No. 27,594.

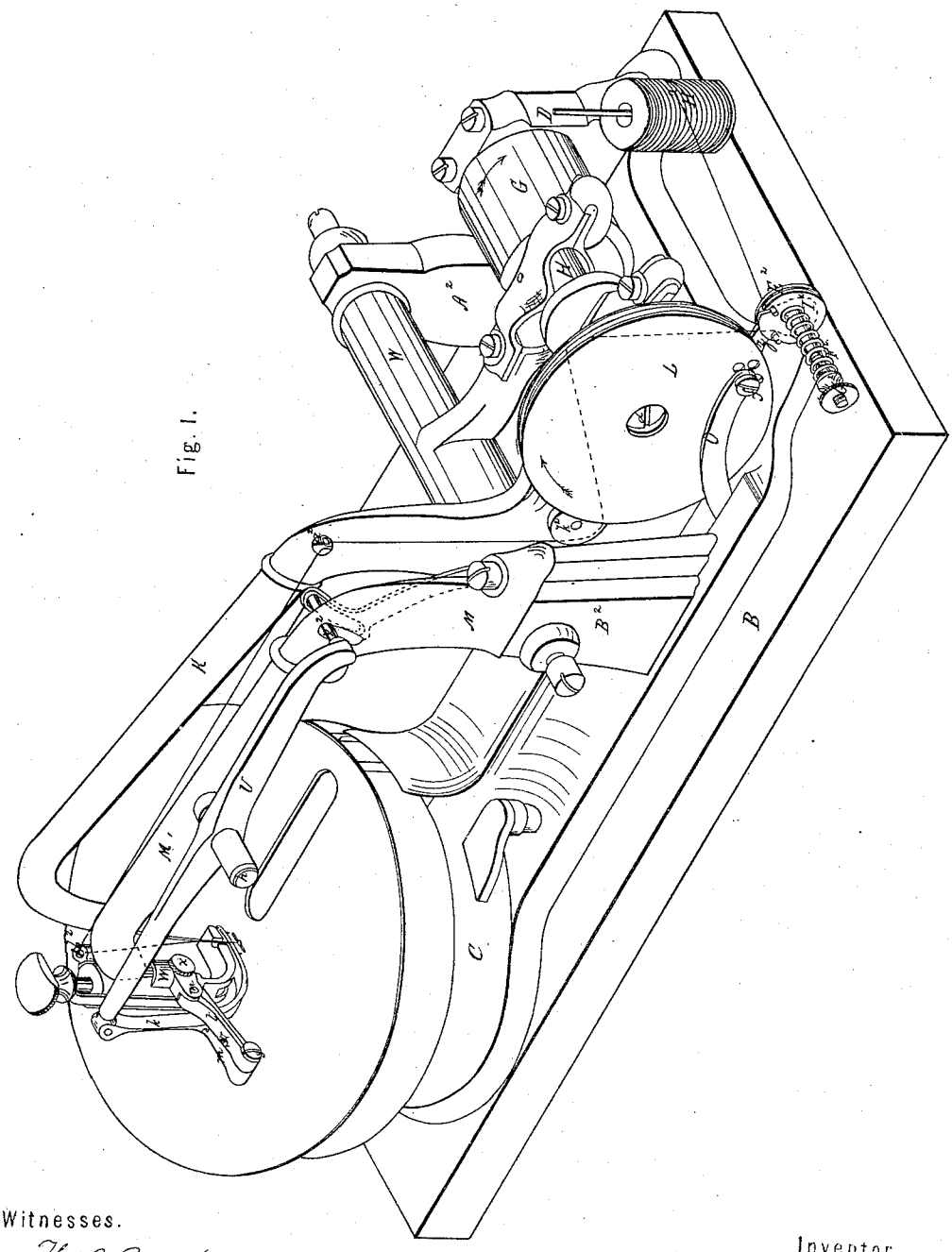
PATENTED MAR. 20, 1860.

L. W. LANGDON.

SEWING MACHINE.

2 SHEETS—SHEET 1.

Fig. 1.




Witnesses.

Thos. P. Roach

C. G. Curtis

Inventor.

L. W. Langdon.

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L. W. LANGDON.
SEWING MACHINE.

2 SHEETS—SHEET 2.

Fig. 2.

