J. ARMSTRONG. 2 Sheets--Sheet 1.

Book-Sewing Machine.

No. 166,329. Patented Aug. 3, 1875.

Fig. 1.

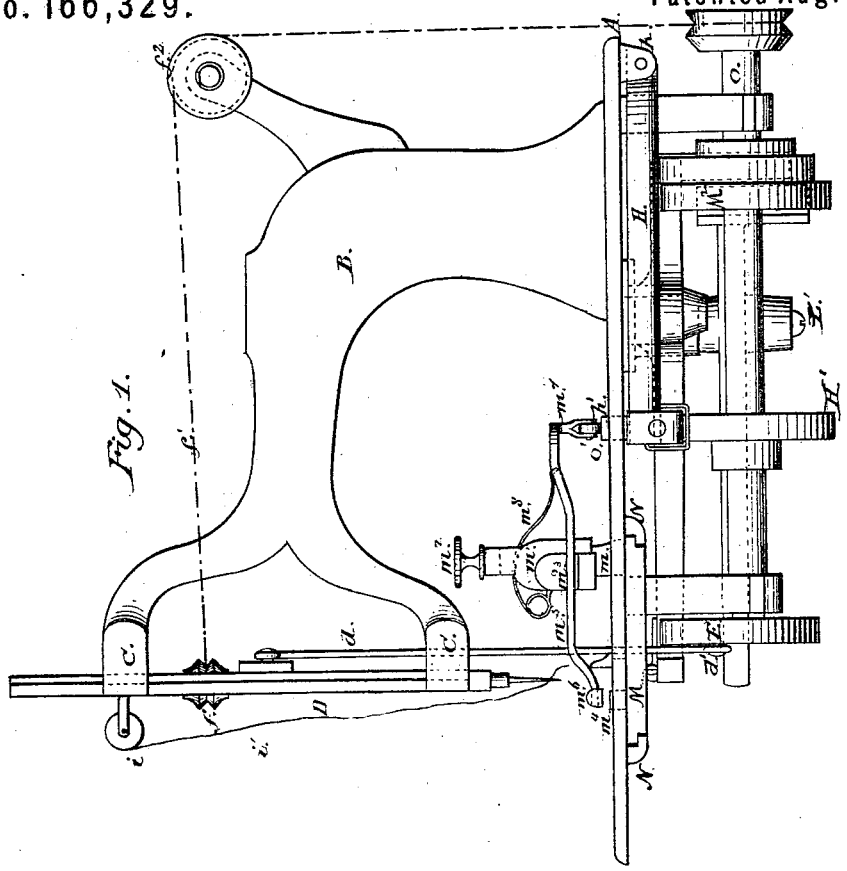
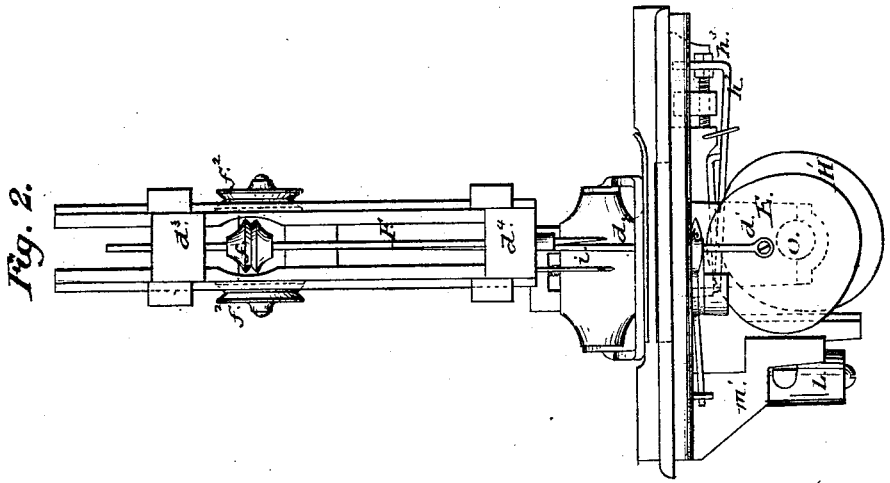


Fig. 2.



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2 Sheets--Sheet 2.

J. ARMSTRONG.

Book Sewing-Machine.

No. 166,329. Patented Aug. 3, 1875.

Fig. 3.

