2 Sheets—Sheet 1.

A. LEAVITT & H. L. DREW.

SEWING-MACHINE.

No. 187,874. Patented Feb. 27, 1877.

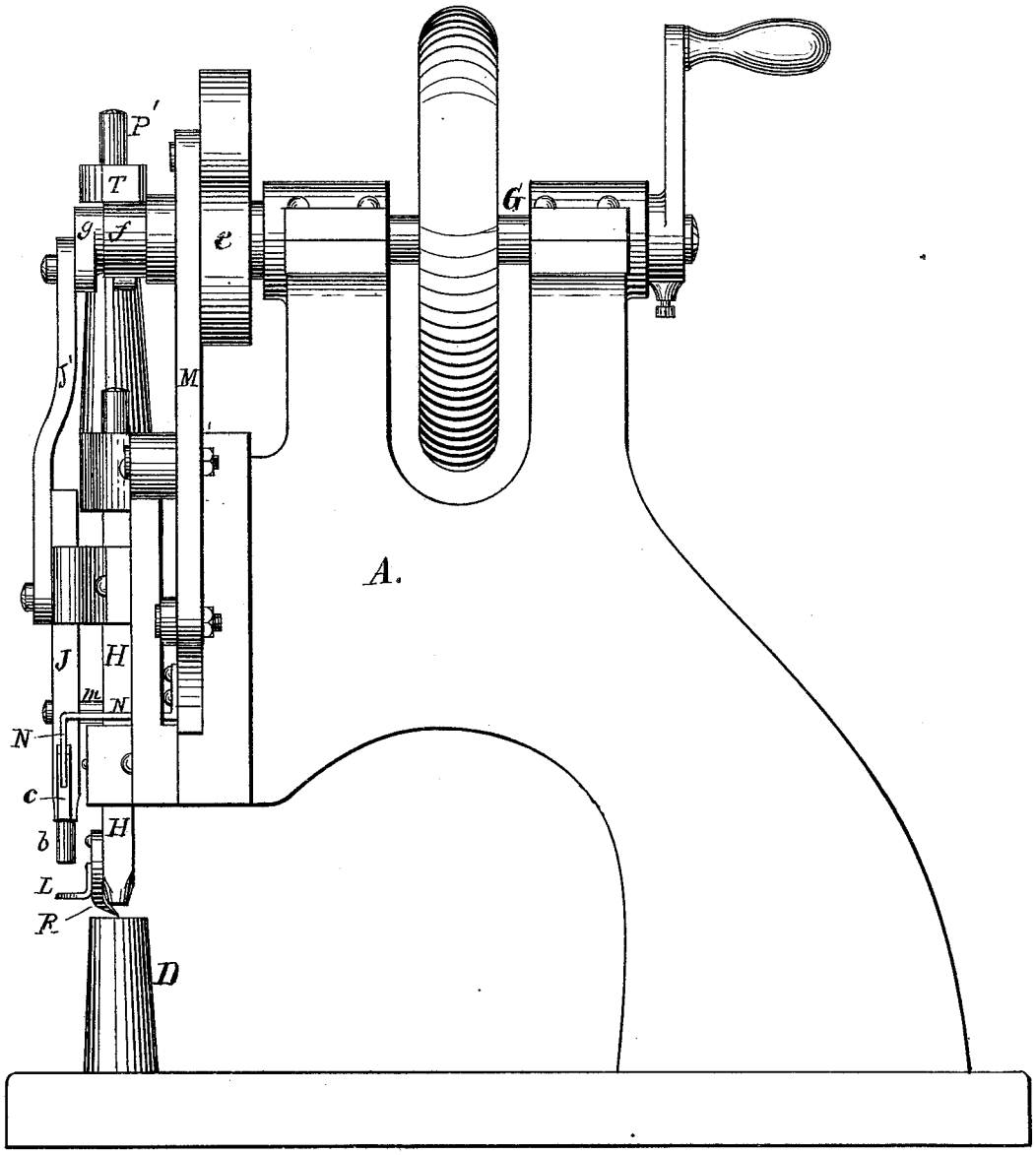

Fig. 1.

WITNESSES.

Wm. B. Edwards

Baee E Running

INVENTOR.

