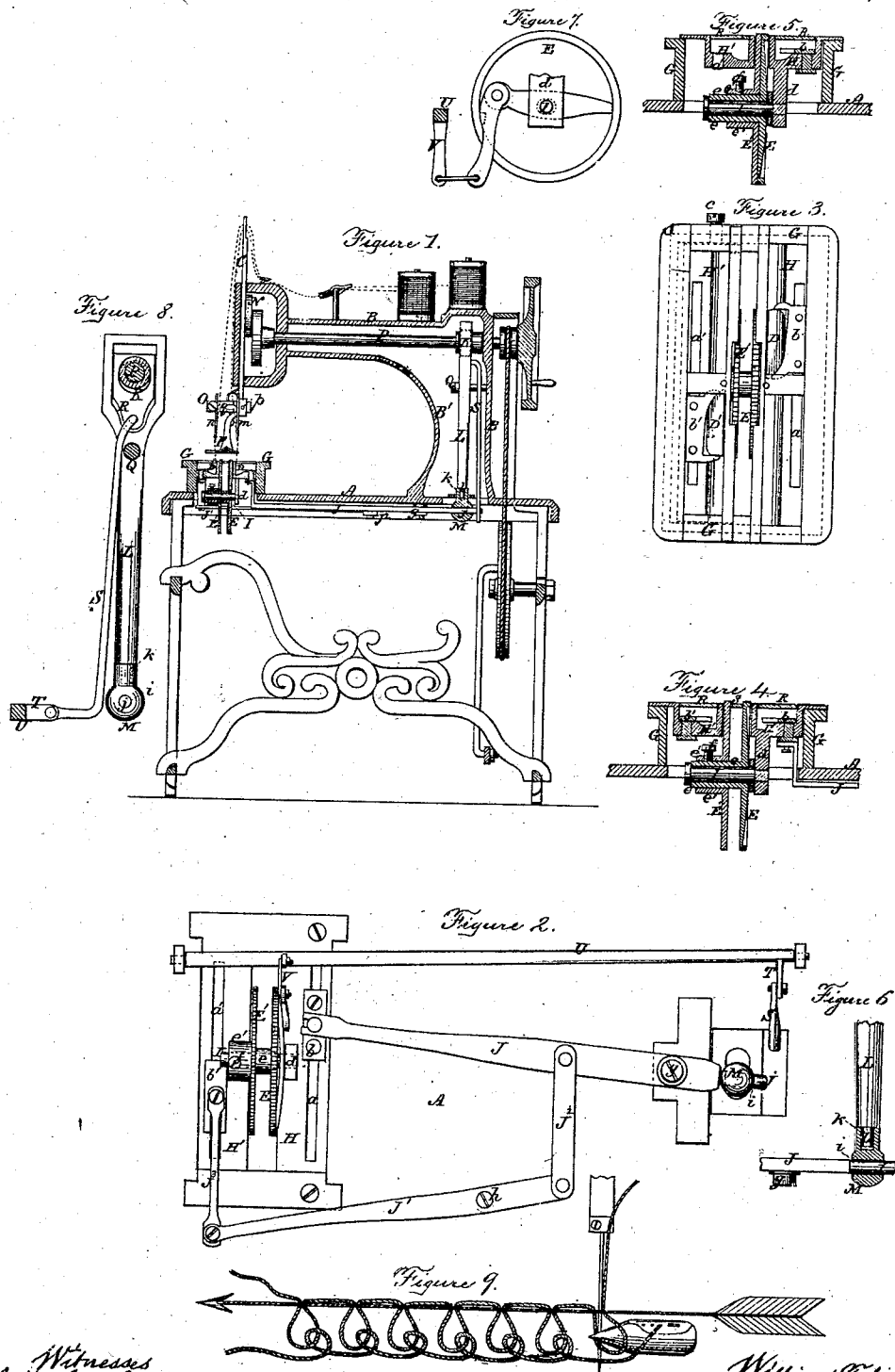


W. T. SMITH.
Sewing Machine.

No. 99,743.

Patented Feb. 8, 1870.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM-T. SMITH, OF WEST ZANESVILLE, OHIO, ASSIGNOR TO HIMSELF
AND WILLIAM T. MAHER.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 99,743, dated February 8, 1870.

