(Model.) 2 Sheets—Sheet 1.

H. COOK.

DEVICE FOR CONTROLLING THE SHUTTLE THREADS OF SEWING MACHINES.

No. 454,610. Patented June 23, 1891.

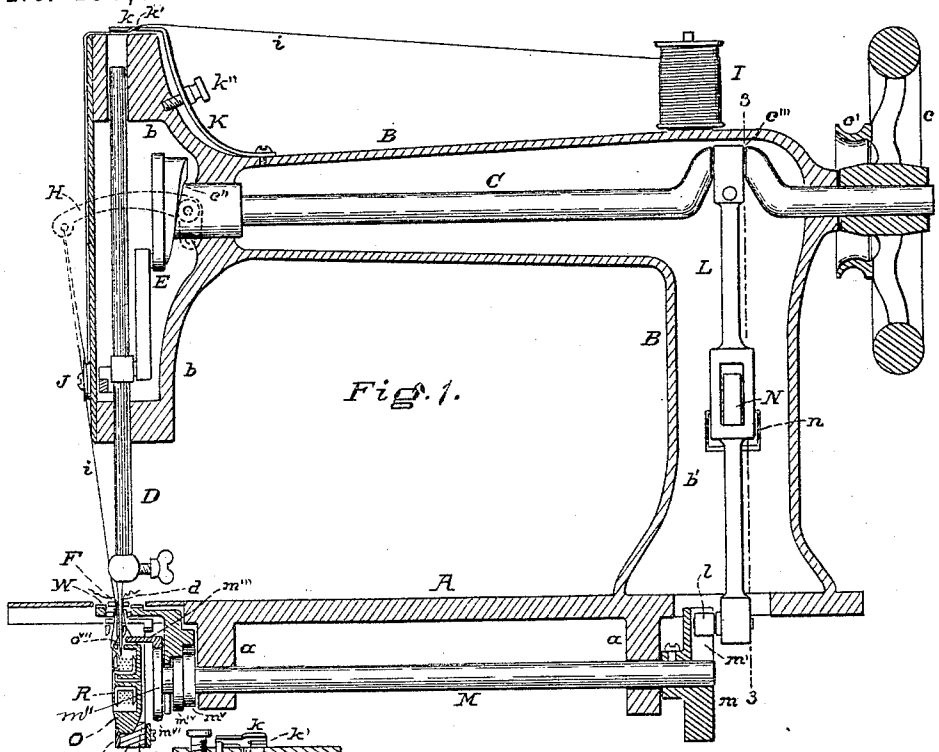

Fig. 1.

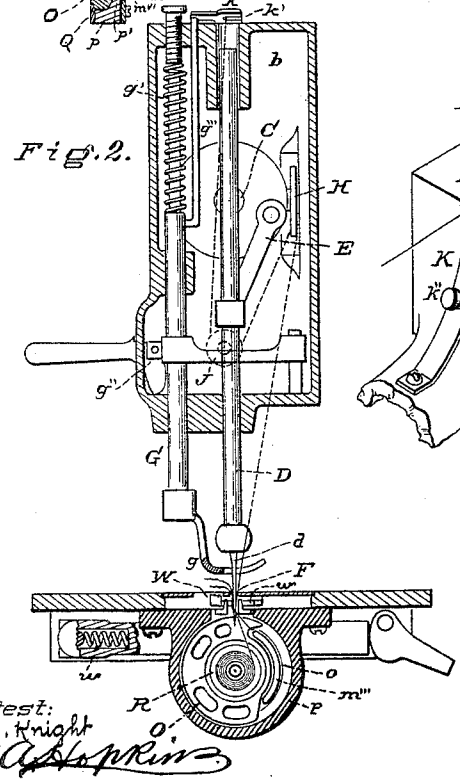

Fig. 2.

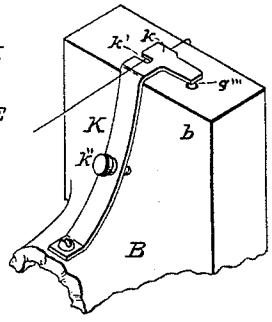

Fig. 9.

