

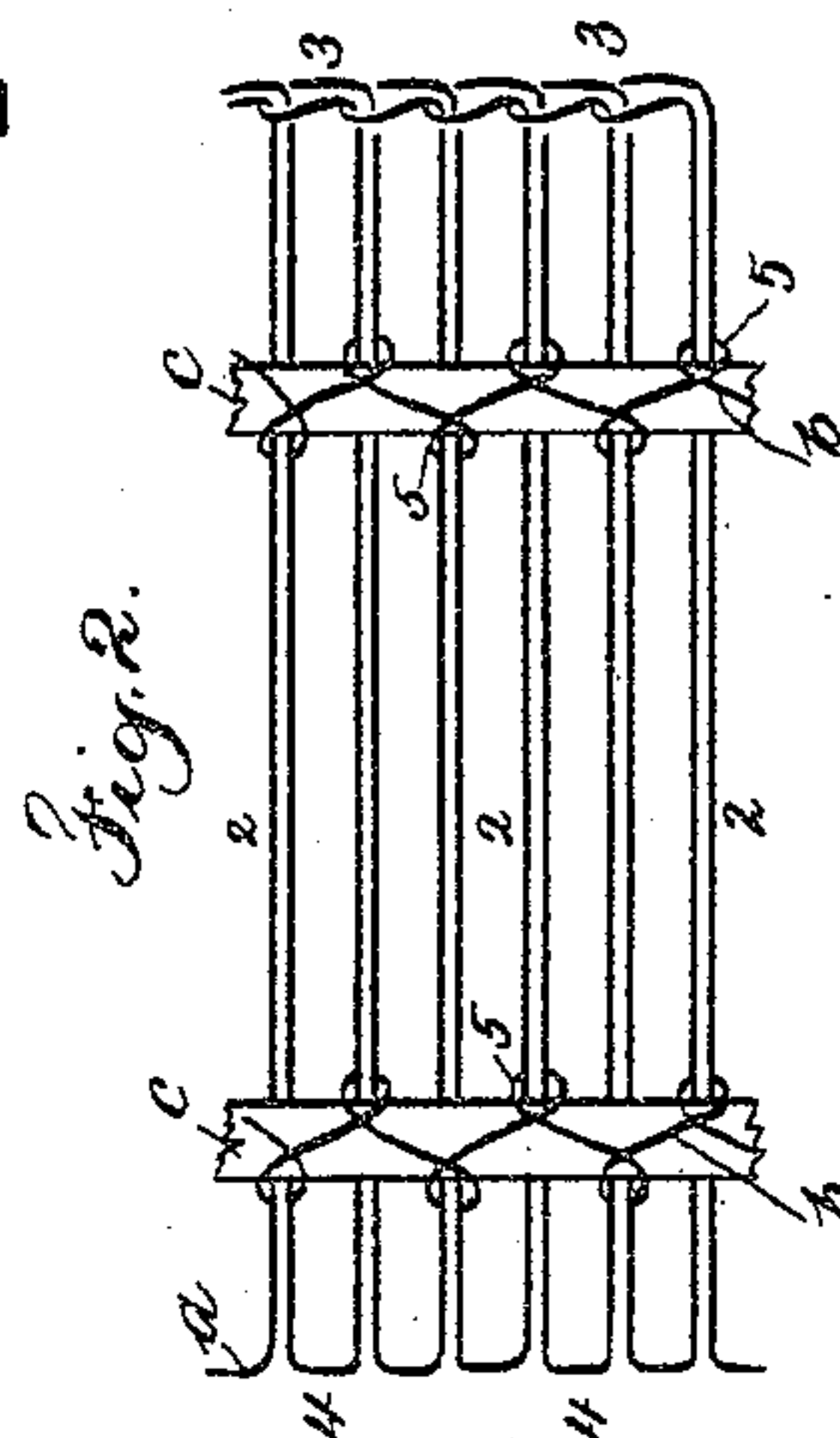
