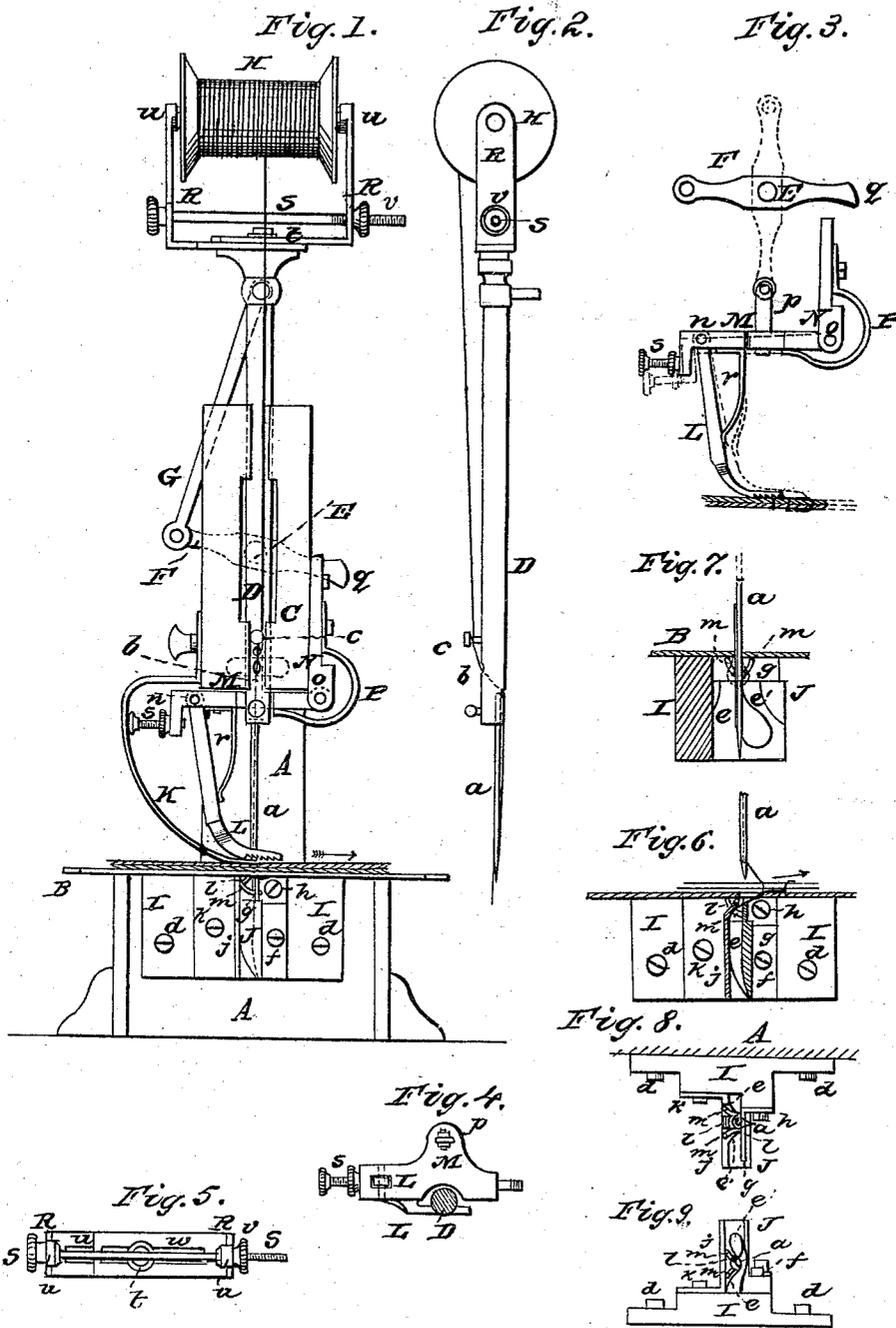


B. ATWATER.  
Sewing Machine.

No. 17,186.

Patented May 5, 1857.



