, which is rigidly affixed at one end to a hook-shaft, K', by a screw or otherwise. Near its outer end the said crank A is pivotally connected to one end of a connecting-rod, B. The other end of said connecting-rod B is pivotally connected to one end of a crank, C, secured on a shaft, H.

A' designates a crank, which is rigidly affixed at one end to a driving-shaft, K. Said crank A', near the outer end, is pivotally connected to one end of a connecting-rod, B'. The other end of the connecting-rod B' is pivotally connected to one end of a crank, C', secured on the shaft H. The cranks C C' may be arranged in line one with the other. The shaft H is journaled in a bearing, M, upon the bed-plate of the machine. Said shaft is eccentric to the shafts K K', which preferably will be in line.

E is a hook for looping the thread which passes the needle. It is attached to a holder secured to the shaft K'. The crank A is preferably arranged upon the hook-shaft and the crank A' upon the driving-shaft in such manner that, supposing the operator to occupy a position at the end of the machine looking in the direction of the arrow X, (shown at Fig. 1,) the said cranks shall both be in a horizontal position to the right when the needle-holder shall have reached the lowest point in its stroke. The shafts K K' are journaled in suitable bearings on the bed-plate of the machine. The lower portions of these bearings, as also that of the bearing M, are secured to the upper portions by means of screws or otherwise, to facilitate the insertion and removal of the said shafts and their appurtenances. The hook E is, as shown, attached to the hook-holder K<sup>3</sup> by a screw. By this arrangement of the parts the hook, when blunted or worn, may be removed and repaired, or a new one substituted at slight labor and expense. At the end opposite the hook the holder K<sup>3</sup> is provided with a weight, e, which



acts as a counter-balance to it and the hook. The hook is curved longitudinally, so that it will approximately form a segment of the circle in which it rotates. At its forward end it preferably tapers to a point. The loop of thread in its passage over the portion of the hook between the holder and the portion just described may be guided thereon by any suitable guide.

10 O is a holder, made in the ordinary or any other suitable manner, and held in place by a spring, *g*, as is more clearly shown in Fig. 1. In the holder O is supported the bobbin N, from which the lower thread is supplied.

15 L is a pulley affixed to the outer end of the driving-shaft K, by means of which motion is conveyed to the said driving-shaft. The driving-shaft has arranged upon it a cam,  $K^2$ , in which are inclined peripheral grooves  $k k'$ .

20 S is a lever fulcrumed at  $S'$  to an arm, R, which is made integral with the bed of the machine. At the lower extremity of the lever S there is pivoted a friction-roller,  $l$ , at right angles to the said lever. This friction-roller is adapted to be reciprocated within the inclined groove  $k$  of the cam  $K^2$ , by which means motion is imparted to the lever S. To the other extremity of the lever S is connected by a link the needle-bar P. Said needle-bar is adapted to be reciprocated in bearings  $p p'$  upon the bifurcated end of the fixed arm R, and is provided at its lower end with the usual means for securing the needle.

V is a lever fulcrumed at  $V'$  to the arm R. At the upper end it operates a device for straining or stretching the thread. To the lower extremity of the lever V is pivoted a friction-roller,  $l'$ , at right angles thereto. This friction-roller is adapted to be reciprocated within the inclined peripheral groove  $k'$  of the cam  $K^2$ , by which means motion is conveyed to the lever V. The thread  $f$  after leaving the spool is made to pass around the tension device U, thence around a small pulley, T, pivotally connected to the arm R, thence through a guide,  $T'$ , thence over the stretching device, thence back through the guide  $T'$ , thence over a pulley,  $T^2$ , pivotally connected to the bearing  $p'$  for the needle-bar, and thence through the eye of the needle.

I will now describe more in detail the operation of the mechanism for accelerating and retarding the movement of the hook.

On referring to Fig. 1 and the detail Figs. 3 and 3' it is seen that the needle R' has entirely descended to form the loop, and that the point of the hook is close to it. The cranks A C, connected by the rod B, form one couple, and the cranks  $A' C'$ , connected by the rod  $B'$ , form another couple.

It will be seen by reference to Fig. 3' that the cranks C and  $C'$  are about equally far to the right, the former being extended upward and the latter extended downward.

65 In describing the position of the cranks as being to the right or to the left, I assume that

the operator occupies the position before mentioned.

After the first quarter of a rotation of the driving-shaft the different parts above mentioned will occupy the position shown by Figs. 4 and 4'. The hook has withdrawn the loop of thread from the needle, and by an accelerated movement has drawn it around the shuttle, making half a revolution around the axis of the shaft by which it is carried, so that its point is underneath the shaft. The needle has partially reascended, leaving the quantity of thread necessary for the enlargement of the loop passing around the shuttle. The great extent of movement of the hook as compared with the extent of rotation of the driving-shaft and the movement of the crank  $A'$  mounted thereon illustrated by these Figs. 4 and 4' as due to this quarter-rotation indicates the great amount of acceleration which is effected in the movement of the hook.

Figs. 5 and 5' show the position of the mechanism after the second quarter of a rotation of the driving-shaft, during which the hook moves approximately at the same speed as the driving-shaft. During this movement it lets go the loop, the needle ascends completely, the stretcher takes up the slack, and the stitch is completed.

Figs. 6 and 6' show the mechanism at the end of the third quarter of a rotation of the driving-shaft, during which the hook has slackened its movement, and only makes one-eighth of a turn. At the same time the stitch is tightened, and the needle begins to descend. Finally, during the last quarter of a turn of the driving-shaft, the hook effects its last eighth of a rotation with the same slackened movement as before, and returns with the various parts to the point of departure. During the last part of the movement the needle has continued to descend, and has formed a new loop, which will be caught by the hook to make a new stitch, and so on.

By comparing the positions of the parts illustrated by Figs. 3, 3', by Figs. 4, 4', by Figs. 5, 5', and by Figs. 6, 6' the relative extent of the movements of the hook and the driving-shaft may be appreciated. The extent of the movement of the driving-shaft during its several quarter-rotations may be ascertained by observing the positions occupied by the crank  $A'$ , which is carried by the driving-shaft.

The presser-bar, the feed, the cam which operates the stretching device, and the stitch-regulating device have only been shown incidentally, as I do not claim any features of them, and they may be of any suitable kind. I may slacken or accelerate the speed of the hook E by varying the angles of the cranks C  $C'$  relatively to each other.

What I claim as my invention, and desire to secure by Letters Patent, is—

In a sewing-machine, the combination, with a reciprocating needle, of a fixed spool or shut-



5 tle, N, a driving-shaft, K, provided with a crank, A', a shaft, K', provided with a crank, A, a hook on said shaft, a shaft, H, arranged eccentrically to the shafts K K', and provided with cranks C C', the connecting-rod B', pivotally connected to the crank A' of the shaft K and the crank C' of the shaft H, and the connecting-rod B, pivotally connected to the

crank A of the shaft K' and the crank C of the shaft H, substantially as specified. 10

In testimony that I claim the foregoing I have hereunto set my hand.

A. J. HURTU.

Witnesses:

G. BARDIN,  
ED. MARTAIN.