

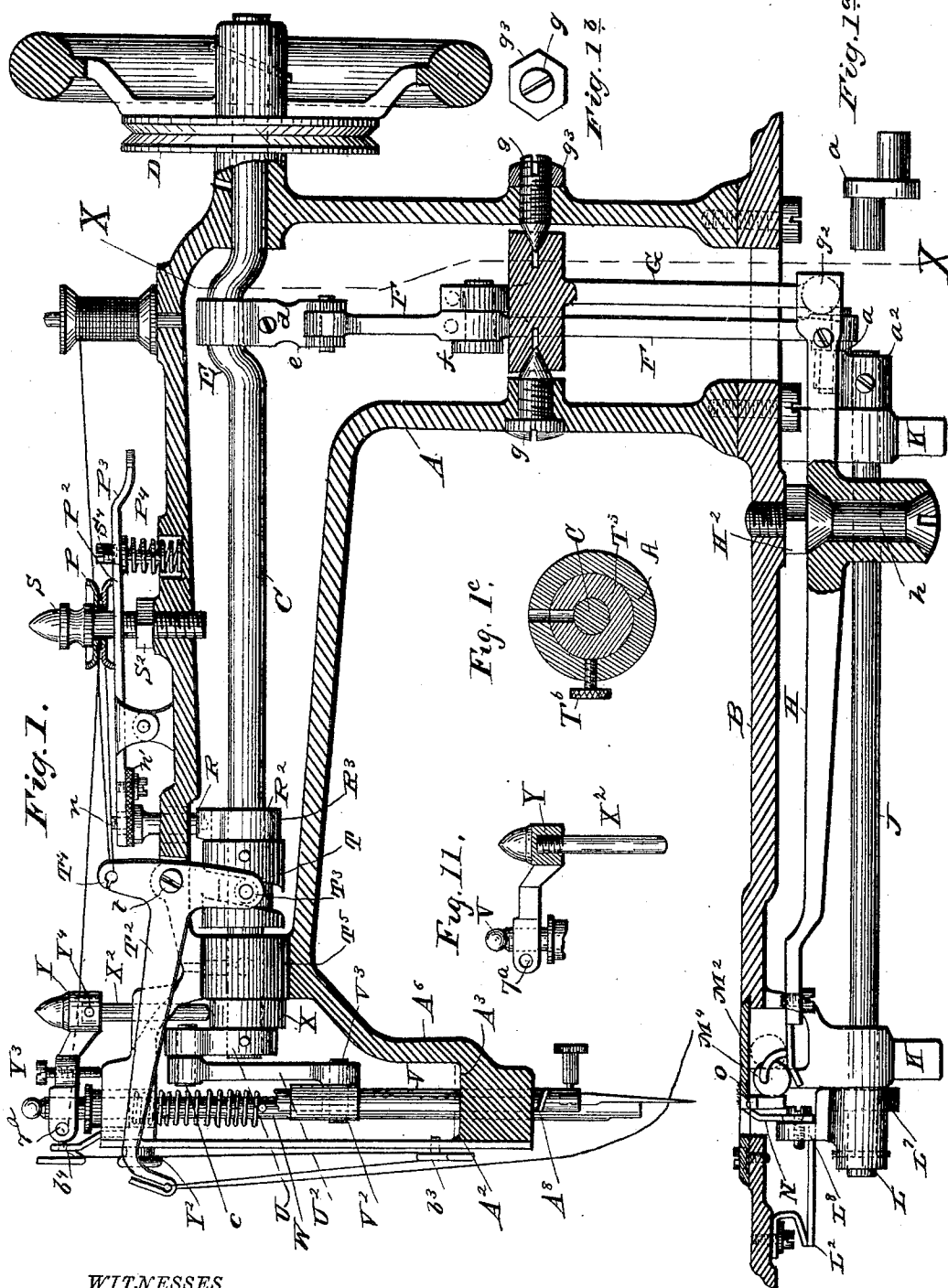
(No Model.)

T. A. MACAULAY  
SEWING MACHINE.

4 Sheets—Sheet 1.

No. 581,828.

Patented May 4, 1897.