# UNITED STATES PATENT OFFICE.

BRYAN ATWATER, OF BERLIN, CONNECTICUT.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 17,186, dated May 5, 1857.

*To all whom it may concern:*

Be it known that I, BRYAN ATWATER, of Berlin, in the county of Hartford and State of Connecticut, 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 part of this specification, in which—

Figure 1 is a front view of a machine with my improvements. Fig. 2 is a side view of the needle-bar, thread-spool, and needle. Fig. 3 is a front view of the driving-shaft and feeding mechanism detached from the machine. Fig. 4 is a plan of the main lever of the feeding mechanism. Fig. 5 is a plan of the device for regulating the tension of the needle-thread. Fig. 6 is a vertical section of the looping apparatus in a plane passing through the needle in the direction of the seam. Fig. 7 is a vertical section of the same in a plane near the needle at right angles to the direction of the seam. Fig. 8 is a plan of the same, and Fig. 9 an inverted plan of the same.

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

This invention consists in a novel contrivance arranged stationary in proper relation to a needle of the kind most commonly used in sewing-machines for the purpose of forming into a loop the slack of the thread that is left behind by the said needle on its retreat through the cloth or other material to be sewed, and directing the said loop into such a position that the needle enters it in its next passage through the cloth, by a repetition of which operation a seam of chain or single-loop stitches is produced from a single thread. This contrivance differs from other contrivances for the same purpose in forming the loop and directing it to the point of the needle by an external instead of an internal operation.

It also consists in a novel arrangement of mechanism for the purpose of feeding the cloth or other material to be sewed in the direction of the seam.

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

A is the stand of the machine, supporting the horizontal table B, on which the cloth or

other material to be sewed is placed, and the stationary needle-slide C, in which the vertical reciprocating needle-bar D works, and contains the bearings for the rotary driving-shaft E, which gives motion to the needle-bar by a crank, F, and a connecting-rod, G. All the above parts resemble in their construction and arrangement similar parts that are found in other well-known sewing-machines.

*a* is the needle, having its eye at about the usual distance from the point, arranged transversely to the line of sewing.

H is the thread-spool, placed at the top of the needle-bar D, in which there is a hole, *b*, arranged transversely to the line of sewing, for the thread to pass through, as shown in Fig. 2, to conduct it down the back side of the needle to the eye.

*c* is a stud, attached to the front of the needle-bar D, for the thread to pass round on its way from the spool to the hole *b*. The thread is represented by a red line in Figs. 1, 2, 6, and 7. The cloth is represented by a double blue line in Figs. 1, 3, and 6.

I is a plate, secured rigidly by screws *d d* to the front of the stand A, under the table B, and carrying the several parts of the contrivance for forming and directing the loop. The principal portion of this contrivance consists of a plate, J, (shown in Figs. 1, 6, 7, 8, and 9,) secured rigidly to the plate I by a screw, *f*. This plate J projects forward from the stand A on that side of the line of motion of the needle from which the cloth moves when fed. The direction of the feed is indicated by an arrow in Figs. 1 and 6. On that side of the plate J which faces the line of motion of the needle there is a V-shaped recess, *ee'*, (see Figs. 8 and 9,) in whose angle the needle works, just touching the plate, the said recess being rounded off toward the bottom, away from the line of motion of the needle, as shown in the vertical section, Fig. 6.

Above the plate J there is a smaller plate, *g*, secured rigidly to the plate I, close under the table B, by a screw, *h*, so as to stand vertically parallel, or nearly so, with the line of motion of the needle, and so close thereto that the needle will work in contact with its upper edge. This plate has a small notch, *i*, (see Figs. 6, 7, and 8,) in its upper edge opposite the needle. On the opposite side of the line

of motion of the needle to the plate J a plate, *j*, which stands parallel with the line of motion of the needle and transverse to the line of the seam, and fits close up to the plate J, as shown in Figs. 1, 6, 8, and 9, is rigidly secured by a screw, K, to the plate L, the said plate *j* fitting close up to the under side of the table, and having a lip, *l*, opposite the needle, said lip inclining toward the needle, so as almost to touch it, as shown in Figs. 6 and 7. Two curved pins, *m m*, (see Figs. 6, 7, 8, and 9,) are secured in the plate *g*, standing out obliquely thereto in opposite directions on either side of the line of motion of the needle.

