



# UNITED STATES PATENT OFFICE.

WARREN MILLAR, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND JNO. NUTT, OF SAME PLACE.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 24,081, dated May 17, 1859.

*To all whom it may concern:*

Be it known that I, WARREN MILLAR, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful improvement on that class of sewing-machines which in the act of joining two pieces of cloth or other materials make what is usually known as "Howe's locked stitch," by which improvement common spools, such as on which thread is usually sold, may be used without rewinding onto small cops or bobbins; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a perspective view showing the hook *h* in the act of drawing down a loop of the needle-thread, and thereby drawing up the old loop, which has just passed under and slipped off the spool-case *c*, the needle-thread shown in red, the interlocking thread in blue, Figs. 1, 2, 3. Fig. 2 is a perspective view showing the needle-thread drawn down by the descent of the hook *h*; also, the flange *b* of spool-case *c* entering the loop. Fig. 3 is a perspective view showing hook *h* in the act of rising on the side of the spool-case opposite to that shown in Fig. 2. By the rising of the hook *h* and the downward tipping of the flange end *b* of the spool-case *c* the thread has been slipped off the hook *h* and over the flange *b* of the spool-case, leaving the hook entirely clear of the loop. Fig. 4 is a longitudinal elevation, showing the spool-case *c*, with its sliding supports *s s s s'* and the rods *r r*, on which the slides rest, and which impart a tipping motion to said spool-case and slides; also, the plate *p p*, hook *h*, with its twisted stem and slotted piece *g*, through which the twisted stem slides. Fig. 5 is a sectional elevation, showing hook *h* and twisted stem, slotted piece *g*, sleeve-shaped piece *a a*, plate *p p*, and driving-mandrel *m*. A crank-pin, *y*, projects from the mandrel into the sleeve-shaped piece *a a*. Fig. 6 is a view of hook *h* and twisted stem in the position shown in Fig. 1. Figs. 7 and 8 show the spool-case *c* in two positions. *b* is a flange for receiving the needle-loop. *x* is a space in which the sliding supports *s s* enter. *v* is a hole for the exit of the interlocking thread.

As my improvement consists, first, in the

form of hook *h* and motion imparted to the same, and, second, in the form of spool-case *c*, (means for supporting and motion imparted to said spool-case,) I will in my description refer only to such other parts of the machine as may be directly connected with the operation of my improvements, simply remarking that the driving-mandrel, feed mechanism, needle-arm, &c., may be or are the same as in other sewing-machines.

*p p*, Figs. 1, 4, and 5, is a reciprocating plate supported at its ends by pins passing through slots in the plate. *h* is a hook to take the needle-thread. Hook *h* has a flat slightly-twisted stem extending downward through a narrow slot in piece *g*, projecting from plate *p p*. *a a* is an irregular-shaped piece partially projecting through a wide slot in plate *p p*. In the projecting end of *a a* is a hole, in which is placed the shank of hook *h*, free to turn. The part of *a a* behind the plate *p p* (see Fig. 5) is sleeve-shaped. A crank-pin, *y*, extending from the driving-mandrel *m* into the sleeve, imparts motion thereby to plate *p p* and hook *h*. To the plate *p p* a horizontally-reciprocating, and to hook *h* and stem a vertically-reciprocating, motion is imparted. The two motions combined cause the hook *h* to traverse a circular path. During the downward motion of hook *h* and twisted stem said stem slides through slotted piece *g* on plate *p p* and rotates hook *h* in the direction of the twist one-quarter round, or at right angles with its position when taking the needle-loop. (Compare positions in Figs. 1 and 2.) The hook *h* is of peculiar shape, and better illustrated in the drawings, Figs. 5 and 6, than by any verbal description. The hook *h* and shank are cut in proper shape from a thin piece of metal. The hook and its shank are then bent downward at their line of junction until the heel of the hook is nearly in contact with the broad shank. The point of the hook is dropped lower than the heel, and the lower edge of the hook is rounded up, in order to facilitate the passage of the loop into the bend of the shank. The bend of the shank is above the heel of hook. A loop, when taken from the needle by the hook-point, glides upward on the hook into the bend of the shank, and is there held, broadly extended, in a line nearly parallel with the point and heel, (see Figs. 1 and 2,)

instead of at right angles to the same, as in most other hooks.

By means of the quarter-rotation and the peculiarly-extended loop above described the needle side of the loop, or that side of the loop nearest the point of the hook, is first spread upon the spool-case. (See Fig. 2.) As the hook in its progress continues to draw the loop around the flange end of the spool-case, the loop, being held only by the rounded heel of hook, is by the rising of the hook and tipping of the spool-case easily slipped off the rounded heel and on the spool-case, leaving the hook-point entirely clear. (See Fig. 3.)

