

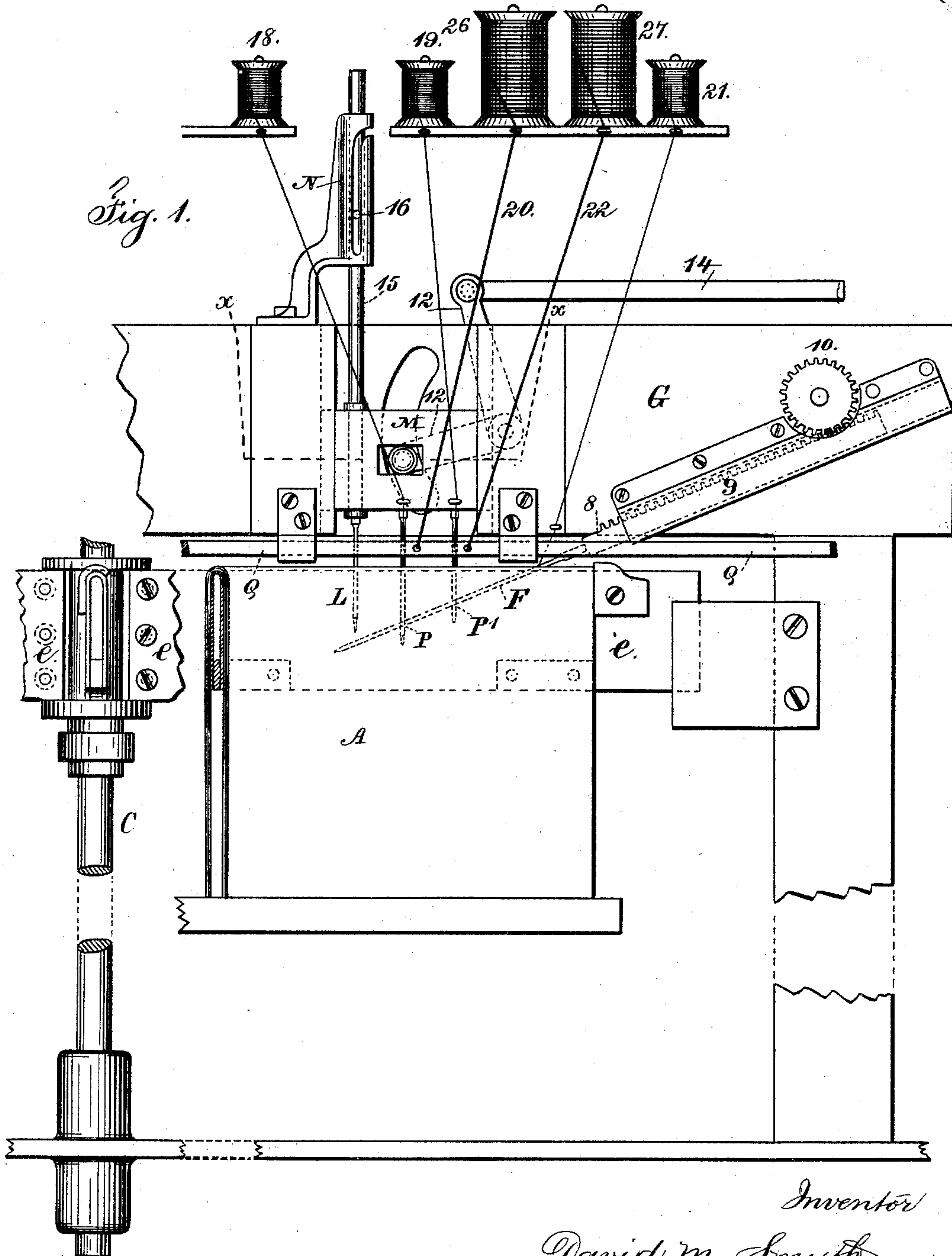
(No Model.)

3 Sheets—Sheet 1.

D. M. SMYTH.
BOOK SEWING MACHINE.

No. 468,118.

