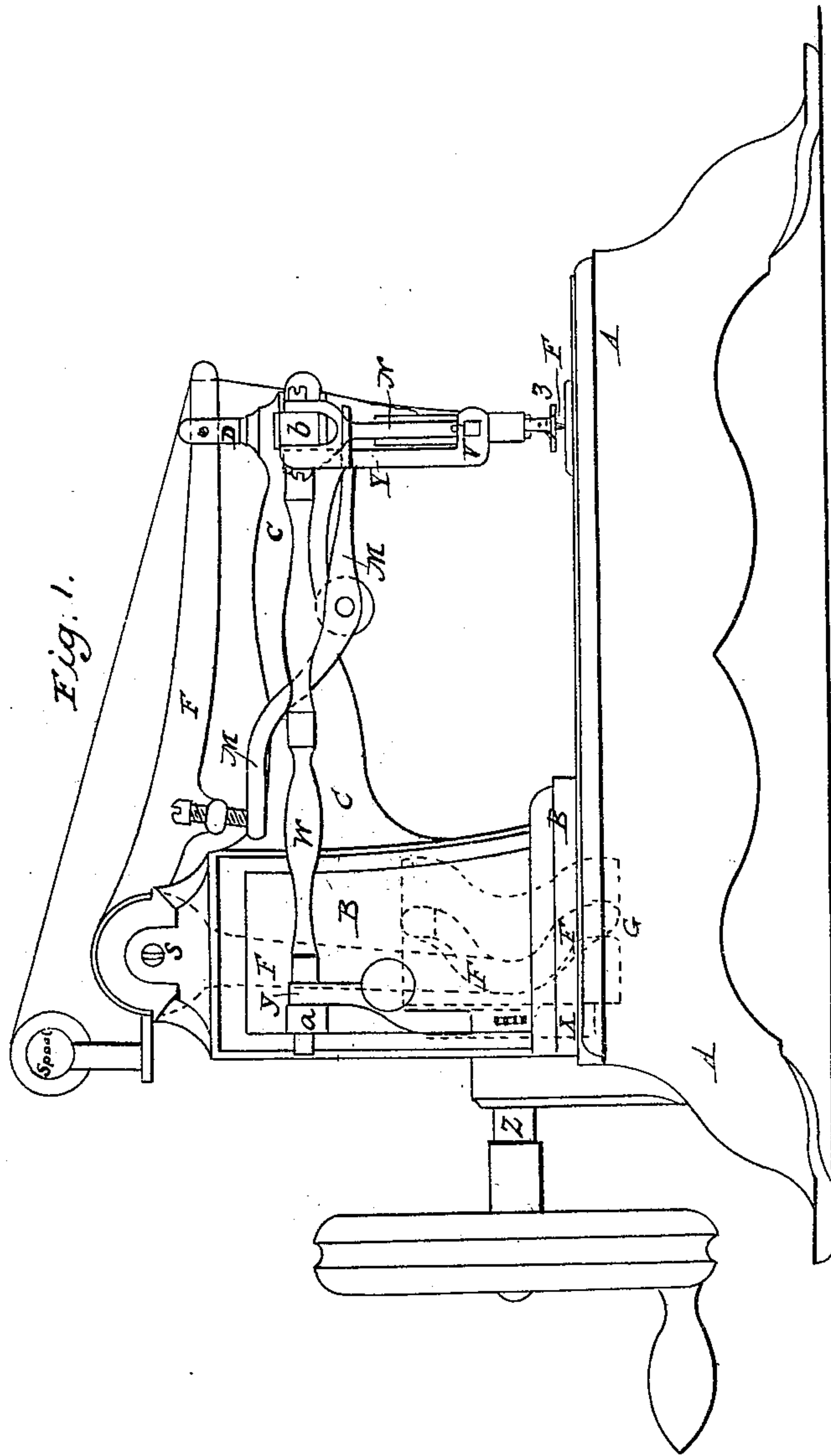


A. H. BOYD.
Sewing Machine.

2 Sheets—Sheet 1.

No. 19,171.

Patented Jan'y 19, 1858.