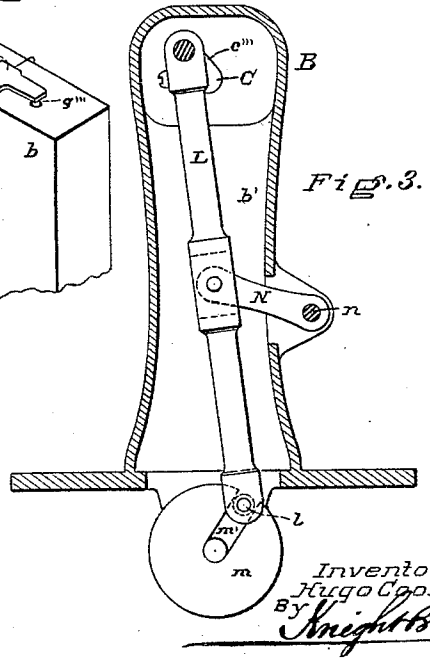

Fig. 3.

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(Model.) 2 Sheets—Sheet 2.

H. COOK.

DEVICE FOR CONTROLLING THE SHUTTLE THREADS OF SEWING MACHINES.

No. 454,610. Patented June 23, 1891.

Fig. 4.

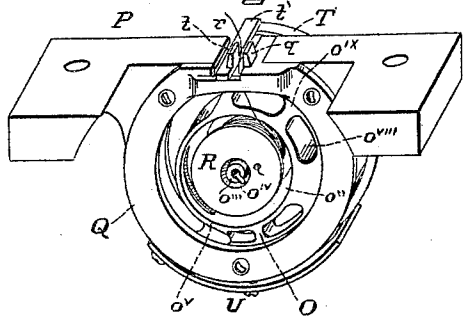


Fig. 5.

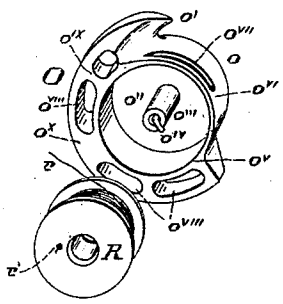


Fig. 6.

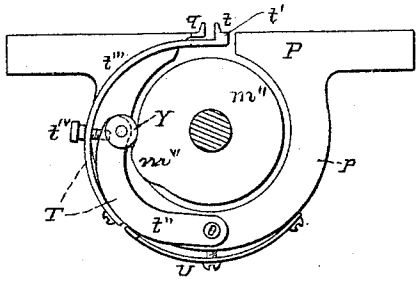


Fig. 7.

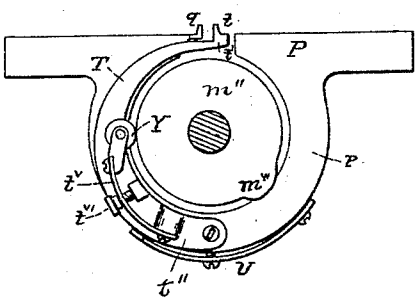


Fig. 8

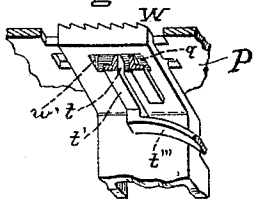
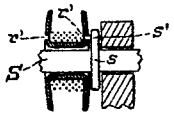


Fig. 10.



Inventor:
Hugo Cook
By Knight Bros.

Attest:
A. P. Knight
F. A. Hopkins

UNITED STATES PATENT OFFICE.

HUGO COOK, OF CHILLICOTHE, OHIO.

DEVICE FOR CONTROLLING THE SHUTTLE-THREAD OF SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 454,610, dated June 23, 1891.

Application filed April 26, 1886. Serial No. 200,202. (Model.)

To all whom it may concern:

Be it known that I, HUGO COOK, of Chillicothe, Ross county, Ohio, have invented new and useful Improvements in Rotary-Shuttle Sewing-Machines, of which the following is a specification.

My invention consists in the novel features of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of a rotary-shuttle sewing-machine provided with my improvements. Fig. 2 is a vertical transverse section of the same through the needle. Fig. 3 is a vertical section on the line 3 3 in Fig. 1. Fig. 4 is a perspective view of the parts appertaining to the shuttle and its race. Fig. 5 shows in perspective the shuttle and bobbin detached. Fig. 6 is a rear elevation of my preferred form of tension device for the shuttle-thread. Fig. 7 shows a modification of the same. Fig. 8 is an under side view of the feed-dog and shuttle-thread tension-plates. Fig. 9 is a perspective view of the needle-thread tension device. Fig. 10 is an axial section of the bobbin in place on the winder.

A represents the table-plate.

