

(Model.)

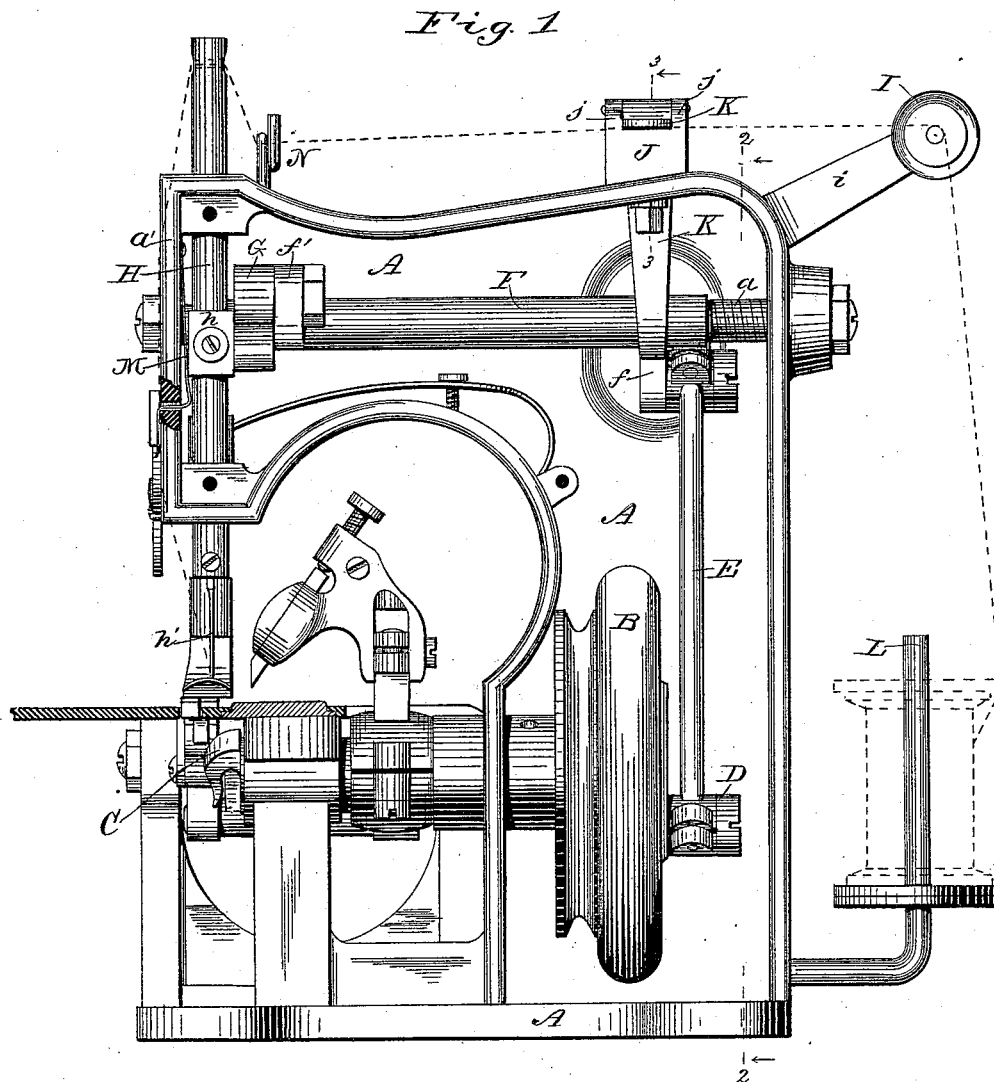
2 Sheets—Sheet 1.

P. DIEHL.

TENSION DEVICE FOR SEWING MACHINES.

No. 347,777.

Patented Aug. 24, 1886.



Witnesses:

E. L. Smith.

E. L. Taylor.

Inventor:

Philip Diehl
by Henry Calver
Att'y.

(Model.)