Patented Feb. 2, 1892.



Witnesses
Chas H. Smith
J. Stair

Inventor
David M. Smyth
per Lemuel W. Ferrell
att'y

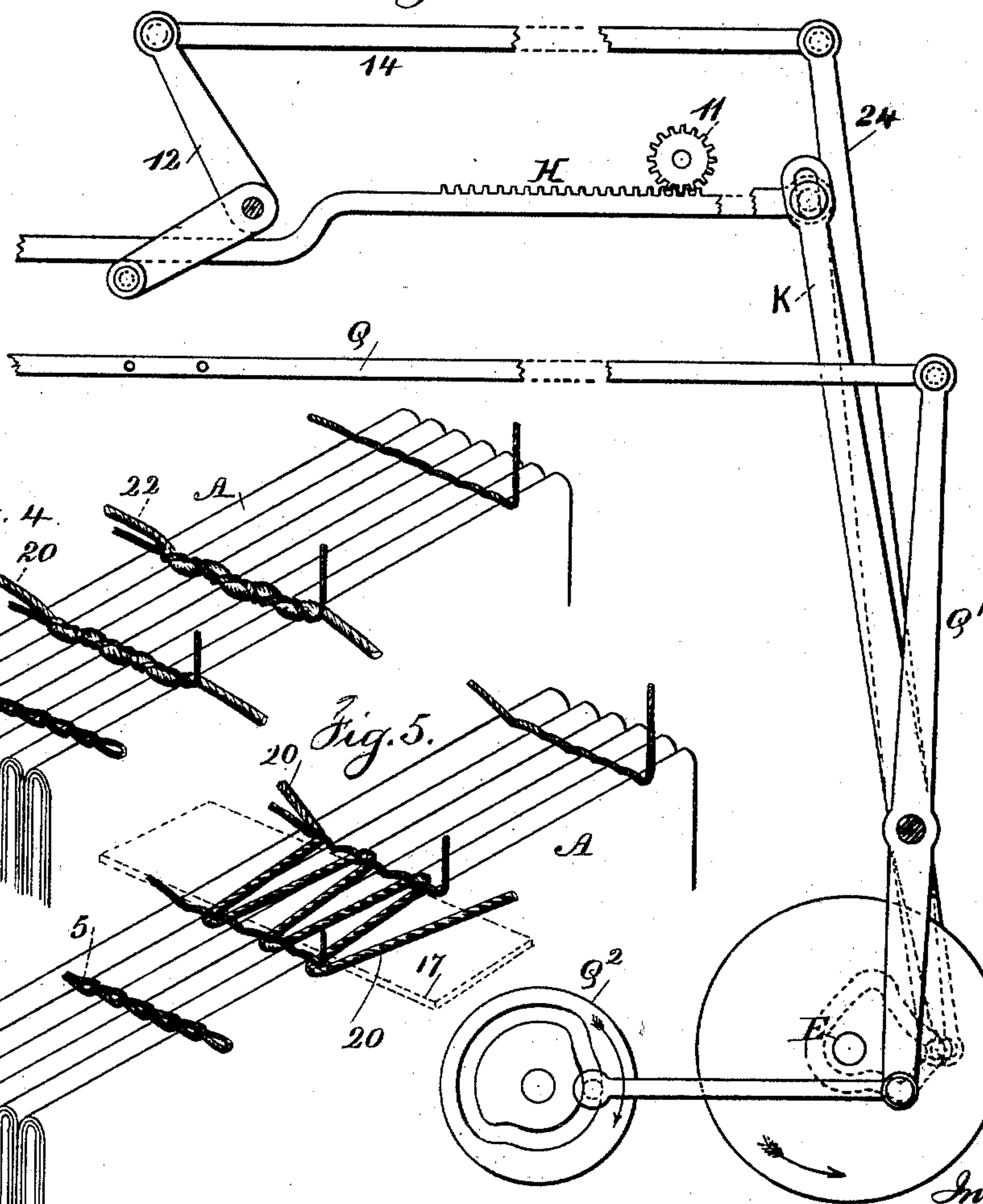
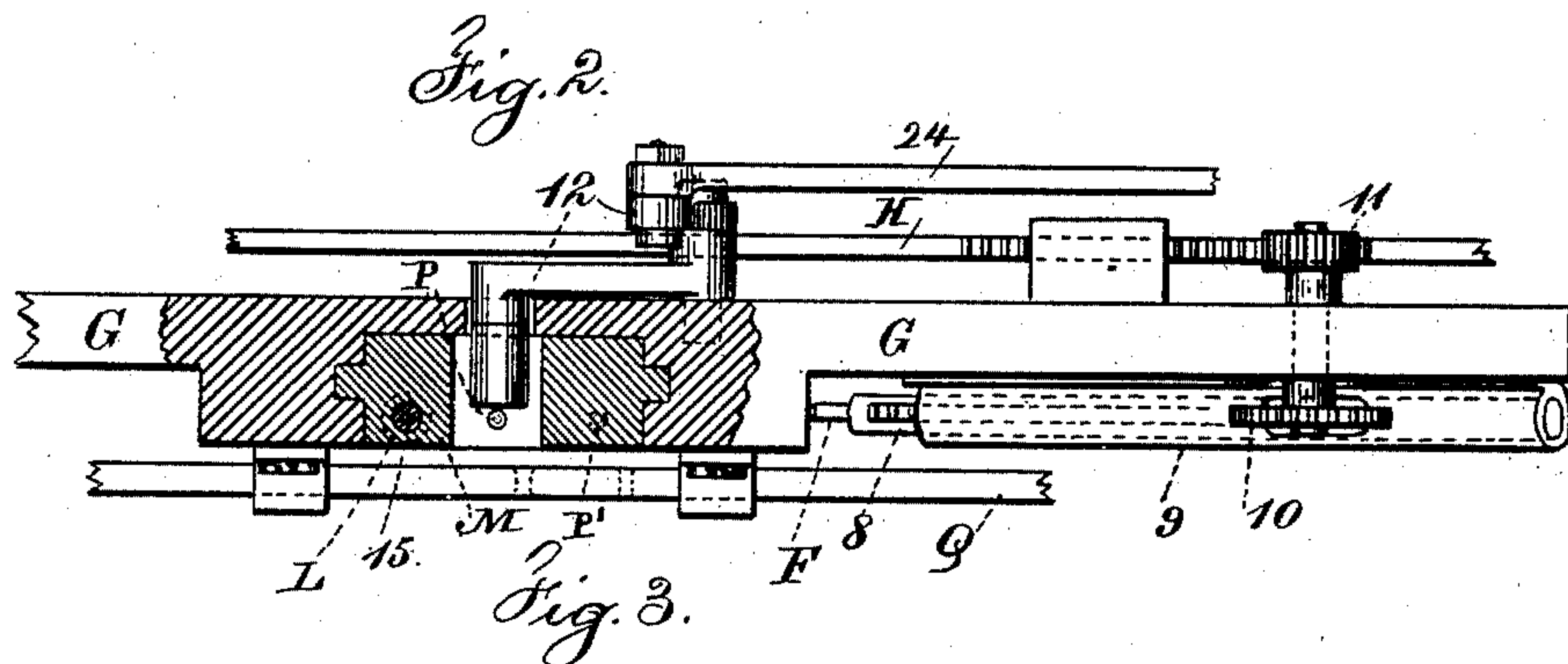
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