B is the hollow arm, in which is journaled the upper shaft C, which carries the fly-wheel *c* and a pulley c^{i}, to receive the driving-cord. The extremity of the arm is formed into a box *b*, in which are orifices for receiving and guiding the needle-bar D, which is driven by a crank and pitman connection E from the shaft C, so as to cause the needle *d* to pass up and down through the throat F. The presser-bar G of the presser-foot *g* is provided with customary depressing spring g^{i} and elevating device g^{ii}.

H is the take-up arm operated by a cam c^{ii} on shaft C.

The spool-thread *i* passes from the spool I through a tension device, then down and around a sheave or disk J, and then through the eye of the take-up arm to the needle-eye. The tension device referred to preferably consists of a spring-plate K, fastened at its foot to the arm B with its head *k* projecting over the box *b*. The thread is inserted into a slit k^{i} in this head, and is pressed between said head and the top of the box *b*. The pressure may be regulated by a set-screw k^{ii}. A rod g^{iii} is secured to the lifting-bar G and extends up beneath the spring-head *k*, so that when the presser-foot is lifted said rod raises said spring-head and releases the thread, enabling the goods which are being sewed to be moved more freely.

A connecting-rod L is attached to a crank c^{iii} on the shaft C and passing down through the arm-upright b^{i}, carries at its lower end a roller *l*, which engages in a radial groove m^{i} in a crank-head *m* on the under shaft M, which is journaled in lugs *a* on the plate A. A radius-bar N is secured at one end by a pivot *n* to the upright b^{i}, and at its other end is pivoted to the middle portion of the connecting-rod L. Continuous and uniform rotation of the shaft C causes an alternately faster and slower rotative movement of the shaft M.

Directly beneath the throat F is the shuttle O, contained in a circular shuttle-race formed by a ring *p* on a lug P, fastened to the table-plate A. An annular flange or shoulder *p'* on this ring bears against the back edge of the shuttle, while a cap-ring Q, fastened to the ring *p*, bears against the front edge of the same, so that the shuttle is held within the annular groove thus formed, but is capable of rotating therein. To enable such rotation the periphery of the shuttle is circular as to its greater part, but has a notch or indentation *o* to receive a shuttle-driver m^{iii} on the collar m^{ii} of the shaft M. The unnotched peripheral portion of the shuttle terminates at its advancing end in a point or hook o^{i}.

In the front face of the shuttle is a central circular recess o^{ii} for receiving the bobbin R, which is journaled on a central stud o^{iii} on the shuttle and is held in place by a spring-catch o^{iv}. The rim or front edge o^{v} of the recess o^{ii} extends forward beyond the line of the needle *d*, so that the thread *r*, which passes from the bobbin over said rim and up through the throat F is held forward and clear of the points of the needle and shuttle, thus dispensing with the inconvenient and fragile guard customarily employed for that purpose. In the wall o^{vi} between the bobbin-chamber o^{ii} and the driver-receiving notch *o* is a slot

o^{vii}, through which the needle-point passes when in its lowest position. When the needle has completed its downstroke and begins to ascend, a loop is formed in the thread i between the needle-eye and the cloth. This loop is caught by the shuttle-point o^{i} and carried around, so that the shuttle and bobbin pass through it, causing the two threads i r to interlock. The loop is then drawn in by the take-up. The work that is done by the take-up and the amount of thread that passes back and forth through the needle-eye at each stroke of the needle vary directly with the diameter of the shuttle. It is therefore desirable that this diameter should be as small as possible. For this reason, instead of making the shuttle of such size as to bring the recess-wall o^{vi} below the lowest position of the needle-point, I prefer to make the needle-receiving slot o^{vii} in said wall and make the shuttle as small as is possible without interference between the needle and the bobbin. The shuttle being of such size as to allow the needle to pass to its lowest point and not strike the recessed wall would necessitate the taking of more thread down to pass over the shuttle and would not add anything to the capacity of the bobbin, which it is desired to have as large as possible. Increase in size of shuttle is to be avoided as much as possible, as the length of thread taken down is constantly passing through the eye of the needle. For this reason it is desirable to have the outside diameter of the shuttle as small as would be practicable. To this end the slot o^{vii} has been provided as means of letting the needle pass through the shell of the shuttle to its lowest point, thereby decreasing the size of the shuttle in proportion to the depth of slot and space between the bobbin and the inside diameter of the recessed wall and bringing the shuttle correspondingly closer to the cloth-plate or goods being operated upon. This construction has also been provided so that the shuttle-hook may be as close to the recess-wall as possible to guard off the shuttle-thread from the point of the needle and not allow the needle to pass on the front side of the thread, whereby a half-twist or half-knot stitch is made. The slot as provided and arranged and size of shuttle are important features having relation one to the other.