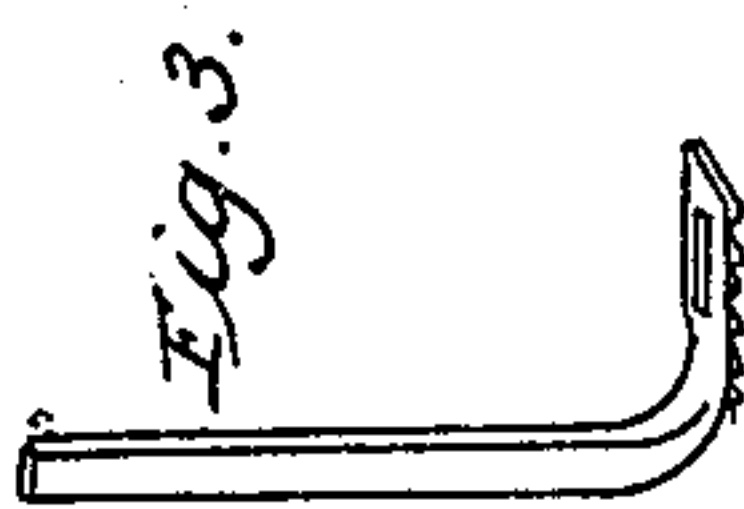
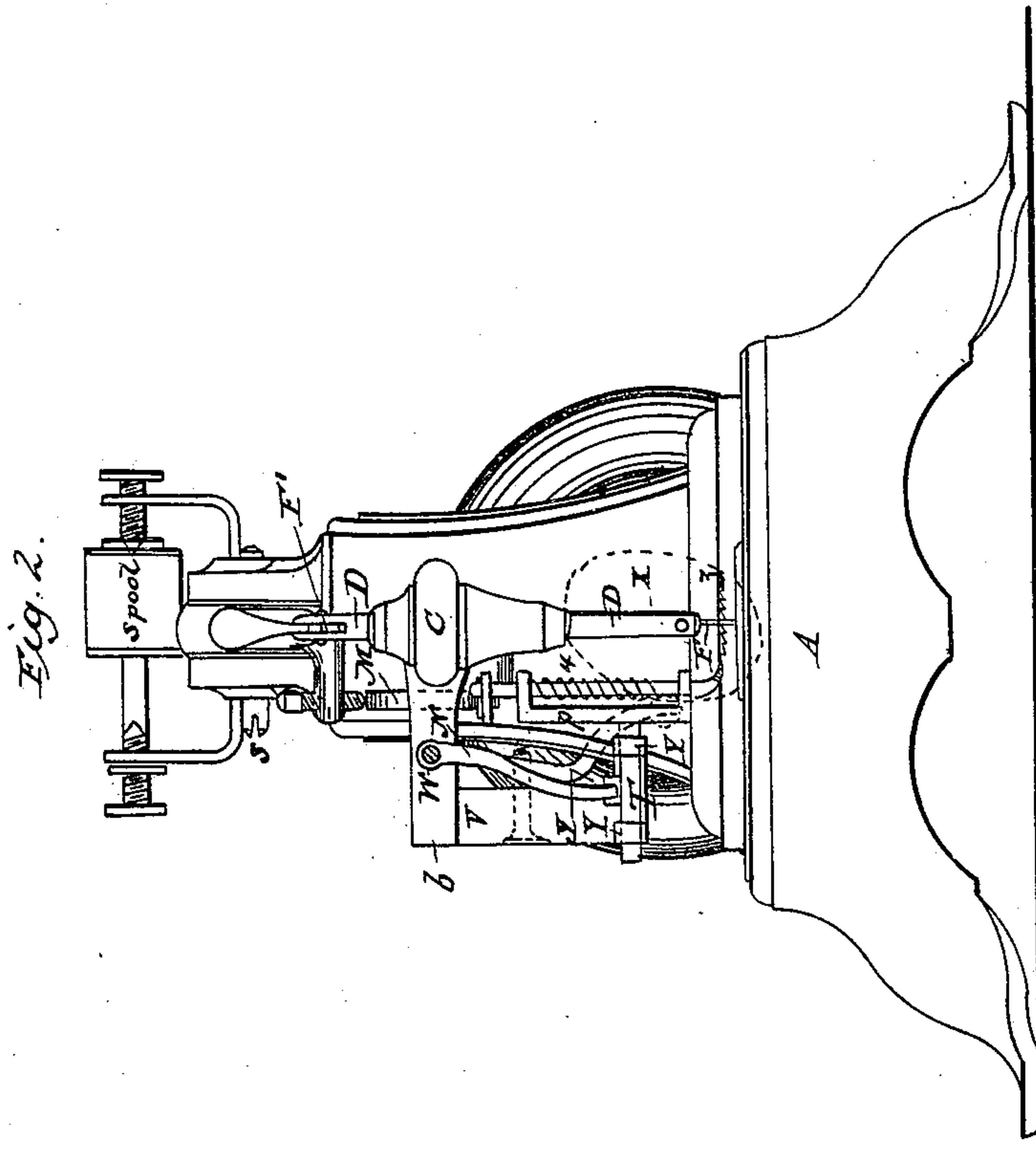


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UNITED STATES PATENT OFFICE.

