2 Sheets—Sheet 1.

J. C. SMYTH.

BOOK SEWING-MACHINE.

No. 184,989. Patented Dec. 5, 1876.

Fig. 2.

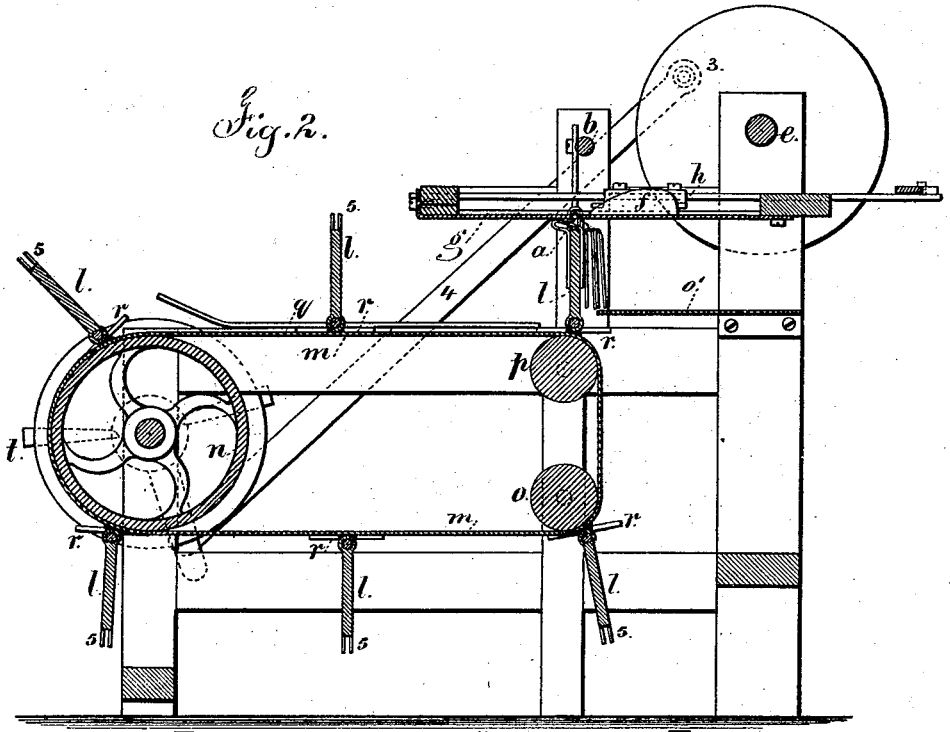
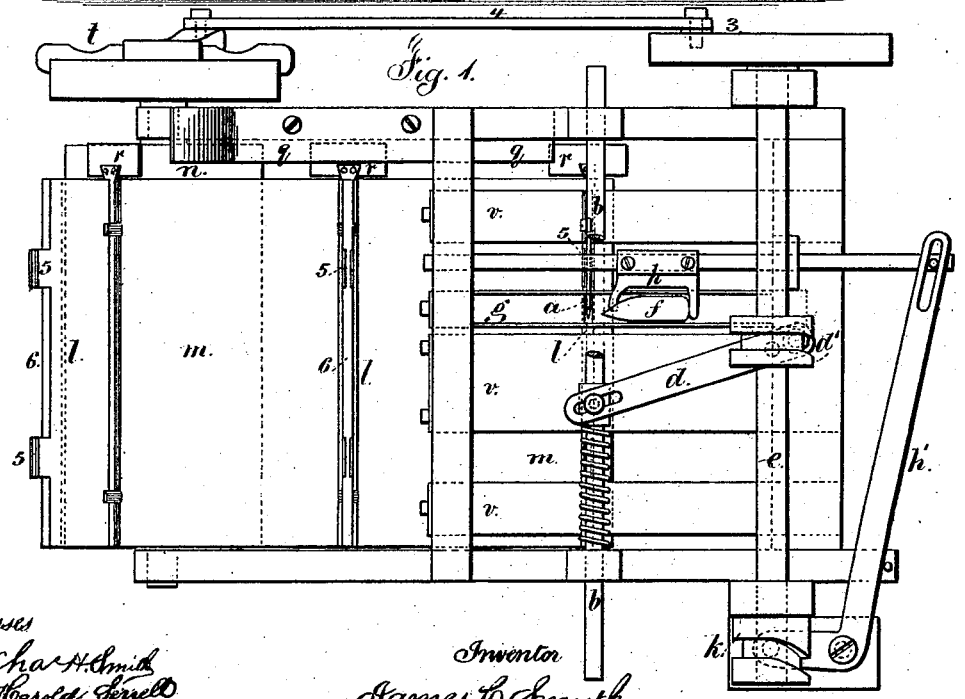


Fig. 1.



Witnesses
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Harold Serrell

Inventor
James C. Smyth
per L. W. Serrell Atty

2 Sheets—Sheet 2.

J. C. SMYTH.

BOOK SEWING-MACHINE.