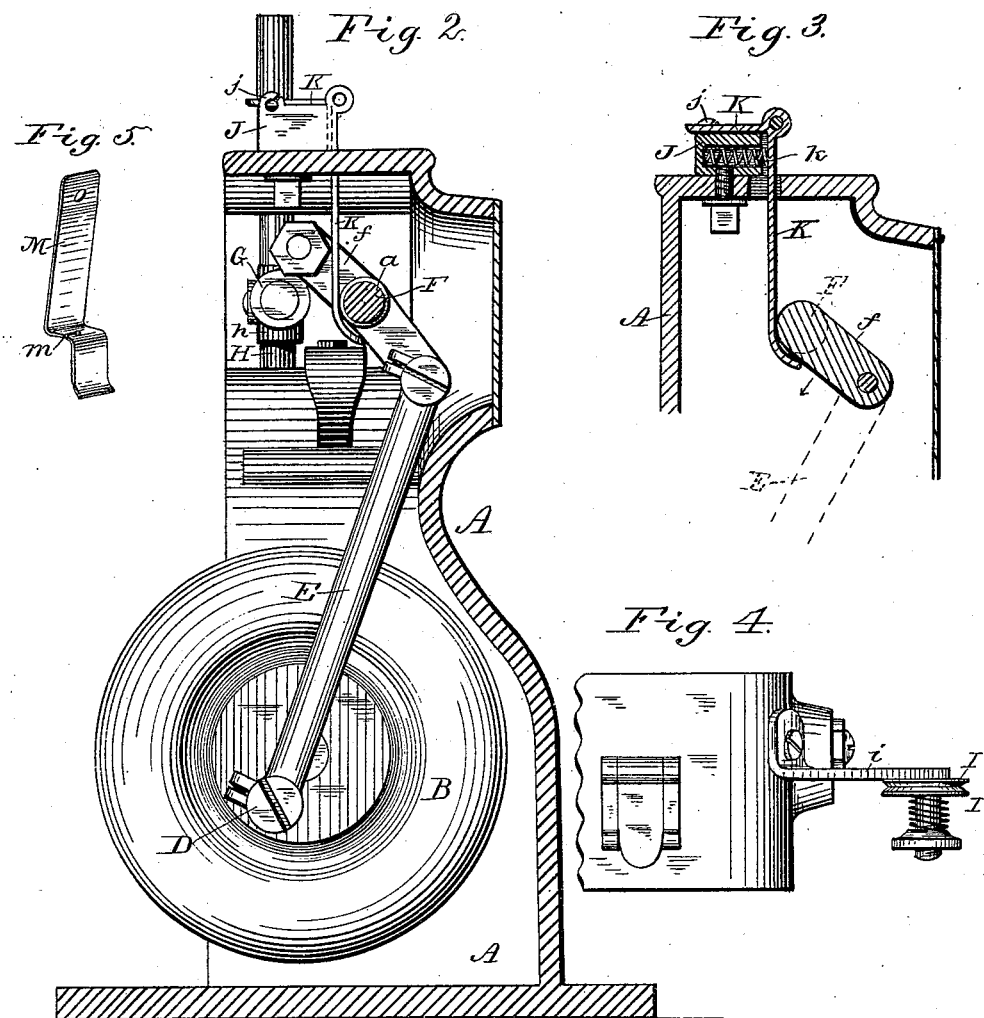
2 Sheets—Sheet 2.

P. DIEHL.

TENSION DEVICE FOR SEWING MACHINES.

No. 347,777.

Patented Aug. 24, 1886.



Witnesses:
E. S. Smith
Chas. L. Taylor

Inventor:
Philip Diehl
by Henry C. Cady

UNITED STATES PATENT OFFICE.

PHILIP DIEHL, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER
MANUFACTURING COMPANY OF NEW JERSEY.

TENSION DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 347,777, dated August 24, 1886.

Application filed October 8, 1885. Serial No. 179,287. (M-del.)

To all whom it may concern:

Be it known that I, PHILIP DIEHL, 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.

10 The object of my invention is to provide a simple and effective thread-controlling mechanism, which is more particularly adapted to a rotary hook or looper chain-stitch sewing-machine, in which the needle-bar is operated
15 by a rock-shaft pivoted in the upper part of the frame or bracket-arm of the machine. To this end I provide an automatic or intermittent tension, which is adapted to be operated by the needle-bar rock-shaft, and between this
20 intermittent tension and the spool from which the thread is drawn I place a light check-tension, which exerts a slight but constant drag on the thread, so as to hold the latter properly when it is released by the intermittent tension. In connection with the tensions above
25 referred to I prefer to use an intermittent check-tension near the needle to exert a slight drag on the thread during the time the needle is out of the work, so that the thread will be held
30 clear of the point of the needle when the latter descends to pierce the work.

In the drawings forming part of this specification, Figure 1 is a side elevation of a sewing-machine embodying my invention. Fig.
35 2 is a rear end view, partly in section, on line 2 2, Fig. 1. Fig. 3 is a detail section on line 3 3, Fig. 1. Fig. 4 is a plan view showing the intermittent and check tensions. Fig. 5 is a detail view of the automatic check-tension
40 spring.

A denotes the frame of the machine, in the lower part of which is journaled the driving-shaft, carrying at its rear end a fly and pulley wheel, B, and at its forward end an ordinary
45 chain-stitch rotary hook or looper, C. The wheel B carries a crank-pin, D, connected by a pitman, E, to the rear arm, *f*, of the rock-shaft F, pivoted on center screws, *a*, attached to the upper part or arm portion of the frame
50 A. The rock-shaft F has at its forward end an arm, *f'*, connected by a link, G, to a block

or collar, *h*, attached to the needle-bar H, the latter carrying an ordinary eye-pointed needle, *h'*.

