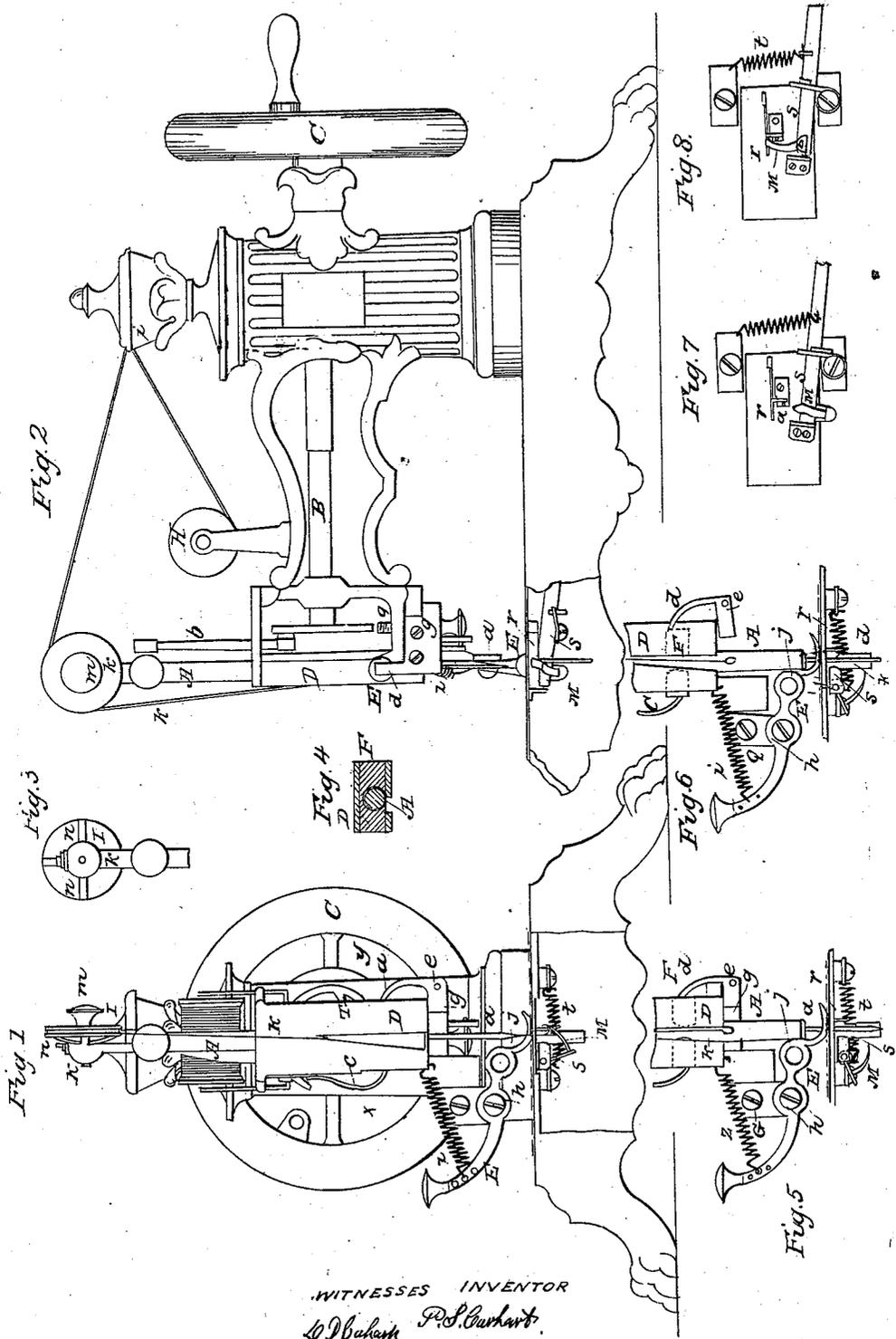


P. S. CARHART.

Sewing Machine.