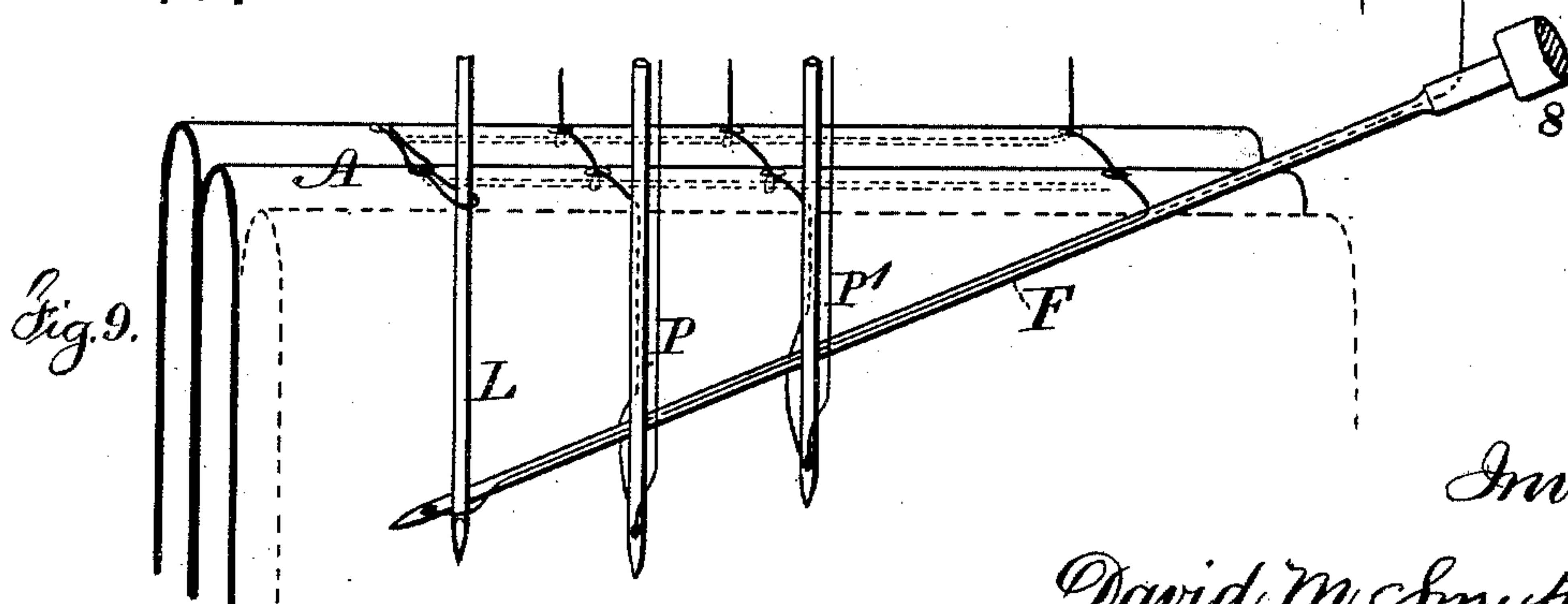
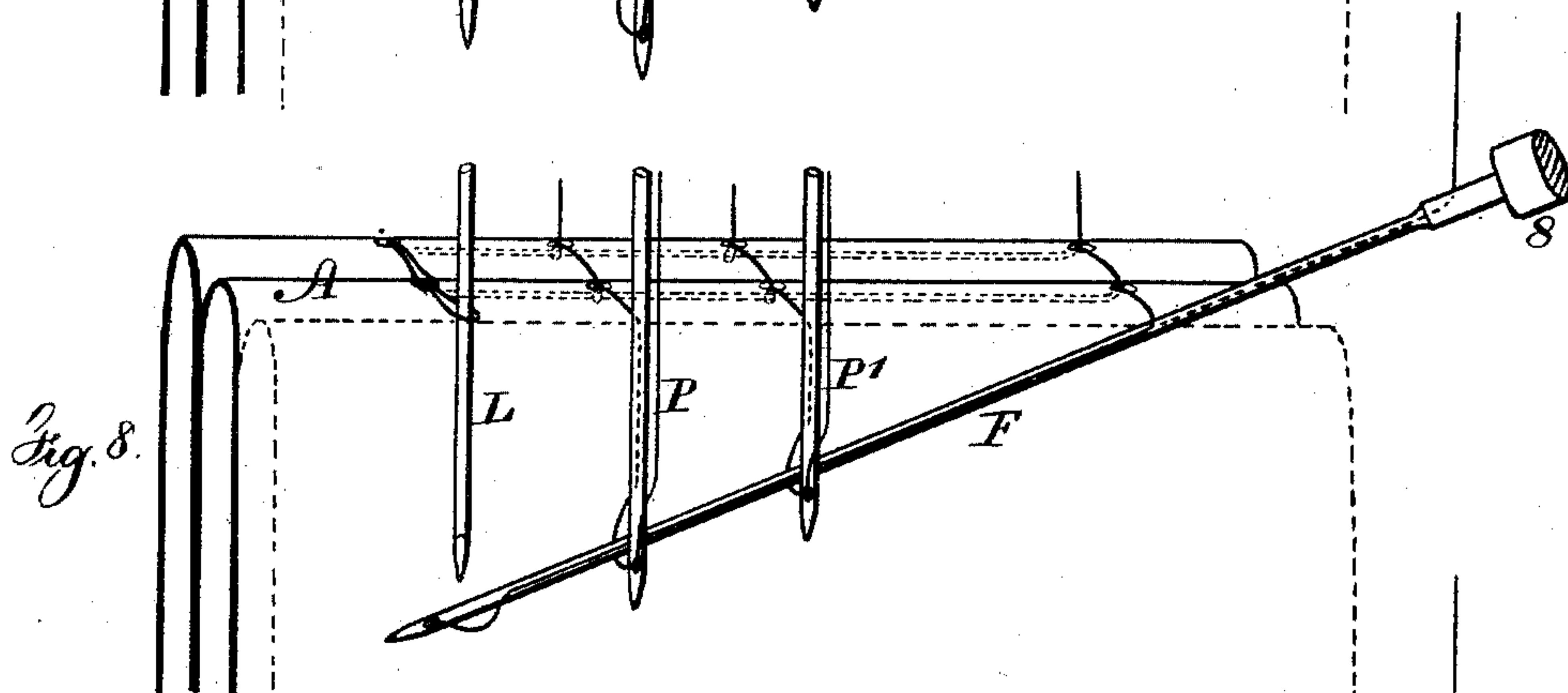
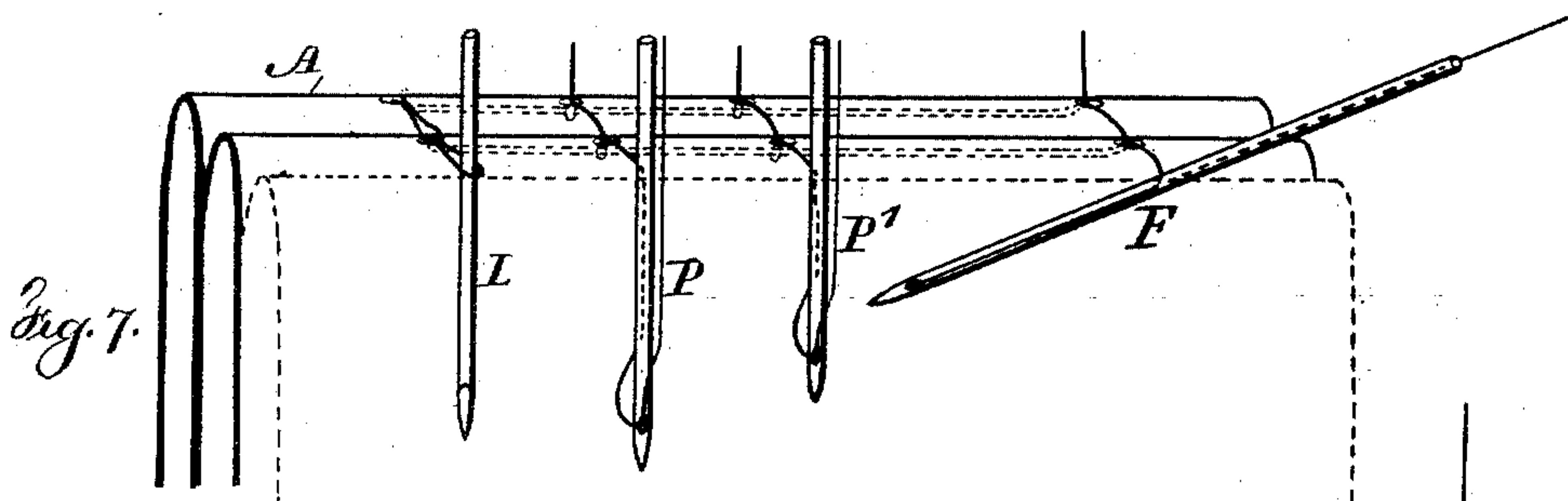
