(No Model.) 4 Sheets—Sheet 1.

J. KEITH.

SEWING MACHINE.

No. 291,602. Patented Jan. 8, 1884.

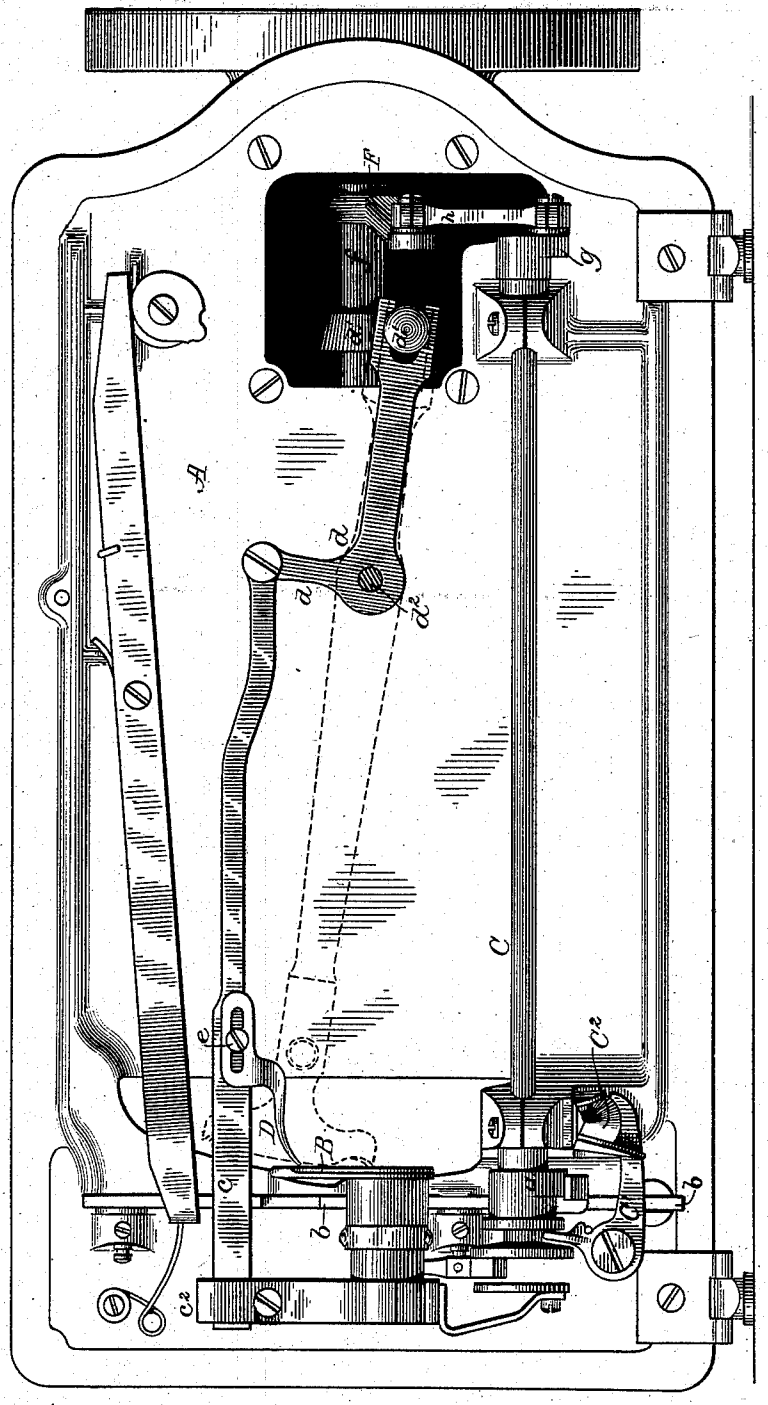


Fig. 1.

Attest:
Philip F. Larner.
Lowell Bartle

Inventor:
Jeremiah Keith.
By Munn & Co
Attorneys.

(No Model.) 4 Sheets—Sheet 2.

J. KEITH.

SEWING MACHINE.

No. 291,602. Patented Jan. 8, 1884.