AMOS H. BOYD, OF SACO, MAINE, ASSIGNOR TO OLIVER D. BOYD, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **19,171**, dated January 19, 1858.

To all whom it may concern:

Be it known that I, AMOS H. BOYD, of Saco, in the county of York and State of Maine, have invented an Improved Operating-Shoe for Feeding and Holding the Cloth or Work on a Sewing-Machine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and the letters and figures of reference thereon.

To explain the nature of my improvement I will observe that the shoe heretofore in use has no distinct lifting and depressing movement, nor was its lateral feed-motion strictly horizontal, and it performed both its feed and backward motions at the same elevation, so that after moving the cloth forward the shoe, in its counter-movement, was apt to push the cloth back again, especially where the work was uneven from plaits, gathers, or otherwise.

Now, the nature of my improvement consists in introducing distinct lateral and perpendicular movements of the shoe, by which the performance of its exact functions are made certain on every kind of work, my lifting and depressing movement being strictly perpendicular and my feed motion strictly horizontal; and I am enabled to use a flat or level shoe, by which the cloth is held firm about the needle a sufficient space to prevent its being strained and forced through the slot in the bed-piece by the action of the needle when passing through the cloth.

I will now proceed to explain such of the parts of a sewing-machine to which my improvement is adapted as are necessary to understand the improvement, omitting other parts of the machinery which have no reference to and act independently of it, the purpose of the shoe and the adaptation of my movements being fully presented in connection with the upward and downward movements of the needle.

Figure 1 presents a side view of a sewing-machine with my improvement attached. Fig. 2 exhibits an end view of the same.

A is the bed-piece or lower part of the frame of the sewing-machine. B is the box or upper part of said frame, the two parts A and B sustaining the operating parts of the machinery, together with arm C of said frame, which projects from said box B. Round shaft

D passes perpendicularly through a hole in the head of arm C, in which it is made to fit, sliding freely therein. In the lower end of shaft D is fixed the needle E, which passes at each stitch through a slot in said bed-piece A. Bent lever F (having its fulcrum S near the top of box B) extends by one of its arms to the upper end of shaft D, passing through said shaft, and connected to it by a pin or screw passing through the body of said shaft and a slot in the end of said lever F. The other end of said lever F, as shown in dotted lines on Fig. 1 of the drawings, extends downward and by means of a stud-roller on the end into groove-cam G on shaft z, which groove is so formed as to produce at every half-revolution of said shaft an oscillating reciprocating movement of said lever F, thereby giving two complete up and down movements of the needle at each revolution of said grooved cam.

I will now describe the parts and operation of the machinery pertaining solely to my improvement.

Fig. 3 represents the form of shoe which I use, being a small plate of metal grooved on the underside or surface, as seen also in Fig. 2, said shoe having a slot or opening near its center for the passage of the needle, the purposes of said shoe being to hold the cloth firmly while the needle is passing through it, and also for feeding or moving the cloth at each stitch the space corresponding to the length of the stitch. Said shoe is attached to a small bar, as seen also in Fig. 3, which I denominate the "upright shaft" of the shoe. Around said shaft is spiral spring 4, as seen in Fig. 2, having its bearings at one end against the upper projection, o, and at the other end against a pin passing through said upright shaft, the office of which spiral spring is to depress the shoe onto the cloth whenever the action of lever M upon it is relieved, as hereinafter specified.

In a projecting lip on lever F is screw d. Lever M, having its fulcrum on arm C, near its lower edge, extends in one direction therefrom to the point of screw d on lever F, and in the other direction to the upright shaft of the shoe, and is attached to said shaft, near its upper end, by a pin in a manner to admit said lever M to move the shoe up and down by the action of screw d in lever F upon lever M.

Fixed to and depending from projection b

on arm C, outside of shaft W, is the frame V, formed as seen in the drawings. Sustained in suitable bearings in said frame is sliding bar T, which slides freely in said bearings.