WITNESSES

Phil C. Dietrich.  
F. J. F. Johnson

INVENTOR

Thos. A. Macaulay

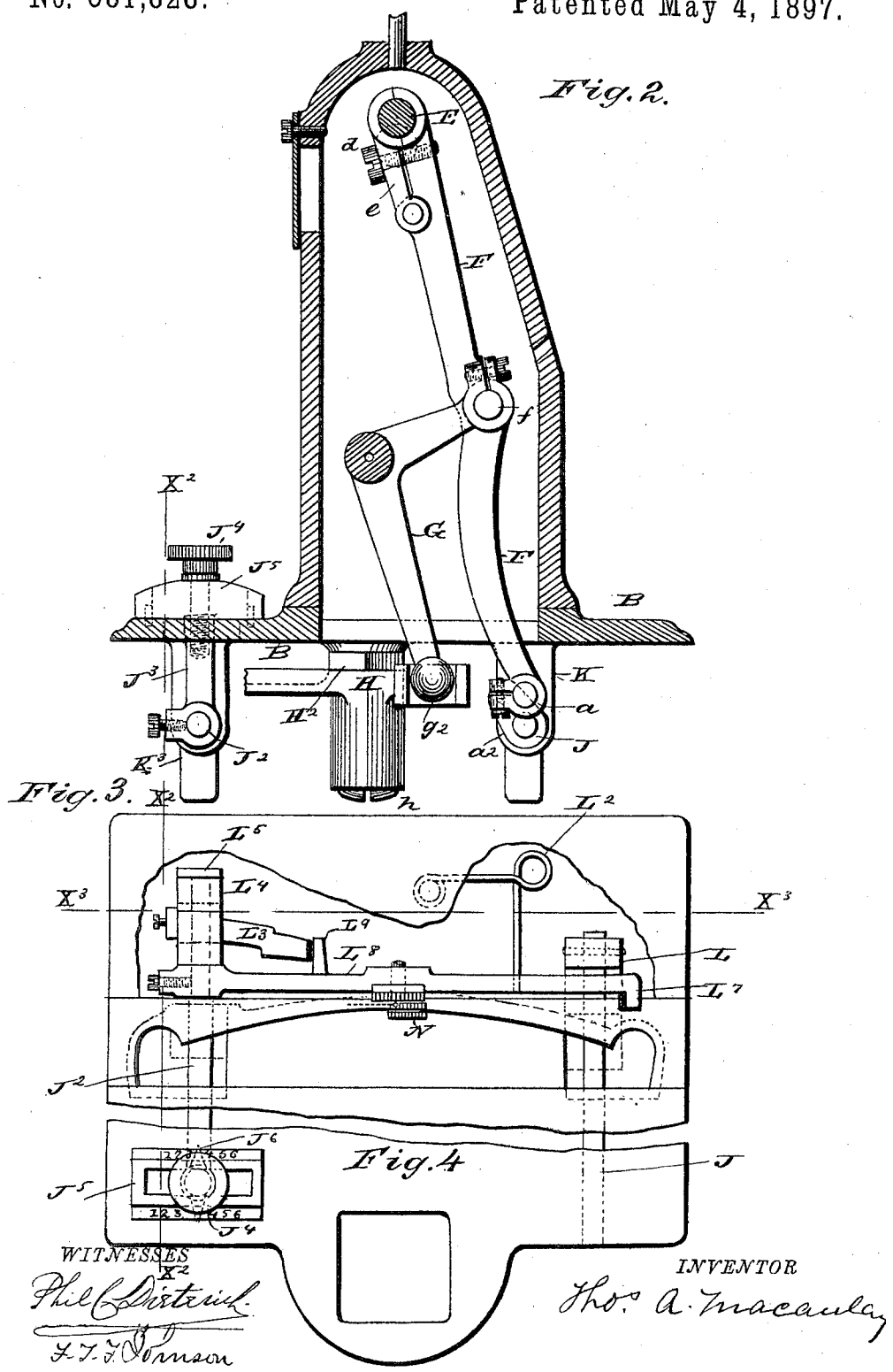
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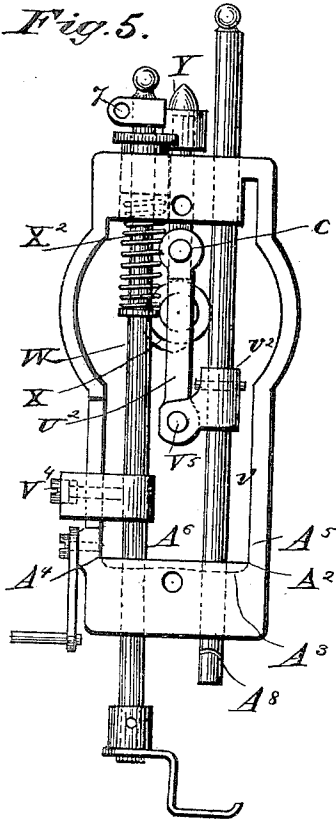
T. A. MACAULAY.  
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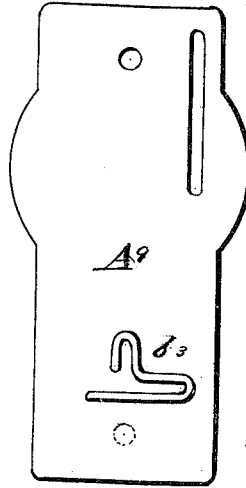
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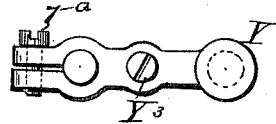
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