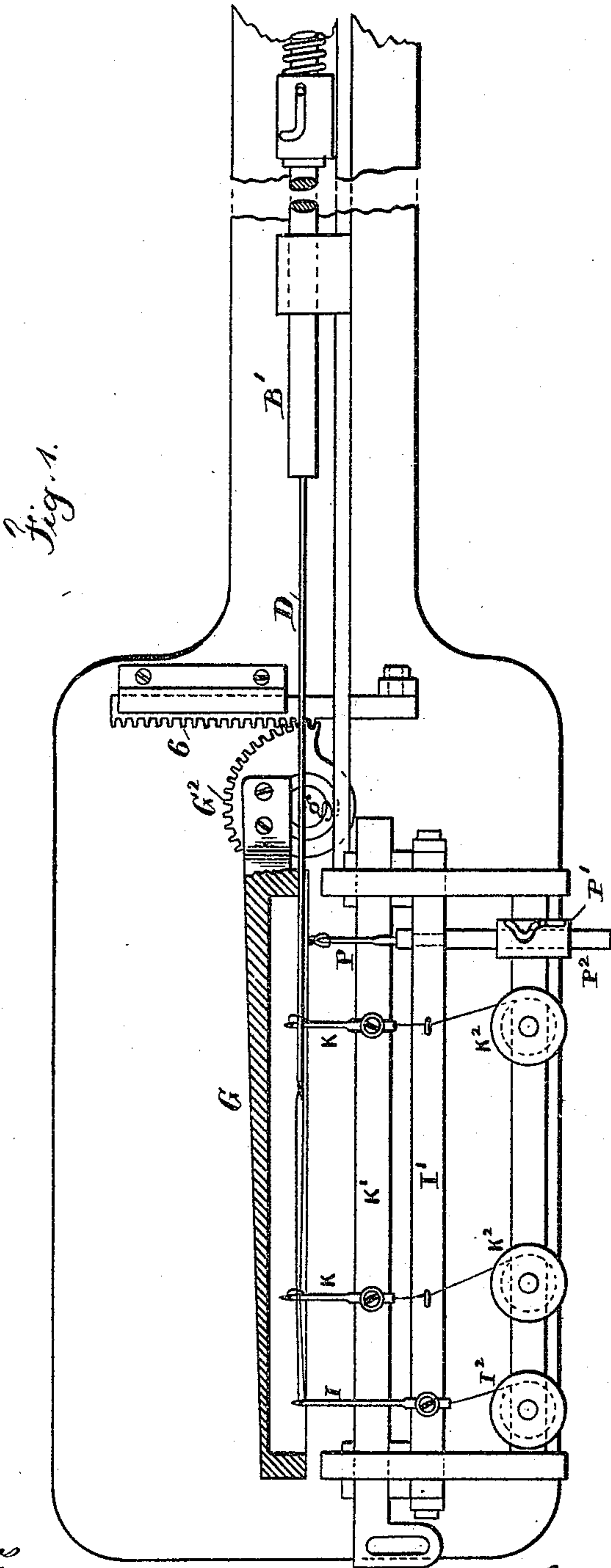
(No Model.)

