(No Model.) 3 Sheets—Sheet 1.

L. L. MILLER.

POP-STITCH SEWING MACHINE.

No. 515,713. Patented Feb. 27, 1894.

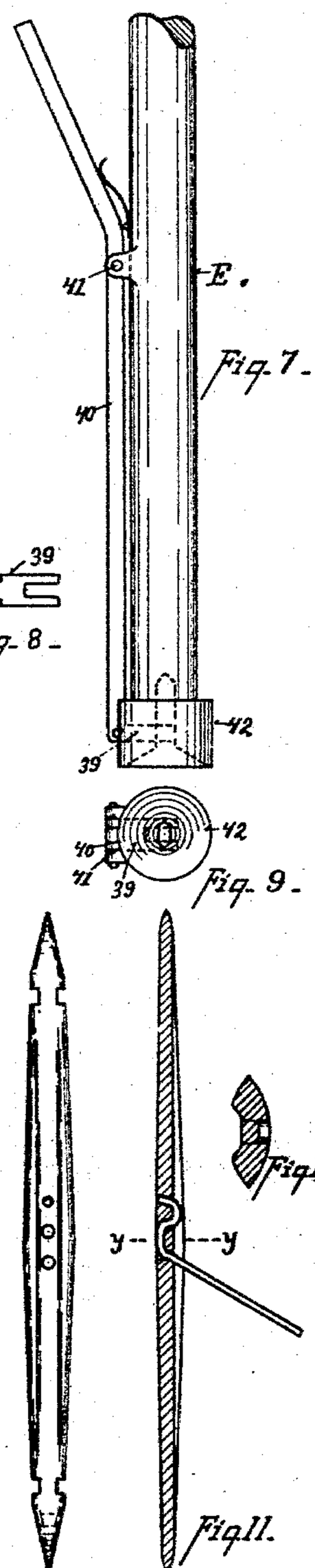

