

(No Model.)

P. DIEHL.  
OSCILLATING HOOK FOR SEWING MACHINES.

No. 523,333

Patented July 24, 1894.

Fig. 1.

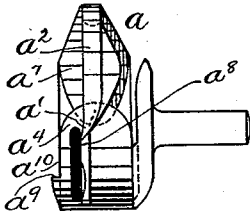


Fig. 2.

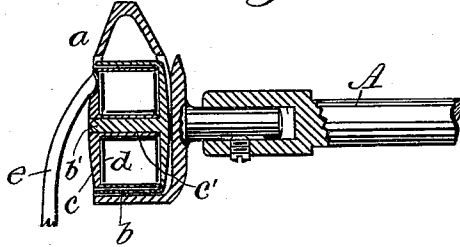


Fig. 3.

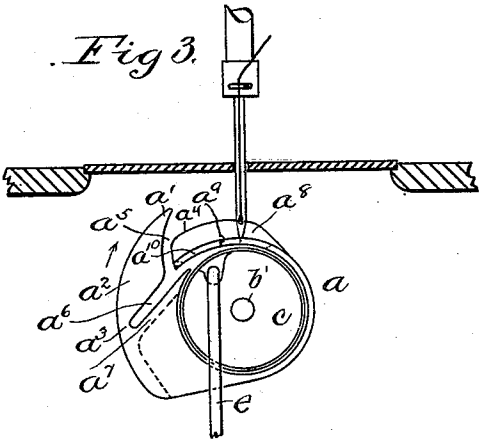


Fig. 5.

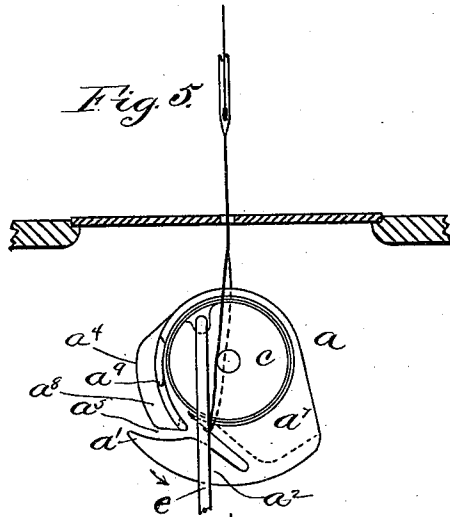


Fig. 4.

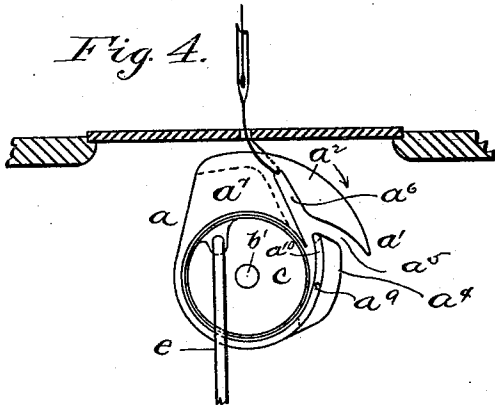
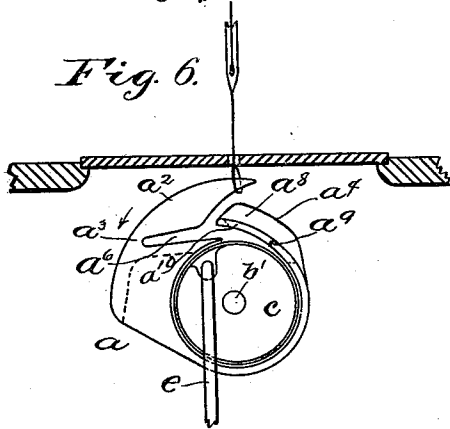


Fig. 6.



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# UNITED STATES PATENT OFFICE.

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## OSCILLATING HOOK FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 523,333, dated July 24, 1894.

Application filed November 20, 1893. Serial No. 491,452. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Oscillating Hooks for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that class of lock-stitch sewing machines in which the lower or locking thread is supplied from a bobbin contained in a bobbin-case which is supported in the cavity of an oscillating hook having between its loop-seizing beak and its heel an opening or mouth into which the loops of needle thread are entered to be passed around the said bobbin case and out of which they are drawn by the take-up after having been passed around the bobbin-case.

