

(No Model.)

R. W. WHITNEY.

AUTOMATIC TENSION FOR SEWING MACHINES.

No. 314,635.

Patented Mar. 31, 1885.

Fig. 1.

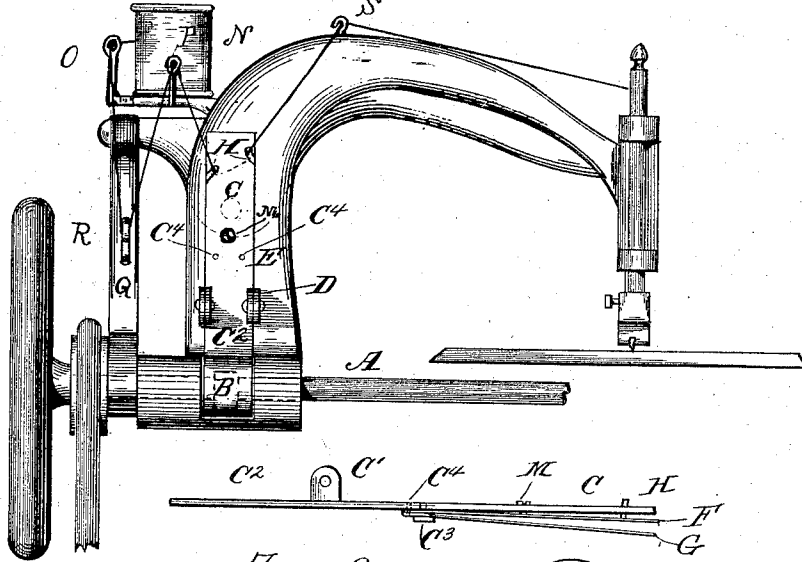


Fig. 2.

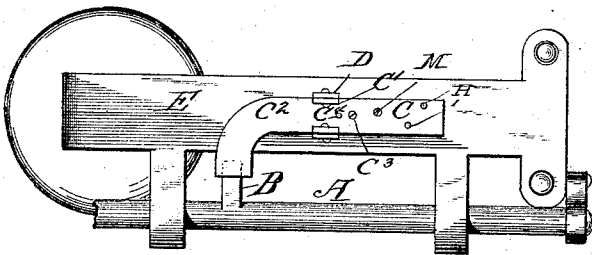
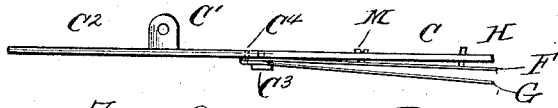


Fig. 3.

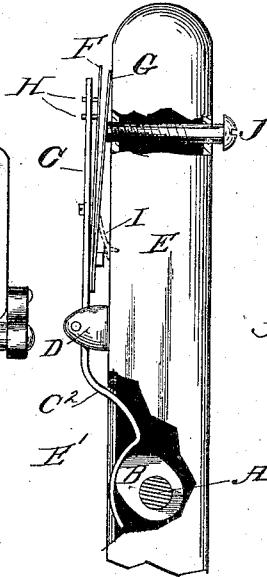
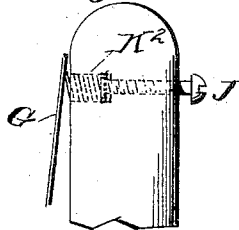


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC TENSION FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 314,635, dated March 31, 1885.

Application filed June 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, RUEL W. WHITNEY, a citizen of the United States, residing at New York, in the county of New York and State

of New York, have invented certain new and useful Improvements in Automatic Tensions for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to automatic tensions for sewing-machines, and is an improvement on that for which a Patent No. 277,094 was granted me May 8, 1883.

The invention relates to that class of automatic tension devices which comprise a spring and a fixed plate, between which the thread is passed on its way to the needle, and means for intermittently forcing the spring and plate against each other in order to retard the progress of the thread therethrough, and my invention in this instance is hereinafter described, and specifically set forth in the claims.

Referring to the drawings, Figure 1 is a rear side elevation of a portion of a loop-stitch machine provided with my improved tension devices. Fig. 2 is a side elevation of the tension plate and spring. Fig. 3 is a plan of a portion of a rock-shaft machine provided with my tension devices. Fig. 4 is an end elevation of a portion of a shuttle-machine provided with my tension devices. Fig. 5 is a modification of details hereinafter described.