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

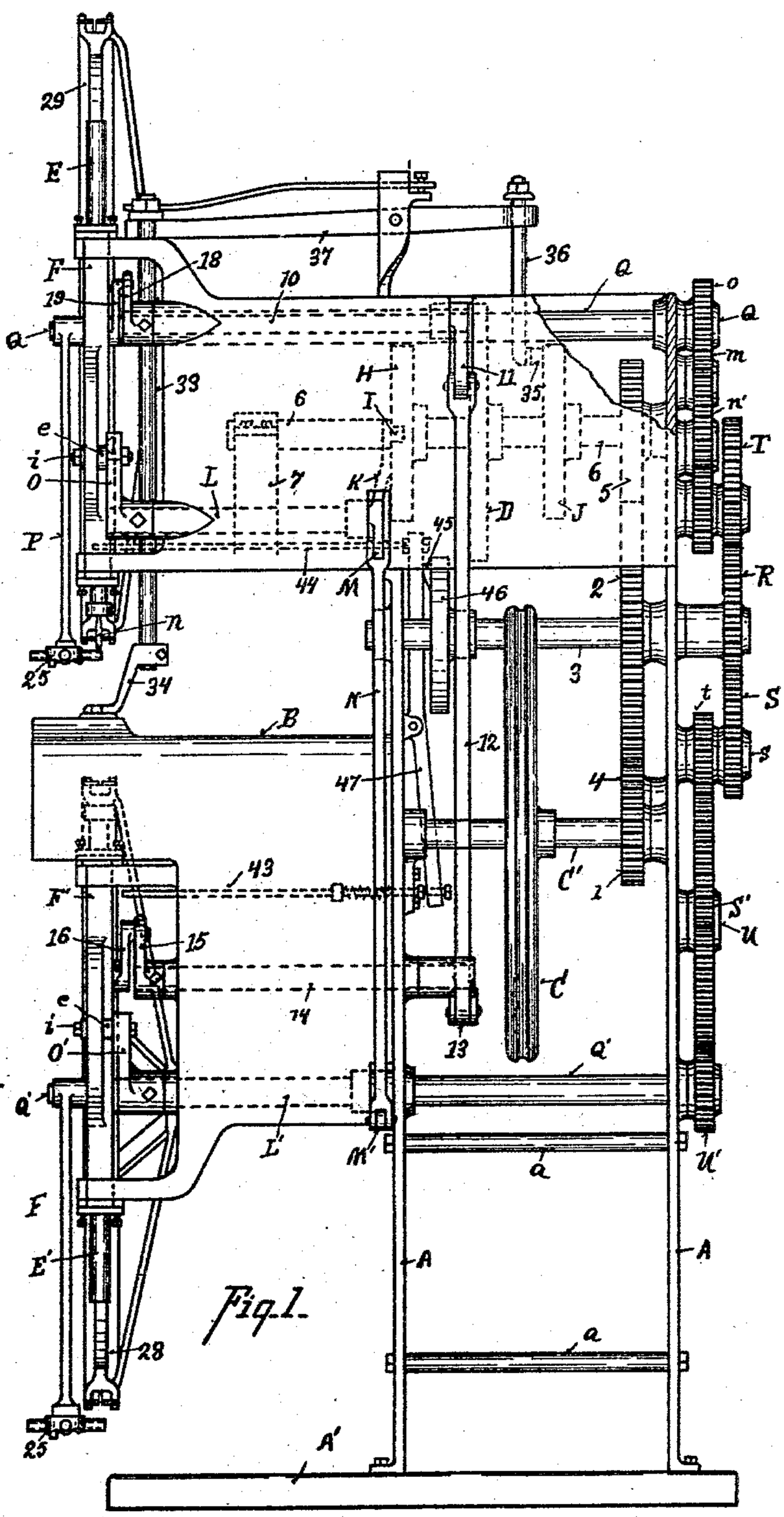

Fig. 1.

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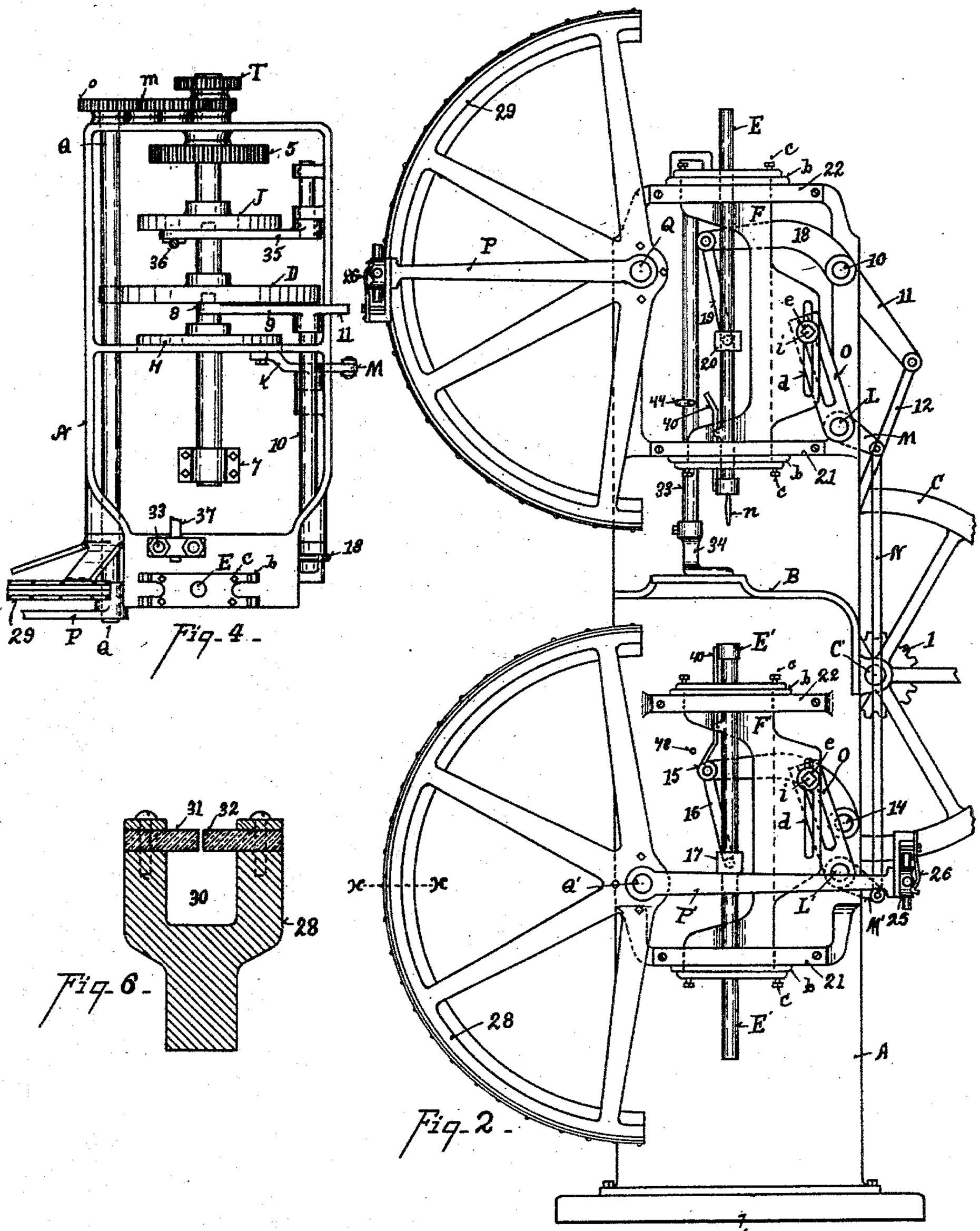