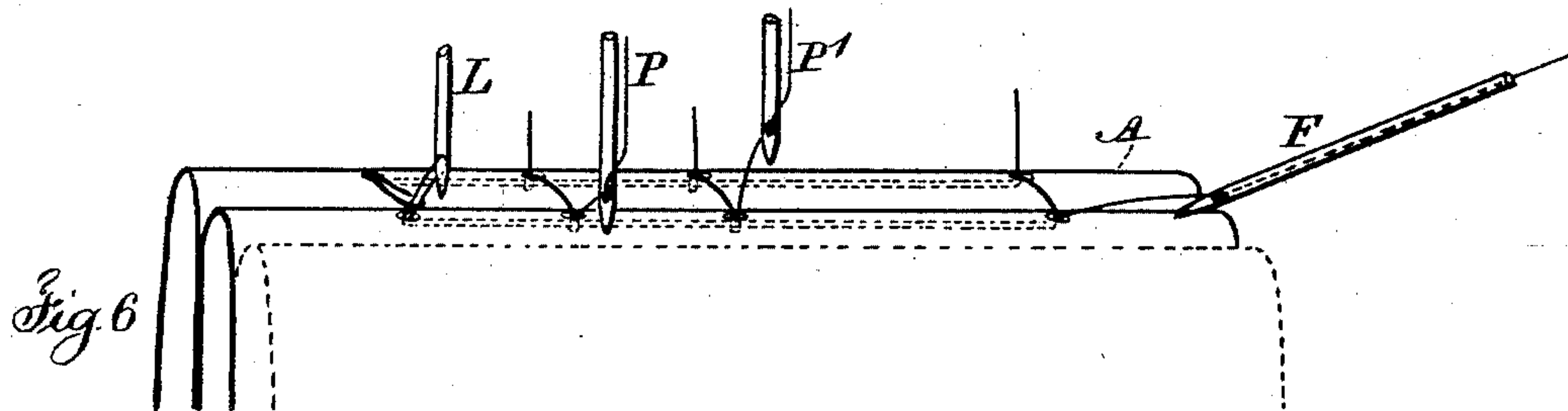
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3 Sheets—Sheet 3.

