2 Sheets—Sheet 1.

# T. EARLE.

## Sewing Machine.

No. 31,156. Patented Jan. 22, 1861.

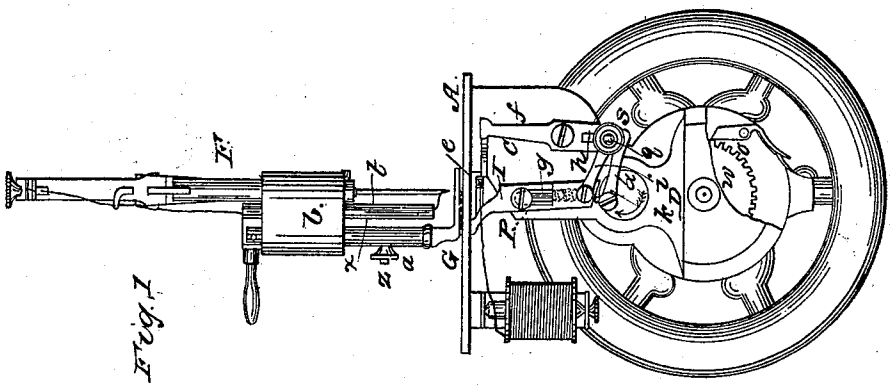

Fig. 1.

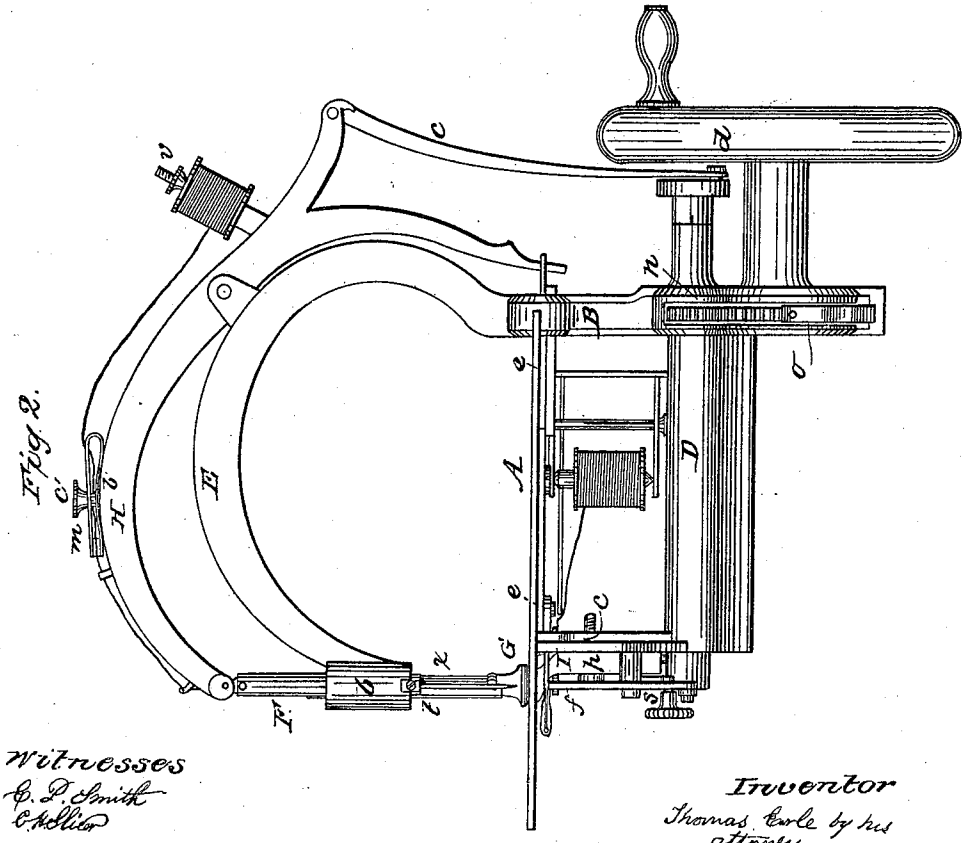

Fig. 2.

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2 Sheets—Sheet 2.

# T. EARLE.

## Sewing Machine.

No. 31,156. Patented Jan. 22, 1861.

