

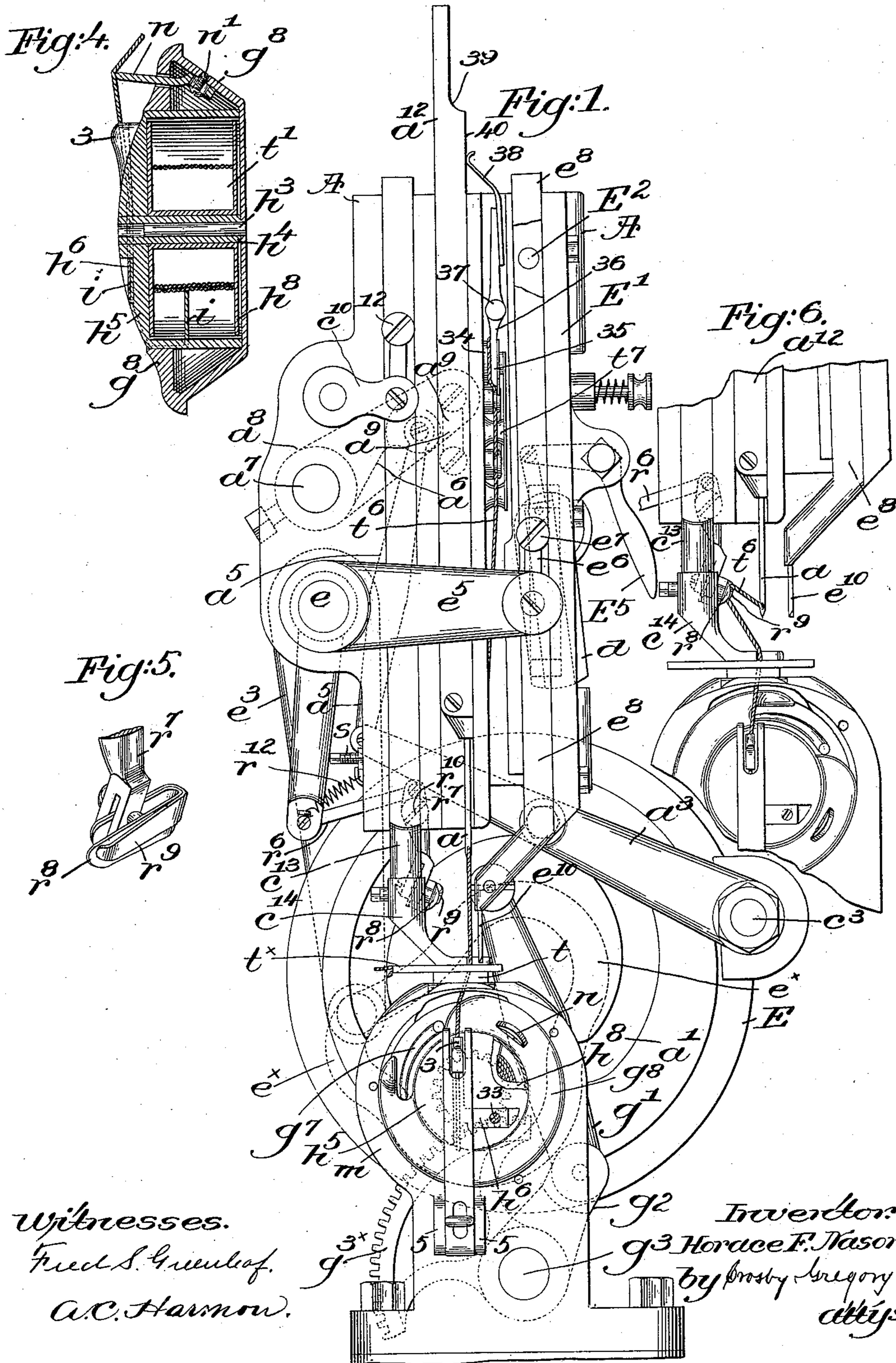
(No Model.)

2 Sheets—Sheet 1.

H. F. NASON.
SEWING MACHINE.

No. 567,000.

Patented Sept. 1, 1896.



Witnesses.