D. M. SMYTH.
BOOK SEWING MACHINE.

No. 468,118.

Patented Feb. 2, 1892.



Witnesses

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UNITED STATES PATENT OFFICE.

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

BOOK-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 468,118, dated February 2, 1892.

Application filed April 22, 1891. Serial No. 389,922. (No model.)

To all whom it may concern:

Be it known that I, DAVID McCONNELL SMYTH, a citizen of the United States, residing at Northwood, in the county of Rockingham and State of New Hampshire, have invented an Improvement in Book-Sewing Machines, of which the following is a specification.

In my present improvements I make use of a needle passing diagonally into the back of the signature, and this needle carries a thread, and there is a looper passing vertically into the fold and seizing a loop of said thread and drawing it out of the back, so as to interloop the same with the previously-sewed loops of the same thread, and I introduce one, two, or more perpendicular eye-pointed needles carrying threads, through the loops of which threads the aforesaid diagonal needle passes, so as to leave the loops of thread around the double threads laid in by the diagonal needle.

One of the special features of this present improvement relates to a heavy cord interlaced with the threads supplied by the perpendicular needles, so that such heavy cord lies transversely of the book-back and occupies a nearly straight position when placed under tension, and these transverse cords may occupy saw-cuts in the back edges of the signatures, if desired; or such cords may be laced across a strip of parchment, tape, or similar material for strengthening the book-sewing.

