

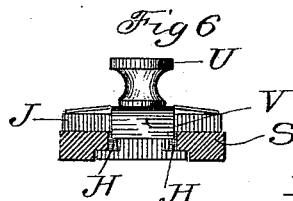
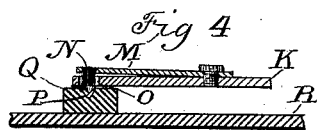
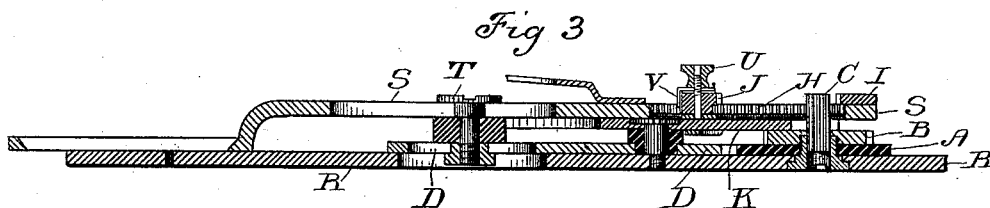
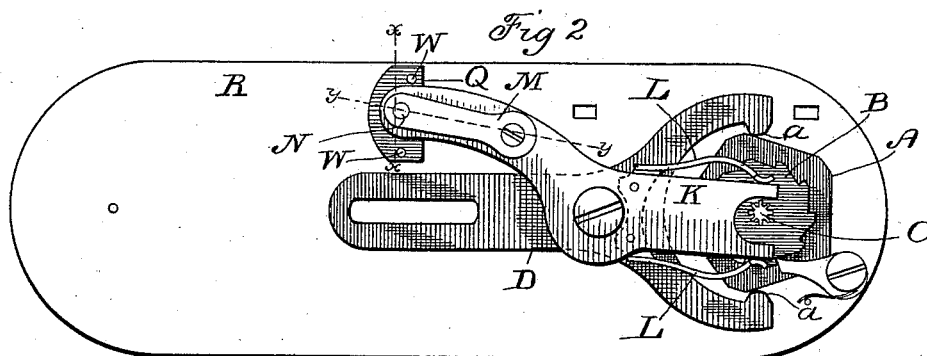
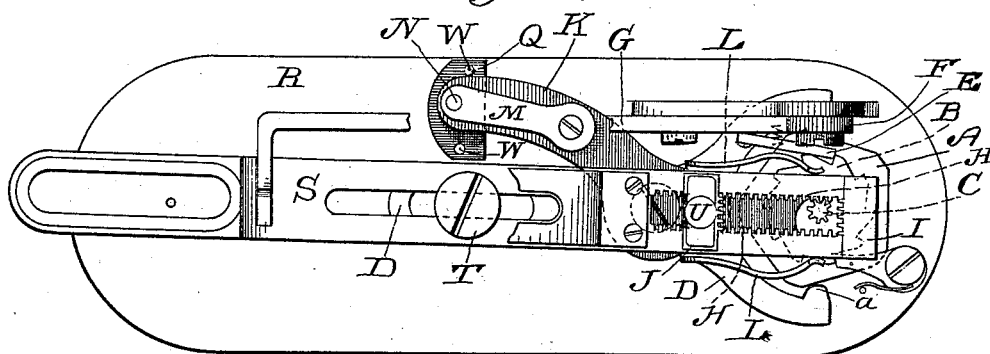
(No Model.)

F. W. SMITH, Jr., & S. S. WILLIAMSON.

BUTTON HOLE SEWING ATTACHMENT FOR SEWING MACHINES.

No. 347,133.

Patented Aug. 10, 1886.



Witnesses

W. J. Harland  
Wm. J. Harland

Inventors

Friend W. Smith Jr.

S. Stuart Williamson

By Smith & Hubbard

Attys.

# UNITED STATES PATENT OFFICE.

FRIEND W. SMITH, JR., AND S. STUART WILLIAMSON, OF BRIDGEPORT, CONN.

