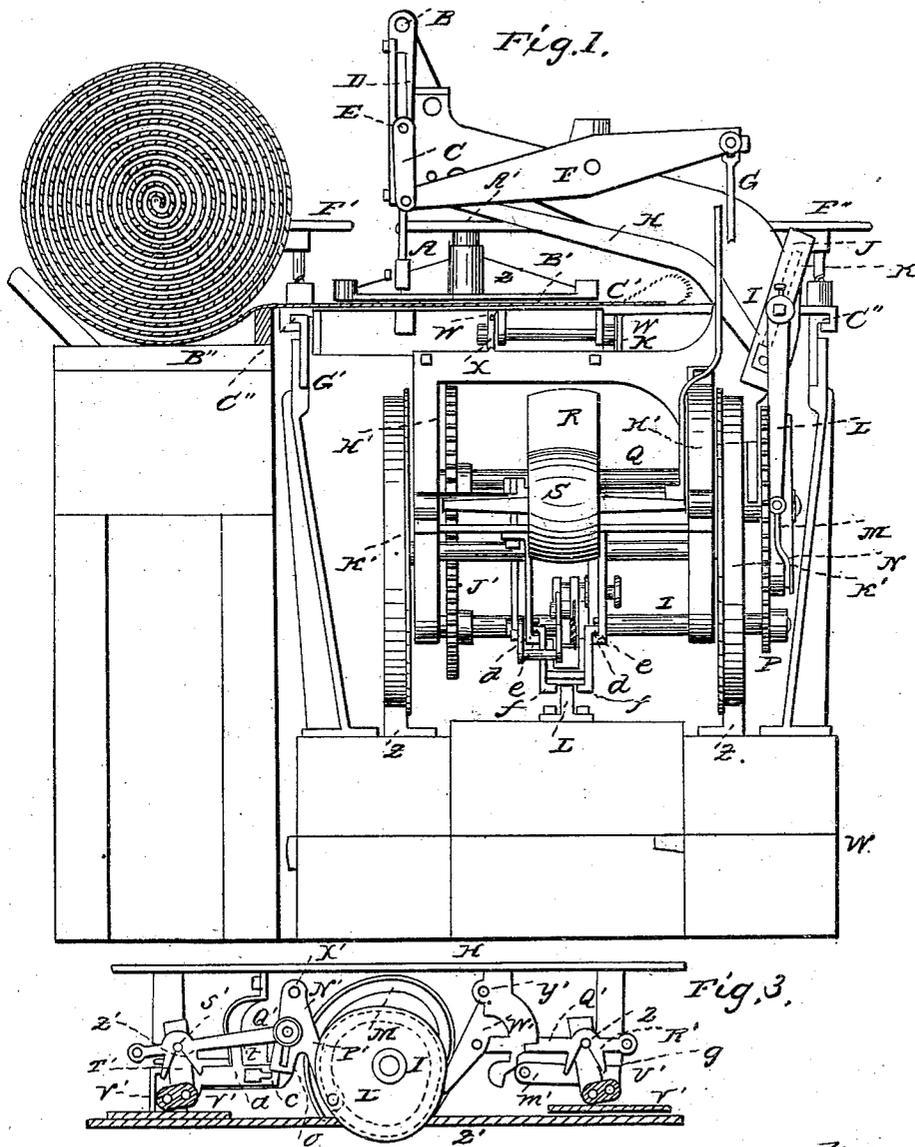


L. H. SMITH.
Sewing Machine.

No. 31,411.

Patented Feb. 12, 1861.