The unnotched peripheral portion of each face of the shuttle is beveled off toward the edge, so that as the shuttle-point comes close behind the needle and the central portion of the front shuttle-face extends forward of the needle a double-convex shuttle is produced which can take a thicker bobbin than a flat-fronted one, and yet allow the thread to slip more readily over it.

The unnotched peripheral portion of the shuttle is preferably rendered lighter by perforations o^{viii}, over which the loop-thread is sheered by the intervening bridges o^{ix}. An unperforated portion o^{x} may be left directly opposite to the notch o.

In each end of the bobbin R is a hole r^{i}. When the bobbin is to be wound, the end of the spool-thread is passed from the inside through one of said holes, and the bobbin is then slipped onto the winder-shaft S, so that a pin s^{i} on a collar s of said shaft enters the threaded hole and holds the thread end while the thread is being wound onto the bobbin. On the cap-ring Q and close under the throat F, is a fixed vertical tension-plate q, opposite to which is a vertical tension-plate t, carried by a projection t^{i} from a semicircular lever T, which is pivoted to the base of the race-ring p and is impelled by a spring U, so as to normally hold the plate t aloof from the plate q. The needle and threads pass between these plates. The projection t^{i} extends over the top of the cap-ring Q, so as to prevent the shuttle-thread r from slipping out from between the tension-plates. The lever T carries a roller Y, with which engages a cam m^{vi} on the shaft M, so as, when the loop in the thread i has passed up beyond the plates q t, to cause the plate t to close on the plate q and hold the thread r while the stitch is being tightened, and to then open, so as to release the thread and permit the cloth to be fed forward freely and to make way for the descending needle.

In order to produce an elastic and yielding tension-pressure on the thread r, I prefer to make the lever T, as shown in Fig. 6, so as to consist of a rigid arm t^{ii}, pivoted to the ring p, and having the roller Y pivoted on it, and a spring-arm t^{iii}, fastened at one end to the arm t^{ii} and carrying the tension-plate t, and having a tension-adjusting set-screw t^{iv}. Said lever T may, however, be made as shown in Fig. 7, the yielding tension-pressure being secured by pivoting the roller Y to the free end of a spring-arm t^{v}, fastened at its other end to the lever T and having an adjusting-screw t^{vi}. This tension device, with either of the described means of adjustment, being stationary as a whole, can be adjusted while the machine is in operation.

The feeding is accomplished by the feed-dog W, actuated by lifting and throwing cams m^{iv} m^{v} on the shaft M, against the pressure of a spring w. This feed-dog has a slot w^{i} for receiving the needle and threads, and this slot is made large enough to allow the plates t q to project up within it, so as to present sufficient surface to the thread for giving a smooth tension.

The object of the variable rotative velocity of the shaft M is to turn the shuttle quickly while it is passing through the loop, and to then turn it more slowly, so as to give sufficient time for the loop to be taken up and a new loop formed. The radius-bar movement has the advantages of comparative durability, ease in running, and cheapness over the fixed roller and slotted connecting-rod device heretofore in use.

I claim as new and of my invention in a rotary-shuttle sewing-machine—

1. The combination of the shuttle-contain-

ing ring, the cap-ring, the fixed tension-plate on said cap-ring, the lever pivoted to said containing-ring, having a movable tension-plate and a roller, the shuttle-driving shaft having a collar provided with a cam engaging with said roller, and a spring for maintaining such engagement, substantially as described.

2. The combination of the shuttle-containing ring, the cap-ring, the fixed tension-plate on said cap-ring, the lever consisting of the pivoted arm and spring-arm, the latter having a movable tension-plate, and means for forcing the movable tension-plate against the fixed tension-plate, substantially as described.

3. The combination of the shuttle-containing ring, the cap-ring, the fixed tension-plate on said cap-ring, the lever consisting of an arm pivoted to said containing-ring, and a spring-arm having a movable tension-plate, the shuttle-driving shaft having a collar provided with a cam, and a spring bearing on said pivoted arm, substantially as described.

4. The combination of the shuttle-containing ring, the cap-ring, the fixed tension-plate, the lever consisting of a pivoted arm having a roller, and a spring-arm having a movable tension-plate, a rotating collar having a cam, a spring bearing on the pivoted arm, and an adjusting-screw working through the spring-arm, substantially as described.

In testimony of which invention I hereunto set my hand.

HUGO COOK.

Attest:
ELMER JANES,
GEORGE E. MOSHER.