To all whom it may concern:

Be it known that I, WILLIAM T. SMITH, of West Zanesville, in the county of Muskingum and State of Ohio, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 is a vertical longitudinal section of a machine embracing my improvements. Fig. 2 represents an inverted view, showing the mechanism for operating the oppositely-moving shuttles and the double feeding-wheels. Fig. 3 represents a plan of the case within which the oppositely-moving shuttles are arranged. Fig. 4 represents a vertical transverse section of the shuttle-case and the feeding-wheels as arranged for a double stitch. Fig. 5 is a similar view when the parts are arranged for a single stitch. Fig. 6 represents a view of the double-socketed joint, with its connecting-levers, detached from the machine. Fig. 7 is a side view of one of the feeding-wheels, showing the mechanism for operating it. Fig. 8 represents a view of the eccentric and its connecting-arms. Fig. 9 represents the knot-stitch as formed by the supplemental shuttle.

My improvements relate to that class of sewing-machines known as the "Singer" machine, and, in the accompanying drawings—

A represents the table, supported by the usual metallic frame, upon which is erected a hollow metallic standard and arm, B, commonly called the "goose-neck," and which carries at its front end a vertically-reciprocating needle-bar, C, while the mechanism from which motion is derived to operate the oppositely-moving shuttles D D' and the feeding-wheels E E' is inclosed in the vertical standard. The machine is also provided with a treadle, band-wheel, and shaft, for giving motion to the several parts of the machine, balance-wheel, spool-holders, tension devices, and presser-foot F, constructed, arranged, and operating in the usual manner.

My improvements relate more particularly to the employment of a pair of shuttles located

and arranged in a case, and moving in opposite directions, in connection with a single needle-bar carrying two needles, said case having the capacity of adjusting said shuttles nearer to or farther from each other; also, in the arrangement of a pair of feed-wheels upon the same axis, capable of adjustment relatively with that of the shuttles; also, in the employment of a double-socketed joint, for uniting the horizontal and vertical arms from which the shuttles derive their motion, by which I obtain a close joint, admitting of no lost motion whatever; and, finally, in the arrangement of the pivoted arms for communicating equal and alternately opposite motion to the shuttles.

As represented in the drawings, the shuttle-case G is secured by screws (so that it may be removed from the bed-plate) upon the table A, and has fitted therein two metallic frames, H H', within which are formed the shuttle-races, and provided with slots *a a'*, within which the slides *b b'* are fitted that carry the shuttles D D'. One of these shuttle-frames, H, is fixed within the inclosing-case G, and the other, H', is so arranged that it may be adjusted and secured by means of a screw, *c*, Fig. 3, for the purpose of increasing or diminishing the space between the two shuttles D D', as it may be desired to change the distance between the parallel rows of stitching.

The feed-wheels E E' are located between the shuttle-frames H H', and project, in the usual manner, above the case G. They are of equal diameter, and are secured upon the same axis I, and one, E, is fixed, while the other, E', is capable of adjustment thereon. The fixed wheel is mounted, by means of a hollow sleeve, *e*, on the fixed axis I, which is supported by an arm, *d*, depending from the fixed shuttle-frame H, on which it may turn freely; and the supplemental feed-wheel E' is also mounted, by a hollow sleeve, *e'*, upon the sleeve of the fixed feed-wheel, so that it may be adjusted nearer to or farther from the latter, in accordance with the adjustment of its corresponding shuttle, and held securely by a set-screw, *f*.

The vice-versa motion of the shuttles is derived from the motion of a single arm, J, pivoted at *g* to the under side of the table A,

quite near its rear end, so that a very slight motion of its short end will communicate the requisite throw to the shuttles. The opposite end of this arm *J* is pivoted to the under side of the slide *b* of the shuttle of the fixed frame, and the vibratory motion of this end of the arm communicates motion to the other shuttle, *D'*, by means of a compound arm, *J¹*, of a less length than the other, also pivoted at *h* to the under side of the table, having connecting-links *J² J³*, one link, *J²*, of which is connected to the central arm, *J*, between its pivot and its connection with the shuttle, while the other link, *J³*, is connected to the slide *b'* of the supplemental shuttle *D'*; and the relative distances between the pivots *g h* of the long and short arms, and their connection by the inner link, *J²*, must be such as to produce an equal distance of vibration of the long ends of the two arms *J J¹*, and consequently of the throw of the shuttles alternately back and forth, the shape of the operating-eccentric *K* being such as to produce a momentary pause at the extreme stroke of the shuttles, for the purpose of allowing the needles to withdraw from the fabric to form the stitches, as will be hereinafter described.