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(No Model.) 3 Sheets—Sheet 3.

L. L. MILLER.

POP-STITCH SEWING MACHINE.

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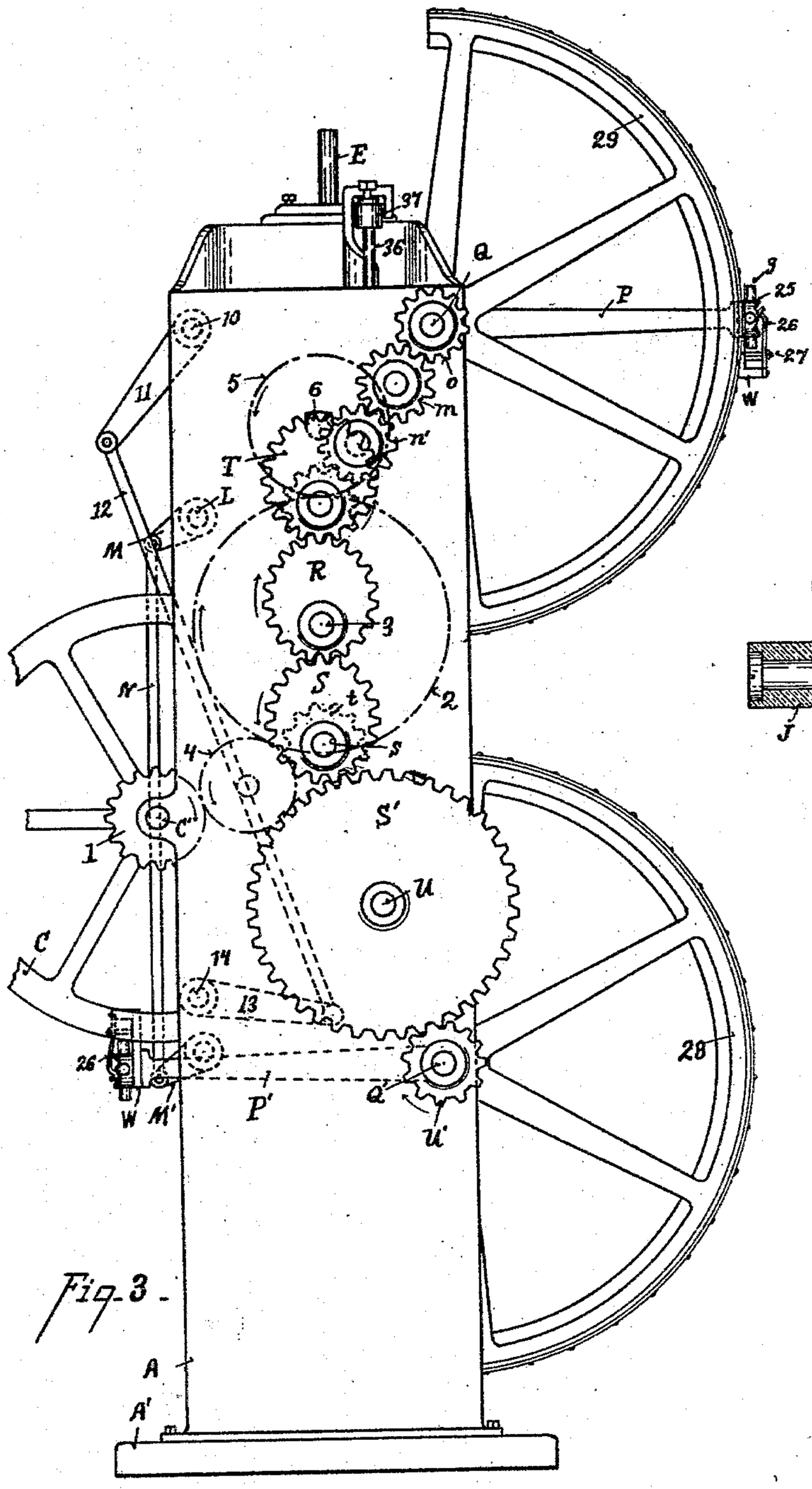

Fig. 3.

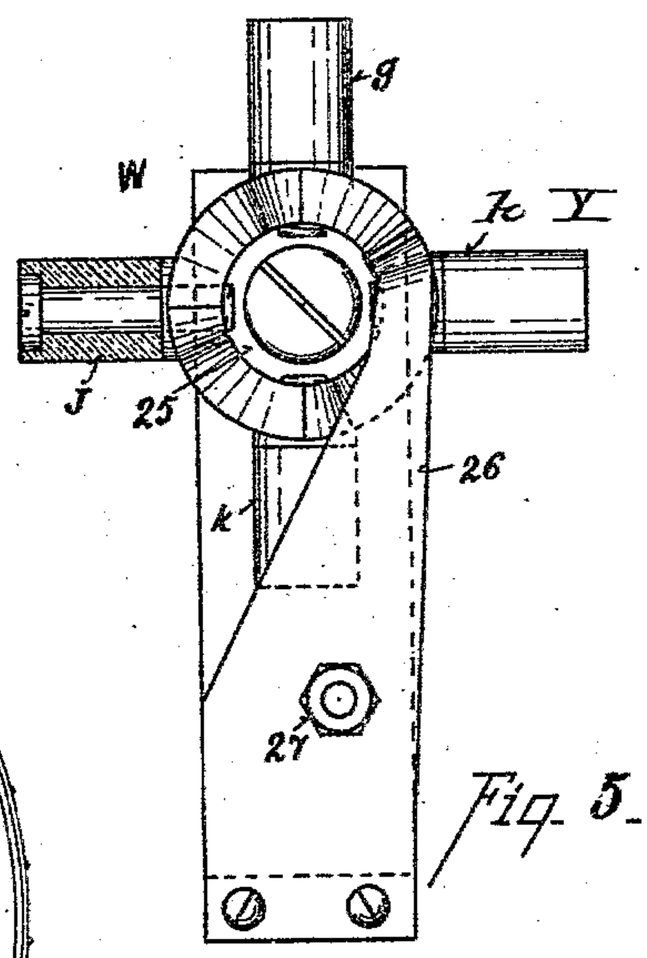

Fig. 5.