Witnesses:

Brookman & Albee

L. F. A. Dietrich

Inventor

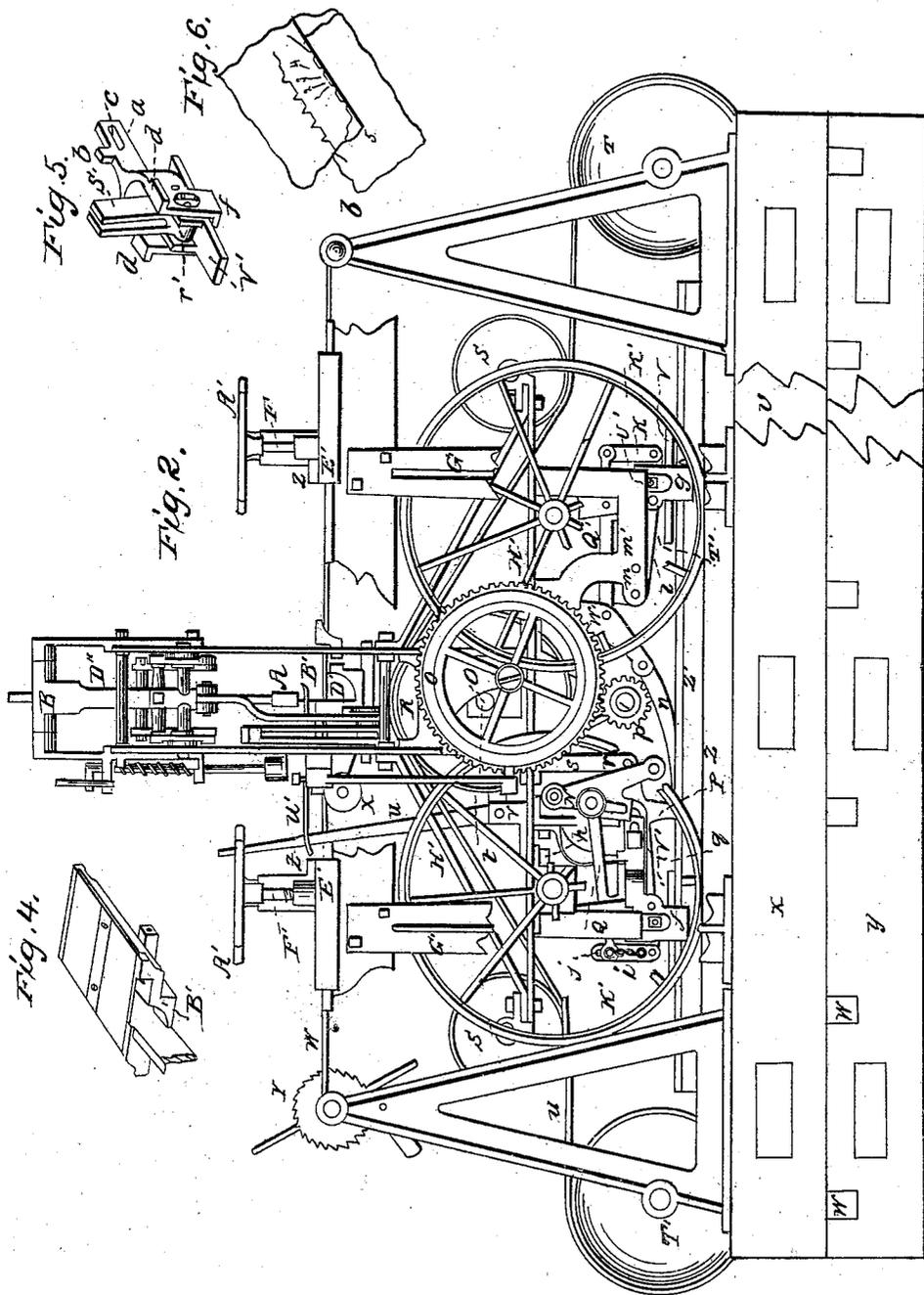
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

LOUIS H. SMITH, OF SALEM, NEW JERSEY.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 31,411, dated February 12, 1861.

To all whom it may concern:

Be it known that I, LOUIS HENRY SMITH, of the city and county of Salem, and State of New Jersey, have invented a new and useful Improvement in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents an end view; Fig. 2, a side view; Fig. 3, a section through the center of the lower part of the machine; Figs. 4 and 5, detached parts of the machine, and Fig. 6 the stitch or combination of stitches made by my machine.

Similar letters of reference in each of the several figures indicate corresponding parts.

