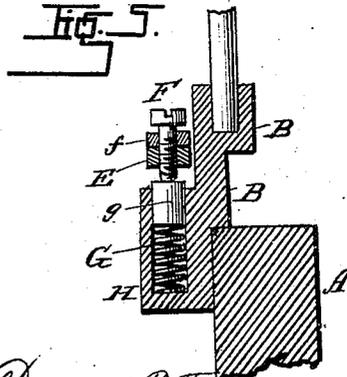
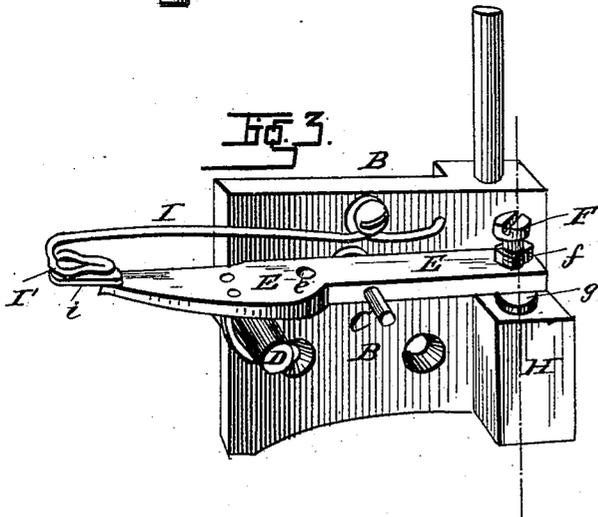
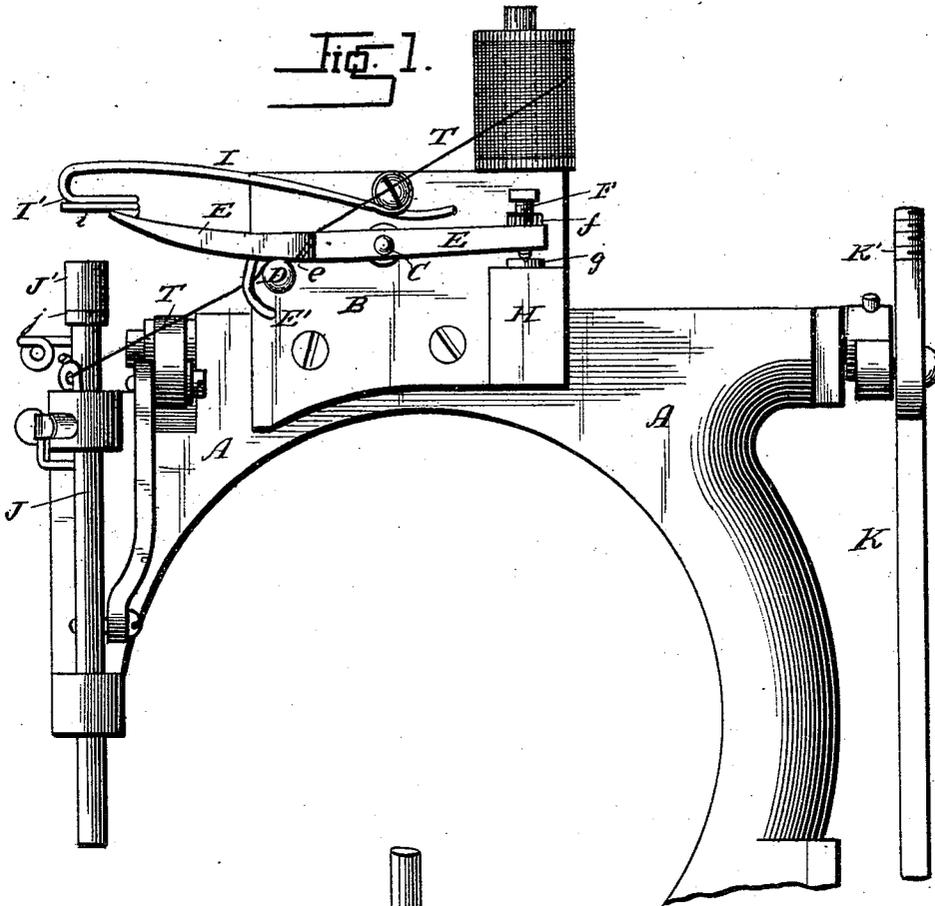


D. P. FITZGERALD & W. LYON.

AUTOMATIC TENSION FOR SEWING MACHINES.

