

(No Model.)

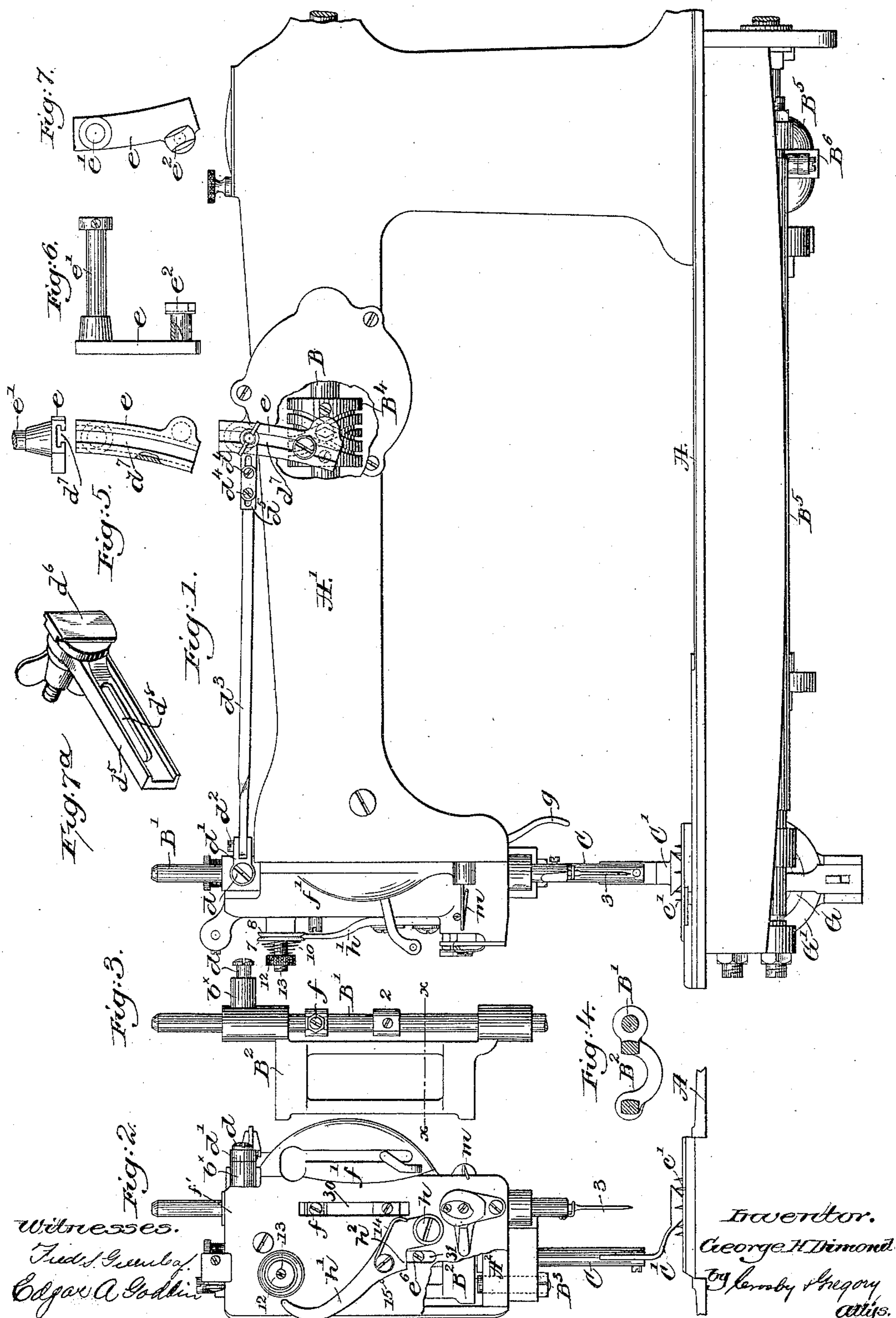
2 Sheets—Sheet 1.

G. H. DIMOND.

TENSION RELEASING DEVICE FOR SEWING MACHINES.