Fred S. Greenleaf.

A. C. Harmon.

Inventor:

Horace F. Nason

by Josby Gregory
attys.

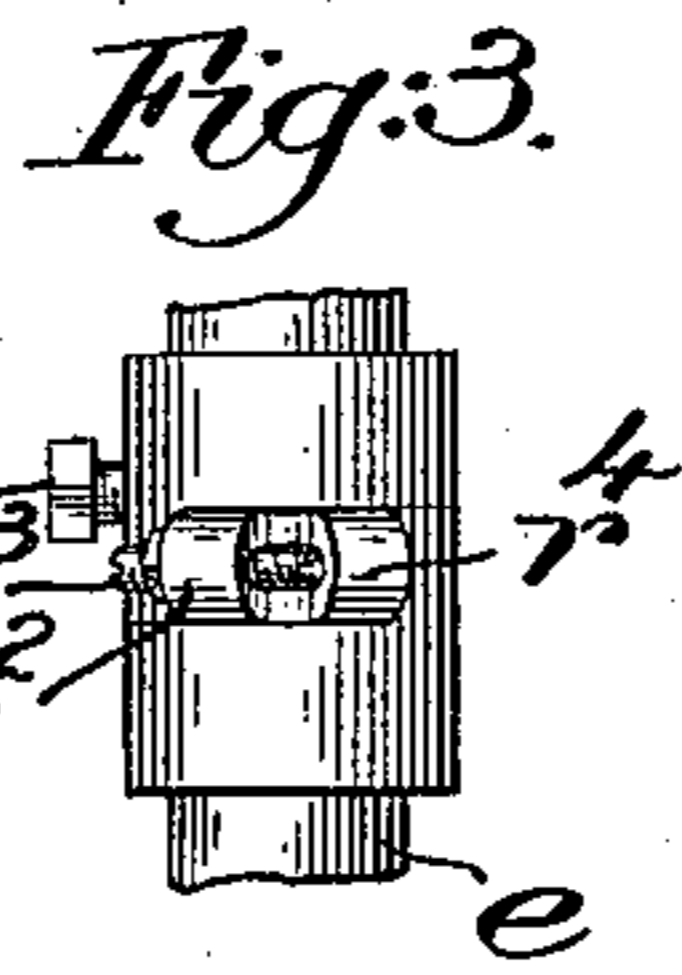