Fig. 2.

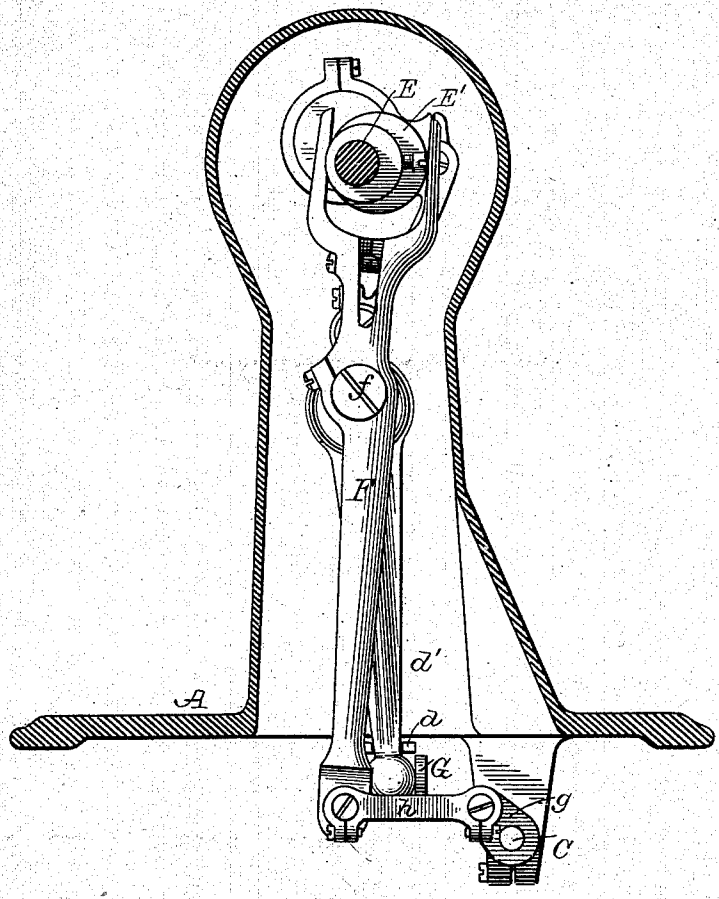
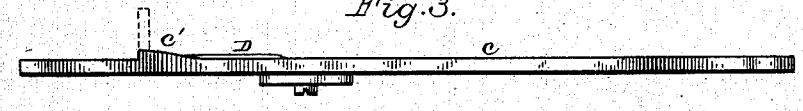


Fig. 3.



Attest:
Philip F. Larner.
Howell Battle

Inventor:
Jeremiah Keith.
By Wm. C. Wood
Attorney.

(No Model.)

4 Sheets—Sheet 3.

J. KEITH.

SEWING MACHINE.

No. 291,602. Patented Jan. 8, 1884.

Fig. 4.

