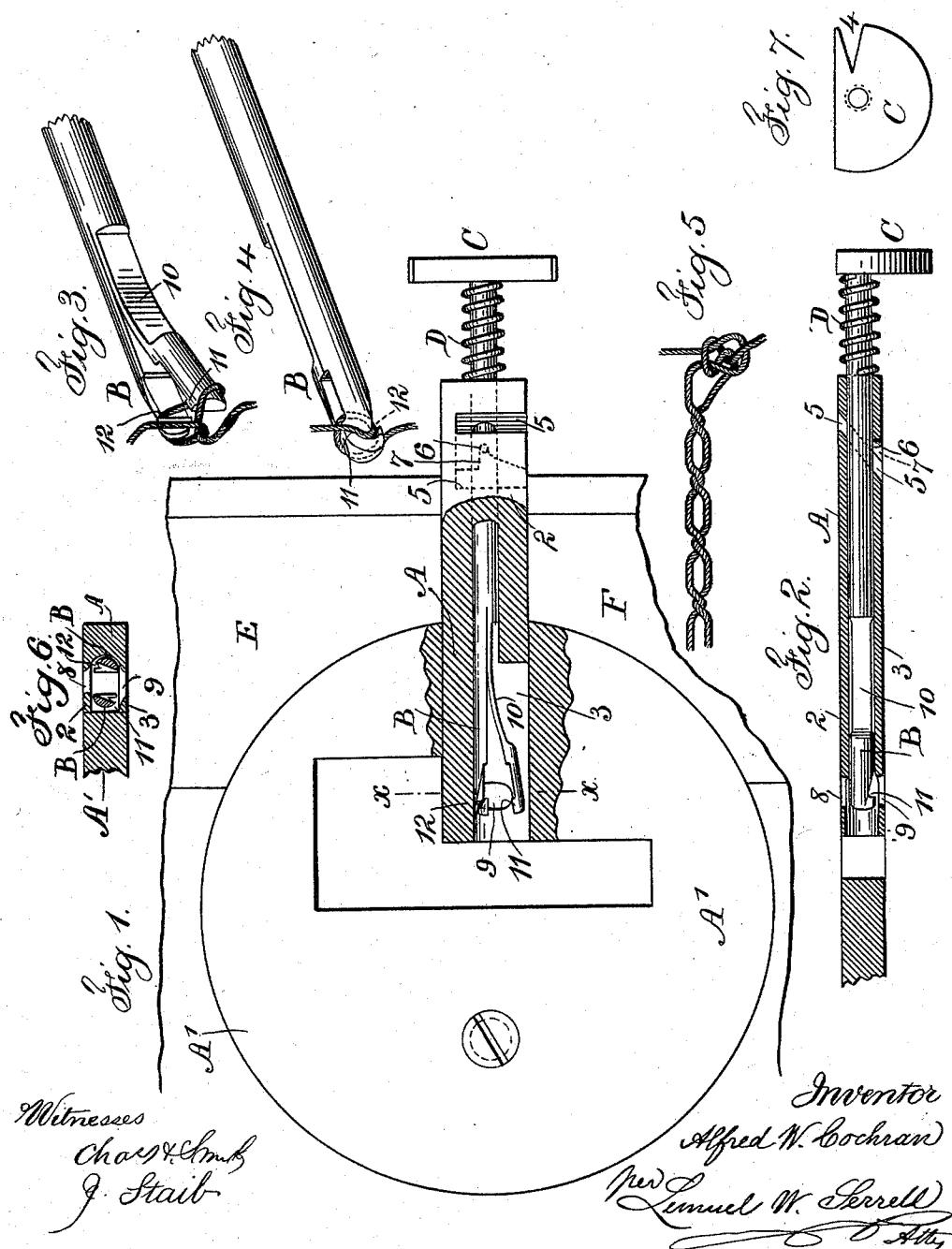


A. W. COCHRAN.
KNOTTER FOR SEWING MACHINES.

Patented Oct. 16, 1894.



UNITED STATES PATENT OFFICE.

ALFRED W. COCHRAN, OF NEW YORK, N. Y.

KNOTTER FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 527,407, dated October 16, 1894.

Application filed August 8, 1893. Serial No. 482,651. (Model.)

To all whom it may concern:

Be it known that I, ALFRED W. COCHRAN, a citizen of the United States, residing in the city and State of New York, have invented an Improvement in Knotters for Sewing-Machines, of which the following is a specification.

In Letters Patent No. 453,730, granted to me June 9, 1891, a knotter is represented having two spring arms and located between the two sides of a throat plate, so that by the rotation of the twister the lower or shuttle thread is twisted into a loop through which the needle passes, and then the shuttle thread is passed through the loop of needle thread and as the threads draw up, a knot is tied between the shuttle thread and the needle thread closely adjacent to the under side of the fabric that is being sewed. In my present invention a similar knot is tied, but I have simplified the parts so as to lessen their expense and also to render the operation more positive and reliable.