Fig. 4

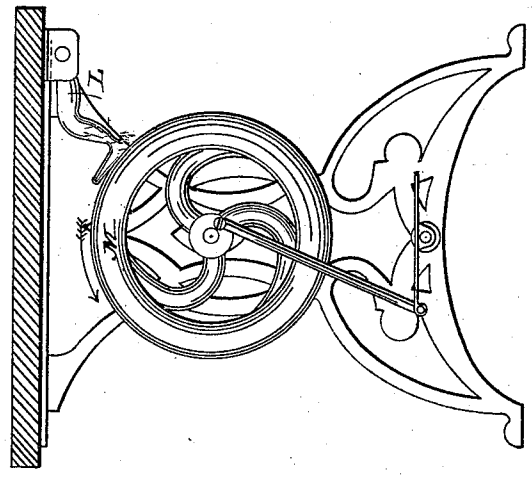
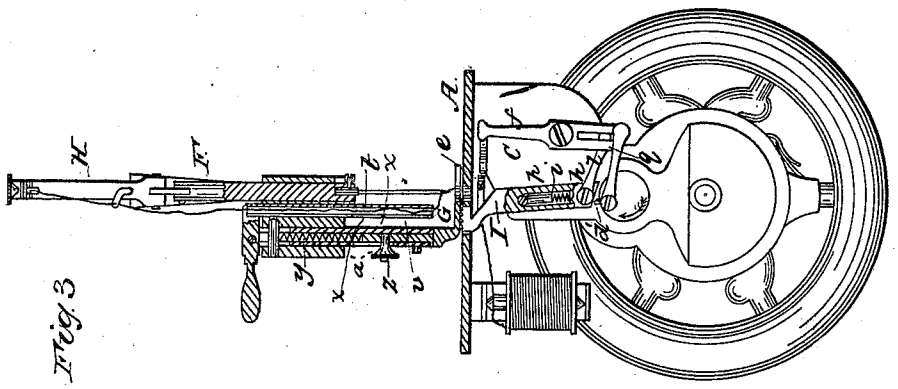


Fig. 3



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C. A. Fliess

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# UNITED STATES PATENT OFFICE.

THOMAS EARLE, OF WORCESTER, MASSACHUSETTS.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **31,156**, dated January 22, 1861.

*To all whom it may concern:*

Be it known that I, THOMAS EARLE, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a front elevation of a sewing-machine embracing my improvements. Fig. 2 represents a side elevation of the same. Fig. 3 represents a sectional elevation through the pressure-bar, feeding-hand, and nippers, showing their arrangement and connection with each other. Fig. 4 represents a modification in the arrangement of the brake.

The object of my improvements in sewing-machines is to simplify the mechanism for giving to the feeding-hand a positive motion and for regulating the length of the stitch, to produce a more uniform and equable pressure of the feeding-hand and pressure-pad upon the cloth, and to protect the thread from oil in its passage from the needle-arm to the eye of the needle; and my invention for effecting these objects consists, first, in arranging the vibrating nippers for drawing out the loop of the upper needle and a vibrating feeding-hand to move in the same or parallel planes, and connecting them by means of an adjustable link, so that the positive motion imparted to the nippers will be communicated by it direct to the feed-hand, by which means the mechanism for communicating a positive vibratory movement to the feeding-hand is simplified and the cost diminished; and my invention also consists in arranging the spring for withdrawing the feeding-hand from the cloth within the hand and in line with its center of motion, so that in all positions of the feeding-hand the spring will be in a direct line passing through its center of motion; and it also consists in arranging within the hollow shaft of the pressure-pad a spiral spring, and combining with it a sliding rod, by which the pressure of the pad is regulated, the spring protected from dust and dirt, and also covered, so that the thread of the upper needle is not liable to become entangled with it.

In the accompanying drawings is represented a sewing-machine embracing my improvements, which consists of a bed-plate, A, on which the work rests while being sewed, and to which is connected by front and back plates, B and C, an under plate, D, provided with the necessary arrangements to clamp the machine to a table or stand. The back plate, B, is cast with a recess to receive and protect the driving gear to the machine, and passing through and having its bearings in the back and front plates, B and C, is a driving-shaft, which gives motion to the different parts of the machine. A curved arm, E, projects from the rear of the bed-plate and arches over to the front, and is provided with guides *b* to sustain a needle-bar, F, and pressure-pad G. To this arm is pivoted a needle-arm, H, which is hinged to the needle-bar in front and forked at the rear end. One of the forks extends below the bed-plate, and is connected with and gives motion to a looper-bar, E. The other fork is connected by means of a link, *c*, with a crank-pin, *d*, and a pair of nippers, *f*, to grasp and draw out the loop of the upper-needle thread. An elongated slot, *g*, is made through the shank of the feeding-hand, through which the pivot *p*, confining it to the front plate, passes. This slot admits of the hand moving upward and downward and also vibrating on the pivot *p*. A cavity is made in the center of the lower portion of the feeding-hand and in line with its center of motion to receive a spiral spring, *h*, and extending from this spring is a rod, *i*, which, through the medium of the spring, is caused to bear on the pivot and draw the hand down. The shank of the nippers *f* extends below its center of motion, and is connected by means of a link, *a*, with a crank-pin, *k*, on the end of the driving-shaft. The feeding-hand receives its vibratory motion from the nippers through a link, *l*, which is pivoted to the feeding-hand at one end and connected with the nippers at the other by means of a pin, *q*, passing through an elongated slot, *p'*, cut in the lower branch of the shank of the nippers. This pin is provided with a set thumb-screw, *s*, by which the link may be clamped to the shank of the nippers nearer to or farther from its center of motion, and thus vary the length of vibration of the feeding-hand and regulate the length of the stitch. The upward move-