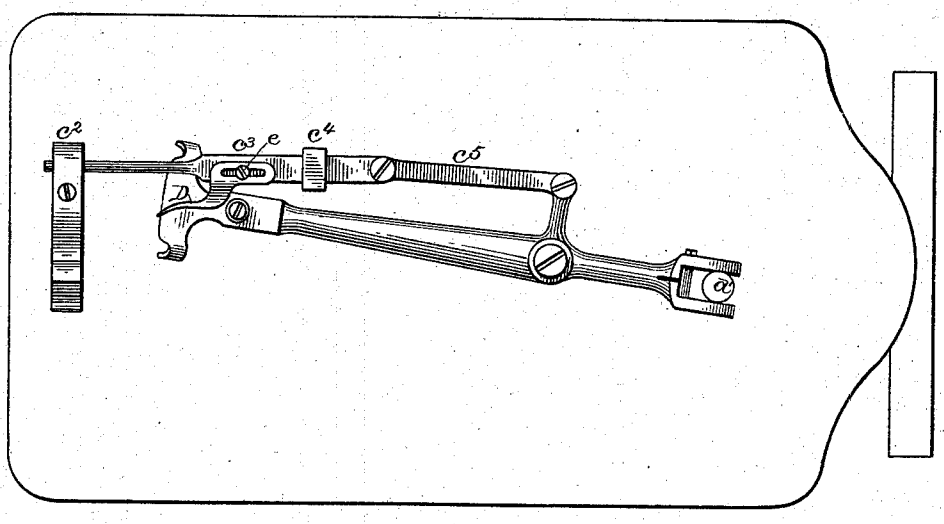
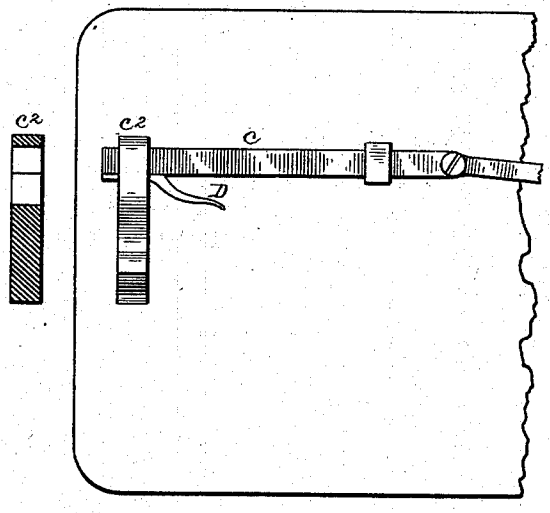


Fig. 5



Attest:
Philip F. Larner.
Lowell Battle

Inventor:
Jeremiah Keith.
By Munn & Wood
Attorneys.

(No Model.)

4 Sheets—Sheet 4.

J. KEITH.

SEWING MACHINE.

No. 291,602. Patented Jan. 8, 1884.

Fig. 6.

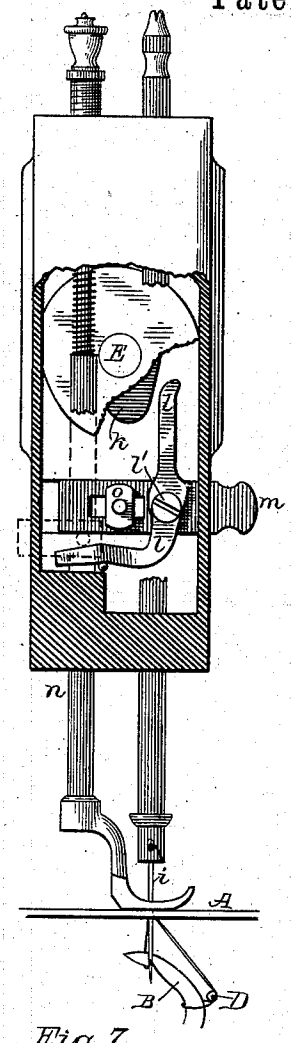
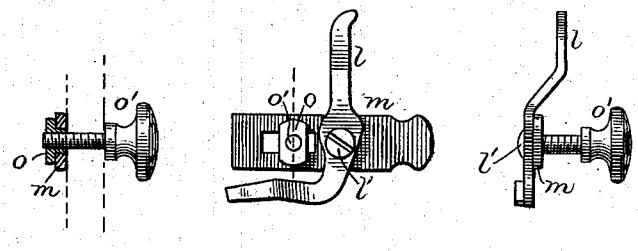


Fig. 7.



Attest:
Philip F. Larner.
Howell Battle

Inventor:
Jeremiah Keith.
By Munn & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

JEREMIAH KEITH, OF FLORENCE, MASSACHUSETTS, ASSIGNOR TO THE FLORENCE MACHINE COMPANY, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 291,602, dated January 8, 1884.

Application filed June 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH KEITH, of Florence, in the town of Northampton, county of Hampshire, and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of the several features of my invention.