In order to produce the vice-versa movement herein described of the shuttles without the loss of motion, I unite the short end of the main horizontal vibrating arm *J* with the lower end of the vertical vibrating arm *L* by means of a double-socket joint-piece, *M*, Fig. 6, having a horizontal cylindrical opening, *i*, for the reception of the correspondingly-shaped stem or end *j* of the pivoted arm *J*; and at right angles thereto, and coincident with the axis of said opening *i*, another cylindrical opening, *k*, is made, into which the correspondingly-formed end *l* of the vertical vibrating arm *L* is fitted, in such manner that the bearing of the joint of one arm will cross the line of the other in such close proximity as to admit of the proper oscillation of the double-socketed joint *M*, in connection with that of the ends of the arms fitted therein, thus effectually preventing the slightest loss of motion, and obtaining a close joint without the least binding or sliding motion.

The needle-bar *C* is operated by means of a grooved cam, *N*, so as to move in unison with the shuttles, and carries at its lower end a needle, *m*, in the usual manner, and also a short horizontal arm, *O*, secured thereto by means of a screw, *p*, and to the outer end of which a supplemental needle, *n*, is secured, which carries its thread in connection with the supplemental shuttle, and is made adjustable, to vary its distance from the fixed needle, with relation to the adjustment of its shuttle, by means of a slot, *q*, in said arm, and clamping-screw *p*, by which a double parallel row of stitching may be made at one and the same operation, of any desired width.

The shuttle-case may be fitted with removable slides *R*, and the shuttles provided with bobbins, in the usual manner.

The presser-foot *F* is provided with guides for the needles, to accommodate any adjustment of the latter for different widths of stitching.

The machine thus constructed can be readily converted from a double to a single-needle machine by simply withdrawing the central slide, *s*, Fig. 4, from the top of the inclosing-case, adjusting the supplemental feed-wheel *E'* in close contact with the fixed one *E*, so as to make one wheel of the two, adjusting the supplemental shuttle-frame *H'* close against the inner bar of the opposite shuttle-frame, *H*, and removing the supplemental shuttle *D'* and the supplemental needle *n*.

The operation of the needle *m* and shuttle *D* forms the lock-stitch common to the Singer machine; but it will be observed that the supplemental shuttle *D'* is arranged with its point to work in a direction opposite to that of the shuttle *D*, as shown in Figs. 3 and 9, and cannot form the lock-stitch without reversing the feed of the wheels and the material. This supplemental shuttle, therefore, forms a coil about the loop of the needle-thread while the fabric is fed forward in a direction opposite to that of said shuttle. In doing this the shuttle *D'*, with its thread, passes through the loop formed by the needle, and as soon as it is through, the needle draws back out of the fabric, draws up its loop, and as the shuttle comes back, its thread is coiled around the loop-thread, and, when properly drawn into the fabric by the needle, forms a stitch equally as neat as the common lock-stitch.

The motion of the shuttles and the feed of the wheels *E E'* are produced by a single cam or eccentric, *K*, (shown in Fig. 8,) secured upon the rear end of the driving-shaft *P*, so as to be embraced by the upper slotted end of the arm *L*, which being pivoted at *Q* to the standard *B'*, its upper end will be vibrated by the eccentric, so as to vibrate its lower end, and with it the arms *J J¹* of the shuttle-slides. Within the slotted end of the arm *L* a slide, *R*, is placed, having its bearing on the eccentric, capable of vertical movement, and connected by means of a vertical pivoted rod, *S*, to the crank *T* of a horizontal rock-shaft, *U*, which, by means of the arm *V*, is attached to and operates the feeding mechanism shown in Fig. 7.

The feed of the wheels is derived from a vertical movement of the slide of the eccentric *K*, while the oscillation of the arm *L*, for operating the oppositely-moving shuttles, is produced by the lateral action of the same eccentric; and thus the motions of these two principal parts are derived from one and the same eccentric.

Having described my invention, I claim—

1. The combination, with the needles *m n* and supporting-table, of the shuttles *D D'* and their operating-arms, constructed and arranged substantially as and for the purpose described.

2. The adjustable and fixed feed-wheels *E*

E', the fixed and adjustable shuttle-frames H H', and the fixed and adjustable needles m n, all arranged substantially as described, whereby the machine may be converted from a double to a single stitching machine.

3. The eccentric K, in combination with its inclosing-slide R, the inclosing-arm L of the shuttle-drivers J, and the connecting-rod S, which gives motion to the feeding-wheels, arranged and operating substantially as shown and described.

4. The combination of alternately opposite-

ly-moving shuttles D D', the needles m n, the fixed and adjustable feed-wheels E E', the fixed and adjustable shuttle-frames H H', constructed and arranged as herein described, with the double-socketed joint M and the compound arms J J¹ J² J³, the whole arranged and operating as described.

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