(No Model.)

J. H. WHITNEY.

AUTOMATIC TENSION FOR SEWING MACHINES.

No. 373,163. Patented Nov. 15, 1887.

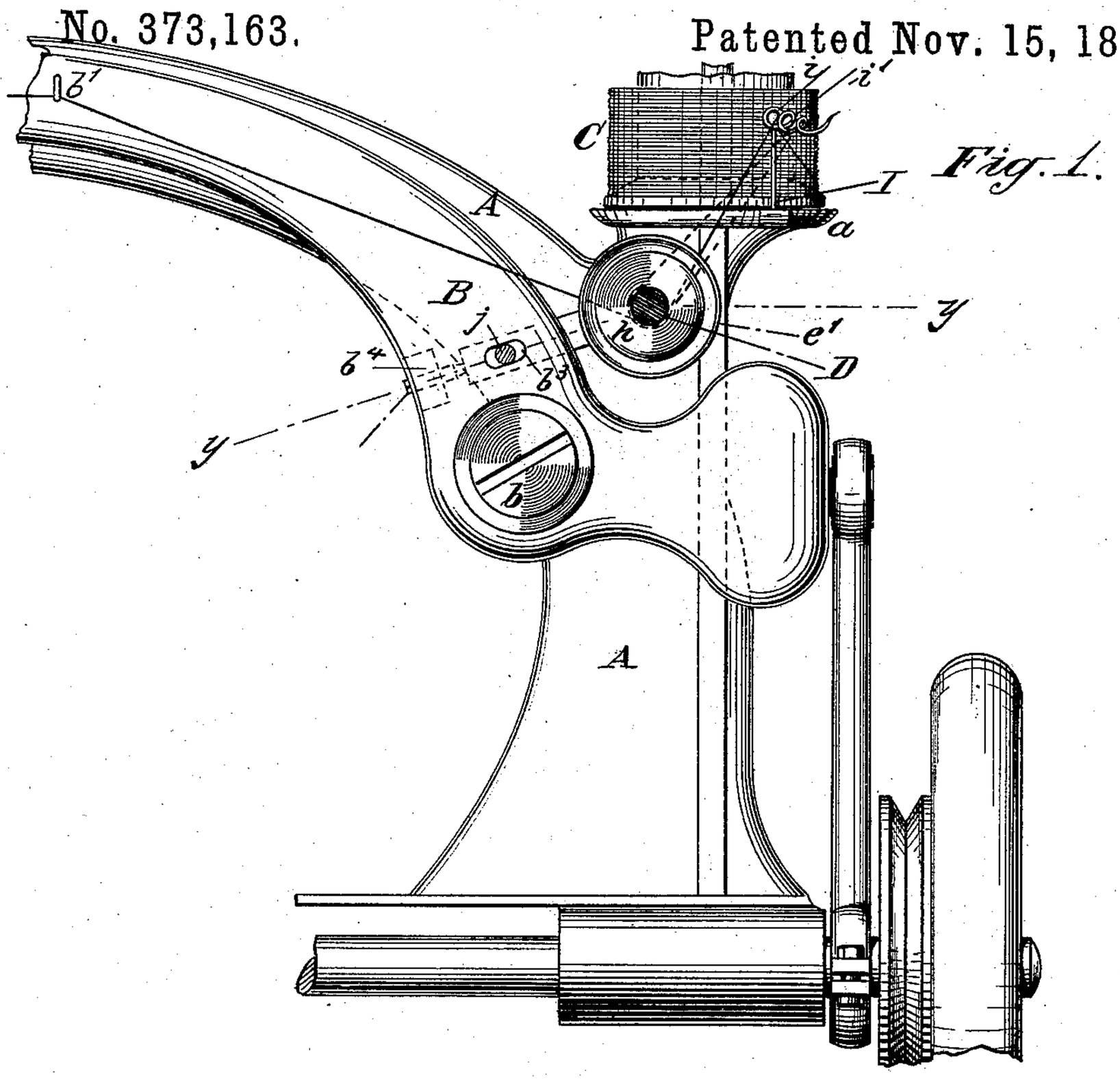


Fig. 1.