My present improvements relate, mainly, to that class of machines shown and described in Letters Patent No. 233,626 and 243,710, issued to me, respectively, October 26, A. D. 1880, July 5, A. D. 1881, and still later in Letters Patent No. 273,854, issued to me March 13, A. D. 1883. Said machines are organized to interchangeably serve as lock-stitch and chain-stitch machines, at the will of the operator. So far as my knowledge extends, my said Letters Patent No. 273,854, March 13, 1883, disclose for the first time the combination, with an eye-pointed needle and looper, of a reciprocating loop-controller which positively controls a loop during the forward movement of the looper for engaging with a fresh loop adjacent to the needle. My said former loop-controller was in the form of a slender rod, bent at its working-tip, pivoted at its opposite end to a short lateral arm projecting from the shuttle-driving lever, and it had a guide-bearing between said working-tip and said arm. Although said prior loop-controller performs good service, it is, when operated at extraordinary high speed, more or less liable to objectionable vibration at its tip; and I have now practically overcome that objection by mounting my loop-controller upon a sliding rod or bar which has a guide-bearing at its outer end beyond the loop-controller, and so that said loop-controller is located between said bearing and the pivoted end of the bar; and I have also so mounted the loop-controller on said bar that it may be conveniently adjusted with relation to the looper. In order that said loop-controller shall, however, be more assuredly free from vibrations at its tip or point, I have mounted it upon a comparatively heavy longitudinally-reciprocating slide-bar, which imparts the lifting movement to the feed-bar, and employ therewith a rock-shaft and cam for imparting a longitudinal reciprocating movement to the feed-bar, instead of relying upon a rotating feed shaft and cam for wholly actuating the feed-bar and vibrating my looper, as in my last-named prior Letters Patent; and to enable the machine to be operated with less power than heretofore, notwithstanding the separate use of the reciprocating slide-bar and the rock-shaft and cam for actuating the feed-bar, I have combined with said rock-shaft and the main shaft of the machine a suspended pivoted vibrating lever, connected at its lower end by a link to the rock-shaft, and forked at its upper end, so as to be engaged by a cam on the main shaft. I still employ the usual pendent lever and cam on the main shaft for operating the shuttle-driving lever, in connection with my pendent lever for operating the feed-shaft and looper; and as these two levers are vibrated oppositely to each other, they are smoothly and easily operated. In order that fabrics may be easily swung around on the work-plate for enabling short corners to be turned, as in both plain and fancy stitching or embroidery, it is well known to be desirable that the presser-foot be automatically lifted at each upward stroke of the needle, so that the cloth may be freely pivoted on the latter; and, as heretofore, for that purpose I employ a lifting-lever actuated by a cam on the main shaft in the head of the machine, and a set or clamp screw by which the fulcrum of the lever may be set in varied positions, and thereby vary the degree of lift on the presser-foot; but I have improved said lifting and adjusting contrivances by mounting said lever upon a lateral slide and providing the latter with a set or clamp screw, so that the lever is supported by the slide instead of being supported by the set-screw, as heretofore, and therefore the jar incident to the vibrations of the lever, and also to the alternate strains thereon at its opposite ends, are borne by said slide instead of the screw, and I have thereby provided an accurate, durable, and reliable means of adjustment.

To more particularly describe my invention I will refer to the accompanying four sheets of drawings, in which—

Figure 1, Sheet 1, is a bottom view of a machine embodying my said improvements in their best form. Fig. 2, Sheet 2, is a rear end view of the interior of the head of the machine, showing the main shaft, cam thereon, vibrating pendent lever, link, and the rock-shaft which imparts a forward movement to the feed-bar. Fig. 3, Sheet 2, is an edge view of the sliding bar which carries the loop-controller, and also imparts to the feed-bar its lifting movement, said feed-bar being shown in dotted lines. Fig. 4, Sheet 3, is a bottom view of so much of a machine as is deemed necessary for illustrating the loop-controller operated by the shuttle-lever, as in my prior machine, but arranged in accordance with my present invention to obviate undue vibration. Fig. 5, Sheet 3, illustrates a reciprocating slide-bar provided with my loop-controller, when said slide-bar serves as the lifting medium for a feed-bar, and performs said lifting movement while moving forward instead of rearward, as illustrated in Figs. 1 and 3. Fig. 6, Sheet 4, is a front view of the head of my machine, with so much thereof broken away as will disclose the cam, the lifting-lever, slide, and set-screw, by which the presser-foot is lifted during the operation of the machine; and the looper and loop-controller is also therein shown as if in operation. Fig. 7, Sheet 4, illustrates in detail said lifting-lever, slide, and screw detached.