The object of my present invention is to provide an oscillating hook, of the class referred to, with a beak-shank of such construction, that, when co-operating with a needle operated from a regularly moving crank-pin, no thread will be drawn down through the eye of the said needle while the latter is moving upward through the work, thus adapting the hook for use in machines for sewing leather and other firm or comparatively hard material and having regular needle-bar movements; to provide an oscillating hook which will positively hold and control the loops of needle thread until they are so well shortened, in being drawn up, that they cannot twist and kink; and also to provide an oscillating hook with a guard to hold the bobbin-thread out of the way of the beak of the hook and with a needle guard, so that while the needle may be so set as to travel close to the path of the point or beak of the hook there will be no danger of breaking the said needle.

In carrying my invention into effect the body of the oscillating hook is provided with a long beak-shank which first increases and then diminishes in cross-section from the point or beak rearwardly, being preferably largest at or near its middle portion, so that when the

needle has descended and a loop of needle thread has been caught by said point or beak said loop will be immediately so enlarged by the forwardly-moving beak-shank, before the eye of the regularly-operated, upwardly-moving needle reaches the under side of the work, that while the eye of said needle is moving upward through the work the slack rendered or given up by the forwardly-moving, rearwardly-diminishing part of the beak-shank will not only render any further downward drawing of the needle thread unnecessary but, on the contrary, will furnish sufficient slack to permit the needle to lift the thread slightly so that the eye of the needle need not travel upward on the thread; and thus the objection (most serious in sewing leather and other firm or comparatively hard material) arising from drawing down thread when the needle is moving upward through the work, is avoided.

To prevent kinking of the needle thread by the escape of large loops thereof from the mouth of the hook, and to positively hold and control said loops until they are so well shortened that they will not twist and kink, I provide the hook with a broad tail-piece which extends laterally on both sides of the beak of the hook, and which tail-piece is inside of or beneath said beak so that it is overlapped, radially, by the latter, thereby so contracting and guarding the opening or mouth between the heel and beak of the hook that a large loop cannot escape or flop out of said mouth but will be positively controlled and held by the retreating beak shank and beak until it is nearly drawn up to the under side of the throat-plate. The broad tail-piece referred to, and which on the forward or loop-seizing movement of the hook is moving in front of said beak, has a needle slot at one side of which is a radially projecting flange, the front or vertical face of which latter is in line with the said beak, said face thus serving as a needle guard in that it travels in close proximity or even contiguous to the needle while the latter is performing the latter part of its downward and the early part of its ascending movement to form the loop to be caught by the point or

beak of the hook; and thus, even if the needle should be so set or bent that it would otherwise be in danger of being struck and broken by the said beak, said needle will be  
 5 so held by the said needle guard that the beak will pass it and take its loop without bending or breaking it. The outer face of said broad tail-piece also serves as a guard for the bobbin-thread to hold the latter laterally away  
 10 from the beak of the hook and prevent said hook from interfering therewith.

In the accompanying drawings Figure 1 is a plan or side view of my improved hook and Fig. 2 is a sectional view of the same and of  
 15 the bobbin cases and bobbin. Figs. 3, 4, 5 and 6 are front end views showing different positions assumed by the needle and hook in the formation of a stitch.

A denotes a part of the hook shaft which  
 20 may be oscillated in any suitable manner, as, for example, by the mechanism shown by United States Patent No. 388,324, or by that shown by my pending application, Serial No. 448,144, filed October 7, 1892. To the said  
 25 shaft is attached the hook *a* having a cavity in which is supported an outer or supplemental bobbin case *b* having a central pin or support *b'* engaging a central sleeve or support *c'* on an inner bobbin case, or bobbin case proper, *c*, which incloses the bobbin *d*.  
 30 The bobbin case *c* is held stationary by any suitable device as by a latch or finger *e*.