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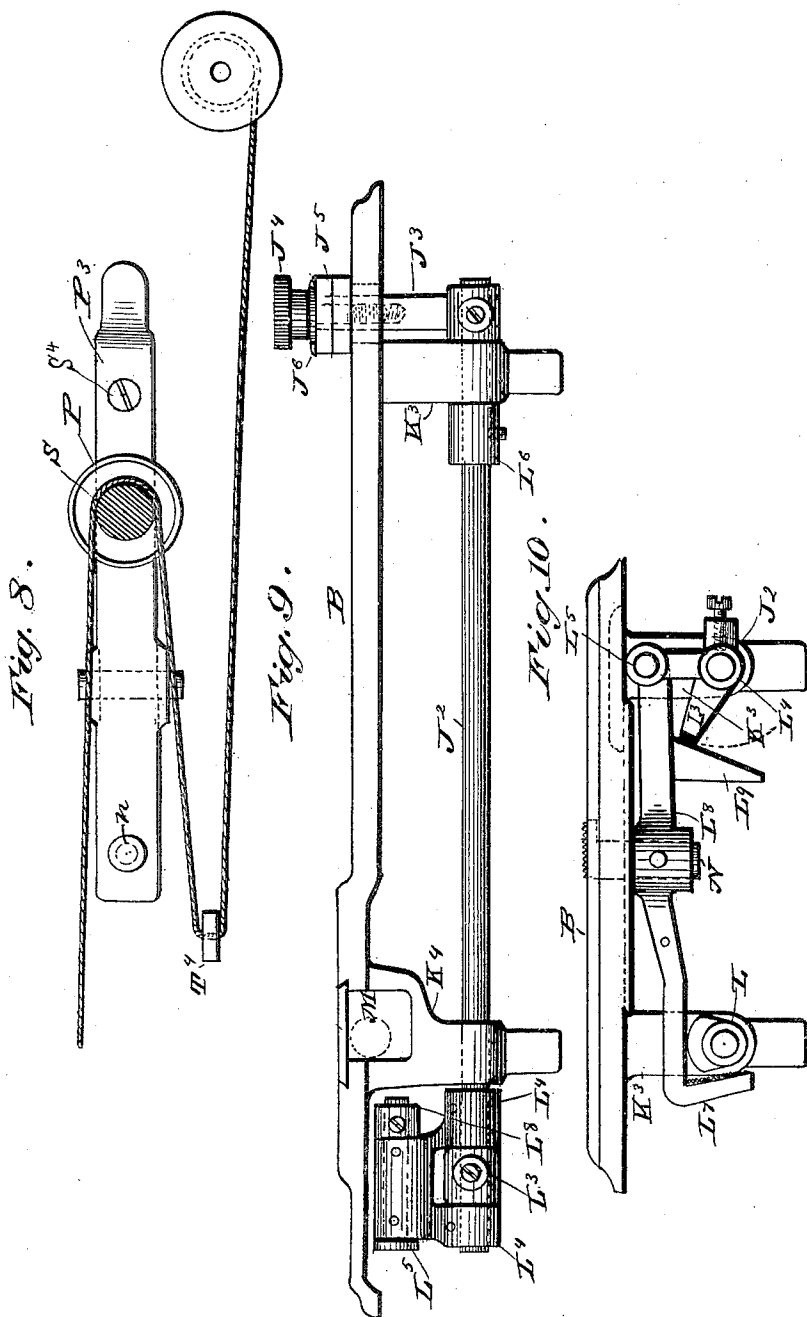
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WITNESSES

*Phil. Dietrich*  
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*Thos. A. Macaulay*

# UNITED STATES PATENT OFFICE.

THOMAS A. MACAULAY, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SINGER MANUFACTURING COMPANY, OF NEW JERSEY.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 581,828, dated May 4, 1897.