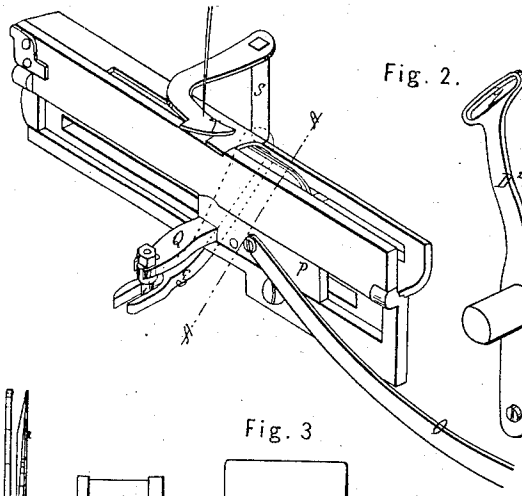



Fig. 4.

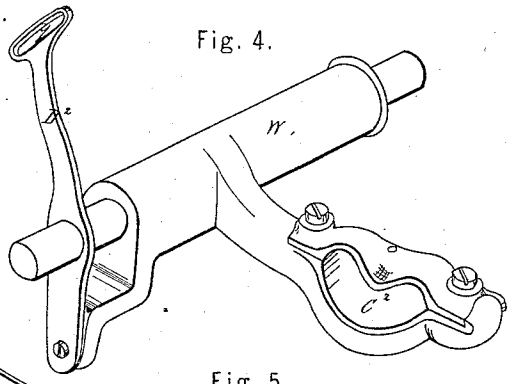



Fig. 3

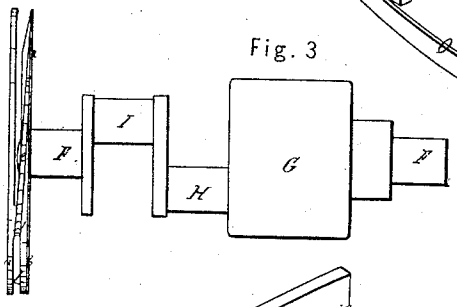



Fig. 5.

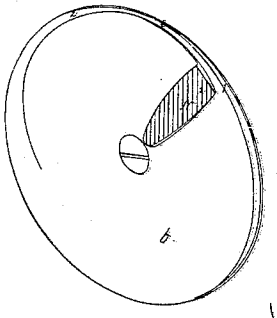



Fig. 12.

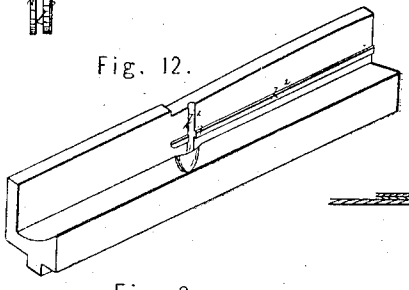


Fig. 11.

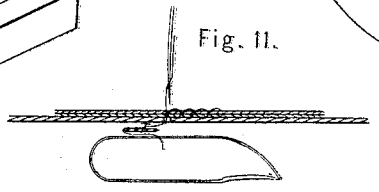


Fig. 10.

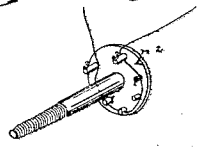


Fig. 8.

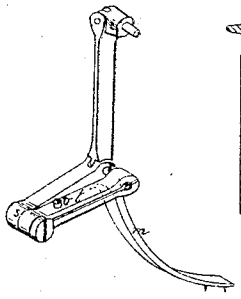


Fig. 9.

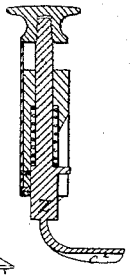


Fig. 13.

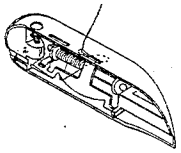


Fig. 6.

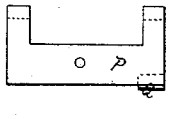
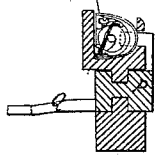



Fig. 7.



Witnesses.
Thos. P. Roach
C. G. Curtis

Inventor.
L. W. Langdon

# UNITED STATES PATENT OFFICE.

L. W. LANGDON, OF NORTHAMPTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF, HIRAM WELLS, AND D. G. LITTLEFIELD, OF SAME PLACE.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **27,594**, dated March 20, 1860.