No. 291,706.

Patented Jan. 8, 1884.



WITNESSES:

Ad. & Dietrich
Arthur L. Monell

Daniel P. Fitzgerald,
William Lyon,
 INVENTORS,

By *Louis Ragger & Co.*
 ATTORNEYS.

(No Model.)

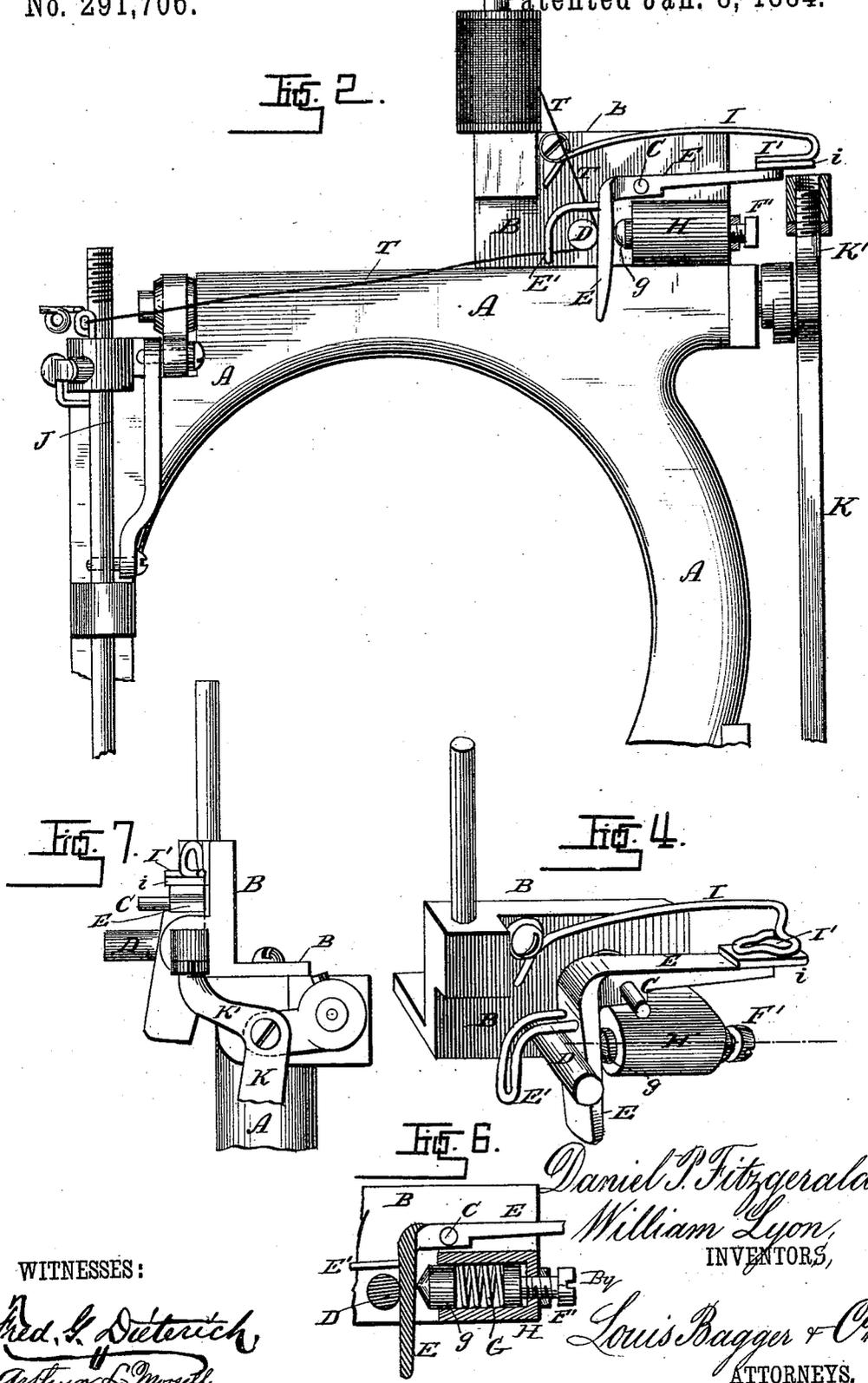
2 Sheets—Sheet 2.