## BUTTON-HOLE-SEWING ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 347,133, dated August 10, 1886.

Application filed November 4, 1885. Serial No. 181,801. (No model.)

### *To all whom it may concern:*

Be it known that we, FRIEND W. SMITH, Jr., and S. STUART WILLIAMSON, citizens of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Button-Hole-Sewing Attachments for Sewing-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to certain novel and useful improvements in button-hole-sewing attachments for sewing-machines, but more particularly to that class of said attachments in which the feed-bar is moved to and fro by the action of an intermittently-rotating pinion against a rack attached to or formed integral with said bar, and has for its object to insure the continuous engagement of said rack and pinion, and also to hold the feed-bar securely while the pinion is operating against the sides of the rack, thereby affording a positive guide for the shifting of said bar to accomplish the barring of the button-hole, and doing away with any independent guide for the movement of the feed-bar; and with these ends in view our invention consists in the details of construction and combination of elements hereinafter fully described, and then specifically designated by the claims.

In order that those skilled in the art to which our invention appertains may more fully understand the same, we will proceed to describe its construction and operation, referring by letter to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view illustrating our improvement in its proper position on a button-hole-sewing attachment for sewing-machines; Fig. 2, a similar view with the feed-bar removed; Fig. 3, a central longitudinal section; Fig. 4, a section at the line *yy* of Fig. 2; Fig. 5, a section at the line *xx* of Fig. 2, and Fig. 6 a detail section showing a rear view of the adjustable end of the rack and the means for securing said end in any adjustment.

Similar letters denote like parts in the several figures of the drawings.

We have shown in our drawings the construction of the several parts of the attachment precisely as they are shown in our Patent No. 316,410, granted April 21, 1885, since our present improvement is especially adapted to the machine which forms the subject of said patent, and as the operation and function of these parts is the same as in said patent, we will not now enter into any detail description of them.

A is the wiper-wheel, B the ratchet-wheel, and C the pinion, all concentrically secured together, so that their movements will be simultaneous.

D is the oscillator, pivoted to the bed-plate, the inner end being forked and having pallets *a*, which bear on diametrically-opposite sides of the wiper-wheel, so that it will be readily understood that at every intermittent revolution of the wiper-wheel the oscillator will be caused to move to and fro about its pivotal point. The ratchet is revolved intermittently by means of a pawl, E, attached to a carrier, F, which latter is actuated by the operating-lever G, as in our patent above referred to. In the construction shown in said patent the pinion engaged with and passed around a vertical rack, which depended from a detachable cap, and around the base of this rack was a continuous groove, within which a pin projecting concentrically from the pinion traveled, so that a guide was thus afforded which insured the engagement of the pinion with the rack throughout the entire circuit of the latter. This construction, while it was perfectly practical and answered the purposes for which it was intended, had one disadvantage—namely, the necessity of substituting racks of different lengths for the purpose of sewing button-holes of different lengths. Our present improvement obviates this disadvantage, and moreover greatly simplifies the machine. The rack H, with which the pinion engages, is formed on the edges of a longitudinal opening in the feed-bar S. One end, I, of the rack is stationary, while the other end, J, is adjustable, whereby the length of the rack to be operated on may be varied, as will be hereinafter explained.

K is a friction-lever pivoted concentrically with the oscillator, and having secured there-

to at the rear thereof spring-arms L. To the forward end of this lever is secured a flat spring, M, having downwardly-projecting lug N, extending through perforation O in said lever.

P are recesses formed within a plate, Q, attached to the bed-plate R. The sides of these recesses are beveled, as shown at Fig. 5. The extremity of the lug N is also beveled, and the recesses are in the arc of the circle described by the lug from the central or pivotal point of the lever K, so that it will be readily understood that the lug will enter the recesses when in alignment therewith.

The feed-bar S is placed over the lever K and between the spring-arms L, and is pivoted to the oscillator by the screw T, as in our aforesaid patent.

