

(No Model.)

S. BORTON.

PULL-OFF DEVICE FOR SEWING MACHINES.

No. 572,048.

Patented Nov. 24, 1896.

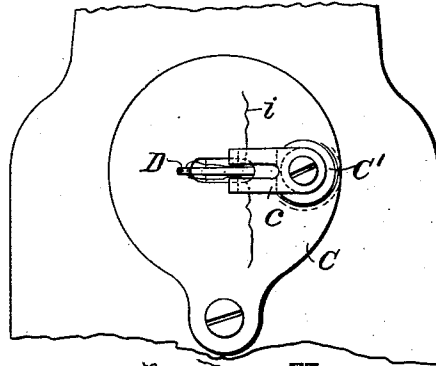


Fig. 3.

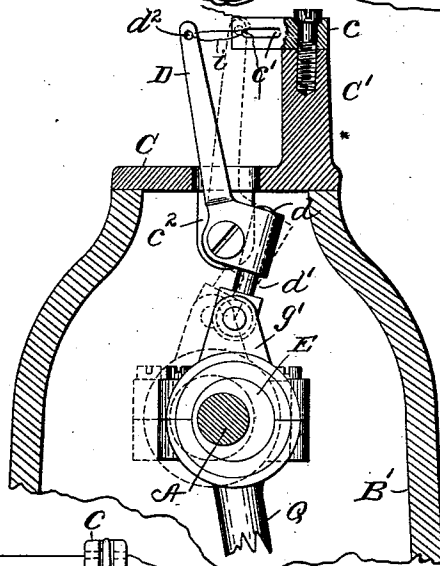


Fig. 1.

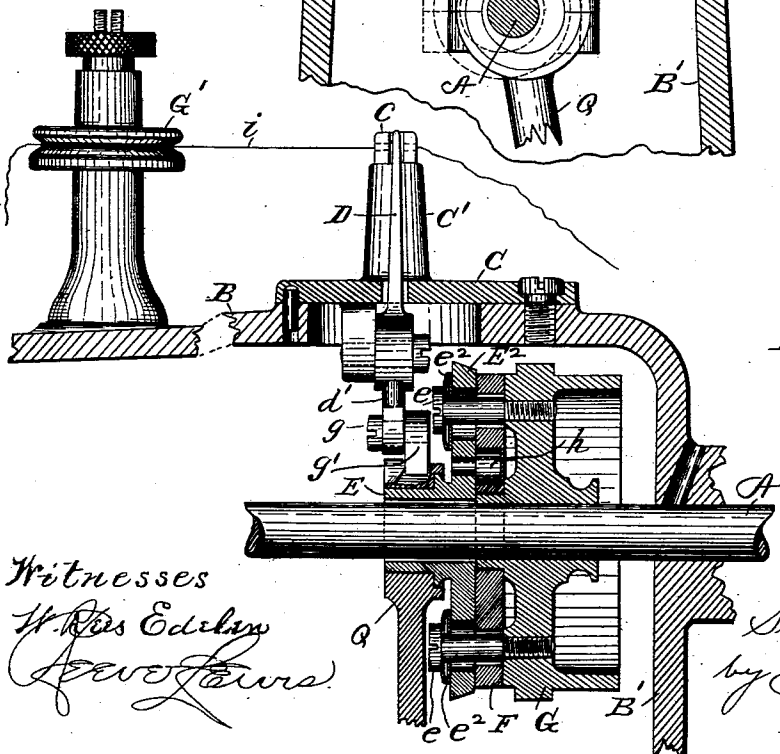


Fig. 2.

Witnesses  
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# UNITED STATES PATENT OFFICE.

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## PULL-OFF DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 572,048, dated November 24, 1896.

Application filed August 10, 1895. Serial No. 558,849. (No model.)

*To all whom it may concern:*

Be it known that I, STOCKTON BORTON, of Brooklyn, New York, have invented new and useful Improvements in Pull-Off Devices for Sewing-Machines, which improvements are fully set forth in the following specification.

The present invention has reference to the construction of a pull-off device for sewing-machines, which device, as its name indicates, is designed to pull off from the spool or other source of thread supply the amount of thread consumed at each stitch and by its operation to relieve the devices which are directly concerned in forming the stitch (as the needle, rotary hook or looper, and take-up) from the necessity of drawing from the spool the requisite amount of thread. The object of the pull-off is mainly to prevent the thread dragging upon the spool and the uneven stitches that result therefrom. The general operation of a pull-off and the desirability of its employment are sufficiently well understood to render a detailed account thereof unnecessary.

Inasmuch as the proper amount of thread to be pulled from the spool at each stitch varies with the length of the latter and the thickness of the goods, it is desirable to provide means for regulating the length of stroke or range of effective movement of the pull-off.

According to the present invention the pull-off is combined with and receives its movement from a variable element of the feed mechanism, preferably from the adjustable feed-eccentric by which the feed-dog is moved horizontally back and forth, and it is particularly applicable for use in connection with a feed mechanism in which the feed-eccentric is located near the rear end of the main shaft, turning in bearings in the gooseneck or arm of the machine. In this type of feed mechanism the transmission of motion from the feed-eccentric to the pull-off is a comparatively simple matter.

