

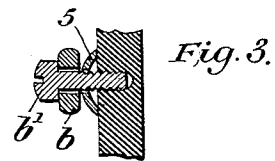
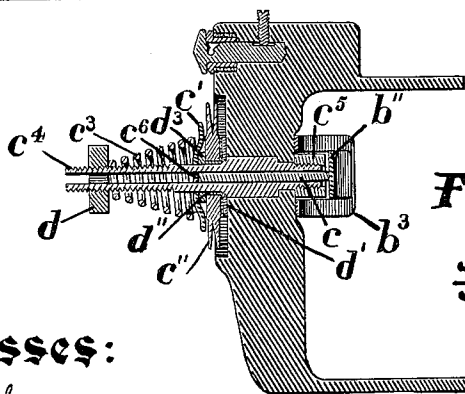
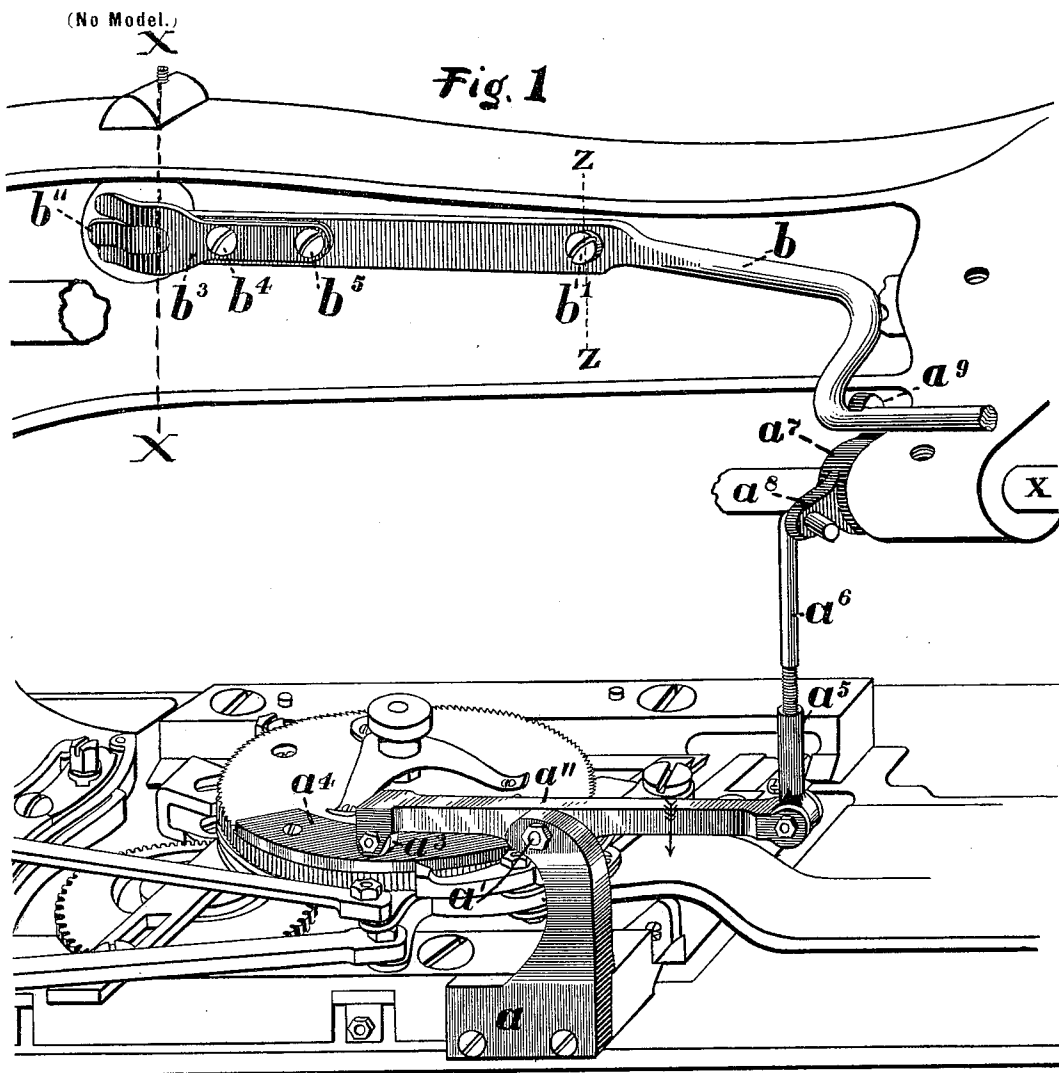
No. 614,973.

Patented Nov. 29, 1898.

F. W. OSTROM.

TENSION CONTROLLING DEVICE FOR BUTTONHOLE SEWING MACHINES.

(Application filed Dec. 17, 1897.)