Fig. 3.

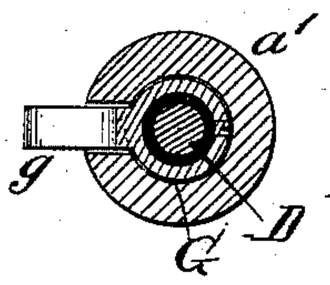


Fig. 2.

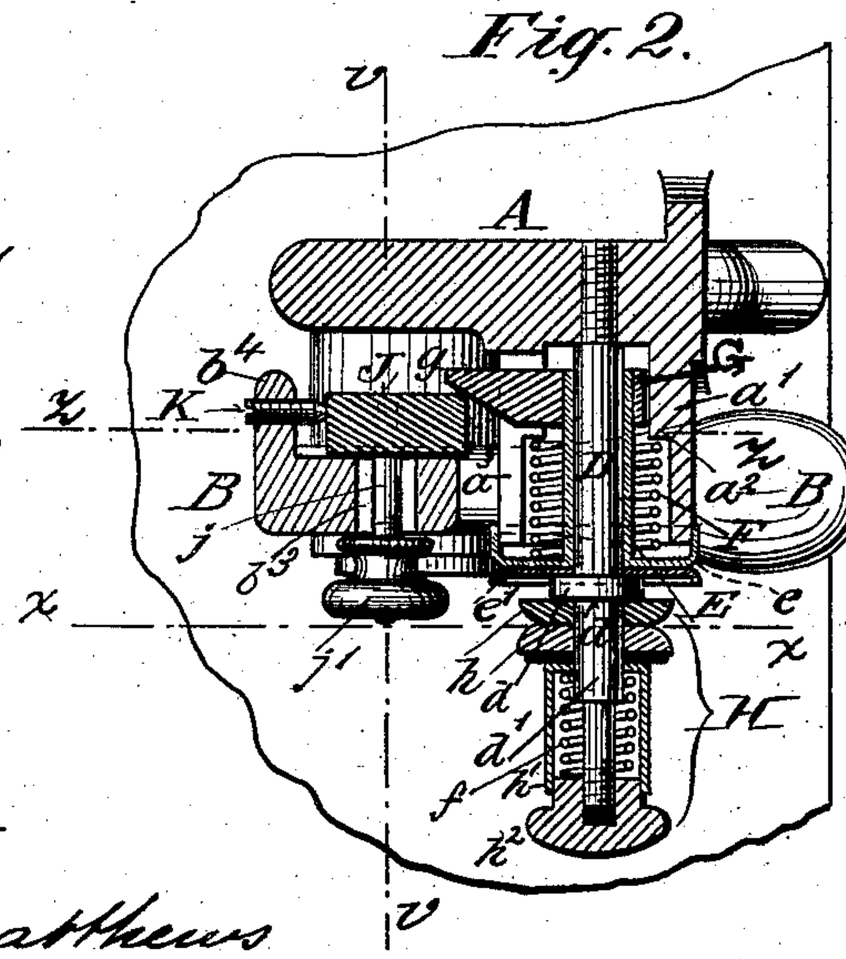
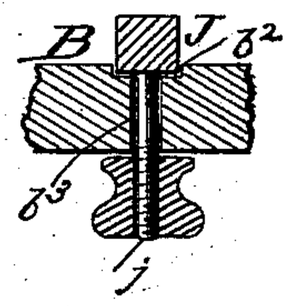


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES H. WHITNEY, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE WHITNEY ELASTIC MOTION SEWING MACHINE COMPANY OF NEW YORK.

AUTOMATIC TENSION FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 373,163, dated November 15, 1887.

Application filed December 26, 1883. Renewed February 10, 1887. Serial No. 227,176. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. WHITNEY, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in an Automatic Tension for Sewing-Machines, of which the following is a specification.