One of the ends of the rack is stationary and the other adjustable, as hereinbefore set forth, the latter being secured in any adjustment by the action of the thumb-nut U, which sets the spring-actuated lip Y down between opposite teeth in the sides of the rack, as seen at Figs. 1, 3, and 6.

The operation of our improvement is as follows: During the vibration and forward and backward movement of the feed-bar, the latter is steadied by the spring-arms L and any lost motion prevented by the temporary rigidity of the lever K, the obvious reason of this being that the force exerted by the pinion against the rack is not sufficient to overcome the friction between the spring-actuated lug N and the recesses P, and shift said lever so as to throw the pinion and rack out of engagement. When the pinion commences to act on the end of the rack, enough force will be exerted to overcome the friction between said lug and recesses, and the feed-bar will of course be shifted to one side—that is, its vertical plane will be changed. In other words, this shifting action will be performed against the resiliency of one of the spring-arms L, and as the latter oppose this action enough force will be brought to bear on the lever K to shift the lug N out of one of the recesses P, and by the continued shifting of the feed-bar said lever will be carried along until the pinion engages with the other side of the rack, when the said lug will fall into the other recess. When the pinion crosses the other end of the rack, the same operation of the feed-bar and lever occurs, with the same result.

W W are stops which arrest the movement of the lever K, so that the latter cannot be forced beyond the points at which the lug engages with the recesses.

It will be readily understood from the foregoing description that our present improvement renders our button-hole-sewing attachment far more simple, in that we have dispensed with the "vertically-depending rack" shown in our aforesaid patent, and far more effective and serviceable, since we are able to

sew any length of button-hole without adding or taking away any of the parts. Also, our present improvement presents one advantage that has never before been exhibited in automatic machines of this description—namely, that in case the thread is broken or a stitch skipped, or for any other obvious reason, the rack may be shifted by hand, so that the pinion will be out of engagement and then moved longitudinally back and forth at the will of the operator.

It is immaterial that the pivotal point of the lever K be identical with the pivotal point of the oscillator; but both these points should be in the same vertical plane with the center of the feed-bar.

We do not wish to be limited to the exact shape of the lever K or to the specific mechanism for locking said lever in position, since we can make the lever in any suitable shape and attach thereto any desirable mechanism which will lock the lever during the time when the pinion is operating against the sides of the rack, and permit the shifting of the lever when the pinion is acting against the ends of the rack.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a button-hole-sewing attachment for sewing-machines, the feed-bar adapted to be vibrated, and having formed therein a double longitudinal rack provided with cross-racks, in combination with a pinion adapted to engage with said longitudinal and cross racks, and means controlled directly by the action of the pinion against the cross racks for preventing the disengagement of the pinion and rack throughout the circuit of the latter, substantially as set forth.

2. In a button-hole-sewing attachment for sewing-machines, the feed-bar adapted to be vibrated, and having therein a continuous rack, in combination with a pinion engaging with said rack, whereby the feeding movements of the bar are accomplished, and a pivoted lever provided with spring-arms which embrace the feed-bar, and having a frictional bearing sufficient to overcome the force exerted laterally by the pinion against the sides of the rack, said lever adapted to be shifted by the action of the pinion against the ends of the rack, substantially as set forth.

3. In a button-hole-sewing attachment for sewing-machines, the combination, with the feed-bar having therein a continuous rack and actuated by an intermittingly-revolving pinion meshing with said rack, of a pivoted lever having spring-arms which embrace the feed-bar, said lever adapted to be shifted by the feed-bar when the pinion acts against the ends of the rack, substantially as set forth.

4. In combination with the feed-bar having therein longitudinal racks H and cross-racks I J, and an intermittingly-revolving pinion

adapted to engage with said racks, the pivoted lever K, having spring-arms L, which embrace the feed-bar, flat spring M, secured to the forward end of the lever and having downwardly-projecting lug N, extending through perforation O in said lever, and recesses P, formed within plate Q, attached to the bed-plate R, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

FRIEND W. SMITH, JR.  
S. STUART WILLIAMSON.

Witnesses:

BENJAMIN L. BUELL,  
W. T. HAVILAND.