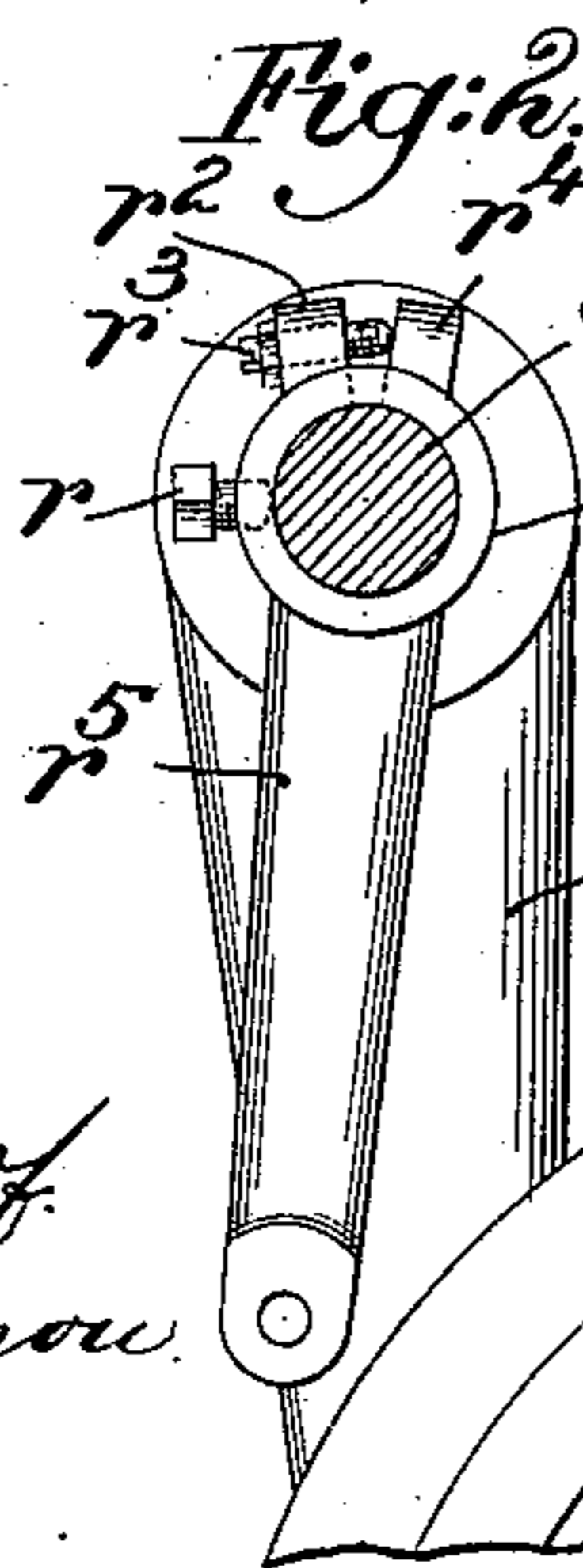
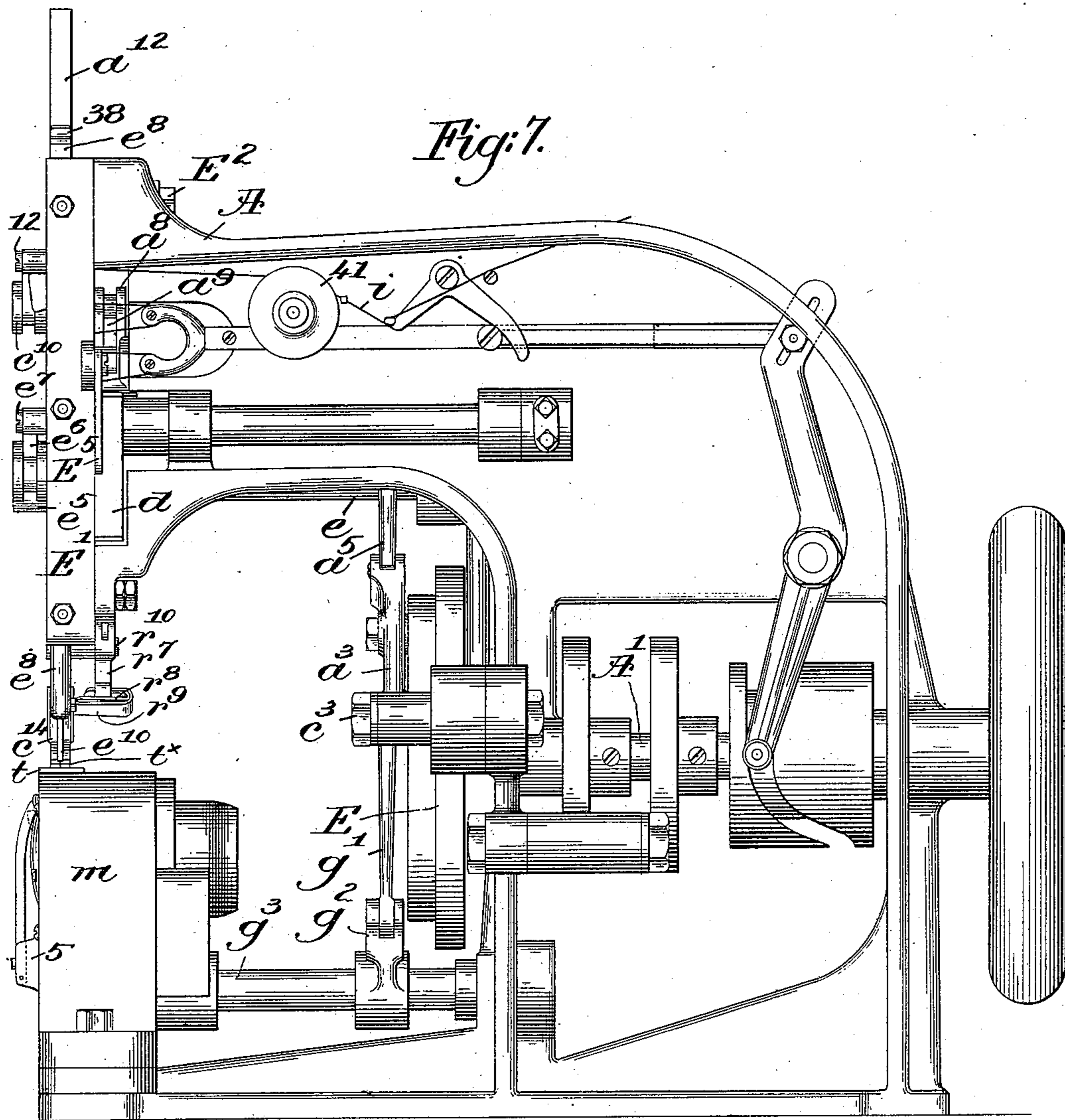
(No Model.)

