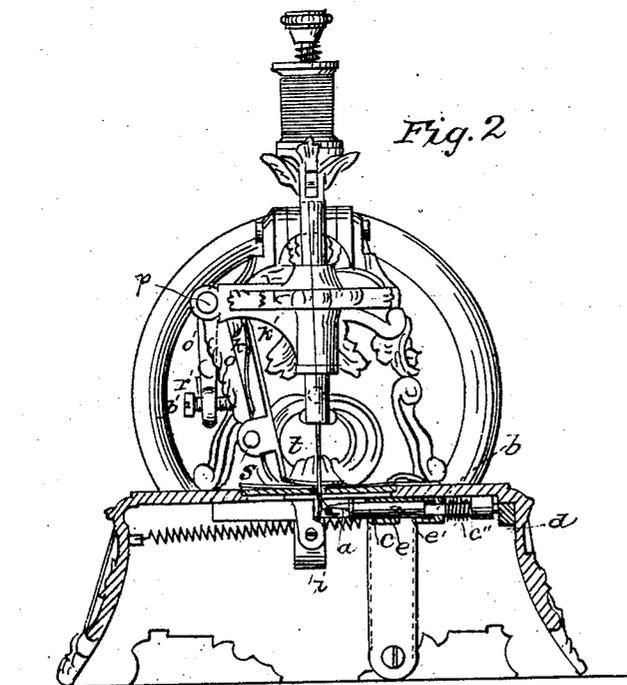
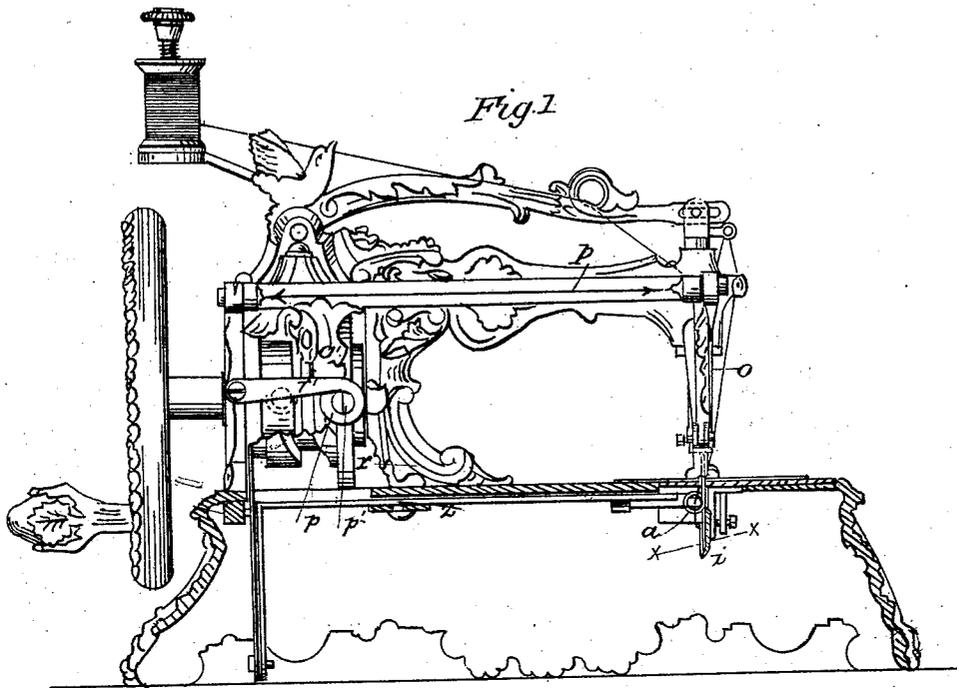


W. C. WATSON.
Sewing Machine.

No. 16,136.

Patented Nov. 25, 1856.