The hook *a* is provided with a loop-seizing point or beak *a'* which is carried by a long  
 35 beak shank *a<sup>2</sup>* which is enlarged rearwardly from the beak *a'* preferably to or near its middle portion where it is largest in cross section, being preferably swelled or enlarged both inwardly and laterally, as shown; said  
 40 beak-shank tapering or diminishing in cross section rearwardly from its enlarged portion to its neck portion *a<sup>3</sup>* where it joins the body of the hook. The said hook body *a* is provided at its heel portion with a broad tail-  
 45 piece *a<sup>4</sup>* which extends laterally on both sides of the beak *a'* of the hook, said tail-piece being beneath or within said beak so as to be overlapped, radially, by the latter. Between  
 50 said heel or tail-piece *a<sup>4</sup>* and said point or beak *a'* is an opening or mouth *a<sup>5</sup>* into which the loops of needle thread are entered and out of which they are drawn by the take-up after having been passed around the bobbin cases and the locking thread supplied from  
 55 the bobbin contained therein; the said tail-piece, extending beneath or being overlapped radially by the said beak *a'*, serving to contract said opening or mouth and thus guard the same from the too early escape of the  
 60 loops of needle-thread. The said tail-piece is broad enough so that the front face *a<sup>10</sup>* of its rear end is laterally to the left or on the front side of the beak *a'* and thus serves to hold the bobbin thread laterally out of the way  
 65 of the said beak when the latter is advancing to take a loop of needle-thread.

Rearward of the slot *a<sup>6</sup>* formed between the rearwardly tapering rear portion of the beak shank and the body portion of the hook is the thread-carrying or loop-spreading part *a<sup>7</sup>*  
 70 of the hook, the front face of said part serving as a stop for the loops of needle thread into which the beak shank has fully entered, as in Fig. 4, so that as the hook moves forward to the position shown in Fig. 5 the loop in  
 75 engagement with said face will be enlarged and carried around beneath the bobbin cases in position to be drawn up on the left or rear side of the bobbin cases, and thus when the hook is reversed to bring its mouth upward  
 80 the loop may escape from said mouth and be tightened into the work.

The broad tail-piece *a<sup>4</sup>* is provided with a needle slot at one side of which is a flange projecting radially from the periphery of said  
 85 tail-piece and having a front vertical face *a<sup>8</sup>* which is in line, or approximately so, with the point or beak *a'* of the hook *a* so as to serve as a needle guard to prevent a needle which is bent toward, or set to reciprocate in  
 90 a line too near the path of said point or beak from being damaged or broken by being struck by the latter; said face or needle-guard *a<sup>8</sup>* moving in front of the said point or beak when the latter advances to take a loop of  
 95 thread from the needle. The tail-piece *a<sup>4</sup>* is provided with a slight lateral projection to form a shoulder *a<sup>9</sup>* which serves, when the hook is in its extreme backward position, to engage the bobbin thread to draw off slack  
 100 enough for the next succeeding stitch, as in the similar construction described in my pending allowed application, Serial No. 455,795, filed December 20, 1892.

Fig. 3 represents the relative positions of  
 105 the hook and needle as the latter is descending and is adjacent or contiguous to the needle-guard or face *a<sup>8</sup>*.

Fig. 4 represents the relative positions of  
 110 the hook and needle when the beak-shank has been fully entered into the loop of needle thread and the eye of the needle has risen above the work, and the hook then advances from the position shown in Fig. 4 to the position  
 115 shown in Fig. 5 to carry the loop around beneath the bobbin cases; Fig. 5 representing the hook in its extreme forward position and ready to commence its reverse movement.

In the position shown in Fig. 6 the hook in  
 120 its reverse or backward movement has returned far enough to permit the loop of needle thread to have been so well shortened or drawn up while still in contact with the beak shank and beak that when dropped from said  
 125 beak, as the hook continues its backward movement, said loop will be so small that it will not be liable to twist and kink, and all difficulty from this source of trouble will be avoided.

It will thus be seen that with my improved  
 130 hook I avoid the difficulty incidental either to drawing the thread through the eye of the

needle or to moving the needle upward on the thread when the needle-eye is in the work; that I am enabled to positively hold and control the loops of needle thread until they are

so well shortened and drawn up that danger of kinking of the said loops is avoided; and that I also provide the oscillating hook with an efficient bobbin-thread guard and needle guard.

Having thus described my invention, I claim and desire to secure by Letters Patent—  
1. An oscillating hook for sewing machines provided with a loop-seizing point or beak and with a broad tail-piece which extends laterally on both sides of the said point or beak, and which is beneath or inside of, and is thus overlapped, radially, by the said point or beak, said hook having between said beak and tail-piece an opening or mouth into which the loops of needle thread are entered and out of which they are withdrawn, and which opening or mouth is guarded by said tail-piece.