Application filed May 20, 1887. Serial No. 238,935. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS A. MACAULAY, of the city, county, and State of New York, have invented new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings, forming a part thereof.

My invention relates to lock-stitch sewing-machines, and more particularly to that class thereof in which a vibrating shuttle-lever beneath the work-plate is operated from a crank on a driving-shaft journaled in the upper part of the arm of the machine, although certain features of my invention are capable of use in other forms of sewing-machines.

In the drawings, Figure 1 is a sectional side elevation of a sewing-machine embodying my invention. Figs. 1<sup>a</sup>, 1<sup>b</sup>, and 1<sup>c</sup> are detail views of certain parts shown in Fig. 1. Fig. 2 is a section through the vertical portion of the bracket-arm on line X X, Fig. 1. Figs. 3 and 4 are plan views of the front and rear part of the bed-plate of the machine, Fig. 3 being broken out to show a portion of the feeding mechanism beneath the work-plate. Fig. 5 is a front view of the head of the machine with the face-plate removed, and Fig. 6 is a front view of the face-plate. Fig. 7 is an enlarged detail view of part of the presser-foot-lifting mechanism. Fig. 8 is a top view of part of the thread-controlling mechanism. Fig. 9 is a front side elevation of the lower part of the machine to show a portion of the feeding mechanism beneath the work-plate of the machine. Fig. 10 is a front end view of the work-plate and the feeding mechanism below the same. Fig. 11 is a detail view showing a slight modification to be hereinafter referred to.

A denotes the bracket-arm of the machine, and B the work-plate, to which said bracket-arm is suitably secured.

C is the driving-shaft, journaled in the upper part of the bracket-arm and provided with the fly and pulley wheel D, said shaft having near its rear end the crank E, from which the shuttle and feeding mechanisms are operated and having at its forward end a crank U, provided with a crank-pin c, connected by a pitman U<sup>2</sup> to the collar V<sup>2</sup>, at-

tached to the needle-bar V, carrying the usual eye-pointed needle.

The crank E is connected by a pitman-lever F to a link a, which is in turn connected to a crank-arm a<sup>2</sup> on the rear end of a rotating feed-operating shaft J, journaled in bearings afforded by hangers K K beneath the work-plate and having at its forward end a cam L, which imparts upward and forward movements to the feed-bar L<sup>8</sup>, carrying the feed-dog N and having an arm L<sup>7</sup> to be engaged by said cam, the backward and downward movements of said feed-bar being effected by a suitable spring, as L<sup>2</sup>. The feed-bar L<sup>8</sup> is provided with a depending arm or bracket L<sup>9</sup>, having an inclined face which, in the backward movement of said feed-bar under the influence of the said spring, abuts against a stopping-arm L<sup>3</sup>, attached to a feed-regulating shaft J<sup>2</sup>, journaled in bearings K<sup>3</sup> K<sup>4</sup> and having attached to its rear end a stitch-regulating arm J<sup>3</sup>, extending upward through a slotted block J<sup>5</sup>, attached to the work-plate and having a curved upper face against which a thumb-nut J<sup>4</sup> abuts to fix the said arm and the feed-regulating shaft J<sup>2</sup>, to which it is attached, in any desired position of adjustment.

L<sup>4</sup> is a link or bracket jointed loosely on the forward end of the feed-regulating shaft J<sup>2</sup> and also jointed at its upper end by means of a pin L<sup>5</sup> to one end of the feed-bar L<sup>8</sup>, which is thus supported at one end by said link or bracket. By varying the position of the feed-regulating shaft by means of the stitch-adjusting arm J<sup>3</sup> the position of the stopping-arm L<sup>3</sup> on said shaft relative to the inclined lug or bracket L<sup>9</sup> on the feed-bar may be changed to vary the backward throw of the feed-bar under the influence of the spring L<sup>2</sup>, and thus as the said feed-bar will always be moved forward to a certain point by the cam L the length of the feed may be adjusted as may be desired by limiting its backward movement.