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UNITED STATES PATENT OFFICE.

LOUIS L. MILLER, OF NEWPORT, KENTUCKY, ASSIGNOR TO THE ROSS-MOYER MANUFACTURING COMPANY, OF CINCINNATI, OHIO.

POP-STITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 515,713, dated February 27, 1894.

Application filed August 17, 1893. Serial No. 483,360. (No model.)

To all whom it may concern:

Be it known that I, LOUIS L. MILLER, a citizen of the United States, residing at Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Pop-Stitch Sewing-Machines, of which the following is a specification.

The object of my invention is to provide a machine which will form a line of stitches with a leather thong such as is employed in sewing leather belts, horse collars, &c.

The various features of my invention are fully set forth in the description of the accompanying drawings making a part of this specification, in which—

Figure 1 is a side elevation of a machine embodying my improvement. Fig. 2 is a front elevation of the same. Fig. 3 is a rear elevation of the same. Fig. 4 is a top plan view of the cam driving mechanisms. Fig. 5 is a detail view, partly in section, of the thong-carrier. Fig. 6 is a section on line *x*, *x*, Fig. 2. Figs. 7, 8 and 9, are detail views of the needle bar and catch mechanism. Figs. 10, 11, and 12, are detail views of the thong needle.

A represents the frame of the machine, which is shown of the hollow form, supported upon a base A′.

a represents cross girders for tying the frame pieces together.

B represents a table which is shown of curved form.

C represents the main driving pulley mounted upon shaft C′ suitably journaled to the frame.

The several operative parts of the machine consist, first, of the reciprocating and longitudinally moving needle bars carrying a needle *n* which is forced through the goods and passed from one needle bar to the other alternately by the operation of the machine, and automatically moved forward while in the goods to feed the same; second, revolving thong carriers which engage the same and pull it through and take up the slack, and which trip and yield under tension to discharge the thong when the stitch is drawn, the thong carriers working alternately on opposite sides of the table; third, friction channels for holding the slack of the thong as it is pulled through by the thong carriers; fourth, a foot for holding the work under the action of the needle. These several parts work in appropriate time movements and are constructed as follows: 1 represents a spur gear on shaft C′ engaging with the spur gear 2 on shaft 3 through the transmitting gear 4. Gear 2 meshes with spur 5 on shaft 6, which is journaled to the frame and to the bracket 7. Cam D operates the needle bars; it is mounted on shaft 6. 8 represents a friction roller journaled in the groove in the face of cam D. It is mounted on the end of the crank arm 9 which crank arm is supported upon the rock shaft 10. 11 represents a crank arm projecting from the shaft 10; it is hinged to connecting rod 12 at one end, and to the other end of said connecting rod is hinged the crank 13 which is affixed to shaft 14. 15 represents a crank arm upon the opposite end of said shaft engaging with link 16, which is swiveled to the collar 17 on the lower needle bar E′; the upper needle bar E is operated by the crank arm 18 on the forward end of shaft 10, the forward end of which is hinged to link 19, which is hinged to the collar 20 attached to the needle bar E, so that said needle bars are raised and lowered by the oscillation of the arms 15 and 18, respectively.