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William Lyon,
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UNITED STATES PATENT OFFICE.

DANIEL P. FITZGERALD AND WILLIAM LYON, OF NEWARK, NEW JERSEY.

AUTOMATIC TENSION FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 291,706, dated January 8, 1884.

Application filed August 4, 1883. (No model.)

To all whom it may concern:

Be it known that we, DANIEL P. FITZGERALD and WILLIAM LYON, both citizens of the United States, and both residents of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Automatic Tensions for Sewing-Machines; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has relation to that class of automatic tension devices for sewing-machines in which the thread is constantly subjected to a gentle pressure by a spring, and to a stronger pressure, which is intermittently relieved by the operating parts of the machine after the loop has been drawn, to complete or nearly complete the stitch, as hereinafter more fully described and claimed.

This device is adapted, by slight modifications in its construction, to be operated either by the needle-bar or by the connecting-rod of the machine, as may be desired, and according to the style or pattern on which the device is to used, as will be seen by reference to the accompanying two sheets of drawings, in which—

Figure 1 is a side elevation of part of a sewing-machine provided with our automatic tension as adapted to be operated by the needle-bar. Fig. 2 is a side elevation of part of the same machine provided with our automatic tension as adapted to be operated by the connecting-rod. Fig. 3 is a perspective view of the tension device shown in Fig. 1. Fig. 4 is a similar view of the tension device shown in Fig. 2. Fig. 5 is a longitudinal sectional view of the spring-inclosing box H in Fig. 3. Fig. 6 is similar view of the spring-inclosing box marked H in Fig. 4, and Fig. 7 is a rear elevation of part of a sewing-machine with our tension device as adapted to be operated by the connecting-rod of the machine.

Like letters of reference indicate corresponding parts in all the figures.

Our improved automatic thread-clamping and tension mechanism is supported by and

upon a frame, B, which is suitably fastened, by screws or otherwise, upon the machine-frame. (Shown in part at A.)

Fastened in and projecting laterally from the frame or plate B are the stud C and cylindrical arm D, parallel to each other. Stud C forms the pivot or fulcrum for an arm or lever, E, which is balanced upon its fulcrum—that is to say, arm E is a lever of the first class, with its fulcrum C at or near its center of gravity. Where one arm of the lever is longer than the other, as in Figs. 1 and 3, the short arm is made so much heavier as to balance the longer arm.

In that form or modification of our automatic tension which is illustrated by Figs. 1, 3, and 5—that is to say, where the device is adapted to be actuated by the needle-bar of the machine—the short arm of lever E is provided with a set-screw, F, having a check-nut, *f*, for holding it firmly in its adjusted position, so that it shall not work loose by the jarring of the machine. The lower end of this screw bears against a cap, *g*, upon a spring, G, inclosed within a box, H, which is by preference cast upon or in one piece with the supporting-frame B. The long arm of lever E bears against the cylindrical arm D, and it follows that the pressure of the lever against the arm may be regulated by adjusting the set-screw F.

I is a strong spring, one end of which is suitably fastened upon frame B, while its free end is bent to form a plate or shoe, I', which overlaps and bears against the outer end of lever E. Shoe I' should have a leather lining or covering, *i*, on its under side, to prevent noise as it is struck by reciprocating needle-bar, J, on each of its upstrokes.

The operation of this form of the device is as follows: The thread shown at T is taken from a spool, placed upon a suitably-arranged spool-spindle, and is carried through an aperture, *e*, in the long arm of lever E, and between the under side of the lever and arm D. The coarser the thread the greater, of course, will be the pressure exerted upon it, as against arm D, by the lever-arm and the spring G. This pressure is what we have termed the "moderate" pressure, which obtains during the intervals of forming the stitch by

drawing the loop up to the goods; but there is another "strong" pressure exerted upon lever E by the spring I. This pressure is, however, intermittent, inasmuch as it is broken every time the free end of the spring is lifted off of the lever by the needle-bar J striking against it on the upstroke, and this occurs after the loop has been drawn to complete the stitch, or nearly so.