Albert Leavitt

Henry L. Drew

2 Sheets—Sheet 2

A. LEAVITT & H. L. DREW.

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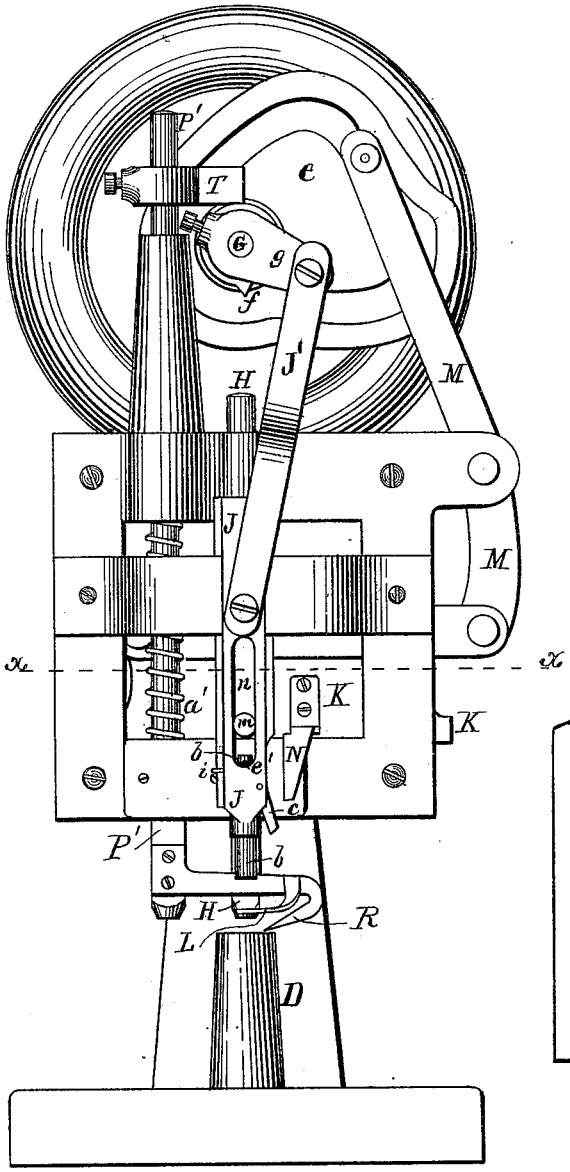

FIG. 2.

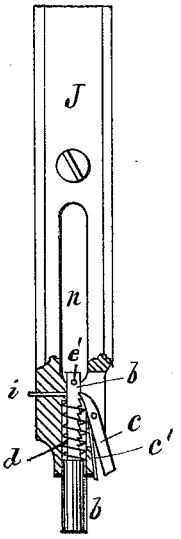

FIG. 4.

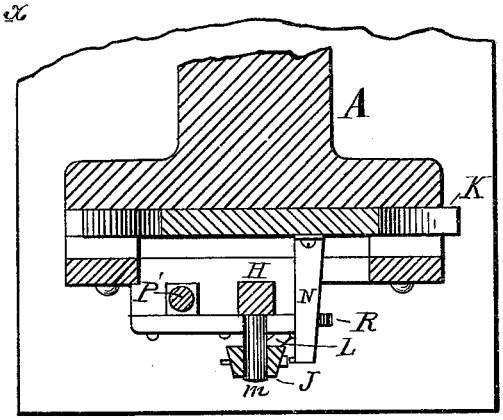

FIG. 3.

WITNESSES.

Wm. P. Edwards

Isaac E. Runny

INVENTOR.

A. Leavitt

Henry L. Drew.

UNITED STATES PATENT OFFICE.

ALBERT LEAVITT AND HENRY L. DREW, OF BOSTON, MASS., ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE AMERICAN STAPLE SEWING MACHINE COMPANY, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **187,874**, dated February 27, 1877; application filed July 10, 1876.

To all whom it may concern:

Be it known that we, ALBERT LEAVITT and HENRY L. DREW, both of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to the mechanism for operating the needle and needle-bar, and automatically varying its throw to adapt it to the varying thickness of the stock being sewed; and it consists in the use, in combination with the needle-bar, of a sewing-machine, and, as a means of imparting an intermittent and variable reciprocation thereto, of a slotted bar, having mounted in its lower end an adjustable pin or bolt, one end of which projects into the slot in said bar a greater or less distance, and serves as an abutment, to engage with a stud, which projects from the needle-bar into said slot, and by the upward movement of said slotted bar raise the needle-bar, the downward motion of the needle-bar being produced by the upper end of the slot in said slotted bar coming in contact with the stud on the needle-bar, the length of time that the needle-bar stands still and the length of its stroke varying according as the distance between the upper end of the slot in the operating-bar and the end of the bolt in the lower end of said slot varies.

Our invention further consists in the employment of a slotted reciprocating operating-bar, provided with a bolt, projecting into said slot, a spring adapted to force said bolt outward, and a pawl to engage with teeth formed on said bolt, and resist at the proper time any outward motion of said bolt, in combination with an arm or lug adapted to be moved horizontally or at right angles to the motion of the needle-bar, to trip said pawl, and allow the spring to force the stop-bolt outward, and an arm or lug mounted upon or movable with the presser-foot, and in a position to engage with the lower end of the stop-bolt in the end of the operating-bar when the same descends, and by stopping the motion of the bolt while the bar and pawl continues to move downward causes the upper end of said bolt to project farther into the slot, in which position it is held by the engagement of the pawl therewith until the upward motion of the bar is completed, when the pawl is tripped, and the bolt is again forced outward.

Figure 1 of the drawings is a side elevation of so much of a machine as is necessary to illustrate our invention. Fig. 2 is a front elevation, Fig. 3 is a partial section on line *x x* on Fig. 2, and Fig. 4 is a sectional elevation of the operating-bar.