No. 184,989. Patented Dec. 5, 1876.

Fig. 4.

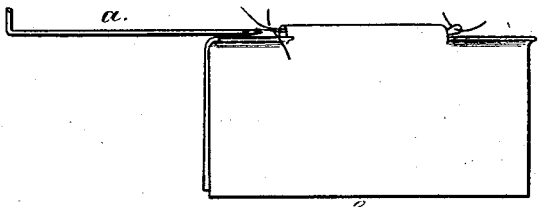


Fig. 3

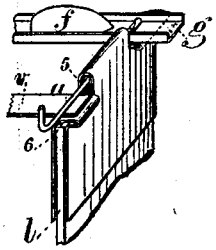


Fig. 5.

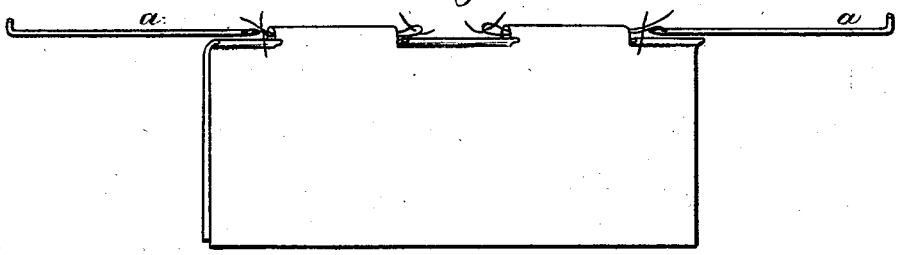


Fig. 6.

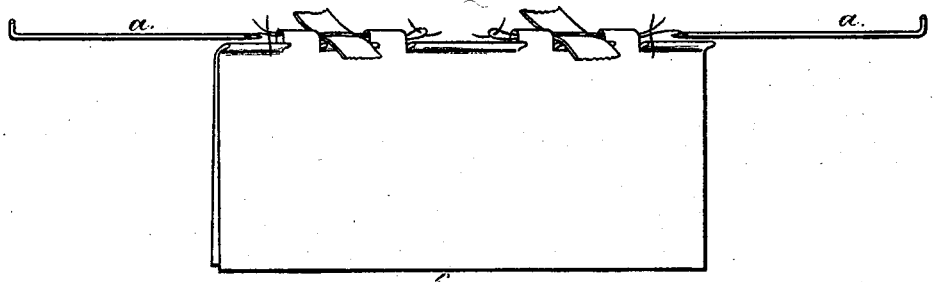
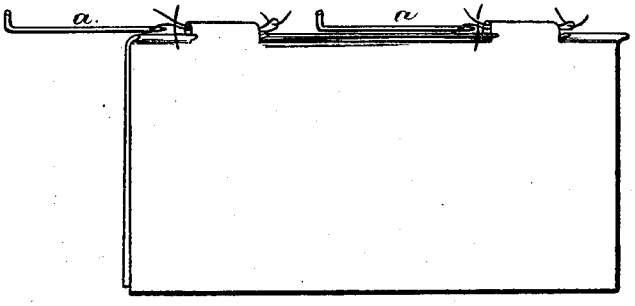


Fig. 7.



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per L. W. Serrell
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UNITED STATES PATENT OFFICE.

JAMES CRAWFORD SMYTH, OF LYNN, MASSACHUSETTS, ASSIGNOR TO ORIANNA S. SMYTH, OF SAME PLACE.

IMPROVEMENT IN BOOK-SEWING MACHINES.

Specification forming part of Letters Patent No. **184,989**, dated December 5, 1876; application filed March 27, 1876.

To all whom it may concern:

Be it known that I, JAMES CRAWFORD SMYTH, of Lynn, in the State of Massachusetts, have invented an Improvement in Book-Sewing Machines, of which the following is a specification:

The object of this invention is to sew the folded leaves of books by an eye-pointed needle or needles passed lengthwise through the inner part of the fold. To effect this a guide is formed for the needle within the sheet-holder, and the paper is folded back so that the needle emerges, and a shuttle passes through the loop of thread to interlock the same. The space for the movement of the shuttle and for the needle to pass out of the fold of the sheet results from bending down the folded edge between two of the saw-cuts that are made across the fold of the sheet. By this improvement the machinery is very much simplified, and the book-sewing is performed with ease and rapidity.

In the drawing, Fig. 1 is a plan of the machine. Fig. 2 is a vertical section, and Fig. 3 is a perspective view of the shuttle, needle, and folded sheet.

The eye-pointed needle *a* is upon a bar, *b*, that is reciprocated by suitable means, such as the lever *d* and cam *d'* upon the motor-shaft *e*.