*To all whom it may concern:*

Be it known that I, L. W. LANGDON, of Northampton, in the county of Hampshire and State of Massachusetts, have invented certain Improvements in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of my machine; Fig. 2, a detached view of the shuttle-race and shuttle-driver; Fig. 3, an elevation of the driving-shaft with its cranks and revolving take-up; Fig. 4, a detached view of the rock-shaft W, which operates the feed; Fig. 5, a view of the inner plate of the revolving take-up; Fig. 6, a detached view of the shuttle-driver; Fig. 7, a section through the shuttle-race, shuttle-driver, and shuttle; Fig. 8, details of the feeding-foot; Fig. 9, a section through the presser-foot; Fig. 10, a view of the back plate of the tension-regulator; Fig. 11, detail showing the operation of the hook T, which takes up the slack of the shuttle-thread.

The uniform motion obtained by the use of a crank renders it far preferable to a cam for the purpose of driving the needle, as it can be run with much less friction, and consequently much more rapidly and with less power; but this very uniformity of motion renders it inapplicable to needle and shuttle sewing-machines, as it does not leave the needle sufficiently long beneath the cloth to allow the shuttle to pass through the loop.

The first part of my invention has for its object to remedy this difficulty; and it consists in a peculiar revolving take-up which is attached to the driving-shaft, and operates independently of the needle-bar, casts off the thread at the required moment to form the loop for the entrance of the shuttle, leaves the loop loose until the shuttle has passed through, and then tightens up the stitch. When the needle-thread is thus controlled and the needle is driven by a crank, it becomes necessary to tighten up the stitch after the needle commences to descend and while the shuttle is upon its back traverse; but it is manifest that this could not be accomplished with a shuttle as ordinarily arranged, as upon the return of the shuttle the shuttle-thread is left slack, and would consequently be drawn through the cloth by the needle-thread.

To remedy this is the object of the second part of my invention, which consists in keeping the shuttle-thread taut, during the return of the shuttle, by means of a vibrating hook or other equivalent device that shall take the shuttle-thread after the shuttle has passed through the loop in the needle-thread and hold it distended until after the stitch is tightened up, the same device serving also to keep the shuttle-thread out of the way of the needle as it descends, and prevent it from being entangled therewith. I am thus enabled to drive both the needle and the shuttle by means of cranks, and at the same time to allow the needle to recede for the formation of the loop before the shuttle advances.

The third part of my invention consists in a peculiar method of operating a sewing-machine feed having the four following motions: first, toward the cloth to engage therewith; second, in advance to feed the cloth along; third, from the cloth to disengage it therefrom; and, fourth, back again, preparatory to a new engagement with the cloth. Where the above four-motion feed is operated by cams and a spring, the force with which the feeding-bar is pressed upon the goods is constant, whatever may be the resistance which they offer to the feed, and where the cams or those parts of the feed-bar which rest upon the cams are worn by use, the amount of engagement of the feeding-foot is liable to vary. With my improved method of operating the feed, the force with which the feeding-foot is caused to press upon the cloth will always be proportionate to the resistance offered to the feed, while the amount of engagement of the foot with the cloth will not be varied by the wear of the parts which actuate it.

To enable others skilled in the art to understand my invention, I will proceed to describe the manner in which I have carried it out.

In the accompanying drawings, B is the table to which the machine is secured; C, the metallic frame that carries the operating parts and from which rise the standards that carry the driving-shaft F, one of which is seen at D, Fig. 1. The shaft F carries a pulley, G, to which may be applied a band from a larger wheel, the crank H, which actuates the feed,

the crank I, which drives the needle-bar K, and the revolving take-up L, from the outer face of which projects the crank-pin *f*, which, by means of the connecting-rod O, actuates the shuttle.

M is the goose-neck, which sustains the presser-foot and carries the feeding arrangements.