For the purpose of regulating or fixing the "throw" of the free end of spring I, we provide the upper end of the needle-bar with an adjustable nut, J', which may be fixed in its position after adjustment by a check-nut, j. The thicker or coarser the thread between arm D and lever E the greater, of course, will be the pitch or elevation of the outer end of the lever, and as that end of the lever carries the shoe I' of spring I with it, it will be seen that it admits of a longer stroke of the needle-bar before contact ensues, and that the time during which pressure by spring I is exerted upon the thread is proportionately increased. In other words, the coarser the thread the shorter the intermittent periods of contact between the top of the needle-bar and the under side of shoe I'. As the thread leaves arm D, it is carried through a thread-guide, E', fixed upon arm E, to the pull-off, and thence to the needle in the usual manner.

In the modified form of our device, as represented in Figs. 2, 4, 6, and 7 of the drawings, which is for the purpose of adapting the tension to be actuated by the connecting-rod K, lever E is bent at right angles, and spring G bears with its cap g against the bent arm of the lever, which presses against arm D. The tension of spring G is adjusted in this case by a screw, F', inserted through the end of box H, and which operates in precisely the same manner and for the same purpose (viz., for the purpose of regulating the continuous "moderate pressure" on the thread) as the set-screw F. In this construction we dispense with the thread-aperture e, but carry the thread T from the spool through the curved thread-guide E', then between arm D and the lever, and then again back through the thread-guide to the pull-off. The shoe I' of spring I is struck intermittently by a projecting bracket or tapet, K', upon the connecting-rod K, which has an adjustable nut and check-nut at its upper end, operating in like manner and for precisely the same purpose as nut J' and check-nut j at the upper end of the needle-bar.

If desired, that part of the tension-lever E which bears against arm D may be widened for the purpose of preventing the thread from slipping from under it; and it is also obvious that the thread may be wound one or more times around arm D, between it and the lever, when it is desirable to have a taut or strong tension, as in "gathering" the goods or for other purposes.

The spring I should be sufficiently stiff or strong to exercise sufficient pressure upon the

thread to do the very strongest kinds of sewing.

Having thus described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In an automatic tension device for sewing-machines, a thread-clamping device composed of a stationary thread-rest or thread-bearing, a lever bearing with one of its arms against the thread-rest, a spring adapted to operate continuously with a gentle or moderate pressure against the lever, a spring adapted to operate with a strong pressure against the lever, and means for intermittently raising said spring, releasing its pressure, constructed and combined substantially as and for the purpose shown and set forth.

2. In an automatic tension device for sewing-machines, a thread-clamping device composed of a stationary thread-rest or thread-bearing, a lever bearing with one of its arms against the thread-rest, a spring adapted to operate continuously against the lever, means or mechanism for regulating the tension of said spring, a spring adapted to operate with a strong pressure against the lever, and means for intermittently raising said spring, releasing its pressure, constructed and combined substantially as and for the purpose shown and set forth.

3. The combination of a supporting-frame secured upon the machine-frame, a thread-bearing lug projecting from said supporting-frame, a lever of the first class, pivoted upon the supporting-frame and resting against the thread-bearing lug, a set-screw turning vertically in one end of the lever, a capped spring bearing against the lower end of said screw, a spring secured at one end to the supporting-frame and bearing with its other end against the other end of the lever, and means from the mechanism of the machine for intermittently raising said spring after the loop has been drawn up, as and for the purpose shown and set forth.

4. In an automatic tension device for sewing-machines, the combination of a stationary thread rest or bearing, a lever bearing with one arm against the thread-rest, a spring bearing continually with a gentle pressure against the lever, means for adjusting said pressure, a spring bearing against the lever with a strong pressure, means from the mechanism of the machine for intermittently raising said spring after the loop has been drawn up, and means for adjusting the throw of said mechanism, as and for the purpose shown and set forth.

In testimony that we claim the foregoing as our own we have hereunto affixed our signatures in presence of two witnesses.

DANIEL P. FITZGERALD.
WILLIAM LYON.

Witnesses:

HENRY C. KLEMM,
ABRAHAM MANNERS.