The operation of forming the stitch is as follows: In the downward movement of the needle through the cloth the thread lies close to the front and back of it, and that portion at the back of it remains close to it as it is withdrawn, but the portion in front of it is retained by the friction of the cloth, and is left slack on the under side of the cloth, as shown in Fig. 7, where the needle is supposed to be rising. The upper part of the slack of the thread is confined closely to the needle by its own friction against the plate *g*, and the upper part of the recess *e e'* in the plate J, close to which the needle works, and consequently as the needle continues to rise the slack of the thread is kept down toward the lower part of the recess *e e'*, where room is left for it, and is thus caused to assume gradually the form of a loop. In Fig. 7 the loop, about half formed, is represented in bold red outline, in which state it corresponds with the position of the needle as there represented, and is shown in dotted outline as being completed and drawn up nearly close to the back of the cloth. The loop is prevented twisting as it is formed by means of the plate *j*, between which and the recess *e e'* there is only just room for it to work; and after it has been formed, and while it is being drawn up toward the back of the cloth, it is prevented moving in either direction laterally to the line of the seam by the two pins *m m*, between which it is drawn up and gradually contracted by the upward motion of the needle. When the point of the needle leaves the cloth, at which time the loop is contracted to about the condition shown in Fig. 7 in dotted outline, the feed movement takes place suddenly, by which means the neck of the loop is drawn over the top edge of the notch *i'* in the plate *g*, as shown in Fig. 6, whereby the eye of the loop is thrown upward toward a position parallel, or nearly so, with the cloth, being prevented from twisting during the movement by the flat lip *l* on the plate *j*. The loop now lies open nearly close to the under surface of the plate A, which, it must be observed, if not made of thin sheet metal, must be made thin at this point, and at this time the needle, whose upward movement terminates as the feed takes place, descends again, and in so doing passes through the loop, and carries through it the thread which is to form the

next loop, tightening the first loop as it does so, and afterward drawing from the spool H the requisite quantity of thread to form a stitch. The next loop, which is formed as above described, is left in the first one when the needle is withdrawn, and thus the stitch is completed, and a new stitch is completed with every succeeding operation of the needle.

It will be seen that the stitch is formed in this machine without a hook or any other device to extend the loop from the inside or otherwise operate within it, and that the loop is formed and guided to the point of the needle entirely by an external operation, in which respect the action of this contrivance for forming and directing the loop differs from all others.

I will observe here that the machine will operate with tolerable certainty without the plate *j* and its lip *l*; but without this the loop will occasionally twist, and consequently be missed by the point of the needle; but the plate *j* and lip *l* insure such a degree of certainty of operation that failure of the needle to enter the loop is almost, if not entirely, impossible. I will also observe that the guide-plate J, which guides the thread in commencing the loop, may be made flat, or nearly so, instead of with an angular recess as deep as that of *e e'*, (represented in the drawings;) but its operation would be less certain. I will also mention that it is essential to the perfection of the operation of this contrivance for forming and directing the loop by external operation that the point of the needle shall pass farther through the cloth than it does in most of the machines now in use, and I prefer that it pass through not less than one inch and a quarter.

K is a spring foot-piece of well-known character, secured to the needle-slide C, for confining the cloth or other material to be sewed to the table B by an elastic pressure.