My said invention consists, first, in devices for imparting alternate intermittent motion to the sewing mechanism, and to a carriage upon which the said mechanism is mounted, from a shaft revolving continuously in fixed bearings; second, in devices for holding the cloth stationary while acted on by a moving sewing-machine; third, in devices for imparting an intermittent lateral movement to the needle-carrier, in manner and for purposes hereinafter explained.

The object of my machine is to stitch the seams of sails, tents, awnings, and other heavy work.

As the machine is intended to sew heavy cloths in seams of sufficient length for the largest sail, as the work is very heavy when a number of such cloths are stitched together, I have found it necessary to facilitate the work and to insure the rapid and exact operation of the machine to keep the cloth stationary while the carriage supporting the sewing device moves along the whole or a portion of the length of the seam. Of course the motion of the carriage must be an intermittent one to afford alternate moments of rest while the needle goes through the cloth. The advantage of keeping the cloth stretched while being sewed consists not only in the consequent regularity of the stitches, but also in the fact that when the cloth is stretched when in use there will be no undue strain on the seam-thread, because the length of this thread corresponds to the length of cloth when in a stretched condition. Cloths, however, which have been sewed without being stretched cannot afterward be stretched

without exposing the seam-thread to the whole of the strain, and thus causing a rupture of some of the stitches. In such work it is necessary that a portion of the stitches forming the seam should be made in a lateral direction over the edge of the cloth, so as to hold down the selvage of the cloth, while the other stitches are parallel with the edge of the cloth, and serve especially to fasten the two pieces together. From this it follows that there ought to be a greater number of the longitudinal stitches constituting the main strength of the seam than of the lateral stitches. A zigzag stitch would be objectionable, because there are, comparatively, too many lateral stitches in it. My machine is so arranged that it makes two or more longitudinal stitches in line and parallel with the edge of the cloth to one lateral stitch.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The frame of the sewing device of my machine forms a carriage resting on four wheels, K', provided with flanges similar to car-wheels, and running on rails *y* parallel with the seam to be made.

The main shaft Q, which drives the movable parts of the sewing device, as well as the carriage itself, is arranged about in the center of the carriage. Motion is imparted to said shaft by an endless band, U, passing over a pulley, R, on said shaft Q, under guide-pulleys S at both ends of the carriage, and around pulleys T, to one of which the power is applied by means of a crank or pulley on its shaft. Motion is transmitted from shaft Q to shaft I by means of a wheel and pinion, I' J', and from this shaft I to a cog-wheel, O, upon an independent axis by means of pinion P.

A disk, M, with a cam-groove in its circumference, is secured to the cog-wheel, which imparts to the needle-carrier the peculiar motion necessary to make one lateral stitch after a certain number of longitudinal stitches have been made by means of the intermediate parts of the machine L J H, hereinafter to be described. An ordinary cam (not shown in the drawings) upon shaft I imparts to the needle-carrier the necessary vertical reciprocating motion by means of the pieces G F C, hereinafter to be described.

Two cams, M' L', upon shaft I serve to im-

part to the carriage the peculiar motion above described, in a manner hereinafter set forth.