2 Sheets—Sheet 1.

D. M. SMYTH.
BOOK.

No. 438,389.

Patented Oct. 14, 1890.



Witness
Chas. H. Smith
J. Staib

Inventor
David M. Smyth
per Samuel W. Perrell

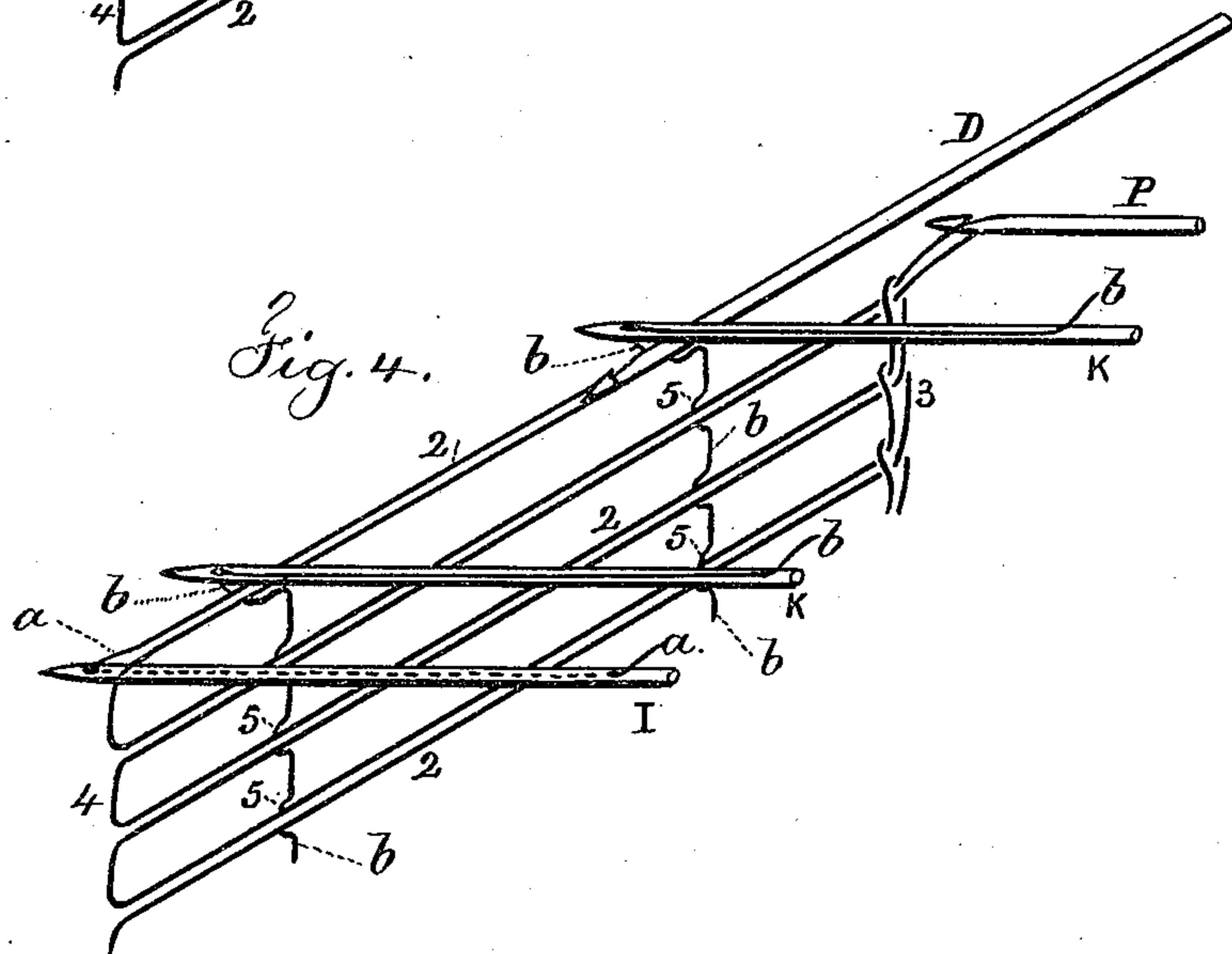
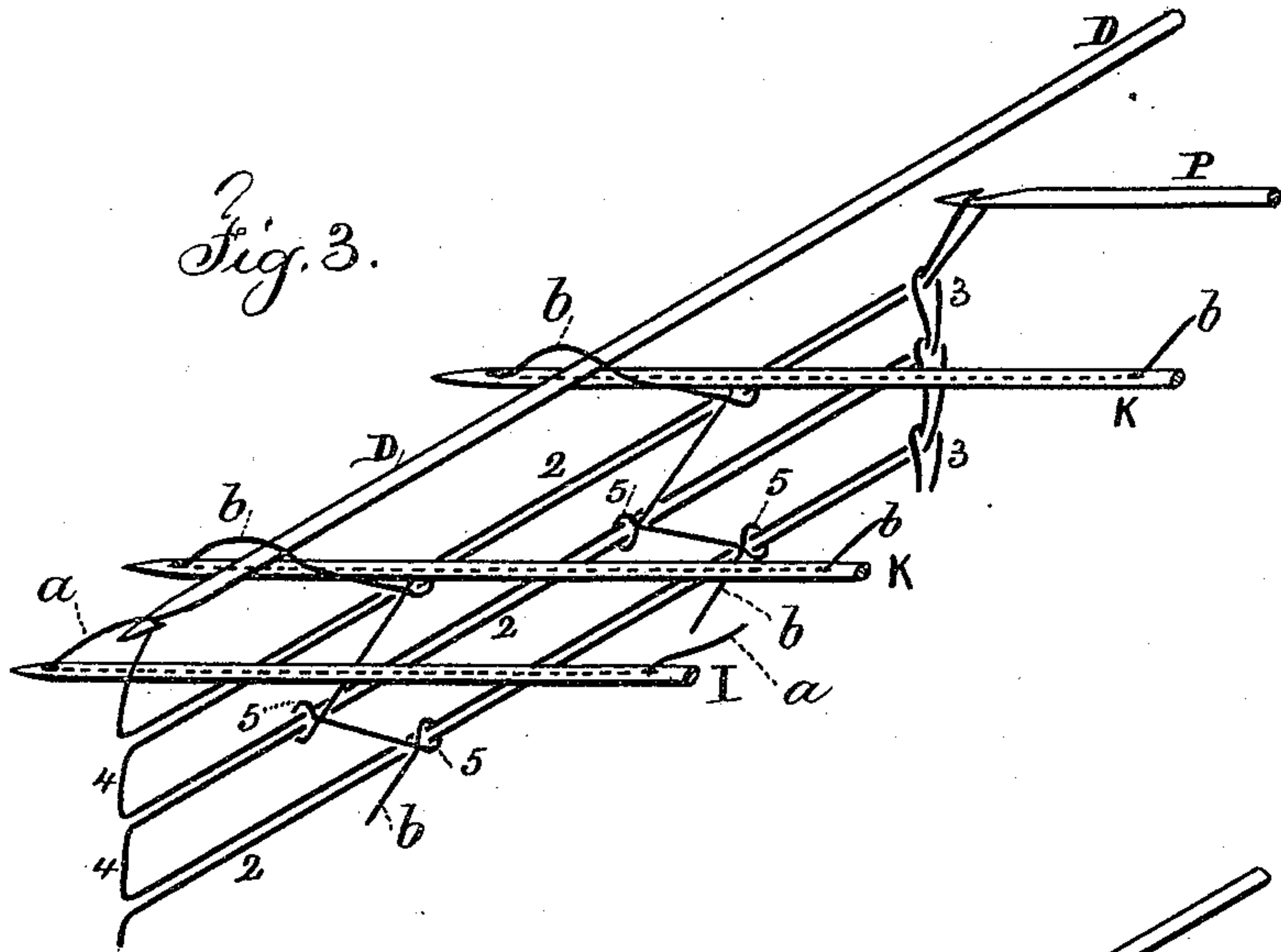
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2 Sheets—Sheet 2.

