

THOMAS HALL.

2 Sheets--Sheet 1.

Improvement in Sewing Machines.

No. 123,892. Patented Feb. 20, 1872.

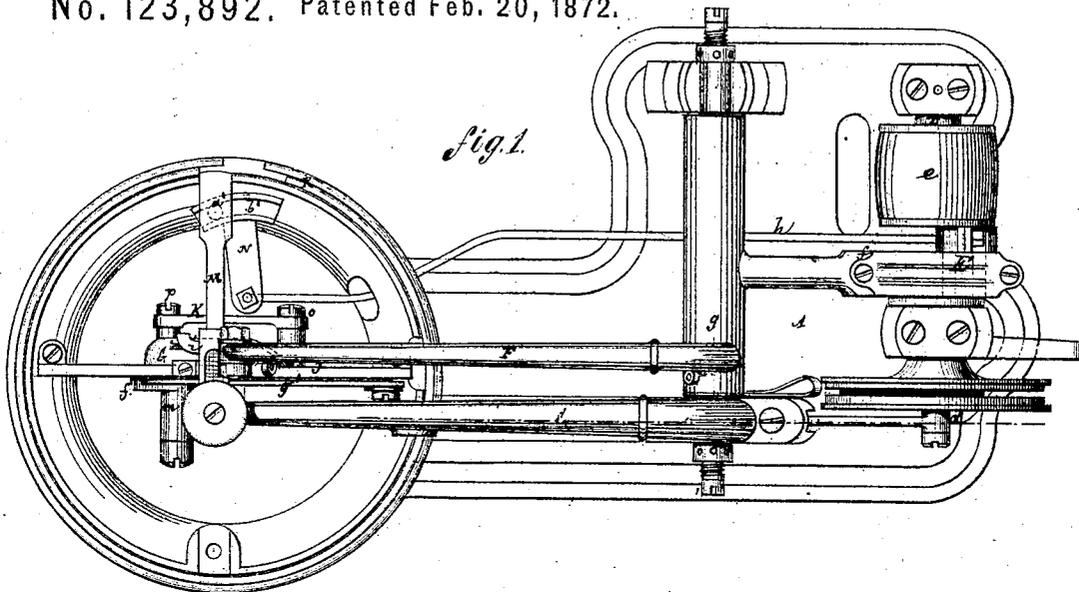


Fig. 1.

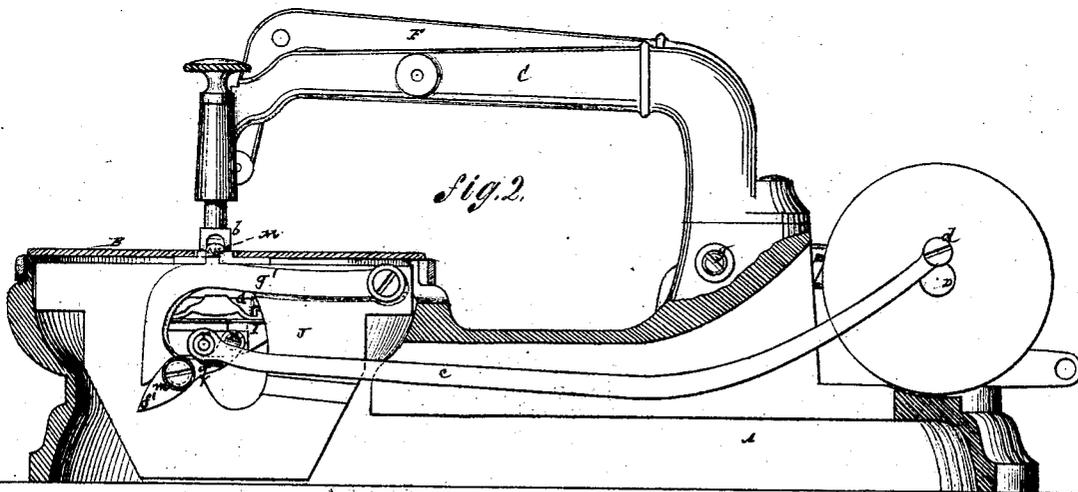


Fig. 2.

Inventor.

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Witnesses:

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fig. 3.

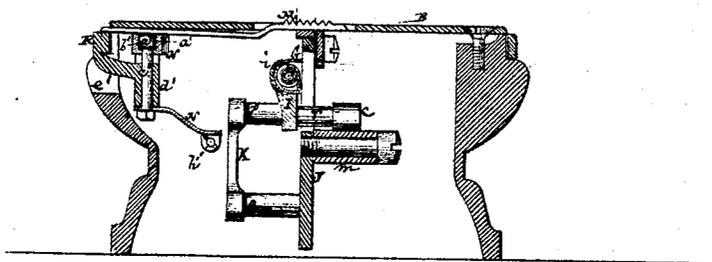


fig. 4.