ment is given to the feeding-hand, causing it to project through the bed-plate to feed the cloth by means of a stud-pin, *d'*, which passes through the driving-shaft near the end, and projects beyond its surface a sufficient distance to raise the hand to the required height. As the shaft revolves in the direction of the arrow this pin strikes the inclined foot of the feeding-hand and gradually raises it to the proper height, while at the same time the foot of the hand is drawn by the nippers in the same direction as the stud-pin moves. Thus the stud-pin remains a longer time in contact with the foot and gives increased length of time for the feed to take place and renders it more certain. Between the needle-bar and the shaft of the pressure-pad is arranged a tube, *t*, through which the thread passes from the lower guide on the needle-arm to the eye of the needle, for the purpose of keeping the thread clean and protecting it from oil used on the machine.

The shaft *x* of the pressure-pad is hollow, and in the cavity is arranged a spiral spring, *y*, for holding it down. The upper end of the spring bears on a pin passing through the shaft and shaft-guide, and the lower end rests on a rod, *u*, from which extends a pin, *z*, passing through a slot in the side of the shaft. To this pin a clamping-nut, *a'*, is attached, and by the movement of this rod, in connection with the clamping-nut, the pressure of the pad is adjusted for different thicknesses of fabric.

A spool-holder, *v*, for the upper thread is arranged on the vibrating lever just back of its center of motion and in front of the spool, and on the needle-arm is a spring-pad, *m*, to regulate the tension of the needle-thread. This pad consists of a U-shaped spring provided in front with clamping-jaws, and a pin, *b'*, extending from the needle-arm, passes through both leaves of the spring, and is provided at its outer end with a thumb-screw, *c'*, by which the jaws may be closed and their pressure on the thread regulated. A hole is made in the upper leaf of the spring back of the thumb-screw, and also through the pin *b'*, so that the thread passes in a direct line from the spool to the jaws of the pad, and thence to an eye attached to the needle-arm in front of the pad.

Attached to the driving-shaft, and within the cavity in the back plate, is a toothed pinion, *n*, to which motion is given by means of a toothed wheel, *w*, also inclosed in this cavity and attached to a main driving-shaft, which has its bearings in the back plate. To the lower end of the back plate and opposite the cavity is attached a spring brake or catch, *o*, so arranged as to rise and not act when the lower toothed wheel is turned in the proper direction for giving motion to the machine; but, when turned in the opposite direction, it enters the spaces between the teeth and prevents a backward movement being given to the machine. Instead of applying this spring-brake to the driving-gear, as shown in the hand-machine, a spring-foot, L, may be so arranged for the table or stand machines, as shown in Fig. 4, so as to act on the periphery of the main driver or fly-wheel *m* when turned backward and stop the machine, when at the same time it is thrown up and exerts no pressure when the machine is turned in the right direction. As the spring for drawing the feeding-hand downward is inclosed within the hand, it moves with and in the same direction as the hand; but, under all circumstances, its position in relation to the line passing through the center of motion of the hand is unchanged, so that it always tends, whatever may be the position of the hand, to draw it downward in this line. Hence its action is more uniform and direct than an external spring, which tends to throw or draw the hand with greater force to one side than to the other. In arranging the retracting-spring within the interior of the shaft of the pressure-pad, not only is the spring protected from injury and prevented from entangling or catching the needle-thread, but by this arrangement a longer and more elastic spring may be used than in those machines in which the spring surrounds the shaft of the pressure-pad and is inclosed in the shaft-guide. Thus greater range of motion may be given to the pad without affecting the elasticity of the spring.

In connecting the feeding-hand and nippers by means of a link their position and movements in relation to each other remain always the same, which is necessary for the perfect working of the machine; and, moreover, by this arrangement a positive motion is imparted directly from the nippers to the feeding-hand, which simplifies the arrangement of the mechanism heretofore used to effect this object.

I do not confine myself to the precise construction and arrangement of the parts as described, as they may be modified without departing from the spirit of my improvements. The link connecting the feeding-hand with the nippers may be arranged to slide on the hand for the purpose of varying the length of the stitch, instead of sliding on the nippers; and, instead of moving in a slot, the adjustable end may be jointed to a sleeve which slides on the shank of the nippers or feeding-hand. The tube for protecting the thread from oil, instead of being stationary may be inserted in a groove in the side of a needle-bar and move with it.

Having thus described my improvements in sewing-machines, what I claim therein as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of the feeding-hand and nippers with a connecting adjustable link, constructed and arranged as described, whereby a positive lateral vibratory motion is communicated directly from the nippers to the feeding hand.

2. The combination of the feeding-hand, constructed and arranged substantially as described, with an interior spring so arranged as to act on the hand to draw it down in line with its center of motion.

3. The combination of the pressure-pad with the interior spring and sliding rod and clamps, the whole arranged substantially as described, for the purpose set forth.

THOMAS EARLE.

Witnesses:
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