

UNITED STATES PATENT OFFICE.

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TENSION DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 580,675, dated April 13, 1897.

Application filed October 10, 1896. Serial No. 608,436. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Tension Devices for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to tension devices for sewing-machines, and has for its object to provide means whereby the tension of the thread or threads may be automatically varied from stitch to stitch for the purpose of producing ornamental seams.

In carrying my invention into effect I preferably loosely mount the tension-disks and tension spring or springs on a movable rod or spindle provided with an abutment or abutments between which and the tension-disks the said spring or springs are confined, and then by slowly reciprocating said rod or spindle so that the same travels back and forth once only while a number of stitches are being made the tension on the thread or threads will be automatically varied from stitch to stitch by gradually compressing and then again gradually relaxing said spring or springs, the tension-disks, it being understood, remaining stationary while the rod or spindle reciprocates through them.

My invention in its preferred form contemplates the employment of two pairs of tension-disks or two tension devices of any other suitable form, one for the upper and the other for the lower thread, the tension-springs of the respective devices being reversely acted on, so that when the frictional hold of the tension device on the upper thread is increased the tension on the lower thread is relaxed, and vice versa.

In the accompanying drawings, Figure 1 is a plan view of a tension device embodying my invention, this view showing a part of the arm of a sewing-machine on which the said device is mounted. Fig. 2 is a side view of the same with the machine-arm in section to show the tension-device-operating mechanism. Fig. 3 is a detail view of the reciprocating rod or spindle and its operating device, and Fig. 4 is a diagrammatic

view of one form of ornamental overseam which may be made by the use of my invention.

A denotes a part of the overhanging bracket-arm of a sewing-machine, and B a small bracket mounted thereon and having a barrel or bearing portion *b*, through which freely slides a rod or spindle C, on which the tension-disks *d* are loosely mounted, two pairs of tension-disks being herein shown. The tension-disks are pressed into yielding contact with each other and held against the opposite ends of the bearing or barrel *b* by springs *e*, loosely surrounding the said rod or spindle and confined between said disks and nuts *c* or other suitable abutments adjustably mounted on said rod or spindle.

F is a small rotating shaft having bearings in the arms *b'* of the bracket B and provided with an eccentric *f*, working in a yoke *c'*, rigidly attached to or integral with the rod or spindle C. The shaft F is provided with a ratchet-wheel *f'*, engaged by a spring-pressed pawl *g*, mounted on a pawl-carrying lever G, pivoted on said shaft and vibrated from a cam *h* on the machine-driving shaft H through a reciprocating yoke *h'*, on which rests a rod *i*, attached at its upper end to the lever G, said rod being held against said yoke by the coil-spring *k*.

From the foregoing it will be apparent that when a sewing-machine to which my invention may be attached is in operation the cam or eccentric *f* will be slowly rotated to slowly reciprocate the rod or spindle C, which alternately compresses and relaxes the springs *e*, thus causing variations from stitch to stitch in the frictional pressure or drag of the tension-disks on the thread or threads passing between them. Thus where two reversely-varied tension devices, one for an upper and the other for a lower thread, are employed, as in the present instance, the tension on the upper thread will be increased from stitch to stitch, while the tension on the lower thread will be diminished, and vice versa.

With the tensions of the upper and lower threads of an overseaming edge-stitching machine thus reversely varied the result will be somewhat as illustrated in Fig. 4, in which

the lines *t* may be supposed to denote the upper thread of one color, the lighter lines *t'* the lower thread of another color, and the curved line *p* the "purl" resulting from the concatenation of the upper and lower threads. A somewhat similar ornamental effect can be secured by varying the tension from stitch to stitch on one of the threads only, or in a four-thread overedge seam, such, for example, as is made on a machine similar to that shown by United States Patent No. 472,046, dated April 5, 1892, this ornamental effect can be increased or varied by passing all the threads through the automatically-varied tension devices. The ornamental seams may also be varied by changing or adjusting the feeding movements of the ratchet-wheel *f'* to rotate the shaft *F* faster or slower by varying the adjustment of the nuts *c* to change the pressure of the springs *e* on the tension-disks or by substituting a cam or pattern wheel of any desired form for the eccentric *f*, as will be readily understood by any mechanic skilled in the art to which my invention relates.

I do not therefore wish to be understood as limiting my invention to the particular form of tension devices herein shown or to the details of construction of the operating mechanism or other parts as herein illustrated, as these may be widely varied without departing from the spirit of my invention. Although I have illustrated in Fig. 4 an ornamental edging-seam produced by the use of my invention, it will be understood that similar ornamental seams may be produced in the bodies of fabrics back from their edges by properly presenting the work to almost any kind of overseaming or zigzag stitch machine equipped with my invention.

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

1. The combination with a sewing-machine tension device, of an automatic mechanism constructed and operating to gradually increase the frictional drag exerted on the thread by said tension device for a series of stitches and then to gradually decrease said frictional drag for a series of stitches, whereby ornamental seams, due to the varying action of said tension device, may be produced.

2. The combination with a plurality of sewing-machine tension devices, of automatic mechanism for reversely varying the frictional drags exerted on the threads by the same, from stitch to stitch; whereby the tension on an upper thread may be gradually increased for a series of stitches while the tension on a lower thread is at the same time gradually diminished, and vice versa.

3. In a sewing-machine tension device, the combination with two pairs of tension-disks, of a movable rod or spindle on which said disks are loosely mounted, confined springs encircling said rod and oppositely pressing against said disks, and means for slowly reciprocating said rod or spindle to cause the pressure of said springs against said disks to be automatically and reversely varied from stitch to stitch.

4. The combination with the bracket *B*, of the rod or spindle *C* fitted to reciprocate in said bracket and provided with the adjustable nuts *c* and the yoke *c'*, the tension-disks *d* and springs *e* mounted on said rod or spindle, the shaft *F* having a cam or eccentric, as *f*, and means for slowly rotating said shaft.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD B. ALLEN.

Witnesses:

HENRY CALVER,
JOSEPH F. JAQUITH.