No. 24,098.

Patented May 24, 1859.



WITNESSES INVENTOR
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IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 24,098, dated May 24, 1859.

To all whom it may concern:

Be it known that I, PETER S. CARHART, of Collamer, in the county of Onondaga and State of New York, have invented a new and useful Improvement in Sewing-Machines, of which the following is a full and clear description, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 represents a front view of a sewing-machine constructed according to my improvement, and Fig. 2 a side elevation of the same, a portion of the stand in both these figures being removed for the purpose of illustrating the action of the looper. Fig. 3 represents in detail a face view of a tension device furnished the needle-bar; Fig. 4, a transverse section, taken as indicated by the line *xy* in Fig. 1, of the needle-bar, with its guiding and co-operating contrivance, as hereinafter described; and Figs. 5, 6, 7, and 8 represent front elevations and inverted plans of certain portions of the mechanism, mainly in illustration of the action of the feed and operation of the looper.

Though my improvement is here shown applied to a single-thread machine for making a series of chain-stitches, the larger portion of my invention is, as will hereinafter appear from the description, equally applicable to other single-thread or double-thread machines.

The particular feature to which my invention relates is the feed of the cloth.

In the machine represented in the accompanying drawings the vertically-reciprocating needle-bar *A*, which carries at its lower extremity the eye-pointed needle *a*, is shown as operated by means of a pitman, *b*, and a crank or wrist-pin connecting it with a main revolving shaft, *B*, driven by a hand-wheel, *C*, at the back. Of course any other suitable actuating means may be adopted. The needle-bar *A*, while sliding up and down or through a frame-piece, *D*, has, independent of this motion, a lateral movement given it at intervals to aid in effecting the feed of the cloth; but this feed is distinct from that of a mere needle-feed, which, besides straining on the needle, has many disadvantages, the cloth here being fed by the combined action of the needle and a friction or pressure pad, *E*, so arranged as to operate jointly and in unison to propel the cloth while the needle descends therethrough, or as it is completing its descent through the

cloth, and the needle and pressure-pad so operating together as that the needle securely holds the cloth in its required position when no feed is taking place, and the pad retreating, to be in readiness for each successive feed, while the needle is retracting, but during its hold on the cloth, to prevent the latter from being drawn back by the pad, as well as to secure it from accidental slip on the smooth surface of the table *D*. Such combined action of the needle and friction-pad as a joint feeding device may be accomplished in various ways, but the means I here select for illustrating how such is or may be done are as follows: The needle-bar *A* has its up-and-down play through a block, *F*, made capable of sliding crosswise in the frame-piece *D* of said needle-bar. This block *F* is pressed outward in an opposite direction to the feed by a spring, *c*, acting against its one end, the other end of the block bearing against a lever, *d*, working on a pivot, *e*, to admit of its upper end acting on the cross-sliding block *F* to press it forward against the spring *c* at its opposite end. Such motion of the lever *d* on the cross-sliding block *F* takes place when the needle is required to feed the cloth conjointly with the pad, the needle-bar by such arrangement necessarily moving laterally in direction of the feed by the action of the lever *d* on the cross-sliding block, through which the needle-bar works; but such is not the entire action of said lever on the needle-bar, for, after having actuated the cross-sliding block to produce the feed of the cloth, it is made to hold the block and needle-bar at the limit of lateral throw thus given them for and during the period of the retraction of the needle to secure the hold of the needle on the cloth in its position after being fed, while the pressure-pad *E* is retreating over the cloth to take a fresh bite and aid preparatory to a fresh feed of the cloth. This double action of the lever *d* on the needle-bar is shown as produced by means of a cam-ring, *T*, on the main driving-shaft *B*, made to operate on a feed-regulating pin, *f*, which is connected with an arm, *g*, of the lever, said cam being of suitable configuration to actuate the lever, as described, and to hold it in position after the feed has taken place. This cam is also formed or broken away at one part of its periphery, so as to admit of the spring *c*, which presses on the forward end of the cross-

sliding block, shooting said block and needle-bar back after the needle has retracted and during its descent through the cloth prior to the feed, in order that the needle may take its hold on the cloth in the rear of the stitch last formed, and to admit of the lever *d* again actuating it to produce a fresh feed.

