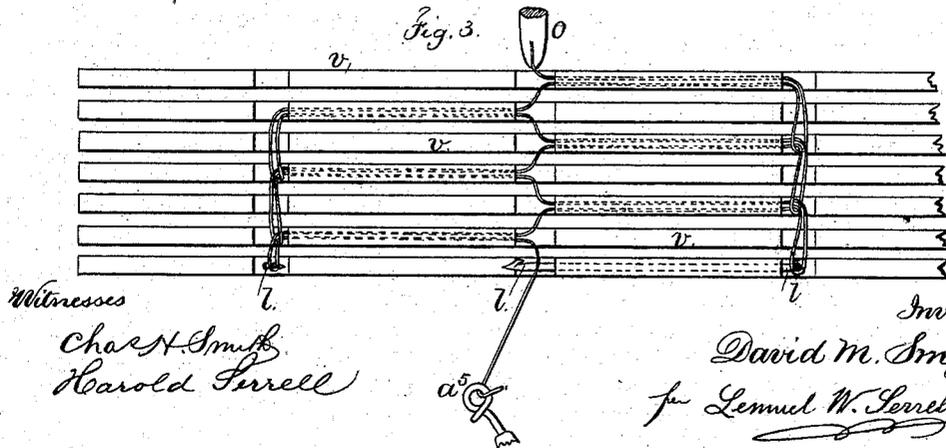
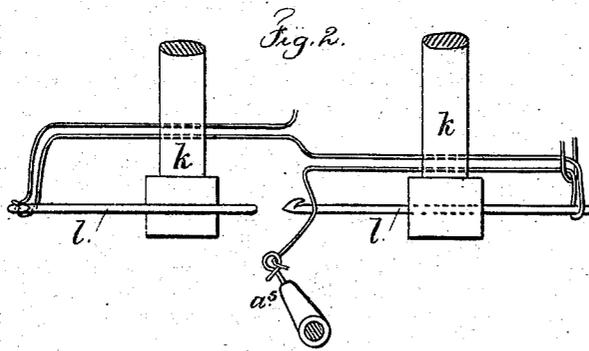
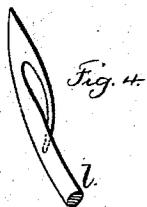
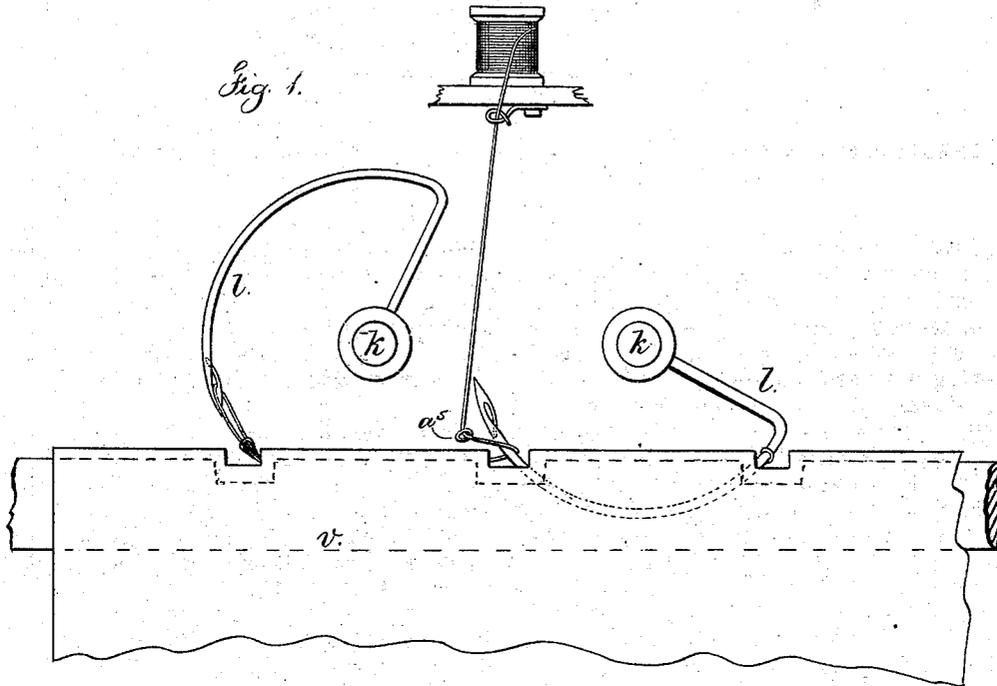


(No Model.)

D. M. SMYTH.
BOOK SEWING MACHINE.

No. 274,986.

Patented Apr. 3, 1883.



Witnesses
Chas. H. Smith
Harold Ferrell

Inventor
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per Lemuel W. Ferrell atty

UNITED STATES PATENT OFFICE.

DAVID M. SMYTH, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE SMYTH MANUFACTURING COMPANY, OF SAME PLACE.

BOOK-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 274,986, dated April 3, 1883.

Application filed July 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, DAVID M. SMYTH, of Hartford, in the county of Hartford and State of Connecticut, have invented an Improvement in Book-Sewing Machines, of which the following is a specification.