Attached to the inner end of sliding bar T, and extending upward and downward from it, is plate *p*, with projections *o o* at either end.

Through each projection *o o* are cut holes, fitting the upright shaft of the shoe, which passes through said holes, sliding freely therein, the purpose of said arrangement being to produce a lateral motion of the shoe without obstructing the perpendicular action produced by lever M; and it should be observed that the connection of lever M with the shaft of the shoe should be so arranged as to admit of a lateral movement of said upright shaft at its connection with lever M, which is done, having a slot or opening in the plate, which shall form the connecting end of said lever, of sufficient space to admit of the required lateral motion, the end of said shaft passing through said opening, and being hung by a long pin across the top or upper surface of said connecting-plate.

To operate said sliding bar T and its connected plate I make use of shaft W, which has its bearings, in which it turns, at one end at point *a* in the projection on box B, and at the other end at point *b* in another projection from the head of arm C.

Fixed to shaft W is one end of lever Y. The other end of said lever, to which is attached a roller, is worked by cam X on shaft Z, the said lever receiving an oscillating movement, by which it communicates a slight reciprocating rotary motion to shaft W. Fixed to shaft W is arm N, the lower end of which extends to and engages with sliding bar T by means of two pins fixed in the upper side of said sliding bar, as seen in Fig. 2 of the drawings. The shape of said cam is shown in dotted lines in Fig. 2 of the drawings, and it is designed to give two complete oscillations to lever Y, and consequently two complete reciprocating rotary movements to shaft W at each entire revolution of the cam, and to produce a distinct rest or intermission between each of the four rotary movements of said shaft W contained in one revolution of said cam—that is, between any rotary movement in one direction and the opposite rotary movement. The precise line of eccentricity of the cam for this purpose will be easily determined by the exercise of ordinary mechanical skill in constructing the machine. Shaft Z being rotated, lever F is made to depress the needle through the cloth or work, and lever M, acted upon by screw *d*, is made to raise the shoe, the precise time during the descent of the needle for the shoe to be lifted being determined by the adjustment of screw *d*. I should adjust it to raise the shoe when the thread has passed through the cloth. As the needle withdraws, lever M being relieved

from pressure, spiral spring 4 depresses the shoe back on the cloth or work. By the same rotary motion of shaft Z the sliding bar T and its plate *p* are operated through cam X and its connecting machinery, producing the same number of distinct lateral motions of the shoe as lever M produces perpendicular motions, the two movements alternating.

The parts of machinery hereinbefore described are to be so arranged that when the needle is up, its point being above the top of the shoe, and the shoe being depressed upon the cloth or work, shaft Z being rotated, a lateral movement of the shoe is produced, feeding or moving the cloth forward or in the direction of shaft W, the space of one stitch. Then, as the needle descends through the cloth, as aforesaid, screw *d* is depressed and the shoe elevated, as before specified. Then follows the opposite lateral movement of the shoe by the action of sliding bar T and its connections the space of one stitch, as before; and, finally, as the needle is withdrawn from the cloth by lever F lever M is relieved from its pressure at screw *d*, and by the action of spiral spring 4 the shoe is again depressed upon the cloth, as in its first position.

I am aware that in the machine patented by Bryan Atwater May 5, 1857, he uses a lever for moving the "shoe," (which he denominates "dog L,") the design and effect being to produce an oblique or lateral movement of such shoe or dog, and thereby to "feed the cloth," but not raising it off the cloth, by perpendicular movement. I therefore disclaim the design of Mr. Atwater's device.

I am also aware that W. C. Watson, in his machine patented November 6, 1856, makes use of the reciprocating rotary shaft W, aided by a spring affixed to the shoe, for producing a swinging or pendulous movement of the shoe, by which to feed the cloth, but does not give a strictly horizontal lateral movement to said shoe. I therefore disclaim everything secured to said Watson by his said Letters Patent.

By "horizontal lateral movement" I mean a movement parallel to the bed of the machine:

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

1. The combination of lever M with the shoe and spring 4 for giving the shoe a vertical reciprocating movement.
2. In combination with the above the slide T, for giving the horizontal reciprocating movement to the shoe, (when the shoe is to be operated in the manner described,) arranged as herein set forth.

Dated October 19, 1857.

AMOS H. BOYD.

Witnesses:

ALEX. F. CHISHOLM,
R. L. BOWERS.