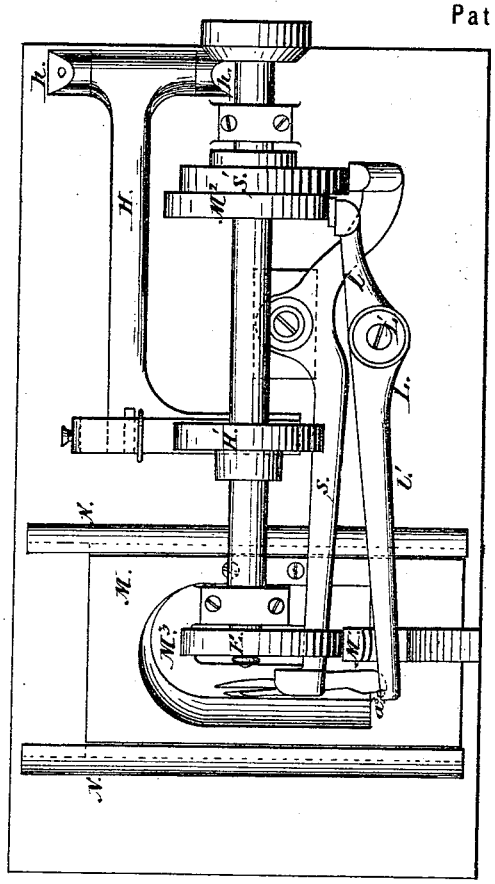


Fig. 4.

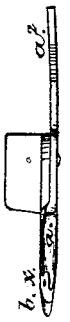
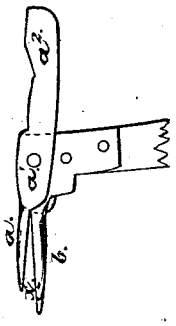


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES ARMSTRONG, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN BOOK-SEWING MACHINES.

Specification forming part of Letters Patent No. **166,329**, dated August 3, 1875; application filed March 9, 1875.

To all whom it may concern:

Be it known that I, JAMES ARMSTRONG, of Cambridge, county of Middlesex, State of Massachusetts, have invented a new and Improved Book-Sewing Machine, of which the following is a full and clear specification, so that others skilled in the art to which it appertains can make and use the same.

Accompanying this specification are drawings illustrating what I consider the best mode of using my invention, and which are referred to by letters of reference, like letters referring to like parts, in which—

Figure 1 is a side elevation of the same. Fig. 2 is a front elevation of the same. Fig. 3 is a plan view of the bottom of the machine, showing the working parts. Figs. 4 and 5 are detail views of the bird's-bill forceps.

The object of this invention is to make a machine which will facilitate the sewing of books in a rapid and substantial manner; and it consists in a device for feeding the book or signature; a device for drilling the holes in the book or signature for the thread; and a stitch-forming mechanism, all combined and operating in an organized machine.

Referring to the drawing, A is the base plate or bed of the machine, upon which is the bent arm B. This arm is divided into two branches, C C. Near its ends each is bifurcated and slotted to allow the upright standard D, carrying the drill and needle, to reciprocate, as hereinafter described. This standard receives its motion from the rod *d* attached to a wrist-pin, d^1, on the eccentric-wheel E on the main shaft O, which, in turn, receives motion in any ordinary manner, as by means of a crank when driven by hand, or belts when power is used. The standard is provided at its base with a needle, *i*, carrying a thread, i^1, from spool i^2. An upright drill is also attached to the standard, having bearings in the cross-pieces d^3 d^4, and a pulley, *f*, with a V-shaped groove, in which the driving-cord runs.

A rapid rotary motion is given to the drill by means of the endless cord f^1 passing over the lazy-pulleys f^2 f^2 around the grooved pulley *f*, and thence around a suitable wheel on the main driving-shaft.

This wheel should be of considerable diamter to insure a rapid rotary motion of the drill.

The drill, therefore, has two motions—a vertically-reciprocating one with the standard D, and a rotary one produced as above described, so that it virtually drills the holes through the paper instead of punching them.

This I consider one of the most important features of the invention, for hitherto it has been impracticable to sew books on a machine of this character, for the reason that it was impossible to make the holes through any considerable number of sheets of paper by punching or piercing the ordinary way; but by the use of the rotary drill I am enabled to make the holes with ease, precision, and rapidity through any thickness used in pamphlet or signature form.