$s s s'$  are supports of the spool-case  $c$ , and slide on rods  $r r$  and through slots in the bent piece  $t$ , which connects rods  $r r$ . A reciprocating motion is imparted to the sliding supports  $s s s'$  by pieces  $n n$ , Fig. 1, projecting from reciprocating plate  $p p$ . The bent piece  $t$  prevents the spool-case from moving laterally with the slides. The motion imparted to slides  $s s$  being synchronous with that of plate  $p p$ , the space between the ends of slides  $s s$  is always opposite the hook  $h$ . When the hook is descending, with a loop of thread on the left of the spool-case  $c$ , (see Fig. 1,) the space between the inner ends of slides  $s s$  is also on the left side of the spool-case. The right-hand slide being then in space  $x$  of the spool-case, and the left-hand slide entirely out of the space  $x$ , the left side of the flange of the spool-case is free to receive the loop of hook  $h$ . (See Fig. 2.) As the hook  $h$  descends and passes under flange  $b$  of the spool-case and rises on the right, the slides  $s s$  move at the same time from left to right, the left-hand slide enters space  $x$  and the right-hand slide passes out of space  $x$ , and the right side of flange  $b$  is then free to receive the thread from hook  $h$ . (See Fig. 3.)

Spool-case  $c$  is supported by slides  $s s$  alternately, thus permitting the complete spread of the loop around flange  $b$  of the spool-case, and not interfering with the descending and ascending motions of hook  $h$ .

Extending from the base of the needle-arm is a foot-piece,  $f$ , which bears against a lever,  $d$ , (see Fig. 1,) on rod  $r r$ . The descent of the needle-arm, bearing down the lever  $d$ , causes rods  $r r$ , connected by bent piece  $t$ , to rotate, also rotating the sliding supports  $s s s'$  and spool-case  $c$  (such rotation not interfering with the reciprocating motion of sliding supports  $s s s'$ ) until spool-case  $c$  reaches the position shown in Fig. 1. As the needle-arm rises, relieving the pressure on lever  $d$ , the spring  $o$  reacts upon lever  $d$  until spool-case  $c$  returns to the position shown in Fig. 2.

The spool-case  $c$ , Figs. 7 and 8, is constructed with a flange,  $b$ , at one end. This flange assists materially in receiving and retaining the

loop presented and drawn around the spool-case by hook  $h$ , Figs. 2 and 3. The flanged end of the spool-case is constructed of two plates, between which a narrow space,  $x$ , is left for the slides  $s s$  to enter. This space may be subdivided, if necessary, for the accommodation of forked slides.

The hole  $v$  is for the exit of the interlocking thread, and is placed at the axis of the spool-case, so that the rocking motion of the spool-case will not vary the tension on the thread.

The spool-case, at its flanged end, rests entirely upon the slides  $s s$ , so that the needle-thread, when extended round the flange by the hook, will meet with no impediment when drawn off the spool-case.

In operating to interlace the two threads to form a seam the hook  $h$  takes the loop thrown out from the needle, Fig. 1, and passes it around the flange of the spool-case, Fig. 3. As the needle again descends the spool-case is tipped by the foot-piece  $f$  of the needle-arm acting upon the lever  $d$  of rod  $r r$  until the spool-case reaches a position nearly at right angles with that shown in Fig. 3, so as to permit the loop left on the cases by the hook  $h$  to be easily drawn off the spool-case, Fig. 1, by the descent of the needle through the cloth. The hook  $h$ , in the meantime rising, takes a new loop from the needle, draws it down, and thereby draws up the cast-off loop into the cloth.

I am aware that various forms of rotating and reciprocating hooks have been constructed heretofore, and also that the twisted stem of hook  $h$  is not new. These, therefore, I do not claim.

I am also aware that spool-cases are not new, therefore make no claim to them; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The hook  $h$ , when constructed and operated substantially as described, in combination with an eye-pointed needle and the spool-case  $c$ , for the purpose specified.
2. The combination of the flange  $b$  and space  $x$ , or their equivalents, of the spool-case  $c$ , when constructed as and for the purposes described.
3. The sliding supports  $s s$ , or equivalents therefor, when constructed, arranged, and operating in the manner substantially as described, for the purpose specified.
4. Imparting to the spool-case  $c$  the tipping or rocking motion to receive the loop of needle-thread from the hook  $h$ , or its equivalent, in the manner and for the purpose described.

WARREN MILLAR.

Witnesses:

S. P. LUNT,  
HENRY BROOKES.