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Fig. 3

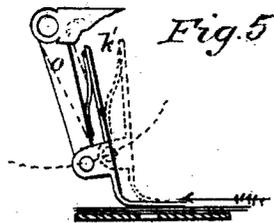
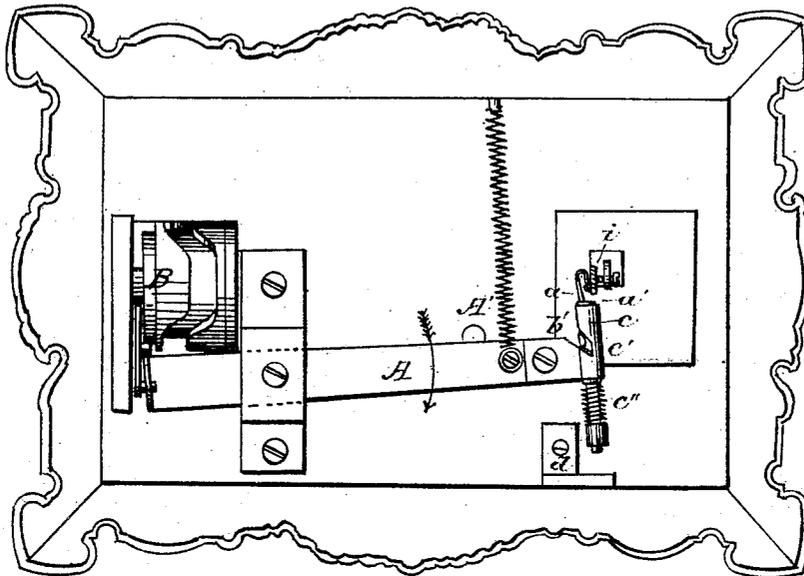
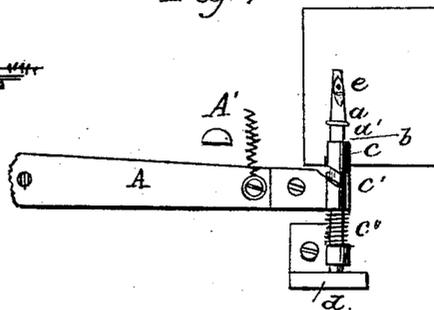


Fig. 4



UNITED STATES PATENT OFFICE.

WILLIAM C. WATSON, OF NEW YORK, N. Y., ASSIGNOR TO WATSON,
WOOSTER & KNIGHT, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **16,136**, dated November 25, 1856.

To all whom it may concern:

Be it known that I, WILLIAM CASWELL WATSON, of New York, county of New York, and State of New York, 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 same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure I is a side view or elevation. Fig. II is an end view. Figs. III, IV, and V are parts in detail; and similar letters indicate similar parts throughout.

My invention consists in an improvement in the method of constructing and operating the hook which takes up the loops formed beneath the table in single-thread sewing-machines.

There has always been great uncertainty in the operation of that part of a single-thread sewing-machine which is to take off the loop and retain it until the needle shall have passed through in the succeeding stitch, and almost all of the various plans—such as hooks, loopers, &c.—proposed have been designed to remedy that uncertainty. This is also the principal object sought to be accomplished by this part of my invention, which is designed to make the workings of the loop-forming part as positive as the operations of the needle itself. The difficulty grows out of the fact that the thread must be released and taken up at each and every stitch. Now, as the time allowed is very short and the space to work in is also extremely limited, the slightest irregularity is sufficient to cause the hook, looper, or whatever device may be employed, either to miss the thread altogether or else to cause the needle to pass by without going through, and thus in either case the stitch will not be formed. In fact, the needle more commonly misses to pass through the loop than the hook or looper fails of taking hold of the thread, because, even after the hook or looper gets hold of the thread, it is commonly held in such a bad position that the point of the needle is as likely to pass outside as to go through. My improvement possesses peculiar advantages in this respect, for it seizes the thread while in contact with the side of the needle, draws it away, and opens it into a wide loop directly in the path of the needle at its next

stroke. In performing this the hook takes three different positions. In the first position it is at the side of the needle, with its point just back of the thread. In the second it has moved horizontally, thus taking hold of the thread and pulling it off to one side. In the third the hook turns one-quarter round, thereby twisting the loop from a vertical to a horizontal position, forming a comparatively large opening directly in the path of the needle, thereby insuring its entrance in the most certain manner, all which will be made apparent by the following description of its construction and operation.