2 Sheets—Sheet 2.

H. F. NASON.
SEWING MACHINE.

No. 567,000.

Patented Sept. 1, 1896.



Witnesses.

Fred S. Grunke.

A.C. Harmon.

Inventor:

Horace F. Nason.

by Lewis & Gregory
attys.

UNITED STATES PATENT OFFICE.

HORACE F. NASON, OF NATICK, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO JOHN Q. A. WHITTEMORE AND CHARLES WHITTEMORE, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 567,000, dated September 1, 1896.

Application filed February 8, 1894. Serial No. 499,452. (No model.)

To all whom it may concern:

Be it known that I, HORACE F. NASON, of Natick, county of Middlesex, State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve the class of sewing-machines represented in my United States Patent No. 513,717, dated January 30, 1894, but my invention is applicable in some of its parts to any sewing-machine employing a circularly-movable shuttle. In machines of the class referred to the thread is drawn from the bobbin in the shuttle by the action of the take-up on the needle-thread after the needle has risen from the material, the take-up at such time drawing the thread back through the eye of the needle and setting the stitch.

Waxed threads require more power to draw them off than dry threads, and it is difficult and almost impossible to make a uniform stitch by drawing the shuttle-thread from the shuttle through the strain of the needle-thread upon it, and the strain on the needle-thread to pull off the shuttle-thread varies as the quantity of thread varies on the shuttle-bobbin.

I have aimed to reduce the strain on the needle-thread and to make the stitch more uniform in appearance, and this I have done by providing the circularly-moving shuttle with a pull-off, which acts against the under or shuttle thread between the tension device of the stationary bobbin-case and the work resting on the work-support, the pull-off acting positively to take from the bobbin-case within the shuttle enough thread for the next stitch to be made, the said thread being left slack between the stationary tension device and the work, the slack in the shuttle-thread being taken up by the action of the take-up through the needle-thread after the needle has been lifted from the work.

In accordance with my invention the pull-off acts while the shuttle is on its back stroke.

I have also provided the machine with an improved slack-thread controller and have operated it by novel mechanism, the slack-

thread controller keeping the slack thread between the eye of the needle and the work out of the path of the descending needle and awl.

Figure 1, in elevation, shows the front end of a sewing-machine containing my present invention, the usual face-plate at the end of the usual overhanging arm being omitted. Figs. 2 and 3 are details of devices in the train of actuating means for the slack-thread controller. Fig. 4, on an enlarged scale, shows the shuttle and its contents in section. Fig. 5 is a detail showing part of the slack-thread controller. Fig. 6 is a detail showing the needle, slack-thread controller, and awl in different positions; and Fig. 7 a left-side elevation of machine shown in Fig. 1.