In several Letters Patent heretofore obtained by me the sewing of folded and grooved signatures is described as effected by semicircular needles passing into the fold of the sheet and carrying with them the threads, and such threads are looped into one another, or else a cord or tape is passed into the loops of thread. Reference is hereby made to Letters Patent No. 220,312, October 7, 1879, for a means for supporting the sheets and actuating the needles, and to Letters Patent No. 250,991, December 13, 1881, for the interlocking of the looped threads in the middle of the sewing.

In my present invention I make use of looping-needles instead of eye-pointed needles, and I draw the thread into and through the folded signatures and loop one stitch into the next in two lines of loops at the respective places where the needles draw out.

In the drawings, Figure 1 is an elevation of a pair of looping-needles. Fig. 2 is a plan of the same and the thread-guide. Fig. 3 is a diagram representing the signatures, needles, and interlooping of the threads. Fig. 4 is a view in enlarged size of the hook end of the needle, and Fig. 5 illustrates the manner in which a loop of thread is shed off the needle around the loop held by the hook end of the needle.

I have shown one pair of needles. They work with one thread. It is to be understood that there may be two, three, or more pairs of needles, according to the size of the sheets that are being sewed together. Each needle *l* is made as a semicircle, or nearly so, with a radial shank secured into the shaft *k*, and these shafts are in suitable supports and receive partial rotation to move the needle into and out of the folded signatures at the proper times. The sheets *v* are to be grooved or channeled across the back folds at the proper places, and the sheets are placed in succession upon sheet-holding arms that are moved up to the place of sewing to carry and hold the sheet while

being sewed, and then such sheet-holder is withdrawn and another sheet brought up to place upon the next arm. All these devices and their modes of operation are fully set forth in my aforesaid Letters Patent, and reference is hereby made to them for a more full description.

The needles I make use of in the present invention vary from those before employed by me to the extent that instead of having an eye near the point they are each made with a spring-hook similar to knitting-machine needles, in order that the hook may receive one thread into it and cast the previous loop off over the new one, as in knitting. I prefer to make the hook of a twisted shape similar to that represented in Fig. 4 in larger size. In this figure the hook is curved around from the front side of the needle toward the back, so that the point of the hook may come into the triangular space in the loop of thread that passes around the needle at the back thereof to the previously-sewed signature, so that the point of the hook, as the needle rises to cast off the previous loop, may pass up into this open part of the loop and insure the casting off of such loop. The thread that is employed passes down through an eye or fork at the end of the vibrator *a*⁵. This vibrator is moved first one way at one stitch, and then the other way at the next stitch, by any suitable connection to the moving parts of the machine. In Fig. 1, for greater clearness, this vibrator is shown simply as an eye for the thread to pass through.

The sewing operation is as follows: The left-hand needle *l* of the pair of needles is moved down and through the saw-cuts of one folded sheet or signature, and the hooked point of *l* projects up through the middle saw-cut of the signature, the vibrator *a*⁵ at this time having been to the left. This vibrator at this moment is moved to the right, drawing the thread around the needle to insure the entrance of the thread into the hook of the needle. Said needle now draws back through and out of the signature, drawing with it the thread double. The next folded signature is now brought up to place, and the right-hand needle passed through its fold, and the hooked

point emerges through the middle saw-cut, and the thread, having been held to the right by the vibrator α^2 , is now moved to the left, wrapping the thread around the hook, and the
 5 needle draws back, pulling the thread through the signature; another or third folded sheet is brought up to place, the left-hand needle descends through the same, the loop of thread from the first signature being around its shank,
 10 the thread is again taken as before, and as the needle draws back out of the signature the previous loop from the first signature is cast off the needle over the loop of thread of the third signature, and when the fourth signature
 15 is applied and sewed the loop of the second signature is cast off the needle over the thread of this fourth signature, and so on.

It is to be understood that the same operations are performed by each pair of needles,
 20 and that there may be any desired number of pairs employed, there being one thread and one vibrator to each pair of needles.

The threads, as looped together in the signatures, occupy the positions indicated in Fig.
 25 3, the threads passing from one signature to the next in the middle portions, and being nearly straight from end to end, and being interlooped similar to chain-stitches at the outer parts of the lines of sewing.

30 If desired, a transverse binding-cord may be drawn into the middle channel or saw-cut

beneath the threads. This may be done by employing a needle, as at o in my aforesaid patents, or by any other suitable means.

I claim as my invention—

1. The combination, in a book-sewing machine, of a semicircular needle having a hook near the end, and means, substantially as described, for partially rotating the needle, a support for the notched signatures, and means, substantially as described, for presenting the thread to the hook, so that the thread is drawn into the signature and looped, substantially as specified. 35 40

2. The combination, in a book-sewing machine, of two semicircular needles, having hooks near the points and standing in opposite directions, with a vibrating thread-carrier to lay the thread around the needles alternately, substantially as set forth. 45 50

3. The method herein specified of sewing books, consisting in drawing the thread in opposite directions alternately in contiguous sheets and looping the threads of the alternating sheets at the respective ends of the lines of sewing, substantially as set forth. 55

Signed by me this 20th day of June, A. D. 1882.

DAVID M. SMYTH.

Witnesses:

CHARLES E. GROSS,
 FRANK E. HYDE.