Witnesses:

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Fig. 2

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UNITED STATES PATENT OFFICE.

FREELAND W. OSTROM, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE
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TENSION-CONTROLLING DEVICE FOR BUTTONHOLE-SEWING MACHINES.

SPECIFICATION forming part of Letters Patent No. 614,973, dated November 29, 1898.

Application filed December 17, 1897. Serial No. 662,275. (No model.)

To all whom it may concern:

Be it known that I, FREELAND W. OSTROM, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Tension-Controlling Devices for Buttonhole-Sewing Machines, of which the following is a specification.

The object of this invention is to provide sewing-machines constructed to automatically stitch or overseam a given figure with a tension-controller designed to automatically vary the degree of tension to be applied to the upper or needle thread during the stitching operation.

It is common in the construction of sewing-machines to provide mechanism capable of releasing the needle-thread when the sewing mechanism is not in operation. Such devices have been combined with sewing-machines employing the ordinary four-motion feed as well as with machines employing a cloth holding and feeding clamp for overseaming or stitching predetermined designs or figures, such as the overseaming of buttonholes and eyelet-holes and the sewing on of buttons. Generally considered, such tension-releasing devices are made a part of the cloth-presser mechanism, as in the ordinary sewing-machine, or a part of the cloth holding and feeding clamp, as in automatic machines for overseaming or stitching predetermined designs, so that the manual operation of the presser or the clamp effects the operation of the tension-release to release the needle-thread. In some instances, as when the tension-release is employed in connection with machines provided with stop-motions, the tension-release mechanism is operatively connected with the stop-motion, whereby the automatic operation of the latter effects an automatic operation of the former. The employment of tension-releases such as I have herein briefly referred to is to avoid care on the part of the operator, so the needle-thread will not be broken when the machine is not in operation and the material is manually moved under the needle. In such instances the tension-release does not affect the form or quality of the stitch. My invention, on the other hand, has no relation to the con-

venience of the operator, but does affect the formation of the stitch.

My invention has for its purpose the automatic location of the lock occasioned by the interlocking of the needle-thread with the under or bobbin thread with relation to the surface of the material operated upon, and to illustrate the operation of my invention I select the overseaming of what is termed the "square barred-end buttonhole," which design of overseaming is illustrated and described in my pending application, Serial No. 639,400, filed June 4, 1897.

The design of overseaming here referred to comprises comparatively short overseam-stitches (about one-sixteenth of an inch) for the overseaming of the two sides of the buttonhole and comparatively long overseam-stitches (about three-sixteenths of an inch) for the barring of the two ends of the buttonhole.

The overseam-stitches common to the art are of two kinds, the purl and the whip stitch, the former produced by giving to the bobbin-thread a very light tension and to the needle-thread a tension sufficient to draw the lock, occasioned by the interlocking of the two threads, up through the material, causing the lock to lie on its upper surface, and the latter by giving to the needle-thread a light tension and to the bobbin-thread a tension sufficient to prevent the lock of the two threads being drawn through the material. The purl-stitch is most desired and of late has largely superseded the whip-stitch, for the reason that the effect produced by the former is more like that produced by handwork. The excessive upper tension necessary to the production of the purl-stitch tends when placing the comparatively long bar-stitches to draw the material, especially such materials as are of soft and fine texture, and owing to this defect it has been largely the practice to "machine" overseam the two sides of the buttonhole and afterward to "hand-bar" the two ends.

My invention as applied to the overseaming of buttonholes having square barred ends renders practical the overseaming of the two sides of the buttonhole with the purl design and the barring of the two ends with the whip-

stitch design by one continuous automatic operation, while avoiding the drawn or pinched appearance of the ends of the buttonhole and the necessity of a second operation. It also provides in machines having a feed for a given design for the automatic control of the needle-thread tension to automatically change the design of the stitch.

My invention is fully described and claimed in the following specification and is illustrated in the accompanying drawings, in which—

Figure 1 is a back view in perspective of a portion of the buttonhole-sewing machine forming the subject-matter of my pending application above mentioned to bring to view the elements of construction necessary to better illustrate the application of my invention thereto. Fig. 2 is a view in section on line X X, Fig. 1, to show in detail the construction and operation of the needle-thread tension. Fig. 3 is a sectional detail to be referred to.