In the drawings, A represents part of the framework for supporting the working parts; A', the main shaft, having suitable cams to operate the various parts; E', a swinging head pivoted upon a stud E², fixed to the framework. e⁸ is an awl-bar sliding in said swinging head. e¹⁰ is an awl connected thereto.

d is a slotted arm connected with a suitable rock-shaft, the slot in the arm receiving, in practice, a stud mounted upon a block made vertically adjustable by or through the lever E⁵ and an arm and link connected therewith, the stud entering the arm also entering a slot in the back of the swinging head, a movement of the lever E⁵ regulating the feed-stroke of the awl.

e is a rock-shaft having at one end an arm e³, which is extended downwardly behind the cam E, fast on shaft A', and is provided with a roller or other stud to enter a cam-groove e^x at the rear side of said cam E and shown in dotted lines, Fig. 1.

e⁵ is an arm fast on the front end of shaft e and connected by link e⁶ to a stud e⁷, fast on the awl-bar.

a³ is an arm having a roller or other stud to enter the cam-groove a' in the cam E, said arm a³, pivoted at c³, being jointed to a link a⁵, in turn jointed to the arm a⁶ of a rock-shaft a⁷, said rock-shaft in turn having connected to it at its front end an arm a⁸, (see dotted lines, Fig. 1,) which, by a suitable link a⁹, is jointed to a stud projecting from the rear side of the needle-bar a¹², which is

adapted to be reciprocated up and down in suitable grooves in the end of the overhanging arm of the machine.

c^{14} is a presser-foot connected to the presser-bar c^{13} , having suitable guideways in the head of the machine, said presser-bar having a stud 12, which receives one end of a link which is jointed to an arm c^{10} of a rock-shaft, which, in practice, is provided with suitable means to rock the shaft for a suitable distance and lift the presser-foot to the proper extent and at the proper times, the presser-foot, in practice, being lifted from the work a certain distance, no matter what its thickness, and remaining above the work while the awl e^{10} in the work feeds it over the work-support t .

g^8 represents a circularly-moving shuttle adapted to be moved back and forth in a raceway in a block m , the shuttle deriving its movement by means of a driver g^7 , in practice projecting from a disk connected with a rock-shaft having thereon a pinion, which will be engaged by a sector g^{3x} , carried by a shaft g^3 , having an arm g^2 , to which is jointed a link g' , the upper end of which fits over a crank-pin fast to the cam-disk E.

The parts so far referred to may be substantially as in United States Patent No. 513,717, dated the 30th day of January, 1894, so need not be herein further described.

The shuttle g^8 has a hollow center provided (see Fig. 4) with a stud h^3 , which receives over it a hollow tube or sleeve h^4 , extended inwardly from the bobbin-case h^5 , said sleeve receiving upon it a suitable disk-bobbin t' , upon which will be wound the shuttle-thread i , the latter being led from said bobbin, as best shown in Fig. 4, through a hole in the circular flange of the bobbin-case, thence out to the front of the bobbin-case up under a tension device h^6 and through a hole in a lug or projection 3, extended outwardly from the bobbin-case, and thence through the needle-hole in a throat-plate and to the work t^x , resting between the work-support t and the presser-foot.

The tension device h^6 is made as a spring, the pressure of which on the shuttle-thread is regulated by a suitable screw or device 33. (See Fig. 1.)

The shuttle, bobbin-case, and bobbin so far described do not differ materially from parts designated by like names in my said patent, but herein I have provided the shuttle with a pull-off n , it being located near the heel of the shuttle and being made adjustable, preferably, so as to extend out more or less beyond the face of the shuttle by or through an adjusting device, such, for instance, as the screw n' .

In the machine herein represented I shall employ a take-up substantially such as contained in the patent referred to, and it in action will draw the needle-thread t^6 between suitable sheaves t^7 , and the thread from the take-up will then be passed between the mem-

bers 34 and 35 of a thread-gripping device, the member 35 being carried by a lever 36, pivoted at 37 and having at its upper end a spring 38, which, when the needle-thread is to be unclamped, as when the needle-bar is down, enters the space 39 in the needle-bar, the gripper clamping the needle-thread whenever the spring 38 rests on the straight side 40 of the needle-bar, as represented in Fig. 1, said clamp being located between the take-up and the needle-thread tension device 41, which may be of any usual or suitable construction to act constantly upon the thread.

The projection 3 on the bobbin-case enters the slot in the upper end of the bobbin-case holder 3^x , made as an arm pivoted between ears 5, so that it may be turned when it is desired to release the bobbin-case, the arm restraining the rotation or movement of the bobbin-case and its tension device with the shuttle.