The cloth to be sewed is supported upon the sewing-machine platform B', and two or more wires, W, extending the whole length of the apparatus. These wires, which are to support the cloth and prevent it from sagging after being adjusted and stretched, are fastened to shafts at the outer end of the machine, and can be properly stretched by means of a ratchet-wheel, Y, upon one of said shafts. The wires pass also over guide-pulleys X, the shaft of which has its bearings in brackets extending from the platform B'. The ends of the cloth are placed between two pairs of plates Z E' at opposite sides of the platform, and clamped between said plates by screwing down the clamp-screws A' A'. Both pairs of plates E' E' run on stationary rails C'', which rails extend parallel to the seam, so that the two pairs of plates with the cloth-clamps between them may be run out both ways from the platform, so as properly to stretch the cloth, and then be clamped to the rails C'' by means of clamp-screws F' F'. After the seam has been completed the clamp-screws are to be unscrewed, so as to release the cloth, which may then be drawn forward and rolled upon a table, B'', running parallel to the traverse of the machine the whole length of the clampsides, as represented in Fig. 1, leaving the rear edge of the last piece sewed on in proper position for the next piece to be clamped to it ready for sewing, as already described. The needle-carrier A works in a slide, D'', which is suspended from a horizontal shaft, B, and is free to swing on said shaft as a fulcrum in a plane at right angles to the line of the seam. Two pivots, E, extend laterally from the needle-carrier through slots D in the sides of the socket D'', and are hung to two parallel levers, F, by means of two short connecting-rods, C. A connecting-rod, G, driven from a cam (not shown in the drawings) on shaft, I, is hung to the rear ends of the lever F, and thus the required vertical reciprocating motion of the needle-carrier and needle is obtained. The lower end of the slide D'' is pivoted to the forward end of another connecting-rod, H, the rear end of which is pivoted to a swinging-bar or rocker, J, the pivot being adjustable in a slot, K, extending nearly the whole length and both ways of the fulcrum L'' of said bar. An arm, L, is secured to the bar J, the lower end of the arm taking into the cam-groove of disk M. As the disk turns round the arm L and the above-described parts connected with it will stand still as long as the end of the arm is in the straight part of the cam-groove; but when it comes into the inclined portion N of the groove the arm L, the lower end of the bar J, and rod H, and, with this latter, the slide and needle-carrier, will be moved back, so as to throw the next stitch backward laterally to the line of the seam. A portion of the part N of the groove is also straight, to keep the slide still while the needle goes

through the cloth. On adjusting the pivot of rod H in the slot K above the fulcrum L'' the motion of rod H, slide, and needle-carrier, it will be seen, will be reversed so as to throw the lateral stitch forward instead of backward; or it may be stopped altogether to produce a straight seam by adjusting the pivot of rod H in line with fulcrum L''. The piece to be sewed on may be placed on top or below the old piece, and yet the lateral stitch can be made to be thrown the proper way by simply adjusting the pivot of bar H in slot K above or below fulcrum L''. By adjusting this pivot at a greater or less distance from the fulcrum L'' the extent of the lateral stitch can be regulated, as will be understood. The needle works in conjunction with a shuttle (not represented in the drawings) traveling in the usual manner in the shuttle-race D'. The two cams L' M' work in conjunction with two short levers, N' W', respectively pivoted to the carriage-frame at X' and Y'. An arm, Q', is pivoted to each of these levers, and each of the arms is made with a fork, R', near its outer end. These forks straddle pins S', projecting from the upper ends of elbows T', the elbows being pivoted to stirrups a f g, Fig. 3. The stirrups have wings d d, with which they are held in horizontal grooves e e in the carriage-frame, so as to allow them slight vertical play. The stirrup g is pivoted to the carriage-frame at m'. The corresponding pivot of the stirrup a f passes, however, through a small slot, e, in the stirrup-arm a, so as to allow the stirrup horizontal play in regard to the pivot and carriage, or vice versa. The arm Q', connected to lever N', is pivoted in a slot, O', of the lever, so that the throw of this arm Q' may be regulated by adjusting a pivot in the slot at a greater or less distance from the fulcrum X'.

The lower ends of the elbows T are provided with pivots, to which horizontal plates V' are hung immediately above the rail Z' in the center of the carriage-way. Horizontal flanges extend from the bottom part of the stirrups f underneath the projecting top of the rail Z'.

It will be seen from the above that when either of the cams L' M' moves out the lower end of its lever N' or W', the arm Q', straddling the pin S', throws out the upper end of elbow T', and the lower end of the elbow, together with the plate V' hung to it, will move down, and as soon as the plate V' bears against the top of the rail Z' and the arm Q' moves still a little farther out the stirrup will be moved around its fulcrum-pin at e or m', so as to rise and cause its bottom flanges, f, to close against the under surface of the top of the rail Z'. The plate V', in conjunction with the bottom flanges of the stirrups, will thus be made to bite the rail. The two cams L M are so shaped that one plate, V', and a stirrup will bite the rail while the other plate and stirrup are off the rail. While the plate V' and stirrup g clamp the rail the carriage stands still and the needle performs the stitch; but as soon as the plate V' of stirrup g releases

the rail the other plate *V'* of stirrup *a f* clamps the rail, thereby becoming stationary parts, firmly connected, as it were, with the rail, and the eccentric portion of the groove of cam *L*, bearing still farther against the arm *P'* of levers *N'* the carriage is moved forward the length or part of the length of slot *c*, which determines the distance of one stitch from the other. The rail is then freed from the plate *V'* and stirrup *a*, and again clamped by the other plate *V'* and stirrups *g* by means of the peculiar relative shape of the grooves of cams *L' M'*, &c.