Referring to Fig. 1, all parts shown in outline and not lettered are in construction and operation the same as the like parts shown and described in my said pending application. To the back slide-frameway is securely attached the bracket *a*. Pivotaly attached to the bracket *a* by the pivot-screw *a'* is a rock-lever *a''*, carrying at its rear end a roller *a³*, which in the operation of the device coacts with the tension-controller *a⁴*, carried by the rotating feed-disk. To the front or opposite end of the rock-lever *a''* is fulcrumed a screw-threaded sleeve *a⁵*, which receives male-threaded rod *a⁶*, whereby adjustment may be made between said sleeve and rod. The rod *a⁶* at its upper end is suitably connected to the collar *a⁷*, loose on the cutter-bar rocker-shaft *x*, the collar *a⁷* having lugs *a⁸* *a⁹*, the lug *a⁸* acting to connect the collar *a⁷* to the rod *a⁶* and the lug *a⁹* acting to give motion to a rock-bar *b*, pivotaly secured in the overhanging arm by the screw *b'*. The hole in the rock-bar *b* for the reception of the screw *b'* is considerably larger than the body of the screw, and directly back of the rock-lever *b* and encircling the body of the screw is a cup-washer 5, (see Fig. 3.) upon which the rock-lever bar *b* rocks when actuated to change the degree of tension normally given the needle-thread. The rear end of the rock-bar *b* is provided with two springs *b''* *b³*, secured to the rock-bar *b* by the screws *b⁴* *b⁵*. The spring *b''* is positioned to actuate the plunger *c*, (see Fig. 2,) which in turn moves the washer *c'* (held against the thread-carrying disk *c''* by the spring *c³*) away from the thread-carrying disk *c''* to permit the latter to more freely revolve on the tension-stud *c⁴*. The parts shown in section in Fig. 2 comprise the usual construction of needle-thread tension device as commonly employed in connection with the Wheeler & Wilson automatic buttonhole-sewing machine and forms no part of my invention.

An ordinary tension device provided with means, as the plunger *c*, to move the friction-disk *c''* so as to more or less vary the tension given the thread as it is fed to the needle would, in combination with my improved construction, effect the same result; but that this particular construction of tension device may be thoroughly understood I will later on refer to it in detail.

The operation of my invention for the over-seaming of a square barred-end buttonhole is as follows: By reference to my pending application, Serial No. 639,400, it will be understood that the rotating feed-disk carrying the tension-controller *a⁴* makes two revolutions for a single cycle of feed movement of the cloth-holding clamp and consequently for the over-seaming and barring of a single buttonhole, causing two engagements of the tension-controller *a⁴* and the roller *a³* for the overseaming and barring of each buttonhole. The tension-controller *a⁴* is mounted on the rotating feed-disk relative to the roller *a³*, so that they coact to rock the lever *a''* in the direction of the arrow and so hold it during the barring of first one and then the opposite end of the buttonhole. The movement of the rock-lever *a''* through the connections *a⁵* *a⁶* and collar *a⁷* transmits motion to the rock-lever *b*, carrying the spring *b''*, causing the latter to contact with and move the plunger *c* against the bar *c⁶* of the washer *c'*, causing a slight movement of the washer *c'* against the resiliency of the tension-spring *c³*, which encircles the tension-stud *c⁴*, securely held in the overhanging arm by the nut *c⁵*. The stud *c⁴* is slotted for about one-half of its length to permit of the movement of the bar *c⁶* of the spring-washer *c'* and drilled out for the remainder of its length for the free operation of the plunger *c*. The friction normally given the thread-carrying disk *c''* is controlled by the tension-nut *d*, forcing the thread-carrying disk through the spring *c³* and washer *c'* against a suitable seat formed in the overhanging arm, as at *d'*. The thread-carrying disk is constructed with a central hub *d''*, which at its rear side bears against the arm, as at *d'*, the opposite side operating within the cup-shaped portion of the washer *c'*. It is sometimes found advantageous to place between the thread-disk *c''* and its seat *d'* and between its opposite side *d³* and the washer *c'* a flexible washer, (usually of felt.)

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

1. In a buttonhole-sewing machine, work-moving mechanism, and needle-thread tension mechanism, combined with a tension-controller, means interposed between the tension-controller and the work-moving mechanism by which the tension-controller is actuated from said work-moving mechanism, and connections between said tension-controller and needle-thread tension mechanism whereby the degree of tension given the needle-thread may be automatically varied by said control-

ler during the sewing operation and stitches of different character formed at the ends and sides of the buttonhole, substantially as described.

- 5 2. In a buttonhole-sewing machine, a work-feed mechanism including a rotating feed-disk, and a needle-thread tension mechanism, combined with a tension-controller connected to and rotating with said rotating feed-disk,
10 and connections between said tension-controller and the needle-thread tension mechanism, whereby by the rotation of said ten-

sion-controller in unison with said feed-disk the degree of tension given the needle-thread may be automatically varied during the sewing operation, substantially as described. 15

In testimony whereof I have hereunto signed my name to this specification, in the presence of two subscribing witnesses, this 15th day of December, A. D. 1897.

FREELAND W. OSTROM.

Witnesses:

E. I. VAN HORN,
C. N. WORTHEN.