The shaft e has fast upon it by a screw r a collar r' , having an ear r^2 , provided with an adjusting device r^3 , made as a screw, said adjusting device, as the shaft e is rocked, acting sooner or later on an ear r^4 , projecting from the hub of an arm r^5 , mounted loosely on the rock-shaft e at one side of the collar r' , said arm r^5 being connected by a link r^6 with the upper end of an arm r^7 , (see Fig. 5,) having connected to it at its lower end two spring-fingers r^8 r^9 , one of said fingers—viz., r^8 —being a little longer than the other, the shorter finger r^9 being represented as curved inwardly toward the longer spring for a purpose to be described, the arm r^7 being pivoted at r^{10} upon a stationary part of the framework, said pivot being shown by dotted lines in Fig. 1, a spring r^{12} acting normally to bring the arm r^5 up to and against a stop s , adjustably connected with the head of the machine.

The arm r^7 and its spring-fingers r^8 r^9 constitute a slack-thread controller for the needle-thread to engage at the proper times while the needle is elevated and keep the needle-thread out of the path of the descending needle, so that the needle-thread cannot get in the way of the needle or awl.

By adjusting the pull-off n so that its acting end projects more or less beyond the face of the shuttle the said pull-off is made to pull off more or less shuttle-thread, that depending upon the requirements of the material.

Referring to Fig. 1, it will be understood that the needle-bar and needle are fully lifted, that the take-up has completed its effective stroke in taking up the slack in the needle-thread and setting the stitch, that the awl has been moved down through the first part of its movement and has met the work, that the shuttle has completed its forward movement, and that the presser-foot then resting on the work is just ready to be lifted. Now, should the machine be started, the presser-foot will be lifted through the arm c^{10} , and the shuttle will start on its reverse move-

ment. As soon as the presser-foot has been lifted from the work the awl will commence to move the work between the lifted presser-foot and the throat-plate, and at or just before the awl completes the feeding movement of the work the pull-off n will act against the shuttle-thread between the tension device h^6 and the work, and said pull-off will pull from the shuttle or the bobbin contained therein enough thread for a new stitch and will leave the said thread in a slack condition while the shuttle completes its backward movement and while the shuttle reverses its movement and passes through the loop of needle-thread to be formed.

The pull-off acts, it will be remembered, on the shuttle thread between the material on the work-plate and the stationary tension device and bobbin-case while the needle is yet elevated and while the take-up and thread-gripper hold the needle-thread stiffly. During the action of the pull-off, as described, the awl commences to move in the second portion of its descent, so as to hold the work firmly, notwithstanding the presser-foot had been lifted, and, the pull-off having acted, the presser-foot is let down upon the work, and the awl is raised therefrom and moved backwardly toward its starting-point to get it out of the way of the needle, as provided for in said patent, which done, the needle commences to descend while the awl continues to rise.

As the awl is being moved in the second half of its downward thrust and is being pushed through the stock the slack-thread controller referred to will be moved toward the needle-thread, then held stretched by the take-up between the eye of the needle and the work, and the finger r^8 of said slack-thread controller will meet the needle-thread, but the other finger r^9 will go past the needle-thread and get behind it, thus inclosing the needle-thread between the two spring-fingers r^8 r^9 .

Just before or about as the awl commences to rise from the stock the slack-thread controller will be moved away from the needle and will pull the needle-thread aside and hold it there while the needle descends, as best shown in Fig. 6, the needle, after its eye has descended below the said fingers, so straining the needle-thread, however, as to pull it from between said fingers, but the point of the needle has descended so far that the slack needle-thread cannot get under the point.

The movement of the slack-thread controller away from the needle is effected by the spring r^{12} , before referred to, but the slack-thread controller is moved toward the needle-thread to engage the same by the action of the adjusting device r^3 against the lug r^4 or arm r^5 .

The point of the shuttle enters the loop of needle-thread as the needle starts to rise from its lowest position, the thread-gripper at such time being open, and as the shuttle enters the loop of needle-thread and the needle rises

the take-up moves toward the needle and gives up to the shuttle the slack thread held by it.