The pressure-pad E, which acts in conjunction with the needle to produce the feed, is shown to work on an intermediate fulcrum, *h*, and to have a constant pressure on the cloth by means of a spring, *i*, the fulcrum of the pad being on a vertical link, G, to admit of the necessary horizontal play of the pad in feeding and retreating. This pad I prefer giving motion to by the needle-bar A direct, by causing said needle-bar in its descent, and just as it begins its lateral throw to effect feed, to come in contact with a crooked portion, J, of the pad, so as, in the continued descent of the needle and during the feeding-throw of the latter, to make said needle-bar urge the pad along with it to effect the feed by the joint action of the needle and pad, and the needle-bar further operating against the crook J of the pad in the early portion of the needle's retraction to keep the pad stationary for a short time after the feed has been effected, but soon to release the pad from such restraint and admit of its springing back or retreating while the needle finishes its retraction and holds the cloth securely in the position of its last feed. Thus, it will be seen, the needle is relieved of heavy strain in effecting the feed by the joint action of the pad, and that the action of the latter is prevented from undue feed and from drawing the cloth back in retreating, and that the cloth generally is kept from slipping by the hold of the needle in the cloth at the several periods before mentioned, and which joint action of needle and pad at the commencement and close of the feed is clearly illustrated in Figs. 5 and 6 of the drawings. The needle-bar, in pressing downward on the crook J of the pad, induces a slight increase of pressure thereof on the cloth to effect feed, which pressure on the needle-bar, in its ascent, clearing the crook, is discontinued, so that a less degree of pressure by the pad on the cloth takes place during the retreating action of the pad, but quite sufficient to hazard the cloth being disturbed or drawn back by it were it not for the fixed hold on the cloth which the needle retains in its retracting motion at that time, while the cloth is at all times held down on the table with more or less force by the pad, but preferably with a firmer grip when the feed is being taken. In this way the needle governs and controls the feed, so that the sewing will necessarily be exact; but the feed is not effected, as seen, wholly by the needle. To regulate the length of stitch, the pin *f*, on which the cam giving lateral throw to the needle acts, may be of screw formation, as shown in Fig. 2, so as to adjust the period of action of the cam on it to operate the lever *d*, and, when set, the screw be locked by any suitable

means. The needle-thread K is supplied to the needle from a bobbin, H, placed in any suitable position, but so arranged that the thread from it, directly or indirectly, passes up through a stationary eye, *l*, some distance in rear of the needle-bar, and from thence passes forward over a tension-pulley, I, mounted on the needle-bar, and from thence down to and through the needle-bar to and through the eye of the needle. The stationary eye *l* in rear of the needle-bar is situated considerably below the highest point reached by the pulley I of the needle-bar in the ascent of the latter, but in a horizontal line, or thereabout, with the lowest point reached by said pulley at its top in the descent of the bar, so that the thread will only be taken from the bobbin as the needle finishes its retracting stroke and when out of the cloth, by reason of the increased distance at that period between the stationary eye *l* in the rear and tension-pulley I of the bar. At no other point will there be any strain on the bobbin to give out thread, for, as the tension-pulley of the needle-bar descends till its top lies in horizontal line with the fixed eye *l*, the distance between said eye and pulley diminishes, and the thread unwound from the bobbin is only held in slack, or the pulley may descend a little below such horizontal line without further unwinding thread from the bobbin. Thus feed of the needle-thread takes place when the needle rises, and feeds most when the needle arrives at the top of its stroke.