The pitman-lever F is provided with a cap e, secured in working position by a clamping-screw d, this construction facilitating the assembling of the parts. To the said pitman-lever is pivoted at f the upper arm of a bell-crank lever G, the lower end of which is pro-

vided with a ball  $g^2$ , embraced by a yoke on the rear end of the shuttle-operating lever H, said bell-crank lever being pivoted on center screws  $g$ , one of which is provided with a lock-nut  $g^3$ . The shuttle-lever H is pivoted on a stud or bolt  $h$ , provided with a lock-nut  $H^2$ , which prevents said stud from becoming loose from the work-plate, into which it is screwed, said nut also serving as an adjustable cone-bearing for the pivot of the shuttle-lever.

The presser-bar W, carrying the presser-foot which is yieldingly forced against the work in the usual manner by a coil-spring surrounding said presser-bar, is preferably automatically lifted at each stitch while the needle is in the work, so as to facilitate turning of the latter on the needle in sewing curved seams. To effect this result, I have provided the driving-shaft C with a cam X, against which rests the lower end of the vertically-movable sliding rod  $X^2$ , to which a gripping-arm Y is pivotally attached by the pin  $Y^4$ , said arm preferably loosely embracing the presser-bar, so that in the operation of the machine when the rod  $X^2$  is lifted by said cam the said arm will be caused to grip the presser-bar and lift the same, and when the said rod  $X^2$  is not lifted by the said cam the presser-bar will be free to move vertically through the gripping-arm Y to adjust itself to varying thicknesses of the material beneath the presser-foot. The adjusting-screw  $Y^3$  limits the downward movement of the arm Y and causes the latter to be unclutched from the presser-bar.

If it be found desirable to attach the lifting-arm rigidly to the presser-bar, this can be done by means of the clamping-screw  $7^a$ , passing through the slotted forward end of said arm, and in such case it may be desirable to attach the said arm rigidly to the bar  $X^2$  by screwing the latter into the arm, as shown in Fig. 5.

$T^2$  is the pull-off and take-up lever, provided with a pin or roller-stud  $T^3$ , entering a grooved cam on the shaft C, said lever being pivoted at  $t$  and having an upwardly-extending pull-off arm  $T^4$ , provided near its upper end with a slotted or open thread-eye.

$P$   $P^2$  are the tension-disks, mounted on a stud S, screwed into the bracket-arm A and provided with a set-nut  $S^2$ , by which it may be secured in any desired position of adjustment. Beneath the lower tension-disk  $P^2$  is a lever  $P^3$ , pivoted forward of the stud S and pressed upward, so as to force the said tension-disks into yielding contact with each other by a coil-spring  $P^4$ , seated in a recess in the top of the bracket-arm and bearing against the under side of the said lever, the pressure of said spring being regulated by a screw  $S^4$ . The driving-shaft C is provided with an eccentric  $R^2$ , surrounded by a strap  $R^3$ , having an upward extension R, which impinges against the forward end of the lever  $P^3$  or against the leather washer  $n'$ , in-

terposed between a shoulder near the upper end of said extension and the under side of said lever, said extension R being preferably constructed with a reduced part at its extreme upper end, forming a stud  $n$ , loosely entering a hole in the said lever. From this construction it will be obvious that when the machine is in operation the lever  $P^3$  will be vibrated, so that at times the tension-disks will be relieved from the pressure of the spring  $P^4$ , thus providing an intermittent or automatic tension which will clamp the thread at the proper intervals and then release it, so that the said tension will properly cooperate with the take-up and with the pull-off afforded by the arm  $T^4$  of the take-up lever.

The tension may be released by the operator when the work is to be removed simply by pressing with the finger against the rearwardly-extended end of the said lever  $P^3$ , thus removing the pressure of said lever from the tension-disks.

The thread passes from the thread-spool forward through the eye of the pull-off arm  $T^4$ , thence backward between the tension-disks  $P$   $P^2$ , thence forward through the thread-eye  $b^4$ , thence downward through the thread-guide  $b^3$  on the face-plate  $A^3$ , thence upward into the hook at the forward end of the take-up, and thence downward to the needle. The pull-off action of the arm  $T^4$  and the take-up action of the take-up lever in tightening the stitches and in drawing slack for the next succeeding stitch will occur alternately, so that the thread will be clamped by the tension-disks  $P$   $P^2$  when the take-up arm is drawing thread from the spool, but will be released therefrom during a portion of the time when the take-up is operating, so that the slack can pass freely forward as may be required in the formation of stitches.