2. An oscillating hook for sewing machines provided with a loop-seizing point or beak and with a broad tail-piece which extends laterally on both sides of the said point or beak and which is beneath or inside of, and is thus overlapped, radially, by the said point or beak, said hook having between said beak and tail-piece an opening or mouth into which the loops of needle thread are entered and out of which they are withdrawn, and which opening or mouth is guarded by said tail-piece, and said tail-piece having a face which is in front, laterally, of the said point or beak so as to serve as a guard for the bobbin thread to hold the latter aside when the said point or beak is advancing to take a loop of needle thread, and said tail piece having also a needle slot at one side of which is a radially projecting flange one face of which is in line, or approximately so, with said point or beak, to serve as a needle guard.

3. An oscillating hook for sewing machines provided with a loop-seizing point or beak and with a broad heel portion or tail-piece having a needle slot at one side of which latter is a flange projecting radially from said tail-piece and one face of which flange is in line, or approximately so, with the said point or beak, to serve as a needle-guard, said hook having between said point or beak and said tail-piece an opening or mouth into which the loops of needle thread are entered and out of which they are withdrawn.

4. An oscillating hook for sewing machines provided with a loop seizing point or beak and with a long beak shank which is swelled or enlarged and then diminished in cross-section from said point or beak rearwardly, said hook being also provided with a broad heel portion or tail-piece which extends laterally on both sides of the said point or beak and

which is beneath or inside of the said point or beak; so as to be overlapped, radially, by the latter.

5. An oscillating hook for sewing machines provided with a loop-seizing point or beak and with a long beak-shank which is swelled or enlarged and then diminished in cross-section from said point or beak, rearwardly, said hook being also provided with a broad heel portion or tail-piece which extends laterally on both sides of the said point or beak and which is beneath or inside of the said point or beak, so as to be overlapped, radially, by the latter, and the said tail-piece having a needle slot at one side of which is a flange projecting radially from said tail-piece and one face of which flange is in line, or approximately so, with the said point or beak, to serve as a needle-guard.

6. An oscillating hook for sewing machines provided with a loop seizing point or beak  $a'$  and with a long beak shank  $a^2$  which is swelled or enlarged and then diminished in cross-section from said point or beak rearwardly, said hook having a loop-spreading part  $a^7$  inside, radially, of the said beak shank and between which loop-spreading part  $a^7$  and the said shank is a slot  $a^6$ , the said hook having also a broad tail-piece  $a^4$  which extends, laterally, on both sides of the said point or beak and which is beneath or inside of said point or beak so as to be overlapped, radially, by the latter.

7. An oscillating hook for sewing machines provided with a loop seizing point or beak  $a'$  and with a long beak shank  $a^2$  which is swelled or enlarged and then diminished in cross-section from said point or beak rearwardly, said hook having a loop-spreading part  $a^7$  inside, radially, of the said beak shank and between which loop-spreading part  $a^7$  and the said shank is a slot  $a^6$ , the said hook having also a broad tail-piece  $a^4$  which extends, laterally, on both sides of the said point or beak and which is beneath or inside of said point or beak so as to be overlapped, radially, by the latter, and the said tail-piece having a needle slot at one side of which is a flange projecting radially from said tail-piece and the outer face  $a^8$  of which flange is in line, or approximately so, with the said point or beak, to serve as a needle-guard.

8. An oscillating hook for sewing machines provided with a loop seizing point or beak  $a'$  and with a long beak shank  $a^2$  which is swelled or enlarged and then diminished in cross-section from said point or beak rearwardly, said hook having a loop-spreading part  $a^7$  inside, radially, of the said beak shank and between which loop-spreading part  $a^7$  and the said shank is a slot  $a^6$ , the said hook having also a broad tail-piece  $a^4$  which extends, laterally, on both sides of the said point or beak and which is beneath or inside of said point or beak so as to be overlapped, radially, by the

latter, and the said tail-piece having a needle-  
slot at one side of which is a flange project-  
ing radially from said tail-piece and the outer  
face  $a^8$  of which flange is in line, or approxi-  
5 mately so, with the said point or beak, to serve  
as a needle-guard, the said tail-piece having  
also a face  $a^{10}$  which is laterally in front of  
the said point or beak and which is provided

with a shoulder  $a^9$  to serve as a pull-off for  
the bobbin thread. 10

In testimony whereof I affix my signature in  
presence of two witnesses.

PHILIP DIEHL.

Witnesses:

J. G. GREENE,

HENRY CALVER.