In the drawings, Figure 1 is a general elevation of the features of the present improvement. Fig. 2 is a sectional plan view at the line $x x$ of Fig. 1. Fig. 3 is a diagram illustrating the manner in which the respective parts can be connected to a motor or main shaft. Figs. 4 to 9 are diagrams illustrating the different positions of the respective needles and the sewing at the back of the book.

The vertical shaft C is provided with sheet-holding arms e , which may be constructed and actuated in the manner represented in my patent, No. 220,312, granted October 7, 1879, and I make use of diagonal needles which may be actuated in any desired manner, and I refer to my Patent No. 250,990 as showing diagonal needles.

The diagonal needle F is represented as supported by a stock 8, sliding in a holder 9

and actuated by a pinion 10, and this pinion 10 is upon a shaft supported in the cross-bar G, and at the rear end a pinion 11 is represented as actuated by a sliding rack-bar H, with a lever K and a cam upon the driving-shaft E; but I do not limit myself to this manner of giving motion at the proper time to the diagonal needle F. The eye-pointed needles P P' are received in the slide M, which is supported by guides upon the cross-bar G, and this slide M receives its vertical movement at the proper time by any suitable mechanism. I have represented a crank 12, the pin of which passes into a slot in the slide M, and the other arm of the crank receives a bar 14, leading to a lever 24, that is actuated by a suitable cam on the driving-shaft E.

I make use of the cord-bar Q or similar device, to which an endwise reciprocating motion is given by any suitable mechanism—such, for instance, as the lever Q' and cam Q², which latter revolves once for every two revolutions of the driving-shaft E—and in this cord-bar Q are holes for the cords 20 and 22 that are supplied from spools. The thread for the diagonal needle F is supplied from the spool 21, and for the eye-pointed needles P P' from the spools 18 and 19, and the parts are constructed and timed so that the sewing is performed in the following manner, it being understood that the signatures A may have received saw-cuts or perforations at the places where the respective needles enter, or such needles may perforate the paper. The signatures A are placed upon the sheet-holding arms in succession and brought around to position and sewed, and after one sheet has been sewed the sheet-holding arm descends and passes out of the same, the sewed signature is pushed back, and another signature is brought round and elevated to position, as in my Patent No. 220,312, or in any other manner known in book-sewing. The needles P and P' are driven down through the signature and carry with them threads from the spools 18 and 19, and they rise sufficiently to throw out loops of thread. By the time this takes place the diagonal needle F has passed into the signature and then goes through the loops of thread, as represented in Fig. 8, and these

needles P P' and the looper L are raised sufficiently for the looper L to be above the loop of thread from the spool 21, which is thrown out by a partial withdrawal of the diagonal needle F. The slide M is again depressed, so that the looper L passes through the loop of thread from the needle F, as shown in Fig. 9. The slide M is then elevated, drawing up the needles P P' and looper L to the position shown in Fig. 6, and the threads are drawn up by a tension or take-up device applied to the respective threads to draw up the slack thread, so that the loop of thread from the needle F lies double along in the signature with the end of the loop around the looper L, and the threads from the spools 18 and 19 and needles P P' are in the form of loops around the threads from the needle F, and these loops that pass around the longitudinal threads may be wrapped around the same if the needles P P' are between the diagonal needle F and the mass of signatures that have been sewed; but if the diagonal needle F passes behind the needles P P' and between the same and the mass of signatures that have been sewed, as represented in Figs. 8 and 9, the loops of thread from the needles P P' that pass around the longitudinal threads will be U-shaped.

When the needles assume the positions shown in Fig. 6, a fresh signature is to be supplied and the needles are caused to penetrate the same and the sewing is proceeded with, as before described, and as illustrated in Figs. 7, 8, and 9.