From the foregoing it will be obvious that 55 when power is applied to the wheel B the rock-shaft F will be operated to reciprocate the needle-bar and the needle carried by the latter, with the co-operating rotary hook C, will form chain-stitches in the usual manner. 60

Sustained by the bracket *i* is a check-tension, I, consisting in the present instance of a pair of ordinary tension-disks held in contact by a light coil-spring surrounding the pin, which supports the disk, the stress of said 65 spring to adjust the tension being regulated by a thumb-nut on said pin in the usual manner. The tension I is preferably placed above or in line with the spool-pin L, as shown in Fig. 1. 70

To the top of the frame A, near the rear end thereof, is attached the automatic or intermittent tension consisting of a block, J, an elbow or bell-crank lever, K, pivoted to said block, and a coil-spring, *k*, the latter being 75 placed in a bored out recess in said block, so as to press outward against the longer arm of said lever, thus serving to hold the shorter arm of the latter in contact with the top of the block. The end of the short arm of the 80 lever K extends slightly beyond the block and the latter is provided with small projections *j'*, one on each side of said arm, said projections having open or slotted eyes or thread-holes. The lower end of the long arm of the lever K 85 is curved, and is arranged adjacent to the arm *f* of the rock-shaft F, so that said arm in its vibrations will impinge against said end at intervals, and will thus move said lever in opposition to the stress of the spring *k*, to lift 90 the short arm of the lever from its bearing-surface at the top of the block J to release the thread. To thread the tension, the thread is drawn into the hole in one of the projections, *j*, around and beneath the end of the short 95 arm of the lever K, and then into the hole in the other of said projections.

In Fig. 3 the arm *f* of the rock-shaft F is shown as being just in contact with the curved end of the long arm of the lever K, so that a 100 further movement of said arm in the direction indicated by the arrow adjacent thereto in said

figure will lift the short arm of said lever from the top of the block J and release the thread. This action occurs just after the hook C has caught the loop of the needle-thread and the needle-bar is rising to tighten the last stitch, and thus the intermittent tension will hold the thread during the greater part of the time that the needle bar is descending, and while it is rising to throw out a loop for the hook, and will then release it to permit the needle bar and rotary hook to draw sufficient thread from the spool or source of supply for the next stitch.

Attached to the inside of the face-plate *a'* of the frame A is a light check-tension spring, M, which extends outward through an opening in said plate, and then downward, so that its lower end will bear against the outer side of said plate. Said end is normally held in contact with the outer side of said plate by the stress of the main portion of the said spring, and is lifted or pushed away therefrom at intervals by the contact of the block or collar *h* on the needle bar with the inclined lower portion of said spring inside of the face-plate *a'*. The spring M is provided at the outer end of its bend with an open hole, *m*, into which the thread can be drawn to bring it beneath the bearing-surface at the lower end of said spring.

The thread passes from the spool (indicated by dotted lines in Fig. 1) or other source of supply through the light check-tension I to the intermittent or automatic tension, and thence through a guide-eye, N, to a hole in the top of the needle-bar H, which serves as a take-up, passing from the latter downward beneath the bearing-surface of the automatic check-tension M to the needle. The latter tension exerts a slight friction on the thread as the needle descends until the point thereof reaches the work, when the block or collar *h* impinges against the spring M, and lifts the lower end thereof from the face-plate, as above-described, to release the thread which remains unaffected by this tension until the needle in its ascent has nearly or wholly cleared the work.

By arranging the tension devices in the manner above described—to wit, with the constant check-tension between the main automatic or intermittent tension and the spool or other source of supply of the thread, and the intermittent check-tension between the main intermittent tension and the needle—I am enabled to control the thread with a nicety and exactness which I deem to be impossible with any other arrangement of these devices.

Owing to the delicate and accurate manner in which the thread is controlled by the devices above described they largely contribute toward rendering my machine capable of very high rates of speed for which it is more particularly intended.

The cutting device shown in Fig. 1 of the drawings is embraced by my application No. 179,286, filed simultaneously herewith, and is therefore not claimed in this application.

I claim as my invention—

1. In a sewing-machine, the combination, with an automatic or intermittent tension, of a constant check-tension placed between the intermittent tension and the spool or other source of supply of the thread, and an intermittent check-tension between the former intermittent tension and the needle, substantially as set forth.

2. In a sewing-machine, a bracket arm or frame, a block secured thereto, a rock-shaft having an arm, a bell-crank tension-lever pivoted to said block, one arm of said lever being arranged in the path of the said rock-shaft arm, combined with a spring for pressing the other arm of said tension-lever against a bearing-surface afforded by the said block, whereby said tension-lever is adapted to clamp and release the thread alternately, substantially as set forth.

3. The combination, with the rock-shaft and its arm, of the block J, having projections *j*, with thread-holes, the lever K, pivoted to said block, and the spring *k*, substantially as set forth.

4. In a sewing-machine, the combination, with the face-plate having an opening, of a bent tension-spring attached to the inside of said plate and extending outward so that its lower end will bear against the outer side of said plate, and a device reciprocating with the needle-bar and adapted to engage said spring at intervals, substantially as set forth.

5. In a sewing-machine, the combination, with face-plate, the needle-bar and operating mechanism for the latter, comprising the collar or block *h*, of the inclined and bent tension-spring M, attached to the inside of said face-plate, but having a bearing-surface outside of the latter, substantially as set forth.

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

PHILIP DIEHL.

Witnesses:

JAMES G. GREENE,
WM. H. DUSLEE.