The hook is shown at *a*, attached to or formed at the end of a round shank or spindle, *b*. It is flat and broad when viewed in front, and thin when viewed at the edge, or as shown in Figs. III and IV. It is carried in a sheath or long bearing, *c*, fixed to the end of a lever situated beneath the bed of the machine at *A*. As the shank *b* stands at right angles to the lever *A*, it points in a line tangent to the arc of vibration of the former, and this is an important feature in the movement of this part of the machine, for it effects the transfer of the point of the hook from the side of the needle to another point, which will be in a line with the path of the needle, or in the two positions shown in Figs. III and IV, wherein Fig. III shows the first-named position and Fig. IV the second. While the hook is being moved in manner above described, it is also turned on its shank, as an axis, one-quarter of a revolution. By this means the thread at the side of the needle is taken up by the hook, then drawn off laterally to the position in Fig. IV. Here, as will next be described, the hook is turned and spreads the loop open, so that it completely embraces the line passed over by the needle, whereby the latter must necessarily enter the loop.

Through the side of the sheath *c* a spiral slot, *c'*, is cut, in which plays a pin, *b'*, projecting from the shank *b*.

The lever *A* first commences its movement from the stop *A'*, Fig. III, in the direction of the arrow shown upon it, carrying the hook, with its thread, to the other side of the needle, but without changing the position in which the thread is held until the further motion of the hook is arrested by the end of its shank

striking against a stop, *d*, as in Fig. IV. The lever *A* does not rest yet, but, continuing on, causes the sheath *c* now to slide over the shank, in doing which the pin *b* is made to traverse in the spiral slot before named, whereby the hook is turned round and the loop formed by drawing off the sewing-thread is spread open in the manner before mentioned, the several parts being then in the positions shown in Fig. IV, the loop being seen at *e*. Before the needle retreats, the hook must become disengaged from the loop, and for this purpose the hook first turns round on its shank, which turning is accomplished by the force of a spiral spring shown at *e'*, which has been compressed by the sliding along of the sheath in the previous movement. As the lever returns, therefore, the spring *e'* keeps the shank against the stop, and the sheath consequently slides along in the first place toward the hook, the pin *b* returning in the spiral slot and causing the hook to rotate. At this point the forward edge of the sheath has arrived at a stop, *a'*, upon the shank near where the hook commences, when the whole moves together back to the first position, Fig. III.

The lever *A* is made to vibrate in the proper time and manner by means of an ordinary cam, *B*, upon the main shaft. In order still further to increase the certainty of action, the point of the needle is braced when beneath the table, so as to stop all vibration and to diminish the risk of breakage by the lateral pull of the hook upon the thread, in case the latter should be stopped by a knot from traveling.

The brace consists of a piece of metal having a narrow groove cut on its face. This is secured beneath the table, just on one side of the hole where the needle comes through, and so that the groove will be inclined so as to tend across the path of the needle. This piece is seen at *i*. As the needle descends, when part of the way through the point strikes angularly against the groove in the brace-plate, and as it continues to descend it is sprung slightly to one side by following the course of said groove, as seen in Fig. I. This pressure is of course slight, just enough to attain the object of having the needle held in the groove and sustained by its sides against the lateral pull of the hook, and also to steady it, so that it will not get into vibration by reason of its rapid motion through the cloth, which is one frequent cause of the hook or looper missing the thread in the old machines, particularly when using a fine needle. The degree of angularity of the brace-plate to the path of the needle may be regulated as desired by a set-screw at the back.

The feed-motion consists of an arm having a peculiarly-constructed finger attached at its lower end, and placed in such position that the vibration of the former will cause the latter to take hold of and move or feed the cloth along under the needle. At *o*, Figs. I and II, is the arm attached at its top end to a rock-shaft, *p*, ly-

ing horizontally and secured to the bracket holding the needle-stock. At the end of this shaft opposite to that to which *o* is attached is another arm, *o'*, in the lower end of which is a screw-stud, *p'*, Figs. I and II, the point of which rests against a cam, *r*, Fig. I, upon the main shaft. The point of this stud is kept up to the surface of the cam by a spring, *r'*, whereby the arm *o'* is made to vibrate according to the figure of the cam's surface. The finger which takes hold of the cloth is a lever having its axis or fulcrum in the end of the arm *o*, as seen at *s*. Its lower end is bent nearly at right angles, and so that its flat side presses upon the table directly under the path of the needle, as at *t*. The needle passes in a slot cut longitudinally through the part *t*, and the under surface of this part is notched in a manner common to the feed-pads of sewing-machines. The pad is made to feed up the cloth by means of a spring, *k*, Fig. II, which presses against the tail *k'*. The finger in operating pulls the cloth along, instead of pushing, as is common to most plans where a finger is employed. In starting, the arm is inclined toward the needle, and in giving the feed it moves in the direction of the arrow in Fig. V, the position of the parts when extended to take the feed being shown also in that figure by the dotted lines. In consequence of the angle at which the arm *o* stands at the commencement of the feed, the point *t* descends slightly toward the table in following the arc in which *o* vibrates, thus slightly increasing the pressure upon the cloth as it moves along. When the arm returns the finger for a new feed, the needle is in the cloth and thereby keeps it in place.