In Fig. 1 my machine is shown as if applied to a table and tipped up, so that the under side of the bed-plate A and the adjacent operative mechanism is fully disclosed. The oscillating looper B, with its cast-off, operates with an eye-pointed needle, Fig. 6, as in my prior Letters Patent No. 273,854, and it is clutched to the feed-shaft C, Fig. 1, and controlled by the lever C′, and thrown into service by the shuttle C^2, as shown and described in my said prior patent. The feed-shaft C, however, instead of being a revolving shaft, as in my prior machine, is now a rock-shaft; but its rocking movement imparts to the looper the same movements and in the same time as when said revolving feed-shaft was employed. The feed-cam *a* on the rock-shaft C is now only relied upon to longitudinally reciprocate the feed-bar *b*, and the lifting movement of the latter is performed by the slide-bar *c*, provided, as seen in Fig. 3, with a wedge-shaped cam, *c′*, as heretofore in other classes of shuttle machines. The sliding bar *c* is longitudinally reciprocated by means of a bell-crank lever, *d*, and a pendent vibrating lever, *d′*, within the rear vertical portion of the head of the machine. The bell-crank lever *d* is pivotally mounted upon the same stud, d^2, upon which the usual shuttle-driving lever is pivoted and mounted, as indicated in dotted lines, Fig. 1, and said shuttle-lever is vibrated by the same pendent lever *d′*, having its connection therewith by the usual fork and ball, as clearly shown.

Upon the side of the sliding bar *c* my loop-controller D is mounted, its shank being slotted for engagement by the screw *e*, to enable convenient and careful original adjustment of the loop-controller upon the slide-bar and with relation to the looper B, as well as any necessary subsequent variation in the adjustment thereof. It will be seen that the outer end of the slide-bar *c* beyond the loop-controller is fitted to slide through properly-fitted guide-bearings in the bracket c^2, and that although the short arm of the bell-crank lever *d* imparts to the rear end of the slide-bar a slightly vibratory movement, this latter movement is not materially imparted to the tip or working-point of the loop-controller D, and that said point or tip will be assuredly limited to its proper movement, and with practically no vibration, whether the machine be operated slowly or at extraordinary high speed. While the combination including said feeding slide-bar and the loop-controller constitutes one portion of my invention, it is to be understood that I do not herein limit myself to the loop-controller so mounted, for it constitutes a valuable improvement to mount the loop-controller upon a slide-bar, which in no manner affects the feed-bar, as is illustrated in Fig. 4, wherein the loop-controller D is mounted upon a sliding bar, c^3, having at its outer end a slide bearing or guide in the bracket c^2, and another bearing at c^4, and said bar is connected to an arm on the shuttle-lever by means of the link c^5. With a properly-fitted outer end bearing at c^2, the inner guide-bearing, c^4, may be dispensed with, and in that case the link c^5 may also be dispensed with, and connection of the bar c^3 can then be made directly with the short arm on the shuttle-lever, as in my prior machine; but this latter connection is not employed by me when the slide-bar c^3 also serves to actuate the feed-bar, because, in view of the extra work then performed by said slide rod or bar, I deem it advisable to employ the separate bell-crank lever *d*, as shown in Fig. 1.

In those machines wherein the feed-bar is lifted by the forward movement of a sliding bar, *c*, it is obvious that the loop-controller D should project toward the rear end of the sliding bar, as illustrated in Fig. 5, the slide-bearing in the bracket c^2 being slotted, as indicated in the sectional view of said figure, to enable the loop-controller to pass to and fro freely through the bracket. In each instance it will be seen that the loop-controller D is mounted upon a sliding rod or bar, which has at its outer end a slide bearing or guide, and that in each instance the said controller is adjustably mounted on said rod or bar; and those features constitute separate portions of my present invention.