The bobbin H has a general tension given it to check, in a measure, too free parting with the thread on feed being established by the needle-bar in its ascent; but such, it will be obvious, could exert no tendency to prevent the slack in the descent of the needle-bar falling below and accumulating at or about the needle on the cloth and occasioning kinks and irregularity in the stitches or spoiling the stitch. To obviate this I make the needle-bar distribute the slack between or over the whole line of thread unwound from the bobbin by constructing the needle-bar pulley I, over which the thread passes, to produce an independent tension, so that in the descent of the needle-bar the slack thread, instead of dropping wholly in front or down the needle-bar, will, to a certain extent, be retained in rear of the needle-bar, and between it and the bobbin, by reason of the friction thrown upon the slack by the needle-bar pulley, which, if free to turn, would have no such effect. To establish this tension at the head of the needle-bar, the thread may be lapped once, twice, or more round the crease in the pulley, and various modes of inducing tension pressure or hold be adopted; but I prefer the following, as applicable to tension arrangements generally: I support the pulley I on a screw-pivot, *m*, which serves to hold it to and adjust it farther or nearer from a support, K, at the back of the pulley, and between this support and back of the pulley I arrange a series of dished radial springs, *n*, pressing at their

extremities on the back of the pulley at or near its periphery, so that by turning to the right or to the left the screw-pivot *m*, by means of a rosette attached to said pivot in front of the pulley, I can adjust with the greatest nicety the free run of the pulley, and so control the tension, as, by reason of the springs acting on the pulley at or near its periphery, the slightest increase or diminution of their force will be most sensibly felt, and but a partial turn of the screw-pivot be requisite to affect materially the run of the pulley.

To make a series of chain-stitches it is necessary that the loop formed by the needle-thread below the cloth should be caught by a looper or its equivalent, and be turned or spread open and held for the passage of the next loop brought down by the needle to pass through it, and so on in succession. Various forms of vibrating loopers have been employed for such purpose, some having a side, others a downward, and others again an upward throw to catch, turn, and hold the thread from the needle. There prefer that form of vibrating looper which is placed more or less obliquely and has an upward throw to catch the loop from the needle during the retraction of the latter, as such form of looper follows the needle, as it were, in its course, and so acts with greater delicacy on the thread; but there have been objections to such class of vibrating pointed loopers. They have failed to hold securely the thread in the path of the descending needle, as the loop, in the retraction of the needle, is readily drawn off from over the point of the looper; nor does the usual lock of bringing the point of the looper in contact with the under surface of the table wholly prevent such liability, while such action of the pointed looper striking the table speedily dulls or breaks the

point of the looper, and so destroys or impairs its efficiency. I obviate such defects by combining with a vibrating looper, *M*, having an upward throw, as here mentioned, a spring, *r*, stationary at one extremity, but yielding in the plane in which the looper-point moves, so as to be sprung, by the looper in its closing action on the loop, crosswise to the motion of the looper, the point of which will readily lap over it, as shown in Figs. 1 and 8 of the drawings, without damaging the pointed extremity of said looper, while a perfect lock of the loop, till released by the back action of the looper, is secured. The looper, acting, as described, at intervals, as usual, may be operated by a rocking shaft, *S*, under the control of a spring, *t*, and connected with the driving mechanism of the machine in any suitable or the usual manner. In Figs. 5, 6, and 7 of the drawings the looper is shown in its back position and out of gear with its spring *r*, while in Figs. 1, 2, and 8 it is shown in its upward position and in lock with said spring.

What I claim is—

Feeding the cloth by the combination of the needle and friction-pad, when the said needle and pad operate jointly and in unison to propel the cloth as the needle descends there-through, the cloth being held in its required position by the needle during the intervals of feed while the pad is retreating to take a fresh feeding-grip on the cloth, essentially as specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

P. S. CARHART.

Witnesses:

A. POLLOK,
EDM. F. BROWN.