Like letters refer to like parts in all the figures.

A represents what is hereinafter designated as the "main shaft" of the machine—that is to say, as in Figs. 1 and 4, the main shaft is arranged below the working bed or table of the machine to operate the loop-hook or the shuttle and feed mechanisms, whereas in Fig. 3 said shaft is a rock-shaft adapted to operate the needle-bar, and in both instances the cam or eccentric B, or its equivalent the rock-arm, is arranged upon the shaft, so as to operate upon my tension devices, as hereinafter described.

The eccentric or rock-arm may be mounted upon any suitable shaft of the machine, so long as such shaft shall have a rotation related properly to the movements of the stitch-forming mechanism, and the tension devices

hereinafter described may be arranged so as to be operated upon by said eccentric or rock-arm, and so as to operate upon the thread, as hereinafter described; and in regard to the shaft selected or the place of attachment of my tension devices, I do not limit myself to any particular location thereof, but reserve my right of attaching and operating the same in any manner within the skill of persons conversant in the construction of sewing-machines.

The tension devices proper consist of the plate C, and its adjacent plates may be either rigid or may possess more or less elasticity, and is provided with bearings C', by which it may be pivotally mounted upon or connected with a fixed part of a machine. In this instance similar bearings, D, are formed upon the arm E of the machine, in Figs. 1 and 4 on the side of the upright portion of the arm, and in Fig. 3 on the top of the arm. The plate C is extended beyond the bearings, as at C², and said extended portion is adapted, by being properly shaped, to operate in connection with an eccentric or rock-arm on a shaft of the machine. In Fig. 1 the said extended portion C² is curved outwardly and downwardly, in order to present it to the eccentric B, arranged at, and at one side of, the base of the arm, while in Fig. 3 the said extension is curved laterally to project over the rock-arm, and in Fig. 4 it is curved inwardly, so as to pass through a slot, E', formed in the arm, and to come in contact with the eccentric B upon the shaft. Other formations of the extension C² will readily suggest themselves in order to adapt the tension devices to any particular machine, or to be operated by any particular shaft in a machine.

To the plate C are secured by means of a rivet or screw, C³, and a pin or pins, C⁴, two spring-plates, F and G, all substantially the same width as the plate C, the spring-plate F serving, in connection with plate C, as the immediate tension-producing devices, the thread being passed back of pins H, when the plates are separated for that purpose, in order to retain it between them during the operation of sewing, as clearly shown in Fig. 1. The spring-plate G, however, has the function of determining, by a proper adjustment there-

of, the firmness with which the thread shall be held by the tension-spring F against the plate C. The pin or pins C¹ serve to keep the three elements in line with each other, and, as shown in Fig. 1, they may also serve as the means of binding these elements to each other where two of said pins are employed. Where one is employed, as in Fig. 2, a rivet or screw, C², is also employed.

Instead of securing the adjusting spring-plate G to the plate C, as described, it may be secured to a fixed part of the machine, as an arm, as shown by dotted lines at I, Fig. 4.

It is evident that when the extension C² is pressed by the eccentric or rock-shaft the plate C is made to oscillate upon the bearings C¹ D and is brought against the tension-spring plate F, thereby seizing the thread passing thereinbetween. Now, it is evident, also, that if the adjustment-plate G be forced more or less strongly against the spring-plate F a movement of the cam or rock-arm will produce a more or less firm holding of the thread between the plates C and F, and therefore I provide a screw, J, arranged opposite the plate G, so as to be forced against the same in order to increase its pressure against the spring-plate F.

If desired, the tension-plate G may be a rigid plate, and a coiled spring, K, may be seated in the arm, so that the screw J may be forced against said coiled spring, and thus a yielding pressure of the plate G against the spring-tension plate F will be secured, as in the construction above described.

The spring K rests against a plate, L, which abuts against the screw J, whereby the screw may be operated against the spring bodily.