L is a forked dog for feeding the cloth, operating on either side of the spring foot-piece K by pressing down upon the face of the cloth and then moving over the table B in a direction parallel therewith, or nearly so. This dog L is pivoted at *n* near one end of a lever, M, which is pivoted at its opposite end at *o* (see Figs. 1 and 3) to a plate, N, that is bolted to one side of the stationary needle-slide C, said lever working under the needle; and it carries an upright stud, *p*, (see Fig. 3,) which is operated upon to depress the lever suddenly just at the moment the needle is drawn to its farthest position out of the cloth by a wiper, *q*, attached to the crank F, and standing on the opposite side of the driving-shaft. The relative arrangement of the lever M, dog L, and face of the table (shown in Figs. 1 and 3) is such that when the lever is depressed by the action of the wiper and the dog is pressed in contact with the cloth the dog receives a motion on its pivot *n*, which causes it to move over the face of the bed and carry the cloth with it. This movement is illustrated in Fig. 3, where the

black outline represents the parts before and the dotted outline during the action of the wiper.

P is a strong spring secured to the plate N, and bearing against the under side of the lever M to raise it after the action of the dog, and thereby lift the dog from or remove the pressure thereof from the cloth; and *r* is a lighter spring applied between the lever M and dog L to throw back the dog when its pressure is removed from the cloth to the position to repeat its operation when the lever is again depressed.

The length of the feed movement is regulated by shifting a stop-screw, *s*, which screws into the lever M, said screw being arranged either to be stopped by the foot-piece K, as shown in Fig. 1, or by the bottom of the needle-slide C.

The very sudden action of the feed as produced by the above-described mechanism is necessary to throw the loop upward, as before described, to receive the needle, and no arrangement of feeding mechanism known to me as heretofore used in sewing-machines is quick enough in its action for this purpose.

R R are two angle-pieces, of brass, steel, or other metal having a suitable degree of elasticity, secured firmly to the top of the needle-bar D by a screw, *t*, fitting to a female screw cut in the top of the said bar, said angle-pieces serving as two elastic standards, between which an ordinary spool, H, of silk or other thread, is held to supply the thread to the needle, said standards having rigidly attached to them two cones, *u u*, which enter the hole in the center of the spool and serve as the centers on which the spool rotates.

S is a screw passing freely through the upright portion of one of the elastic standards R R and screwing into the other, for the purpose of drawing the cone centers toward each other with such force as to produce such a degree of friction on the spool as may be desirable to give the requisite tension to the thread.

V is a set-nut for securing the screw S when the friction is properly adjusted. The horizontal portions of the standards R R are slotted to receive the screw at the top of the nee-

dle-bar, as shown at *w w*, Fig. 5, and hence they can be set with their centers nearer together or farther apart to suit spools of different lengths.

I do not claim forming a loop for a chain-stitch and holding it in position to receive the succeeding loop, wherein a stationary shuttle is used, as in the patent of T. J. W. Robertson; but

What I do claim as my improvement is—

1. The arrangement above described, by which I am enabled to keep the loop of the needle-thread positively in position by guides alone, without the necessity of introducing a looper or any other device into the loop or making the loop pass round a hook or fixed shuttle—that is to say, the within-described arrangement of guides for forming the loop from the slack of the needle-thread and directing the same by an external operation to a position for the needle to pass through it, consisting of a stationary guide-piece, J, a stationary notched plate or edge, *g*, and two stationary guides, *m m*, arranged, as specified, in proper relation to each other and to the needle and the cloth or other material to be sewed, and employed, in connection with a proper feeding-movement of the cloth or material, to operate substantially as herein described, and in combination with the said contrivance the guide-plate *j*, with its lip *l*, arranged and operating as set forth.

2. Though I do not claim the dog L, operating, as described, in connection with an elastic foot-piece, K, on the face of the cloth, as in the machine of T. J. W. Robertson, to produce the feeding movement of the cloth or other material to be sewed, I claim the attachment of the dog L to a lever, M, arranged and operated upon by a wiper, *q*, on the driving-shaft E, as herein set forth, to produce a quick or sudden feeding movement of the cloth or other material, which shall at the same time aid in throwing the loop in the path of the needle, as and for the purpose herein specified.

BRYAN ATWATER.

Witnesses:

J. F. BUCKLEY,  
S. F. COHEN.