The needle bars are moved to approach each other and remain stationary for the feeding motion which consists in mechanism for sliding the needle bars forward; this is accomplished by mounting the needle bars in carriages F F′, each being the counterpart of the other; these carriages are mounted in slides 21, 22. To allow these carriages to be adjusted so as to take up lost motion I provide gibs *b* and set screws *c*, the needle bars journaling in the heads of said carriages. These carriages are moved forward at the appropriate time by means of the following mechanisms: H represents a cam mounted on the shaft 6. I represents a friction roller on arm K mounted upon shaft L, as shown in Figs. 1 and 2. M represents a crank arm projecting from said shaft L. N a connecting rod hinged to said crank M at the top, and to crank M′ at the bottom, attached to shaft L′, as shown in Fig. 2. Said shafts L L′ are provided with slotted stud arms O O′, carriages

F F′ are provided with slots *d*, *d′*. *e* represents a sleeve loosely resting in said slots. *i* represents clamp bolts for hinging the carriages F F′ to the stud arms O O′. The cam H at the appropriate time through the arm K moves the connecting rod N and oscillates the crank arms M M′, the slotted stud arms O O′ by means of the friction sleeves *e* move the carriages F F′ forward and backward. These parts are so adjusted that the forward movement of the carriages F F′ takes place when the needle bars have operated so that the needle occupies the position in both bars ready to be passed from one to the other; the movement of the carriage then stops and the needle is drawn through, say from the upper to the lower side of the goods; the needle bars are retracted or moved apart and then stop, and the carriages F F′ are moved backward to their former position.

It is necessary to pull the thong through and take up the slack drawing the stitch tight while the needle bars are stationary and before they approach each other for a second stitch; this is accomplished by means of continuously revolving take up arms P P′ mounted upon shafts Q Q′. It is also desirable to have the movement for pulling the thong through the goods take place quickly, and this is accomplished by means of the following mechanism: On the outer end of shaft 3 is mounted an eccentric gear R which engages and drives the eccentric gears S, T. The eccentric S is mounted upon the stud shaft *s*. *t* represents a spur gear on the same shaft meshing with and driving gear S′ mounted upon shaft U; this gear meshes with and drives the gear U′ on shaft Q′, upon which the lower takeup arm P′ is mounted. As the thong is pulled through alternately on each side of the goods, their movements are arranged so that while the upper arm is moved slowly the lower arm is moved quickly, and vice versa; this is accomplished by means of the eccentric T being opposite the eccentric S; eccentric T drives gears *n′ m o*, and shaft Q on which the upper takeup arm P is mounted. It is desirable to have the arms P P′ move quickly during one part of the revolution for taking up the slack and pulling the thong, and slowly during the remaining portion of the revolution; so that the slack of the thong will all have been taken up before the needle bars approach each other for the second stitch.

In order to allow ample time for all the other working parts of the machine the slack of the thong should all be taken up during one quarter of a revolution of the main driving shaft; the eccentric gears being so constructed as to lose the time gained in the first quarter of the revolution in the main driving shaft and bring the takeup arms in proper position for taking the thong for the next stitch. But in order to allow the continuous rotation of said arms the thong must be automatically tripped from the thong carrier W, which I preferably construct as follows: 25 represents a hub journaling on the end of the takeup arms P and carrying pins on which are mounted the friction rollers *g*, *h*, *j*, *k*, four rollers being employed, each being used successively in the following manner: 26 represents a spring the free end of which engages with serrations in the face of the hub 25, there being a recess opposite each roller and inclined on either side, the friction of the spring holds the roller in place and it is adjusted by means of nut 27 to the desired tension, and when the thong is drawn to said tension the spring will yield, the hub is rotated by the pull of the thong on the roller to which it is engaged, bringing the next succeeding roller forward in position to take up the thong for the next stitch. The rollers are carried by the take-up arms across the path of the needle as at Y, Fig. 5.