The needle-bar V is provided with a downwardly and backwardly inclined groove near its lower end to carry any superfluous oil backward away from the needle-thread.

The driving-shaft C is preferably journaled at its forward end in a bushing or sleeve  $T^5$ , secured in a recess in the forward part of the arm by means of a set-screw  $P^6$ , the opening in the arm A in which said bushing or sleeve is inserted being of sufficient size to permit of the passage therethrough of the crank E and also the take-up cam T on said driving-shaft, so that in assembling the parts of the machine together the said shaft with said cam and crank can be placed in position by being inserted from the front end of the bracket-arm through said opening.

From the foregoing it will be seen that I provide a lock-stitch sewing-machine in which all of the necessary mechanisms for actuating the needle, shuttle, feed, and take-up, as well as mechanisms for operating a pull-off, an intermittent or automatic tension, and an automatic presser-foot-lifting device, are all operated from a main or driving shaft located in the upper part of the arm of the machine,

thereby simplifying the construction of a lock-stitch machine having all of these desirable features.

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

1. The combination with the feed-bar  $L^3$  provided with the feed-dog N, the arm  $L^7$  and the depending arm or bracket  $L^9$ , said arm or bracket being rigid with said feed-bar and having an inclined face, of a rotating shaft provided with a cam for imparting upward and forward movements to said feed-bar, a spring for effecting the downward and return movements of said feed-bar, the feed-regulating shaft  $J^2$  extending lengthwise of the machine and provided with the stopping-arm  $L^3$  which may be moved to different positions relative to the inclined face on the said arm or bracket  $L^9$ , to limit the backward movements of the said feed-bar under the influence of said spring and thus regulate the feed.

2. In a sewing-machine, the combination with the main shaft thereof, of take-up and pull-off devices operated from said main shaft and having an alternate action so that the pull-off performs its function when the take-up relaxes the needle-thread and the take-up performs its function of tightening the stitches when the said pull-off is moving idly, and an intermittent or automatic tension coöperating with said take-up and pull-off devices and arranged to act on the thread between the take-up and pull-off and the spool or thread supply, substantially as set forth.

3. The combination with the tension-disks and the stud on which the said disks are mounted, of the lever  $P^3$ , a spring, independent of said lever, for pressing the latter against one of said disks, and means for operating said lever, whereby said disks are intermittently relieved from the pressure of said spring, substantially as set forth.

4. The combination with the tension-disks and the stud on which the said disks are mounted, of the lever  $P^3$ , an independent

coil-spring P acting to press said lever against one of said disks, the driving-shaft C provided with the eccentric  $R^2$ , a strap surrounding the said eccentric and having an upward extension for operating said lever to cause the pressure of said spring to be, at times, removed from the said tension-disks, substantially as set forth.

5. The combination with the driving-shaft C provided with the cam T and with the eccentric  $R^2$ , of the take-up and pull-off lever operated by said cam, the tension-disks P and  $P^2$ , a stud on which said disks are mounted, the lever  $P^3$ , the spring  $P^4$  for forcing said tension-disks into yielding contact with each other, and the eccentric-strap  $R^3$  provided with an upward extension R for operating said lever to relieve the tension-disks, at times, from the pressure of said spring, substantially as set forth.

6. The combination with the driving-shaft C provided with the cam X, of the presser-bar W, the vertically-movable sliding rod  $X^2$  operated by said cam, the horizontal gripping-arm Y pivotally attached at one end of said rod  $X^2$  and having at its opposite end an opening for loosely receiving the presser-bar; whereby when the said rod  $X^2$  is lifted the said arm will be caused to grip the said presser-bar and lift the same, but will permit the said presser-bar to move vertically through the said opening when the said arm Y is not in gripping or clutching connection with said presser-bar, so that the presser-foot may freely rise and fall to accommodate itself to different thicknesses of work, but will have a uniform vertical movement whatever may be the thickness of the work.

7. In a sewing-machine, a needle-bar provided with an oil-groove  $A^8$  inclined downwardly toward and extending to the rear side of said bar, for the purpose of carrying surplus oil backward away from the needle-thread, substantially as set forth.

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Witnesses:

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W. F. TALIAFERRO.