The revolving take-up L, Fig. 1, is composed of two metallic plates, *a* and *b*, Fig. 3, which are united together by a rib, N, Fig. 5, the inner plate, *b*, being secured by a screw, *d*, or otherwise to the driving-shaft, so that the two plates shall revolve with the shaft. The inner plate, *b*, is so formed upon the edge, Figs. 3 and 5, as to retain the thread in a slight groove, *e*, which extends from 1 to 2, and so long as the thread remains in this groove the thread will continue to be tightened up; but at the point 2 the groove runs out and the thread then slips off and becomes instantly slack. The position of the rib N and groove *e* with respect to the crank which drives the needle, and the crank-pin *f*, which drives the shuttle, is such that they shall commence to take up the needle-thread as the heel of the shuttle passes through the loop. The stitch is consequently tightened up. While the shuttle is upon its return traverse, previous to the drawing up of the thread, the needle has left the cloth, and the stitch is finally tightened up while the needle is descending again to enter the cloth. So soon, however, as the needle has entered the cloth, its thread, running out of the groove *e*, is cast off and becomes entirely slack. It is manifest, as before stated, as the stitch is tightened up while the shuttle is upon its return traverse, that the shuttle-thread must in some way be kept tight, that it may not be drawn through the cloth by the needle-thread.

The shuttle-driver P is seen in its race in Fig. 2 and detached in Fig. 6. Fig. 7 represents the shuttle, shuttle-driver, and race in section. From one side of the shuttle-driver projects an arm, Q, having a pin, *i*, at its extremity, which plays in a slot in the end of an arm, *g*, attached to an upright shaft, S, pivoted to the frame-work, and carrying at its upper end a hook, T. This hook is so arranged that when the shuttle has shot through the loop the hook has passed the shuttle-thread as it comes from the cloth to the shuttle, and as the shuttle returns, and while the stitch is being tightened up by the revolving take-up, the hook shall carry off the shuttle-thread and keep it tight, Fig. 11. It is evident that the thread which passes over the hook will be double, one end leading to the seam and the other to the shuttle. It is therefore necessary that the hook move through but half the space traversed by the shuttle, or that the shuttle should move with a velocity double that of the hook. This is effected by making the arm *g* of double the length of the shank of the hook. When the needle is driven by a cam, it is allowed to remain stationary while the shuttle is being passed through the loop, the eye of the needle serving to hold the loop of the needle-thread from being carried forward by the shuttle; but it is manifest that when the needle is driven by a crank it cannot be allowed thus to remain stationary, as it must commence to recede to form the loop before the shuttle advances, and that the loop thus left by the needle will be carried along by the shuttle. To remedy this difficulty, and to hold the loop from being carried along by the shuttle, I place within the shuttle-race a longitudinal rib, $h^2$, Fig. 12, which fits in a groove, $i^2$, Fig. 13, in the face of the shuttle. At the point $k^2$ where the needle descends, this rib is cut away so as to form a shoulder, 3, against which the needle-thread catches, and by which it is prevented from being carried forward by the advancing shuttle.

It now remains to describe the method of operating the feeding bar or foot. This is effected by a direct connection with a vibrating lever, U, which is pivoted to the goose-neck at *h*. The forward end of this lever is pivoted to a rod, K, which is pivoted at *r* to the feed-bar *m*, which is of the form represented in Fig. 8. At *s* the feed-bar is pivoted by a loose joint to an arm, *t*, which is jointed at *n* to a block, *w*. This block is secured to the socket of the presser-foot by a screw, *x*, and may be raised or lowered for the purpose of increasing or diminishing the length of the stitch. The joint at *n*, between the arm *t* and the block *w*, is a tight or friction joint, the arm being divided or split and forced to grasp the pin at *n*, on which it turns by the screw *v*, by which means the friction at this point is governed. As the forward end of the lever U is depressed the feed-bar moves freely round the joint *s* until the feeding-surface strikes the table or the cloth upon it. The continued descent of the lever U now obliges the point *s'* to descend, and the arm *t* pivots around its friction-joint *n*, and the feeding-surface is driven horizontally across the table, and when the forward end of the lever U is raised the loose joint *s* permits the feeding-foot to rise out of contact with the cloth until it strikes the presser-foot, (within a groove, $c^2$, upon the under surface of which it acts,) when, as before, the joint *s* is raised by the revolution of the arm *t* around its friction-joint *n*, and the foot is drawn back preparatory to another feed. It will be perceived that the feeding-surface is always entirely disengaged from the cloth before it is retracted, and that as it descends it becomes firmly engaged with the cloth before it commences to advance. It is also obvious that the engagement of the feeding-surface will always be proportionate to the resistance offered to the motion of the cloth, and with very light goods this pressure will be graduated by the friction produced at the joint *n*; but where the goods are heavy, or where from any cause whatever the feeding is resisted, the foot is pressed with an increased force upon the cloth until it is sufficiently engaged with it to carry it along.