The shuttle *f* is in a raceway, *g*, and it is moved at the proper time to pass through the loop of needle-thread by the shuttle-driver *h*, that is actuated by any suitable means. The lever *h'* and cam *k* are shown as the means for moving the shuttle in proper time. These parts and the sewing operations, being well known, do not require further description, except as hereafter contained, and I remark that I have shown one needle and shuttle, but there may be two or more needles upon the same bar, and a corresponding number of shuttles and raceways and shuttle-drivers.

The sheet is presented by a sheet-holder, *l*, the edge of which is grooved to form a guide for the needle. It is preferable to employ a number of these sheet-holders attached to an endless belt or chain, *m*, passing around the pulleys or rollers *n*, *o*, and *p*, and each sheet-holder has a guide-foot, *r*, sliding in a stationary groove, *q*, so as to keep the sheet-holder in a vertical position, and bring the sheet to the place where the sewing is performed, after which the end of the foot *r* clears the groove *q*, and the sheet-holder is carried bodily down out of the folded and sewed sheet by the belt as it passes downwardly between the rollers *n* and *o*, leaving the sewed sheet suspended to be pressed along upon the table or support *o'* by the next sheet that is brought up to position by the next sheet-holder. The belt or chain, with the sheet-holders, is moved around progressively by any desired mechanism. I have represented the crank 3, connecting-rod 4, and a clamping-feed, *t*, similar to that upon a sewing-machine.

The fold at the back of the sheets of paper to be sewed together is cut or sawed at proper places in the usual manner, and the portions of the fold through which the needle or needles pass are held up firmly by the grooved portions 5 of the sheet-holder, and the intermediate portions of the sheet are pressed or bent over (where the notches 6 are in the edge of the sheet-holder) by the sheet-holder pressing the folded part of the sheet into contact with the under side of the shuttle raceway *g* and the stationary plates *v*, as indicated in Fig. 3. In consequence of this way, in which the paper at the fold is bent aside in sections, opportunity is given for inserting the eye-pointed needle through the portion of the fold that stands up, and the end of the needle comes out of the fold at the shuttle raceway, so that the shuttle can pass through the loop of thread carried by such eye-pointed needle, and the shuttle is moved freely at right angles to the needle, or nearly so, in order to take the loop of needle-thread in the best manner, and this shuttle carries a cord or stout thread adapted to form one of the back cords of the book.

It is to be understood that the machine is to be constructed with reference to the size of book to be sewed, and the character of the sewing required.

In the diagrams, Figs. 4, 5, 6, and 7, some of the forms of sewing are illustrated. Fig. 4

shows the small book-leaves with two saw-cuts, one stitch, and a thread or cord in both saw-cuts. In this case one cord is laid in by the shuttle, the other is laid in by simply raising the thread at one stitch, so that the needle passes below it, and depressing it at the next stitch, so that the needle passes above it. The thread or cord is supplied from a spool, and an eye in a lever is used to raise or depress the thread. In Fig. 5 a style of sewing is illustrated, the same as in Fig. 4; but instead of being single it is double. This is produced by duplicating the parts of the machine relating to the needle and shuttle, so that two needles will be moved simultaneously toward and from each other, and there will be two shuttles. In Fig. 6 a similar kind of sewing is represented to that shown in Fig. 5; but in addition two central incisions are made in the back, and a strip of parchment, tape, or other suitable material is applied, the same being in the machine beneath one of the metal strips *v*, so that the strip of parchment is depressed enough for the needle to pass over it. The strip *v* either terminates near the needle or is bent up to allow the needle to pass between it and the strip.

It will be evident that two or more needles can be used on one needle-bar with a corresponding number of shuttles in instances where the spaces between the sewed sections are wider than the sewed sections, as indicated in Fig. 7, so that there will be room for the movement of the needles in the sections of the back that are folded or bent back, as shown.

A looper might take the place of a shuttle, or the shuttle might be revolved instead of reciprocated; and it is to be understood that only one sheet-holder might be employed, having the necessary up-and-down motions to present the sheet; but it is best to use the belt, because it gives more time for adjusting the sheet to place while the sewing of the previous sheet is being performed.

I claim as my invention—

1. The combination of a sheet-holder, having a grooved and notched edge, with a plate, *v*, to bend the paper of the sheet aside in sections, and an eye-pointed needle and sewing mechanism, substantially as set forth.

2. In a book-sewing machine, the combination of a reciprocating needle, a shuttle carrying a thread or cord, a sheet-holder with a grooved edge, and an endless belt to move such sheet-holders successively to the point of sewing, substantially as set forth.

3. The sheet-holder *l* and belt *m*, in combination with a foot, *r*, and guideways *q*, to retain the sheet-holder in a vertical position, substantially as set forth.

4. The combination, in a book-sewing machine, of mechanism substantially as described, for bending the cut section of the back aside and passing the sewing-needle into one end and out of the other end of the standing portion of the fold, substantially as set forth.

Signed by me this 21st day of March, A. D. 1876.

J. C. SMYTH.

Witnesses:
NATHAN M. HAWKES,
D. M. SMYTH.