I construct the twister with jaws, the exterior surfaces of which when the jaws are closed form a cylinder between the upper and lower parts of the throat plate, and by the act of rotating the twister the spring-jaw is closed against the rigid jaw around the thread, by the pressure of said spring-jaw against one wall of the opening in the throat-plate, and a cam-slot and pin are provided for drawing back the jaws after they have been closed to seize the thread, in order that the parts of the loop may interlock at the end of the twister, and then the twister is moved forward again and opens by the spring jaw to spread the twisted loop and hold the same for the passage of the needle, after which the shuttle is passed through the loop of needle thread and the twisted loop of shuttle thread draws off the twister and is around the needle and draws up closely against the under surface of the fabric that is being sewed as the needle rises and the knot is tightened at this place as the threads are drawn up in the usual way in tightening the stitch.

In the drawings, Figure 1 is a plan view partially in section, representing the throat plate and twister. Fig. 2 is a side view of the parts, also partially in section. Fig. 3 is a perspective view showing the twister as de-

tached from the throat plate and open to spread the loop, and Fig. 4 shows the twister as closed and revolved half way around. Fig. 5 is a diagram of the knot. Fig. 6 is a cross section, at the line xx , Fig. 1, and Fig. 7 is an elevation of the button head of the twister.

The throat-plate A, is preferably formed of a piece of metal sufficiently thick for a hole to be bored therein longitudinally and parallel with its upper and lower surfaces and an opening extends from this hole laterally to the edge of the plate thereby forming an upper plate 2, and a lower plate 3, which are perforated with holes for the passage of the needle, and the twister B is formed of substantially a cylindrical wire filling the hole in the throat plate and having a button or head C at the outer end, and this button or head C is advantageously circular except that the upper part thereof should be cut off at the same level as the top surface of the throat plate so as not to interfere with the fabric that is being sewed as the same lies upon the surface of the throat plate, and by providing a notch at 4 in the end of the head, the twister may be rotated by inserting the nail in the notch 4, pressing the twister inwardly against the action of the helical spring D that surrounds the outer part of the twister shank, and in so doing the circular portion of the head C is brought above the surface of the sewing machine table and can be rotated by pressure of the finger, so that it revolves once in twisting the thread, as hereinafter described.

The throat plate (A) may be secured to the bed of the sewing machine in any convenient manner. Usually it is attached to the plate (A') that is screwed to the bed of the sewing machine and has the openings for the feed bar as usual. Across the projecting end of the throat plate is a diagonal slot or mortise at 5 within which is a pin 6 upon the shank of the twister; and it will be observed that this pin 6 as the twister is rotated and the pin travels in the slot 5 gives to the twister an end movement bodily and then forces the twister back again into its normal position, and by providing an offset or notch in the slot 5, as at 7, the twister is stopped each rotation in the proper position by the pin 6 passing into said notch or offset at the com-

pletion of the rotation, and the twister has to be pushed inwardly against the action of the spring D before the pin 6 will clear the offset 7 and hence before the twister can receive its rotation. This insures the inward movement which is advantageously given to the twister in the act of grasping the thread. Through the upper and lower sides 2 and 3 of the throat plate there are the holes 8 and 9 for the eye-pointed needle to pass through, and these are in such a position that the jaws of the twister are at opposite sides of the needle as it passes through the holes; and it is to be understood that this throat plate is secured to the sewing machine but with the upper surface of the throat plate on the level or nearly so of the sewing machine bed and hence that the shuttle thread passes up through the holes 8 and 9 as the lock stitch is drawn up or tightened in the fabric, and that the twister is to be actuated only when the needle is out of the cloth, and hence the twister acts upon the lower or shuttle thread as it draws through the holes 8 and 9.

The peculiarity of the jaws of the twister will be most clearly seen in the detached perspective view Fig. 3. The body of the twister is slotted longitudinally to form the two jaws. One side is reduced so that the portion 10 forms a spring that tends to open the jaw end of the twister, and the exterior surfaces of the jaw ends of the twister are semi-cylindrical, and the opposite adjacent faces of the jaw ends are recessed so that when the jaw ends are brought together as in Fig. 4, there is an elongated mortise for the thread, and upon the spring jaw of the twister is a hook 11 having its point extending inwardly toward the mortise, and in the rigid side of the jaw is a groove 12 running outwardly from the mortise; and it will also be observed by Fig. 6 that the lower eye or hole 9 through the lower side 3 of the throat plate is elongated and beveled toward the rigid jaw, the object being to prevent clamping and cutting the thread when the parts are rotated in twisting the shuttle thread. It is now to be understood that when an end motion is given to the twister, as before described, it passes toward the shuttle thread as the same extends through the two eyes or holes 8 and 9 of the throat plate, and as the twister is rotated the spring jaw thereof is closed by the semi-cylindrical surface thereof sliding on the lower plate as the twister is rotated between the upper and lower sides of the throat plate, and the twister is closed so that the thread is within the elongated slot of the twister. In this position the ends of the mortise through the twister extend as far as the edges of the eyes 8 and 9, so that the thread cannot be caught between the surfaces that come together but is free within the mortise, and as the rotation proceeds the twister is also drawn back by the action of the diagonal slot and pin and one part of the thread passes into the groove of the hook 11