I am aware that a sewing-machine feed has been made having this peculiarity; but such feed has pressed constantly upon the surface of the cloth with a given force, and has not had the capability of disengaging itself entirely therefrom before being retracted, but has scratched back over the surface of the goods.

Any efficient means of vibrating the lever U may be adopted. In the machine represented in the accompanying drawings I employ the following: W is a shaft, Fig. 4, which is pivoted in the standards $A^2$ $B^2$, and is vibrated a short distance by the crank H, the crank playing in a curved slot, $C^2$, Fig. 4, in an arm projecting from the shaft W. From this shaft also projects an arm, $D^2$, having at its upper extremity an inclined slot, *q*, in which plays a pin, $x^2$, projecting from the lever U, and thus as the shaft F is revolved the lever U is vibrated and the feed is operated.

In the devices heretofore employed to put a constant tension upon the needle-thread by means of pinchers or clamps it has been found that the pressure upon the thread throws back the twist and causes it to "kink." To remedy this I employ a peculiar device for the purpose of producing friction upon the needle-thread, in which the friction is extended over a considerable length of thread, so that at no point is the pressure upon the thread sufficient to cause the twist to run back. $E^2$ is the stationary plate of this tension-regulator, which is attached to an arm, Z, projecting from the frame-work. From this plate projects a series of short pins, 1, and two longer pins, 3. The movable jaw or plate $I^2$ is pressed up against the stationary plate by a spring, $F^2$, the tension of which is regulated by a nut, $G^2$. The thread from the spool $H^2$ is passed between the plates $E^2$ and $I^2$, over the pins 1 and beneath the pins 3, thence over the revolving take-up L, then under a guide-roller, $K^2$, thence through the eye $a^2$, having a diagonal slit for the entrance of the thread, thence through a similar eye, $b^2$, upon the socket of the presser-foot to the needle. The plate $I^2$ of the tension-regulator is cut away or bored to admit the pins 1 beneath its surface, that the pressure of the spring $F^2$ may be thrown upon the thread; or, in lieu of pins, one of the plates may have a flange near its circumference fitting into a groove in the other and around which the thread is passed.

Operation: The machine being threaded as above, and motion being communicated to the shaft F in the direction of the arrow, Fig. 1, the needle is caused to descend. While this descent is taking place, and before its point reaches the cloth, the previously-made stitch is being tightened up by the revolving take-up, and the shuttle is making its back traverse, the hook T keeping the shuttle-thread tight, as before explained, that this thread may not be drawn through the cloth by the needle-thread. As the point of the needle enters the cloth (the stitch being now tightened up) the needle-thread slips off the revolving take-up, and as the needle commences to return, the shuttle advances and passes through its loop, the thread being left slack for the purpose. As the needle enters the cloth the feeding-foot rises (the arm *m* pivoting round the joint *s*) until it strikes the top of the recess in the presser-foot Z, Fig. 9, when, its upward motion being arrested, the friction-joint at *n* is forced to yield, and the foot is drawn back. As the point of the needle leaves the goods the feeding-foot is again depressed, its feeding-surface pivoting round the joint *s* until it strikes the cloth, and is sufficiently resisted thereby to cause the friction-joint to yield, when the motion of the foot will be in the plane of the table, carrying the cloth alo with it.

I do not now intend to claim giving to the feeding-instrument of a sewing-machine the four motions above described, as this will form the subject of another application for Letters Patent; but

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

1. Operating a four-motion feed by means of a loose and a friction joint, substantially in the manner and for the purpose specified.

2. The revolving take-up L, operating as set forth, for the purpose of governing the needle-thread, as described.

3. The hook T, or any equivalent device for the purpose of keeping the shuttle-thread tight, as described, when used in combination with a needle driven by a crank, as set forth.

4. In combination with a needle driven by a crank, the rib $h^2$ in the shuttle-race, with its notch or shoulder 3, for the purpose of preventing the loop from being carried forward by the shuttle, as set forth.

L. W. LANGDON.

Witnesses:

SAM. COOPER,

P. E. TESCHEMACHER.