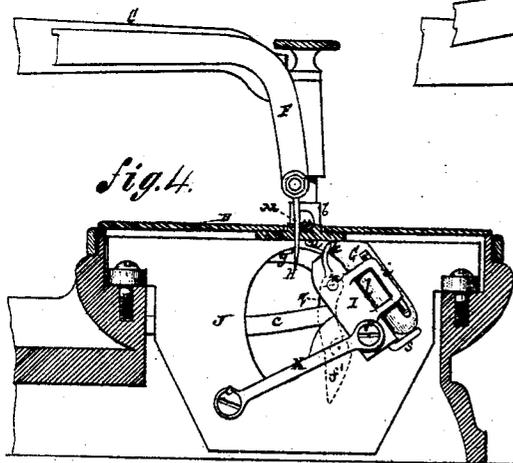
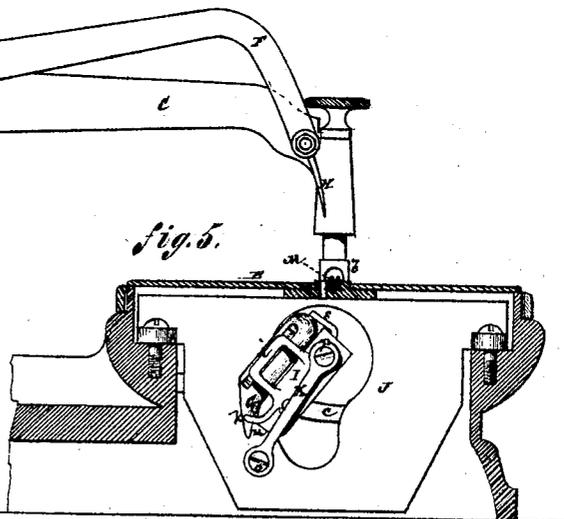


fig. 5.



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fig. 6.



UNITED STATES PATENT OFFICE.

THOMAS HALL, OF FLORENCE, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 123,892, dated February 20, 1872; antedated February 9, 1872.

To all whom it may concern:

Be it known that I, THOMAS HALL, of Florence, in the county of Hampshire 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 drawing forming part of this specification, and in which—

Figure 1 represents a plan of a sewing-machine having my invention applied to it, the cloth bed or table being removed; Fig. 2, a longitudinal vertical section taken mainly as indicated by the line *x x* in Fig. 1; Fig. 3, a vertical transverse section in direction of the line of feed; and Figs. 4 and 5, longitudinal vertical sections looking in the opposite direction to Fig. 2, and from the reverse side of the shuttle-race, said figures showing the needle and shuttle in different working positions. Fig. 6 is a transverse section on an enlarged scale through the shuttle-carrier and shuttle.

Similar letters of reference indicate corresponding parts.

The first part of this invention relates to shuttle sewing-machines; and it consists in a shuttle having a compound movement, which causes its point to move in a different line from its heel, and in close proximity to the cloth-bed, when entering the loop, and afterward to tip or tilt, to effect the extension and clearance of the loop and tightening of the stitch. Such compound shuttle movement admits of a shorter and, consequently, stronger needle and a shorter needle-stroke being used, inasmuch as the eye of the needle need only to project a little below the cloth-bed, which is of especial advantage when curved needles are used; and, besides this, by such movement the loop is very perfectly spread and caused to slip very easily over the heel of the shuttle. The invention likewise includes certain mechanism for communicating such compound movement to the shuttle; also, a peculiar construction of the shuttle, with its point arranged to project below its bottom; and, furthermore, a peculiar construction of the shuttle-carrier for holding the shuttle down to its place. The invention furthermore includes a simple arrangement for obtaining the lift of the feed-bar by a toe on a sleeve or shaft connected with the shuttle-carrier; also, an arrangement

of devices whereby the motion to effect the feed is derived from the same crank that drives the needle.