The length of stitch is regulated by the angle at which the arm *o* stands at the commencement, which angle is given by the set of the screw *p'*. As this stud is screwed outward, the arm *o'* will move toward the cam *r*, and *o* will move toward the needle, and the fulcrum *s* of the feed-finger will be lifted upward by being carried along the arc which *o* describes, as clearly seen in Fig. V. Thus the feed-finger could be eventually raised entirely from the table. As the throw of the cam *r* constantly vibrates *o* to the same degree, it will be seen that the length of stitch depends upon the angle at which *o* stands on commencing the feed, since the pad is made to pass a greater or less distance, according to said angle, and the cloth will be moved along more or less accordingly. This angle is regulated by the screw-stud *p'* moving the arm *o'*, and through that the other arm, *o*, toward or from the surface of the cam. The finger, however, never leaves the cloth, the arm not being, in any position of the regulating-screw, allowed to rise high enough for that; hence it acts also as a pressure-pad.

The other parts of the machine can be understood by inspection of the drawings without a more particular description, being common to sewing-machines and well known.

The operation will be as follows: The nee-

dle being supplied with thread, turn the crank until its point is raised to its greatest height, press upon *k*' with the finger. This raises the pad from the table, and the cloth may then be put under in the proper place for being sewed. Continuing the motion of the crank, the needle descends through the cloth and commences to rise, puffing out thereby the thread which lies along the inner side of the needle. The hook *o* is at that moment in the position shown in Fig. III, the cam B strikes the tail of the lever connected with A, and it begins to move in the direction shown by the arrow. The hook catches the thread and draws the loop off to one side, then turning round it spreads the loop, as shown in Fig. IV, in the manner already described. As the needle descended, it struck the groove of the brace-plate *i*, placed on the opposite side of the hook, where it is well braced by the side of said groove, as well as steadied against the lateral pull of the hook. At this moment, also, the feed-finger returns, to be ready for a new grip upon the cloth, and as it pushes along against the frictional pressure of the spring *k* the clutch is kept from going with it by the needle holding it in place, the brace-plate also serving to steady it against this action, as well as against the pull of the hook. The needle having risen above the cloth, the proper projection on the cam *r* strikes the point of the stud *p*', thereby vibrating the arm *o* and giving the feed by bringing the pad *t* down upon the cloth and drawing it along in the manner already set forth. The needle now descends, passing directly through the loop *e*, Fig. IV, the hook *a* then returning to its first position, Fig. III, to take off the next loop, and thus interlock or weave the chain in the manner well known.

I am aware that a plate has been used to press against one side of the needle in order

to insure the formation of the loop wholly on the other side, and such is already secured to me by Letters Patent of March 11, 1856; but the face of that plate is perfectly flat, and it does not thereby operate to deflect the needle from the vertical line, by which deflection the needle would be prevented from vibrating, as above set forth; nor does it secure the needle against the danger of being broken by the lateral pull upon the loop or by the motion of feeding. I am also aware that a barbed needle operating through the cloth in the manner of a crochet-hook, and having a partial revolution about an axis in the direction of its length, has been used to form a chain-stitch; but therein it served as a substitute for the ordinary needle, and it is uncertain in its action, whereas in my machine the looping-hook is not in any sense a needle, but acts in connection with one of usual construction. I am aware, likewise, that a tweezer having partial revolution on its longitudinal axis, given by the operator at each required moment, has been employed in the hand-working of button-holes. This, however, is so far unlike my automatically-acting hook that it would be but a crude device for making a continuous seam.

What I claim is—

1. The revolving and reciprocating looping-hook, constructed and operating substantially as described.

2. The inclined and grooved brace-plate *i*, so placed beneath the cloth as to deflect the lower end of the needle to one side of its path, whereby its vibrations are prevented, and it is secured from breakage by the lateral pulls, as set forth.

W. C. WATSON.

Witnesses:

J. P. PINSSON,
S. H. MAYNARD.