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Chas. H. Smith
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Inventor

David M. Smyth.

per Lemuel W. Serrell
(Signature)

UNITED STATES PATENT OFFICE.

DAVID M. SMYTH, OF NORTHWOOD, NEW HAMPSHIRE, ASSIGNOR TO THE
SMYTH MANUFACTURING COMPANY, OF HARTFORD, CONNECTICUT.

BOOK.

SPECIFICATION forming part of Letters Patent No. 438,389, dated October 14, 1890.

Application filed November 9, 1888. Serial No. 290,365. (No model.)

To all whom it may concern:

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

In the present improvement there are at least two threads in each set of uniting devices. One thread *a* passes double along in the fold of each signature, and the loop 3 at the end is around the double thread of the next signature near its loop, so as to form a chain of loops across the book-back, and this thread passes in and out from one signature to the other, as at 4, in a line across the book-back. The other or transverse thread *b* passes into and out of the folded signature in the form of loops 5, through which the double thread 2 passes, so that the thread *b* crosses the back of the book to serve as a connection between the doubled longitudinal thread 2 at as many places as desired, thus forming a very strong and simple form of book-sewing; and where the transverse thread is passed in at different positions into alternate signatures the said transverse thread is laced across a tape or strip *c* at the back of the book. I have represented in Fig. 2 two strips *c* and two transverse threads *b*.

In my application, Serial No. 290,366, filed November 9, 1888, an apparatus is represented that is capable of performing the sewing to which my invention relates, and in the applications of Reynolds & Jacobs, Serial Nos. 291,441 and 291,442, filed November 21, 1888, and of A. I. Jacobs, Serial No. 346,887, filed April 7, 1890, a mechanism is represented that is capable of performing the same sewing as that to which the present invention relates. My drawings are only illustrative of the devices sufficient to indicate the peculiar features of the sewing.

Figure 1 is a plan view illustrating a sewing-machine. Fig. 2 represents the concatenations of the threads in the book, and Figs. 3 and 4 are perspective views illustrating the sewing by the needles.

The illustration in the drawings of portions of a sewing-machine is sufficiently described, as follows, to indicate a manner in which the

respective parts may be actuated in performing the sewing.

A reference is hereby made to Patent No. 378,984 for a description of the reciprocating needle D and needle-bar B', that passes in at one end of the back of the folded signature, and the sheet-holding arm G is mounted upon the upper end of the vertical shaft *g* and receives a swinging motion from the reciprocating rack 6 and toothed sector G², as in my aforesaid application, Serial No. 290,366, or this sheet-holding arm G may be moved by any suitable mechanism.

Bars I' K' may be provided, to which a lateral motion is given toward or from the back of the folded signature, and the bar K' can receive in addition an endwise movement. A reference is made to my application, Serial No. 290,366, for a description of devices that may be employed for giving motion to these bars I' K'. I have shown one eye-pointed needle I upon the bar I' and two eye-pointed needles K upon the bar K'; but for large books the number may be increased. Threads are supplied to these eye-pointed needles I and K from spools I² K², and I have shown a penetrating hooked needle or looper P, that may be connected to and reciprocated with the bar I', and there is a stationary cam P', into which the pin upon the circular needle-bar P² enters, so that as the needle P is reciprocated the cam P' may give to the needle-bar P² and hooked needle P a partial rotary movement at the proper time, for the purposes hereinafter described.

The sheet-holding arm G is grooved at its edge next the needles for the passage of the needle D longitudinally of such sheet-holding arm and for the passage of the eye-pointed needles I and K and the hooked needle P, which pass in at right angles to the edge of the sheet-holding arm, and usually these needles penetrate the paper, so as to avoid the use of saw-cuts at the back edges of the signatures; but such saw-cuts might be used, if desired, for the needles to pass into.

The cams and mechanism for giving motion to the respective parts may be the same as shown in my said application, Serial No. 290,366, or of any suitable character to give

to the parts the movements at the right times for performing the sewing in the manner next described.