Referring to the accompanying drawing, A represents the base or main frame of the machine, terminating at its front in a circular hollow stand or support for the cloth-bed B, and which also serves to contain the feeding mechanism and shuttle with its operating devices. C is the goose-neck, carrying at its front end the presser-foot *b*, and having arranged to pass through its lower portion the rod *c* that operates the shuttle; said rod receiving its necessary reciprocating motion from a revolving crank or eccentric pin, *d*, in connection with the main shaft D, that is driven by a pulley, *e*, or otherwise, and is constructed or provided with a crank, E, which serves both to operate the needle and to work the feed. F is the needle-arm, having its fulcrum as at *g*, and worked by a slotted arm, *f*, through the crank E. The motion to effect the feed is taken from the crank E by a rod, *h*. G is shuttle, and H the needle, the needle being curved and carried by the arm F for operation as in other machines, but, by reason of the peculiar compound movement of the shuttle, not requiring to project much below the cloth-bed or table to secure the passage of the shuttle through its loop; hence a shorter and stronger or finer needle may be used. The shuttle G is seated within a carrier, I, being slipped into or entered therein from the rear, and being retained in the same by a front guard, *k*, in conjunction with a top guard, *i*, and a heel-crank or pivoted catch, *s*, which, when turned up, serves to hold the shuttle in place, but when turned down or to one side readily admits of the shuttle being removed. The top guard *i* is made to overlap and hold down the shuttle, its lower edge projecting above or over the bottom edge of the slot in the latter. Said shuttle, which has its race formed by a vertical dividing-plate, J, of the space or chamber below the cloth-bed and carries a longitudinally-arranged bobbin, has its point *u* curved to project below its bottom *l*, which is straight, or nearly so. This hooked construction of said shuttle insures the catching of the needle-thread, and prevents the loop from slipping off the point of the shuttle.

The supports of the point and heel of the shuttle-carrier have different and independent

motions, the former being carried in the arc of a circle described by the pivot *n* around the sleeve *m* as its axis, the latter in the arc described by the pivot *P* around the axis *o* of the link *K*, and each having a curvilinear reciprocating motion. The operating-rod *e* is attached to the carrier by a wrist, *r*, arranged, as it were, between the sleeve *m* and pivot *n*. By this mode of hanging and operating the shuttle-carrier, the point of the shuttle is made to work in close proximity to the cloth-bed when approaching and passing through the loop formed by the needle-thread, the shuttle then and for a certain portion of its forward stroke having, as it were, a rocking motion under control of the link *K*, which governs the movement of the heel of the shuttle; but as the shuttle draws toward the completion of its forward stroke, and as the wrist *r* and pivot *n* approach and cross a horizontal line, then the pull of the rod *e* operates to rock the shuttle-carrier from the pivot *n* as a center of motion, causing the heel of the shuttle to be thrown or turned up. This compound movement of the shuttle not only renders it necessary for the needle in its working to project but a little below the cloth-table, thereby reducing its length to the advantage of its strength or tightness, and admitting of the machine being worked more rapidly, but the loop of the needle-thread is more easily passed over the heel of the shuttle.

M is the feed-bar, which is a four-motion one and reversible. Said bar has its horizontal movement effected by the application of the power close to or in line of its motion by means of the arrangement of its reversing-link *N*, with which it gears by a pin, *a'*, and slot *b'* in a horizontal position, or upon a vertical pivot, *c*, that forms the rocking center for the link as operated by the rod *h*. The direct application of the power to the feed-bar *M* effects its positive motion in either direction. The feed is reversed by shifting the pivot *c'* of the link *N* to either side of the pivot *a'* on the under side of the feed-bar. This may be done by arranging the pivot *c'* in a socket, *d'*, attached to a slide or ring, *R*, which is arranged to surround the

stand portion of the table, and which serves as a handle to reverse the feed accordingly as said ring is turned to the right or to the left. The limit of motion of the ring may be determined by a slot, *e'*, through which an arm of the socket *d'* forms its connection with the ring. I furthermore propose to attach a spring, by which the reversing action of the link *N* is caused to move to its limit either way, and so that the link will be restrained from standing on its dead-center. The up-and-down motion of the feed-bar *M* is effected in a simple and direct manner by a toe, *f'*, on the sleeve *m* of the shuttle-carrier motion, said toe lifting on a lever, *g'*, which raises the feed-bar, that in the back stroke of the toe falls to its place again.

I do not here claim the vibrating link *b'* and its adjustable pivot *c'* for operating the feed-bar, as they constitute parts of a separate and distinct invention, for which I intend to make another application for separate Letters Patent.

What is here claimed, and desired to be secured by Letters Patent, is—

1. A shuttle, operated by mechanism substantially as described, whereby its point is first caused to enter the loop close to the under side of the cloth-plate, and then dip in nearly a vertical direction, while its heel is thrown upward to clear the loop without lateral strain thereon, as set forth.

2. The combination, with the shuttle-carrier, of the pivot *n* on the arm or projection *q* of the rocking shaft or sleeve *m*, the wrist *r*, and the link *K*, arranged to produce a compound movement of the shuttle, substantially as specified.

3. In combination with the above, the toe *f'* on the sleeve *m*, arranged to lift the feed-bar *M*, in the manner substantially as set forth.

4. The guard *i* on the carrier, arranged to enter a groove or slot in the shuttle, as shown and described.

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Witnesses:

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