The movable part of the pull-off may be conveniently in the form of a vibrating arm or lever, although it may within the principle of the invention be variously formed. By connecting it with the feed-eccentric its length of stroke is automatically regulated by the adjustment of the throw of the eccentric. In

the form in which this invention has been reduced to practice the pull-off lever is pivoted in the top piece or cover of the hollow vertical standard of the machine between the spool and the tension. The strap surrounding the feed-eccentric, from which the horizontal movement of the feed-bar is derived, has an ear or projection to which is attached a short plunger. The latter works in a socket in the short arm of the pull-off lever, giving thereto its vibrating motion, which is directly proportional to the throw of the eccentric.

Heretofore it has been deemed necessary to combine the pull-off with a clamping tension which clamps the thread while the pull-off is drawing upon it. According to the present invention the pull-off is combined directly with an ordinary friction-tension, and its action is easy and satisfactory.

In the accompanying drawings, which form part of this specification, Figure 1 is a view in section transversely of the main shaft and partly in elevation. Fig. 2 is a view partly in section at right angles to Fig. 1 and partly in elevation, and Fig. 3 is a plan view.

In the drawings, A represents the main shaft (or it may be any continuously-rotating shaft) of the machine, journaled in bearings in the hollow arm B, supported by standard B', and carrying an adjustable eccentric E, which actuates a pitman Q. The latter through suitable connections, which, as they form no part of the invention, are not shown, communicates the horizontal movement to the feed-bar of the machine. Reference may be had to Letters Patent No. 354,590, granted December 21, 1886, for a description of feed mechanism deriving its movements from a feed-eccentric on the main shaft.

Eccentric E is adjustable transversely of shaft A, this adjustment being effected in any convenient way. In the machine shown the eccentric is formed on one side of a supporting-disk E<sup>2</sup>, which has a crank-pin h, which enters a cam-slot in a rotatable cam piece or disk F adjacent to support E<sup>2</sup>, so that by turning the cam-piece F the eccentric may be adjusted across the shaft. Eccentric-support E<sup>2</sup> is attached to a disk G, fast on the shaft by means of screw-pins e, which pass through radial slots in the support E<sup>2</sup> and through

concentric slots in cam-piece F and provided with spring friction-washers  $e^2$ , all as more fully described in application, Serial No. 558,850, filed August 10, 1895, by Charles H. Willcox and Stockton Borton. These supporting and adjusting devices for the eccentric E are shown simply by way of example.

The pull-off stand C is a flat metal plate, which constitutes also the cover of the hollow standard B'. It has a post C', carrying a horizontal forked piece c, provided with a thread passage or slot  $c'$  in each of its branches. The pull-off lever D works in a slot in plate C, being pivoted to a lug  $c^2$ , depending from said plate within the hollow arm B. In the short arm of lever D is a socket  $d$ , in which lies a plunger  $d'$ . The latter is attached by a screw g to an ear or projection  $g'$  on the upper end of pitman Q, so that the plunger partakes of all the movements of the eccentric, having a longitudinal movement in socket  $d$  and also a lateral or vibratory movement. During these movements the pull-off lever D is vibrated through a path whose length is proportioned to the throw of the eccentric.

In operation the thread  $i$  is brought from the spool through one eye of the forked guide-piece c. Thence it passes through the eye  $d^2$  in the end of lever D and back through the other eye  $c'$ , going from that point to the tension G', which is of the ordinary friction variety, and coöperates directly with the pull-off without the intervention of a clamping tension.

It will be obvious that when the eccentric E is adjusted by the means already described to vary the length of stitch the throw of the pull-off lever will be lengthened or shortened proportionately, so that it will draw from the spool a sufficient amount of thread to form the stitch.

It is to be understood that the invention is not limited to the construction of the various parts herein illustrated and described, but that these are susceptible of modification within wide limits without departing from the spirit of the invention.

Heretofore a sewing-machine has been provided with a two-part tension having a pull-off operated from the feed-bar between the

two parts of the tension. The object of this device was to bring an additional tension to bear upon the thread after the take-up had pulled the normal amount through the ordinary tension, and in this manner to prevent loose loops.

According to the present invention the pull-off is located between the tension device and spool and draws directly from the latter. Its object is to prevent entirely the drag upon the spool by pulling off always a sufficient amount of thread, or an amount slightly in excess of what is required.

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

1. In a sewing-machine, the combination with the adjustable feed-eccentric, of a thread pull-off and connections for communicating thereto from said eccentric a vibratory movement approximately proportional to the throw of the latter, substantially as described.

2. In a sewing-machine, the combination with the main shaft carried in the hollow arm of the machine, and the adjustable feed-eccentric on said shaft, of a pull-off lever pivoted to a support in proximity to said eccentric and connections for imparting from the latter a vibratory motion to said lever, substantially as described.

3. The combination with the variable-feed eccentric, and with the friction-tension of a sewing-machine, of a pull-off lever from which the thread is led directly to said tension, and means for imparting to said lever from said eccentric a vibratory movement, substantially as described.

4. The combination with the adjustable feed-eccentric and the pitman operated thereby, of a pull-off lever pivoted in a suitable support and having a socket in its short arm, and a plunger connected with said pitman and working in said socket, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

STOCKTON BORTON.

Witnesses:

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