The operator places the folded signature
 5 upon a suitable table or support, and the sheet-holding arm G swings into the same and holds the sheet while the sewing is being performed. The needles K and I are now brought up and penetrate the folded back edge of the
 10 signature, the needles K penetrating the farthest into the signature, and they are drawn out slightly so as to throw up loops of the thread *b* from the respective spools. The reciprocating needle D is now caused to enter
 15 the fold of the sheet and travel through the loops of thread *b* from the eye-pointed needles K, and at the end of the needle D is a hook that catches a loop of thread *a* from the
 20 needle I and draws such loop of thread double, as at 2, through the loops of thread from the eye-pointed needles K as such needle D is drawn back out of the signature; but before the hook of the needle D passes out from the
 25 folded signature the hooked needle P is to be thrust through the fold of the signature and into such loop of thread from the needle I that is upon the needle D, and the needle D receives a partial rotation and moves sufficiently for the loop of thread to be cast off
 30 the hook of the needle D and received upon the hook of the needle P. As this needle P draws back, the hook thereof pulls out the loop of thread at the folded back edge of the signature, and such hooked needles P receive a partial rotation to slightly twist the
 35 loop of needle-thread. Another signature has by this time been placed upon the first, the sheet-holding arm G is swung back out of the first signature and forward into the second
 40 signature and carries such signature accurately to the point of the sewing, and the operations before described are repeated by the needles K being caused to penetrate such signature for the needle D to pass through
 45 the loops of thread at the needles K, and the needle I also penetrates the second signature for the loop of thread to be taken by the hooked needles D and drawn back through the loops of thread at the needles K, and as
 50 this is done the hooked needle P passes into the loop of thread that has been around its hooked end and penetrates the second signature and passes through the loop of thread that has been drawn from the eye-pointed
 55 needle I by the hooked needle D, and this loop of thread is dropped by the needle D around the needle P, and the hook of the latter draws out the end of the loop from the signature through the loop from the first signature
 60 that had been around the needle P, and this is now cast off around the second loop of thread and the operations are now repeated, so that the needles D and P form a chain of looped stitches and the threads from
 65 the needles K form loops around the threads from the needle I.

It will be understood that for large books the devices described can be duplicated, there being two needles D passing in at the top and bottom edges of the fold at the back of the book, as in my patent, No. 378,984, and two sets of needles I K and P, so that the sewing is performed toward each end of the fold of the signature in the manner herein described, and I also remark that strips of parchment or tapes may be made use of, as described in my application, Serial No. 290,366. The needles K penetrate one signature at one edge of each strip and then penetrate the next signature at the other edge of such strip, the bar K' being moved endwise to change the positions of the needles K between one stitch and the next, as fully described in said application.

It is to be understood that the mechanism made use of does not form part of this invention. If the needles K are at the side of the needles D toward the previously-sewed signature, the loops 5 will be wound around the doubled thread at 2. If the needles D are at the side of the needles K toward the previously-sewed signature, the loops 5 will simply pass under or behind the double threads 2, as indicated in Fig. 4.

I claim as my invention—

1. In a book, the thread *a*, laid double along the folds of the signatures, with the loop at the end of the doubled thread in one signature around the doubled thread of the next signature and such thread *a* passing out of one signature into the next, in combination with a thread *b*, passing across the back of the book with loops 5 within the signatures and through which the doubled portions 2 of the threads *a* pass, substantially as specified.

2. In a book, the threads *a*, laid double along the folds of the signatures and passing out of one signature into the next, and the loops at the ends of the doubled portions of the threads interlooped across the back of the book, in combination with the thread *b*, passing across the back of the book and having loops passing into each signature and around the doubled longitudinal threads, substantially as set forth.

3. The combination, in a book, of the thread *a*, passing from one signature into the next and laid double in the folds of the signatures, the loops at the ends of the doubled portion being interlooped across the back of the book, in combination with a tape or strip crossing the back of the book, and a thread *b*, laced across the strip and having loops entering the folded signatures and passing around the longitudinal doubled threads, substantially as specified.

Signed by me this 23d day of October, 1888.

DAVID M. SMYTH.

Witnesses:

HENRY KNOWLTON,
 OLIVE J. TILTON.