It will be understood from the preceding part of this specification that if the adjustment of the pivot of arm *Q'* at the greatest distance from fulcrum *X'* which the extent of slot *O'* admits of correspond to the whole play the slot *C* allows to the stirrup-pivot—to wit, to the greatest length of the stitch—this length of stitch can be diminished by adjusting the pivot of arm *Q'* in the slot *O'* nearer toward the fulcrum *X'*. Thus a very simple means is furnished for adjusting the length of the stitches. A small spring, *b*, serves to throw the stirrup *a* back into its original position after it has performed the above-described functions.

When it is desired to free the rail *Z'* from the grip of both plates *V'* and stirrups for the purpose of moving the carriage back after the seam has been completed or other purpose, it can be done by means of the device now to be described.

The outer end of that arm *Q'*, which is connected to cam *M'*, is hung to one end of lever *L* by a link, *k*. The lever is fulcrumed to the carriage-frame at *m*, and its other end is connected with the arm *p* of a lever, *q*, by means of a rod, *n*. The lever *q* is pivoted to the carriage-frame, and one of its ends is connected with the outer end of the other arm, *Q'*, by a link, *i*. This end of arm *q'* plays in a small slot, *j*, in the end of link *i* to accommodate itself to the above described adjustment of the pivot of arm *Q'* in the slot of lever *N'*. The other end of lever *q* is by means of link *s* hung to an arm, *t*, extending from shaft *v*, to which latter a hand-lever, *U*, is keyed. When this hand-lever is thrown toward the center of the machine, both arms *Q'* will be simultaneously lifted by means of the above-described connecting parts *t s i q p n l k*, and the forks *R'* will be raised above the pins *S'*, so as no longer to operate the rail-clamping devices.

This machine, it will be seen, can be driven by steam or other power, as the shaft of the pulley *T*, from which motion is transferred to the carriage, has a continuous motion in fixed bearings independent of the carriage.

The whole apparatus is supported on a bed-frame, *x*, which may be placed in a more or less inclined position in relation to a foundation-plate, *y*, by means of adjusting-wedges *w*, driven in between the two plates. Thus the carriage can be made to descend and move easily along while the sewing is being done.

The relation of the gear-wheels *O P* is such that shaft *I* turns three times round while cam *M* turns once, so that the cam upon shaft *I* will cause the needle-carrier to reciprocate thrice and the needle to make three longitudinal stitches, 1 2 3, (see Fig. 6,) while the cam *M* moves the needle-carrier once laterally, so as to cause the needle to make one lateral stitch 4. (See Fig. 6.) This relation of the longitudinal and lateral stitches can be altered by changing the relative size of gear-wheels *O P*.

I do not desire to be understood as confining myself to the precise form of cloth-holders or to the position of the ways on which they move.

Whereas the imparting of motion to a traveling sewing-machine and its sewing mechanism from a stationary shaft forms the subject of a patent issued jointly to Quartus Rice and myself, I do not desire to be understood as claiming the above principle in this application.

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

1. The endless belt or chain *U*, pulleys *T R*, and clamping mechanism *V' f g*, or substantially equivalent devices, operating in combination with the cam-shaft *I* and ways *Z'*, substantially as and for the purposes set forth.

2. The adjustable cloth-holders *Z E'*, and wires or lines *W* upon a stationary frame, operating, substantially as set forth, in combination with a moving frame or carriage carrying the sewing mechanism.

3. The connecting-rod *H*, cam-disk *M*, and slotted rocker *J K L*, operating, in combination with the hinged slide *D*, substantially as set forth, to impart an intermittent lateral motion to the needle-carrier.

LOUIS HENRY SMITH.

Witnesses:

S. YORKE ATLEE,
GOODWIN Y. ATLEE.