The object of my invention is to provide an improved automatic tension operated by the vibration of the needle-arm or lever to automatically relieve the tension on the thread when the needle-bar on its upstroke has nearly reached its highest position, thus allowing the needle-bar in completing its upstroke to pull off a little of the thread from the spool, and thereby to slacken the thread between the spool and the needle-bar without causing any further pull upon the thread end in the fabric.

The object is further to combine, by a simple construction and in a small compass, an automatic and an ordinary adjustable tension, to enable the operator of a sewing-machine to use, at his or her pleasure, either tension device singly or both combined.

The invention will be hereinafter fully described and claimed with reference to the accompanying drawings, in which—

Figure 1 represents a front side elevation of a portion of a sewing-machine provided with my present improvements, parts being broken out on line *x x* of Fig. 2. Fig. 2 is a plan section of the same, taken on the line *y y* of Fig. 1. Fig. 3 is a detail section on the line *z z* of Fig. 2 of the automatic tension. Fig. 4 is a cross-section through the needle arm or lever and the feed-cam of the automatic tension, taken on the line *v v* of Fig. 2.

A is the upright stationary arm or frame of the machine; B, the vibrating lever or needle-arm, pivoted at *b* to the frame A in the usual manner. Upon the frame A is formed the ordinary small platform, *a*, on which the spool C is placed, being held to turn upon a central stud, *c*, in the usual manner. Beneath the spool-platform *a*, and a little forward of the same, the frame A has a horizontal hub, *a'*, projecting toward the front side or toward the operator. In the hub *a'* is bored, by using first a larger and then a smaller drill, a socket, gradually decreasing in size inward, so as to form an annular shoulder, a^2. In the side of the hub nearest to the head of the machine is cut a slot, a^3, running from the exterior edge of the hub to, or nearly to, the bottom of the aforesaid socket, as shown in Fig. 2. In the axis of the hub *a'* is fitted a steel stud, D, threaded with its inner end into a hole in the frame A in the bottom of the said socket. In front of the socket the said stud D has a fast collar, *d*, and then a smaller shank, *d'*, threaded at its outer end.

Upon the stud D is fitted to slide a steel sleeve, E, having a tension-washer, *e*, upon its outer end, which washer is flanged on its edge, to embrace the outer end of the circular hub *a'*. The sleeve E is surrounded by a spiral spring, F, of proper size to fit in the larger bore of the socket, and which (by pressure with its inner end against the annular shoulder a^2 and with its outer end against the said washer *e*) tends to always keep the said washer *e* pressed against another oppositely-flanged washer, *e'*, interposed between the said washer *e* and the collar *d*. Upon the inner end of the sleeve E is secured a ring, G, small enough to get room in the inner and smaller bore of the socket, and this ring is provided with a toe, *g*, which is inclined or rounded off on its outer end, to adapt it to be acted on by a cam, as will presently appear, and which toe projects through the aforesaid slot a^3 in the hub, in which it is free to slide, while preventing the ring and sleeve from turning on the stud D. Outside of the collar *d* is fitted, upon the small shank *d'* of the stud D, an ordinary adjustable tension, H, consisting of the glass washers or disks *h*, the ferrule *h'*, (inclosing the spring *f*, which surrounds the shank,) and a thumb nut or knob, h^2, by which the spring *f* can be more or less compressed, and thus the pressure regulated upon the threaded post between the two disks *h*. The looped wire or guides I, which guide the thread from the spool to the tension, is provided with extra loops, *i i'*, arranged in juxtaposition to the center plane of the washers *e e'* and *h h*, respectively, so that the thread, upon passing through the ordinary guide-eye,

b', on the needle-lever, may be passed through the automatic tension-disks $e\ e'$ or the ordinary tension-disks $h\ h$, as may be desired; or it may be brought first to the automatic tension, back to the loop i', and then to the ordinary tension before passing through the guide-eye b'. Thus either tension may be used singly or both combined, though the latter is seldom required.