Another great obstacle in sewing books has been found in feeding the book or signature fast enough, so as to enable long stitches to be taken.

This I overcome by a device substantially as follows: M is a plate sliding in the grooved ways N on the under side of the bed-plate A. A reciprocating motion is given to this plate by the cam-wheel E bearing against the projecting arm or lug m^1 on the under side of the plate, which moves it forward, and cam-wheel m^2 on the main shaft bearing against the short arm *l* of the lever L pivoted to the stud L^1, the long arm *l'* of which bears against the rear side of the arm or leg M^1, and produces the return or backward movement of the plate. A slot, M^3, is made in the plate to allow the working of the stitch-forming mechanism.

An upright slotted standard, *m*, rises from this plate through a hole in the bed A, to which is attached the sliding lug m^1, vertically adjustable by the thumb-screw m^2. A frame, m^5, preferably of metal, is pivoted, by means of the lugs m^3, to the frame m^1. To the end of this frame m^5 is attached the metal strip or presser-foot m^6, bent at the front end, and to the other end is attached the arm m^7, carrying a friction-roll. This end of the frame is pressed

downward by the spring m^8, keeping the roll in contact with the bar h^1. This, in connection with the bar m^4, also attached to the plate M, acts as a clamp to feed the book or signature, in the manner hereinafter described.

A hinged arm, H, attached to the under side of the bed by the lugs h, is provided with a bar, h^1, projecting through the bed-plate, and on its under side it is provided with an inclined metal strip, h^2, bent, as shown, and made adjustable by the screw h^3. The cam-wheel H^1 bears against the arm, raising and lowering the bar h^1. The book or signature being placed between the bars m^4 m^6, the cam H^1 raises the bar h^1, as before described, causing the bar m^6 on frame m^5 to clamp the book, when the cam E, operating against the lug m^1, moves the plate M forward the length of the stitch, and with it the book. The length of the stitch is regulated by the bent strip h^2, for as that is moved it causes the bar m^6 to clamp the book a longer or shorter period. The book having been fed forward, cam H^1 allows the bar h^1 to fall, and the spring m^8, bearing upon the frame m^5, raises the bar m^6 from the book, while at the same time cam M^2, by means of lever L, returns the plate M to its normal position. Meantime the standard D, carrying the drill and threaded needle, descends and drills one hole, forcing the needle through the previously-drilled hole.

The stitch may be formed by any well-known mechanism, but I prefer what I call the "bird's-bill forceps." (Shown in Figs. 4 and 5.) These consist of fingers a b, pivoted, at a^1, to the lever S, operated by the cam S'. The finger b is securely fastened to the lever S, and is provided with an eye, x, through which the under thread may pass, if any is used. The finger a is provided with an extension, a^2, which strikes against the pin a^3, which operates as a means to open and close the forceps. The movement of the forceps is so timed that they will spread the under thread, so that, the needle descending, they will enter, withdraw, and re-enter the loop formed by the upper thread, and thus lock the stitch. When no under thread is used, the forceps are so moved as to retain the upper thread at their points, and push it slightly forward, so as to be looped by the next descending movement of the needle.

Having thus fully described the operation of what I consider the best manner of using my invention, I will state that the mechanism may be somewhat varied, and I do not wish to limit myself to the exact mode described.

My machine may be used in sewing many other things as well as books, but it is specially adapted for that use.

What I claim as my invention, and desire to secure by Letters Patent in the United States, is—

1. In combination with a stitch-forming mechanism, the reciprocating rotating drill, as and for the purpose described.

2. The rotating drill F, provided with pulley f, in combination with the reciprocating standard D, carrying the needle i, as described.

3. The combination of the rotating drill F, reciprocating standard D, carrying the needle i and spool i^2, with the rod d and cam-wheel E on the main shaft, as described.

4. In combination with the stitch-forming mechanism, the reciprocating rotating drill F, and the intermittent feed mechanism, operating substantially as described.

5. The pivoted arm H, carrying the adjustable bent strip h^2 and bar h^1, in combination with cam-wheel H^1 and pivoted frame m^5, whereby the length of the stitch is controlled, substantially as described.

6. The intermittent feed mechanism, consisting of the plate M, constructed substantially as described, provided with the bar m^4 and standard m^1, carrying the pivoted clamping-bar m^6, operating as described.

JAMES ARMSTRONG.

Witnesses:

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