and the other part of the thread passes out through the groove 12, as seen in Fig. 4, and the twister draws back sufficiently for the two parts of the thread to twist together and interlock at and beyond the end of the twister before the rotation is completed and as the twister is forced back again to its normal position and the spring jaw of the twister opens, the twisted loop of thread is spread, as illustrated in Fig. 3, for the eye-pointed needle to pass through such loop, the interlocking parts of the thread being at and beyond the ends of the twister and hence below one edge of the hole 8, and out of the way of the descending needle, and the portion of the loop of thread that passes across from one hook 12, to the other hook 11, is near the other edge of the hole 8, so that the needle passes freely through the loop. The loop of needle thread is passed around the shuttle or the shuttle passed through the loop, as illustrated in Fig. 5, so that the twisted loop of shuttle thread draws off the twister by the tension and is around such eye-pointed needle and is shed off the needle against the under side of the fabric that is being sewed as the needle draws up and the needle thread is drawn up, by the action of its tension, through the twisted loop of shuttle thread until the threads tighten and a knot similar to a sailor's knot is tied closely adjacent to the under side of the fabric that is being sewed.

It will be observed that the metal of the throat plate that is adjacent to the rigid side of the twister when the twister is in the normal position shown in Fig. 1, keeps the spring side of the twister closed up against the rigid side of the twister when the parts have been half rotated, as indicated in Fig. 4, and the respective grooves and hooks upon the jaws of the twister are in such a position that the thread passes out of the mortise of the twister into such grooves and the parts of the thread are held by the hooks in the grooves of the jaws, and when the twister has been revolved half way the twister has been drawn back by the pin and inclined slot so that the ends of the twister are back from the holes 8 and 9, and the threads are obliged to twist together beyond the ends of the jaws as in Fig. 4, and as the twister completes its rotation it is moved forward into the position shown in Fig. 1, and the loop of thread is spread as indicated in Fig. 3, and the interlocking portions of the thread are beyond the open ends of the twister jaws and the twisted loop is easily drawn clear from the spring twister jaws, in consequence of the movement of the shuttle after the needle has passed through the twisted loop, because the part of the twisted loop that is around the spring jaw is free to pass off from the spring jaw, and the other part of the twisted loop between the rigid jaw and the throat plate is only held with a slight friction and the thread pulls out from that position by the friction of the twisted loop around the eye-pointed needle.

as such eye-pointed needle rises; and it will be observed upon reference to Fig. 6, that the upper part of the lower side of the throat plate around the lower eye 9, is beveled to give ample room for the loop to cast off from the spring jaw. The knot is completed as the threads are tightened as aforesaid.

By constructing the parts in the manner before described the operations are rendered perfect and reliable and the end movement of the twister is rendered as short as possible and the angle of the cam slot is such that the pin can be easily moved therein with but little friction. The ends of the jaws when closed being cylindrical and filling the space between the upper and lower sides prevent the thread slipping out from the hooks 11 and 12, and the thread draws over the hooks as the jaws open and the loop is spread.

In some characters of sewing machines the cover plates over the shuttle raceway will come up at each side of the extending portion of the throat plate and also partially adjacent to the plate A', as illustrated at E F, Fig. 1.

I claim as my invention—

1. The combination with the throat plate, with an opening for the passage of the eye-pointed needle and a longitudinal hole, of a rotatable twister within such hole having one rigid and one spring jaw, the exterior of the spring-jaw being rounding so as to be closed in its rotation by contact with the throat plate, the jaws being recessed in their inner faces to form an elongated eye and having grooves and hooks at the ends of the jaws for twisting the thread substantially as specified.

2. The combination with the throat plate having upper and lower sides with openings for the passage of the eye-pointed needle and a longitudinal hole, of a rotatable twister within such hole having one rigid and one

spring jaw, the exterior of the spring jaw being rounding so as to be closed in its rotation by contact with the throat plate, the jaws being recessed in their inner faces to form an elongated eye and having grooves and hooks at the ends of the jaws for twisting the thread, and means for giving an end movement to the twister as it is rotated, substantially as specified.

3. The combination with the throat plate, of a twister formed of a cylindrical wire split longitudinally and having a spring jaw, hooks and grooves near the ends of the jaws, mechanism for giving an end movement of the twister as the same is rotated, a circular head upon the end of the twister with the upper edge removed to the level of the top of the throat plate, and a notch for receiving the finger nail for rotating such twister, substantially as set forth.

4. The combination with the throat plate having upper and lower sides, with openings for the passage of the eye-pointed needle, a diagonal slot and a longitudinal hole, of a rotatable twister within such hole having one rigid and one spring jaw, the exterior of the spring jaw being rounding so as to be closed in its rotation by contact with the throat plate, the jaws being recessed in their inner faces to form an elongated eye and having grooves and hooks at the ends of the jaws for twisting the thread, and a pin on the shank of the twister within said diagonal slot, the latter having also an offset or shoulder to form a stop for the pin, substantially as specified.

Signed by me this 4th day of August, A. D. 1893.

ALFRED W. COCHRAN.

Witnesses:

GEO. T. PINCKNEY,
A. M. OLIVER.