I will next refer to Figs. 1 and 2, and describe the mechanism intervening between the main shaft E and the rock-shaft C.

While it is not broadly new to impart the

rocking movement to a feed-shaft by means of a cam, E', on the main shaft, and a pendent lever, F, pivoted upon and supported by a stud, *f*, and connected to the feed-shaft by means of an arm, *g*, thereon, and a link, *h*, I am the first to organize those elements in combination with a looper operated by the feed-shaft; and this feature is of special value when the looper is organized to operate in the shuttle-race of a machine capable of shuttle lock-stitch sewing, and also single-thread or chain-stitch sewing, not only because the pendent lever which operates the feed-bar and looper can be vibrated so as to balance the vibrations of the shuttle-levers, and thereby cause the machine to run evenly and smoothly, but also because a looper operating in a shuttle-race must be located between the feed-shaft and the vertical path of the needle, so as to provide for the reception of intermediate clutching mechanism, and also to allow the looper to be thrown wholly backward out of the shuttle-race when a shuttle is to be employed. The upper end of said pendent lever F is slotted or forked to receive the cam, and suitable provisions for compensating for wear are made at the cam-fork and at the connections of said lever with its pivot, as well as at both ends of the link. With these parts thus constructed and combined I obtain the proper movements of the feed-shaft and looper with but little friction of the parts, and greatly contribute to light, easy, and noiseless operation. It will be obvious that the movements of the pendent pivoted lever *d'*, which vibrates the shuttle-lever G, and which also vibrates the bell-crank lever *d*, are practically opposite to the movements of the pivoted lever, and therefore this portion of the machine is well balanced and operates equally smooth and easy, whether the looper or the shuttle be employed.

As hereinbefore indicated, I have embodied in my machine means for automatically lifting the presser-foot, so that the fabric may be freely swiveled or turned upon or around the eye-pointed needle *i*, as in various prior machines, and I employ in this connection, as heretofore, a cam, *k*, at the front end of main shaft, as seen in Fig. 6, for vibrating the lifting-lever *l*; but this latter is mounted by me in a novel manner, in that it is a bell-crank lever pivoted at *l'* to a lateral slide-plate, *m*, which is fitted to a lateral slot in the rear side of the head of the machine. By moving the slide-plate *m* inwardly or outwardly the position of the pivot or fulcrum *l'* is varied with relation to the cam *k* and presser-foot bar *n*, causing the latter to be lifted more or less, as may be desired. The slide-plate is longitudinally slotted, as clearly indicated, and its slot is occupied by a flanged nut, *o*, which is engaged by the thumb-screw *o'*, which occupies a hole or seat in the rear side of the head, so that said slide-plate, after adjustment, can be readily clamped in position. These parts as thus organized by me cause the slide-plate to support the bell-crank lever and the strains thereon, instead of using the thumb-screw as the fulcrum for said lever, as heretofore; and I therefore materially obviate the liability of loosening said screw, render the latter more durable, and avoid the consequent liability of variation in adjustment heretofore incident to the employment of the thumb-screw as a fulcrum for the lever.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the eye-pointed needle and looper, of the loop-controller mounted upon a sliding rod provided with a slide bearing or guide at its outer end and beyond the loop-controller, substantially as described.

2. The combination, with the eye-pointed needle, looper, feed-bar, and reciprocating slide-bar which lifts the feed-bar, of the loop-controller mounted upon said slide-bar, substantially as described.

3. The combination of the oscillating looper and the loop-controller adjustably mounted upon a longitudinally-reciprocating rod or bar, substantially as described.

4. The combination of the oscillating looper operating within a shuttle-race, the feed rock-shaft for oscillating said looper when clutched thereto, the link, the pendent forked lever, the main shaft, and the cam thereon, engaging with the fork of said lever, substantially as described.

5. The combination, with the cam on the main shaft and the presser-foot bar, of the bell-crank lever for lifting said bar, the slide-plate on which said lever is pivoted, and the set-screw for confining said plate in position, substantially as described.

JEREMIAH KEITH.

Witnesses:
J. C. BUCKLEY,
E. L. KIRBY.