In order to hold the slack of the thong away from the line of the needle I provide the following instrumentalities: 28, 29 represent segmental arms provided with the channel 30 directly under the path of the travel of the thong carried by said takeup rollers. 31 32 represent strips of rubber secured to said rim with the joint or their abutting edges centrally over the channel 30; the takeup pulls the thong through said joint into the channel and it is held by the friction of the rubber until it is pulled back by the strain of the opposite thong carrier. The foot bar 33 carrying the foot 34 is operated by means of the cam J mounted on shaft 6. 35 represents a crank arm operated by said cam. 36 represents a vertical arm carried by said arm, operating the lever 37 which engages with the foot bar 33, and raises and lowers it at the appropriate time.

The needle bars are provided with the following clutch mechanism which alternately clutches and releases the needle to pass it from one bar to the other; 39 represents a fork hinged on the lever 40; 41 a pivot connecting the same to the needle bar E. 42 represents a collar on the end of the needle bar which is pierced with a hole to receive said fork 39; and when the fork rests in the groove it engages the shank of the needle as indicated in Fig. 7. It is necessary to retract this fork, and it is accomplished by means of the tripping rods 43, 44, which are reciprocated alternately by means of the cams 45, which is affixed to the face of the disk 46 and engages with the lever 47 on the upper end of which the tripping rod 44 is mounted, and on the lower end of which the tripping rod 43 is mounted so that said tripping rods are reciprocated alternately by the revolution of the cam to release the upper and lower needle forks at the appropriate times for drawing the needle through the goods in either direction.

A material advantage is obtained by the use of rotating thong takeups which move at variable speed during their revolution over

intermittently reciprocating thong carriers, in that vibration due to reciprocating motion is avoided, and consequently a much higher speed may be obtained with the rotating takeup arms. I have shown the eccentric gear as the preferred form of obtaining this variable speed, but do not wish to limit myself to this particular form of gear.

Having described my invention, what I claim is—

1. In a pop-stitch sewing machine, the needle bars E E′ mounted in traveling carriages F F′, mechanism for intermittently reciprocating the bars, and mechanism for moving the carriages F F′ longitudinally when the bars E E′ are at their closest approach and the needle occupies its position in both bars, substantially as specified.

2. In a pop-stitch sewing-machine, the combination with the intermittently reciprocating needle-bars E and E′, and needle N, of the variably speeded rotating take-up arms P and P′, and the tripping-thong carriers mounted thereon, substantially as specified.

3. In combination with the needle bars E E′, the lever 40 hinged thereto, the fork 39 hinged to said lever, and tripping mechanism for intermittently actuating the same, substantially as specified.

4. In a pop-stitch sewing machine, the rotating arms P P′, mechanism for driving the same at a variable speed, and the series of intermittently rotating thong carriers mounted on said arms, substantially as specified.

5. In a pop-stitch sewing machine, the rotating arms P P′, mechanism for driving the same at a variable speed, the series of intermittently rotating thong carriers mounted on said arms, and the mechanism for imparting tension to the thong-carriers, whereby they are successively tripped and brought into position, substantially as specified.

6. In combination with the take-up arms P and P′, the thong-carriers *g*, *h*, *j*, and *k* journaled thereon, and the tension spring 26 engaging the hub of the thong-carriers, whereby a successive movement of the series of thong carriers is obtained, substantially as described.

7. In a pop-stitch sewing-machine, the rotating take-up arms P, P′, each provided with a tripping thong-carrier and located at opposite sides of the table, operated by the eccentric driving gear R T S, receiving motion from the main driving shaft and transmitting it to the said arms, whereby the fast movement of each arm takes place alternately with the movement of the opposite arm, substantially as described.

8. In a pop-stitch sewing-machine, the combination with a table, of the rotating take-up arms P P′ located upon opposite sides of the table and each provided with a tripping thong-carrier, variably speeded driving mechanism for operating the take-up arms, the needle-bars E E′, and a needle, said take-up arms operating alternately with the needle-bars to alternately take up the slack of the thong at the sides of the table, substantially as described.

In testimony whereof I have hereunto set my hand.

LOUIS L. MILLER.

Witnesses:
T. SIMMONS,
W. R. WOOD.