A is the frame of the machine; D, the work-support; and G the driving-shaft, carrying at its forward end the cams *e* and *f* and crank *g*. The cam *e*, acting upon the lever M, imparts a reciprocating motion, in a horizontal direction, to the plate K, which carries the feed-bar and feed-point, (not shown in the drawings,) and imparts motion thereto. The cam *f* acts upon the arm T, projecting from the upper end of the presser-bar P′, to raise said bar against the tension of the spring *a′*, and lift the presser-foot or feed-guard R off from the stock, to allow it to be fed forward to form a new stitch.

All the parts that have now been described are constructed and operate substantially as described in Letters Patent No. 174,159 granted to Sawyer and Esty February 29, 1876, upon which our invention is an improvement.

In sewing the soles of boots and shoes to their uppers, the thickness of material to be sewed varies materially in the same boot or shoe, the stock being considerably thinner in the shank than on the ball, or at the toe of the boot or shoe, and, of course, it requires more thread to form each stitch when the stock is thick than when it is thin, and, as a natural consequence, in order to draw the thread equally tight when making a stitch in thick or thin stock it is necessary that the needle should lift the same distance above the upper surface of the stock at each stitch.

This desirable result is obtained in a very simple and effective manner, as follows: The needle-bar H is mounted in suitable bearings in the usual manner, and has set in its front side, and projecting therefrom, the stud *m*, which fits into a slot, *n*, formed in a bar, J, located just in front of, and parallel to, the

needle-bar, and adapted to be reciprocated vertically by the rotation of the crank *g* acting thereon through the medium of the connecting-rod J′. In the lower end of the operating-bar J is fitted the bolt *b*, having formed upon one side thereof a series of ratchet-teeth, to engage with the pawl *c*, to hold it in any desired position during the upward movement of the bar J, when the upper end of the bolt *b* engages with the stud *m*, and lifts the needle-bar H. The bolt *b* is forced downward when the pawl *c* is disengaged therefrom by the tension of a coiled spring, *d*, which surrounds said bolt, as shown in Fig. 4, and is limited in its downward motion relative to the bar J by the stop-pin *e*′. The bolt *b* is also prevented from being rotated in its bearing by the pin *i*, the inner end of which enters a longitudinal groove formed in the side of said bolt, but not shown in the drawings. L is an arm or bracket, secured to, and moving with, the presser-foot or feed-guard R, the outer end of which is directly under the bolt *b*, in position to be struck by it when the bar J descends, and stop the downward movement of the bolt while the bar J and pawl *c* continues to move downward, and thereby force the inner end of the bolt *b* farther into the slot *n*, in which position the pawl *c* retains it until the bar J and needle-bar H have completed their upward movement. N is an arm or bracket, secured to, and projecting from, the sliding plate K, with its outer end in such a position that a movement of the plate K from right to left causes it to come in contact with and trip the pawl *c*, releasing the bolt *b*, and allowing it to be forced downward by the spring *d*.

It will be obvious from the foregoing description that the thicker the stock under the presser-foot the quicker the bolt *b* will come in contact with the arm L in its downward movement, and, as the bar J has a constant and invariable movement, the farther the upper end of the bolt *b* will be made to project into the slot *n* in the bar J, and, consequently, the sooner it will engage with the stud *m*, and begin to lift the needle-bar and will carry it to a greater height.

The pawl *c* is made to engage with the teeth on the bolt *b* by the action of the spring *c*′.

We do not claim, broadly, making the throw of the needle proportioned to the thickness of the stock under the presser-foot, as we are aware that this has been done before; but

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. As a means of imparting a variable reciprocating motion to the needle-bar of a sewing-machine to adapt its stroke to the thickness of the stock being sewed, the combination of the stud *m*, set in the side of the needle-bar, the secondary bar J, provided with the slot *n*, and adapted to be reciprocated in a line parallel to the needle-bar by the crank *g*, as set forth, and the bolt *b* set in the lower end of the bar J, with one end projecting into the slot *n*, and adapted to engage with the stud *m*, and to be automatically adjusted endwise, to vary the working length of the slot *n*, as and for the purpose described.

2. The combination of the needle-bar H, provided with the stud *m*, the operating-bar J, provided with the slot *n* and pawl *c*, the bolt *b*, provided with the spring *d*, and a series of ratchet-teeth, to engage with the pawl *c*, and the arm or bracket L, secured to, or connected with, and having its position vertically controlled by the presser-foot or feed-guard R, all arranged and adapted to operate as and for the purposes described.

3. In combination with the needle-bar of a sewing-machine, provided with the stud *m*, and a slotted operating-bar for imparting an intermittent reciprocation thereto, the bolt *b*, provided with a spring, *d*, and a series of ratchet-teeth, the pawl *c*, a stop for limiting the downward motion of the bolt *b*, and controlled by the presser-foot, and the arm or bracket N, adapted to engage with and trip the pawl *c*, to release the bolt *b*, substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 6th day of July, 1876.

ALBERT LEAVITT.
HENRY L. DREW.

Witnesses:
WM. P. EDWARDS,
ISAAC E. RUNNY.