The looper L in all instances seizes a loop of thread from the diagonal needle F and draws such loop out at the back of the signature and through the similar loop from the previously-sewed signature, so that there is a line of loops, as represented at 5, and I remark that this looper L may be actuated in any suitable manner to throw off the previous loop as the fresh loop is drawn through such previous loop, as common in sewing-machines.

I have represented the looper L as at the lower end of the looper-rod 15, and this rod 15 slides in a standard N, which is slotted for the reception of the pin 16, and the slot is cam-shaped at its upper end to give to the looper-rod and looper a partial rotation to prevent the hook of the looper catching the previous loop as such previous loop slips off the end of the looper and around the fresh loop of thread.

The devices thus far described, and illustrated by the diagrams Figs. 6, 7, 8, and 9, may alone be made use of in sewing books; but it is advantageous to make use of the cords or heavy threads 20 22 from the spools 26 and 27 to strengthen the sewing, these cords passing through eyes in the cord-bar Q, and this cord-bar Q is moved endwise between one sewing operation and the next. Hence each cord 20 22 is interlaced and confined by the threads from the needles P P',

as indicated in Fig. 4, because the cords are to be moved by the bar Q at the time the needles P P' are entirely elevated. Hence such needles P P' will pass into the signatures first at one side and then at the other side of such cords 20 22 and the sewing will be performed as illustrated in Fig. 4, and where the back edges of the signatures have been channeled or saw-cut such cords 20 22 will lie in such saw-cuts, and the tension applied to such cords 20 22 should be sufficient to cause the cords to draw nearly straight and thereby the strain of the binding will be thrown upon such cords.

If only one cord 20 is made use of and the cord-bar Q receives a sufficient length of movement, the cord 20 will be laced around the thread from the needle P and then around the thread from the needle P', as illustrated in the diagram, Fig. 5, and in this case such cord 20 may confine to the back of the book a strip of parchment or a tape, as illustrated by the dotted lines 17.

It is to be understood that the sewing devices described form a group, and that in large books there may be two or more groups of sewing devices arranged and actuated as herein described, and, if desired, the diagonal needles F may be placed in an opposite direction in one group from what they are in the other group, and there may be three eye-pointed needles or more instead of two eye-pointed needles P P', and in cases where only one eye-pointed needle is made use of the cord-bar and cord from the same can be interlaced, as before set forth.

I claim as my invention—

1. In a book-sewing machine, the combination, with the diagonally-reciprocating eye-pointed needle F, of a looper for interlooping the thread of such diagonal needle, a vertically-reciprocating eye-pointed needle passing into the signature and carrying a thread, through a loop of which the double threads from the diagonal needle pass, and means for interlacing a cord with the thread from the vertically-reciprocating eye-pointed needle across the back of the book, substantially as set forth.

2. The combination, in a book-sewing machine, of a diagonally-reciprocating eye-pointed needle carrying a thread and a vertically-reciprocating eye-pointed needle carrying a thread that is laid around the double thread from the diagonally-reciprocating needle, and the looper interlooping the thread from such diagonally-reciprocating needle, and mechanism for placing a cord or thread first at one side and then at the other side of the path of the vertically-reciprocating eye-pointed needle, substantially as set forth.

3. The combination, in a machine for sewing books, of a sheet-holding arm, a slide and means for reciprocating the same vertically, eye-pointed needles and a looper carried by such slide, a diagonally-reciprocating eye-

pointed needle, and means for giving to the looper a partial rotation to throw off the previous loop, substantially as set forth.

4. The combination, in a book-sewing machine, of a sheet-holding arm, a diagonally-reciprocating eye-pointed needle, a looper and a vertically-reciprocating eye-pointed needle, a slide for carrying the same, and mechanism for moving such slide and causing the vertically-reciprocating needle and looper to penetrate the signature, a recip-

rocating bar having an eye for a cord, and mechanism for moving the same so as to interlace the cord or heavy thread with the thread of the vertically-reciprocating eye-pointed needle, substantially as set forth. 15

Signed by me this 15th day of April, 1891.

DAVID McCONNELL SMYTH.

Witnesses:

JOS. E. SMYTH,
C. A. BRICKETT.