The needle stops in its ascent after it has risen a short distance above the work, but the shuttle continues to rotate and draw through the work and the eye of the needle the slack thread given up to it by the take-up, the take-up completing its movement in giving up slack thread just before the shuttle completes its stroke and just before the loop of needle-thread is cast off, and it is during this last part of the movement of the shuttle that the latter pulls upon the needle-thread yet unclamped and draws enough thread from the eye of the needle, the take-up, and the tension device for the requirements of the next stitch.

The quantity of shuttle-thread pulled off by the shuttle in the latter portion of its stroke will vary more or less, according to the thickness of the material, the shuttle commencing to act sooner and to pull off the thread from the bobbin located in the stationary bobbin-case within the shuttle as the material under the presser-foot and between the latter and the work-support is thicker, and vice versa, the thicker material having shortened the thread between the work and the shuttle. In this way the amount of needle-thread pulled off is automatically controlled by the thickness of the stock.

The needle-bar commences to rise after the needle-thread has been pulled off, as described, and it reaches a position where the end 38 of the gripper is moved outwardly by projection 39 of the needle-bar, just about as the shuttle casts off the loop of needle-thread, and that done the needle-thread is again gripped and held until after the take-up has operated and the stitch has been completed. The needle-thread having been gripped, the take-up commences to act and draws the needle-thread back through the eye of the needle, taking up the loop of needle-thread just cast off by the shuttle, and as the take-up completes its effective stroke the needle-thread is made to draw the shuttle-thread with it into the hole just vacated by the needle, the needle-thread in doing this having only to pull in the slack thread previously pulled off and left slack by the pull-off as the shuttle was on its back stroke. The take-up having drawn the needle-thread in such manner as to cause it to draw the shuttle-thread previously measured off into the work, the awl acts to feed the work, it moving the work over the work-support while both threads are held taut and while the presser-foot is lifted, and during this feeding movement the awl, by its pressure against the work through which it has been thrust, causes the leather between the awl and the threads just drawn into the previous awl-hole to be pushed forcibly against said threads, which aids materially in keeping the lock of the thread in the position where it was left by the strain or

pull of the threads, one from above and the other from below the work.

By the employment of the pull-off, as described, the more or less quantity of thread 5 contained upon the bobbin in the shuttle will not at all affect the uniformity of the stitch, and by providing the shuttle with the slack thread, as described, I may with greater uniformity leave the lock of the stitch at any 10 desired point between the upper and lower surfaces of the "work," by which term I designate the leather or other material receiving the stitch.

This invention is not limited to the employment of the exact means shown for imparting to the shuttle its circular movement, and instead I may employ any other usual or suitable mechanism.

Having described my invention, what I 20 claim, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the following instrumentalities, viz: a work-support; a needle-bar, its attached needle and means to operate 25 said needle-bar, a circularly-movable shuttle, a stationary bobbin-case therein provided with a tension device, and containing an under-thread carrier, means to move said shuttle; a pick-off carried by said shuttle and 30 adapted to act upon the shuttle-thread; means to adjust said pick-off parallel to the center of rotation of said shuttle in order that it may draw more or less under thread from said bobbin-case, and a slack-thread controller for 35 the needle-thread, it receiving the said needle-

thread when the needle is elevated, and means to move said slack-thread controller to draw the needle-thread aside preparatory to the descent of the needle, the latter in its passage through the material taking the said 40 slack thread from said controller to operate substantially as described.

2. In a sewing-machine, the following instrumentalities, viz; a work-support; a needle-bar; means to move it; an eye-pointed 45 needle; a slack-thread controller composed of two fingers substantially as described adapted to receive the needle-thread between them when the needle is elevated, and means to move said slack-thread controller to draw 50 the needle-thread aside preparatory to the descent of the needle and let the needle in its descent pull the thread from between the fingers of the said controller, substantially as described. 55

3. The needle-bar, and its attached eye-pointed needle; the rock-shaft *e* having the projection *r*³; the arm *r*⁵ loose on said shaft and provided with the ear *r*⁴, combined with the slack-thread controller, and connections 60 between it and said arm, to operate, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HORACE F. NASON.

Witnesses:

FREDERICK L. EMERY,
JOHN C. EDWARDS.