The automatic tension is operated from the vibrating needle-lever by the following simple and adjustable device: A block, J, which I here will call a "cam," as its action is that of a cam, is fitted in a shallow groove, b^2, in the lever B, which groove keeps the cam from lateral displacement. A pin, j, threaded upon its outer end, is secured with its inner end to the said cam, and passes through an oblong hole, b^3, which, from the bottom of the groove b^2, passes through the lever B, and has upon its outer end a thumb-nut, j', by tightening which latter against the front surface of the lever B the cam may be kept securely in position.

The cam may be adjusted to give greater or less contact with the toe g of the automatic tension by being moved along in the groove b^2 and then fastened by the nut j', as aforesaid.

In order to enable the adjustment to be made with great nicety, I provide on the inside of the lever B a lug, b^4, in which is a threaded hole and an adjusting-screw, K, fitted in the said threaded hole in such a manner that the end of the screw may be in contact with the end of the cam J, and the latter will be moved forward toward the toe g by turning the said screw K inward. The thread, being inserted between the disks $e\ e'$ of the automatic tension, is held clamped between them by the force of the spring F all the time during the downward movement of the needle-arm and needle, and also during the greater portion of the upward movement of the same until, toward the end of the upward stroke, (sooner or later, according to the adjusted position of the cam,) the said cam J strikes the forward curved or inclined surface of the toe g, thereby causing the sleeve E and disk e to be drawn inward against the pressure of the spring F just sufficient to release the hold on the thread between the disks $e\ e'$, and, consequently, to allow the upper guide eye on the needle-bar, during the completion of the upward stroke of the latter, to pull a corresponding portion of the thread from the spool C. The position of the thread, as seen from the front when only one tension is used, is indicated in full lines, and its position, as it would be if both tensions were used at the same time, is indicated in the same view in dotted lines.

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

1. The combination of the stud D, the clamping-disks $e\ e'$, the sliding sleeve E, having the toe g secured upon it, and the spring F, interposed between a flange or shoulder in the hub a' and a flange or shoulder on the said sleeve, to normally press the clamping-disks together, with the vibrating lever B, having a cam or projection, J, to engage the said toe g, substantially as and for the purpose set forth.

2. In combination with the spool-holder of a sewing-machine and with the vibrating lever B, having cam J, the stud D, having upon its outer end an adjustable tension, H, and upon its inner end an intermittent tension device, E $e\ e'\ g$ F, substantially as set forth, and a collar or shoulder, d, fixed upon the said stud D between the said adjustable and intermittent tensions, substantially as shown and described.

3. The combination of the stationary socketed and slotted hub a', the stud D, fixed centrally in the said socket and having collar d, the stationary washer e', the movable washer e fixed upon a sliding sleeve, E, having a ring, G, on its forward end and a toe, g, projecting from the said ring through the slot in the said hub, a spring, F, interposed between the disk e and an annular shoulder, a^2, in the said socket, with a vibrating lever, B, having a cam, J, to operate in contact with the said toe, substantially as specified.

4. In combination with the toe g of the automatic tension device, the needle-lever B, provided with the groove b^2, oblong hole b^3, and the lug b^4, the cam J, provided with the pin j and nut j', and the adjusting-screw K, all substantially as and for the purpose hereinbefore set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 20th day of November, 1883.

JAMES H. WHITNEY.

Witnesses:
ROBT. W. MATTHEWS,
A. W. ALMQVIST.

Correction in Letters Patent No. 373,163.

It is hereby certified that Letters Patent No. 373,163, granted November 15, 1887, upon the application of James H. Whitney, of Brooklyn, New York, for an improvement in "Automatic Tensions for Sewing Machines," was erroneously issued to the "Whitney Elastic Motion Sewing Machine Company, of New York," as owner of the entire interest in said invention; that said Letters Patent should have been issued to *Deborah C. Folk, of Brooklyn, New York*, it being shown by the record of assignments in this Office that said Folk is the assignee of the entire right, title, and interest in the patent, while the Whitney Elastic Motion Sewing Machine Company is a licensee only; and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 29th day of November, A. D. 1887.

[SEAL.]

D. L. HAWKINS,
Acting Secretary of the Interior.

Countersigned:

BENTON J. HALL,
Commissioner of Patents.