The operation of the tension devices will be readily understood from the description already given. The cam or arm B being timed to rotate once during the formation of each stitch, it intermittently forces the oscillating plate C against the tension-spring, and the thread is firmly held between them. This operation takes place during the ascent of the needle—about the first half of the upward movement—and by the ordinary devices employed the slack of the thread is taken up, and, with the tension, serves to set the stitch. When the rock-arm or cam leaves the extension, or the shorter radii of the cam are in contact therewith, the thread is free to move between the plate and the tension-spring. The thread is free to move between the spring and plate while the needle is elevated clear of the material being sewed, the latter portion of the upward movement of the needle bar serving to draw a fresh supply of thread when devices hereinafter described are not used.

Any suitable thread-guiding device may be employed in connection with the tension devices herein shown, the arrangements of such guides being such that the thread is not drawn around too sharply or against the retaining-pins H. Instead of the pins H, slots (see Fig. 1) extending inwardly from the edges of the

plate C may be employed, as in my previously-mentioned patent.

To adapt the spring-plate F and the plate C to receive thereinbetween coarser threads, I employ an adjusting-screw, M, seated in the plate C and bearing against the spring-plate F, whereby these plates may be separated one from the other for that purpose.

In Fig. 1 I illustrate an arrangement of devices for pulling the thread from the spool which are arranged back of the tension devices. Projecting upwardly from the bracket N are thread-guides O P, and attached to the eccentric-lever Q is a hook, R, and to the fixed arm of the machine is another hook, S. The thread is passed from the spool through the guide O into the hook R and through the guide P, and thence passes through the tension devices and through the hook S to the needle-bar. It will be seen that the thread, in passing down to and up from the pull-off hook R on the rod Q, is at each downward movement of said rod pulled off from the spool in a quantity sufficient for the next stitch. The tension releases the thread just before the needle-bar reaches its highest point, and tightens soon after the needle enters the goods. By this arrangement of the pull-off there is provided in rear of the tension devices a sufficient quantity of thread, which, being not under tension or strain, is easily drawn between the friction-plates, whereas if the thread passed directly from the spool to said plates the friction of the spool would also add to the tension of the thread while it is being drawn through the tension-plates. Provided the guides O P are above the pull-off hook R and the tension devices, it is immaterial where the spool is supported. It may be supported at the lower part of the fixed arm on an upright spindle, so that the thread would be drawn from the spool directly over its end, whereby it would be taken from the spool while it remained stationary, and in this manner the strain upon the thread in rear of the tension devices would be further lessened.

Having described my invention and its operation, what I claim is—

1. An automatic upper tension-plate in the form of a lever attached pivotally and about centrally to a fixed part of the arm of the machine, extended in one direction to and in contact with a moving part of the machine, and having an opposite extension, to which is rigidly secured a tension-spring and an adjusting-plate, in combination with means for varying the pressure of the adjusting-plate upon the tension-spring, substantially as specified.

2. The combination, with a shaft, A, an eccentric-arm, B, mounted thereon, of a pivoted tension-plate, C, having an extension, C², and having a spring-tension plate, F, and adjusting-plate G connected thereto, and screw J, substantially as shown and described.

3. The combination of the plate C, having the bearing C¹ and extension C², with the spring-tension plate F, and the adjusting-

screw M, mounted in the plate C and bearing upon the plate F, and means for actuating the plate C, substantially as shown and described.

5 4. The combination of the arm E, the bearings D, the plate C, having the bearings C, screw M, and the extension C², the spring-tension plate F, the adjusting-plate G, and screw J, and means for actuating the plate C, substantially as shown and described.

10 5. The combination, with the thread-guides O P, arranged above the eccentric-rod, with the pull-off R, mounted upon the eccentric-rod Q, and between the guides, substantially as shown and described.

15 6. The combination of the fixed arm of the

machine, provided with the tension-plates C and F, and with a guide-hook, S, at one side of the tension-plates, spool-supporting bracket N, having the thread-guides O P, arranged at the other side of the tension-plates, and the 20 pull-off R, mounted upon the eccentric-rod Q, below the thread-guides O P, substantially as shown and described.

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

RUEL W. WHITNEY.

Witnesses:

S. F. ADAMS,

H. W. GEBAUER.