No. 473,869.

Patented Apr. 26, 1892.



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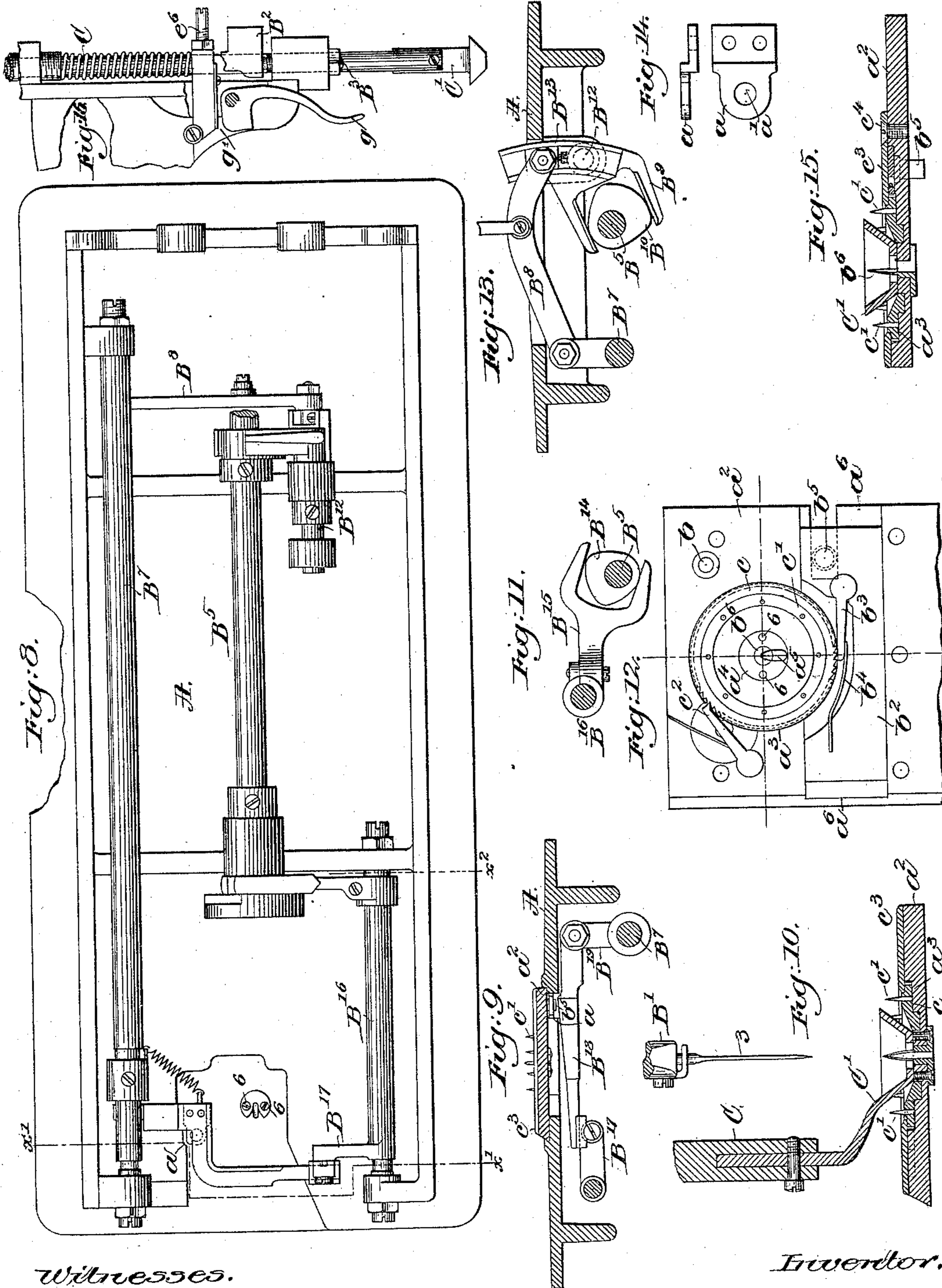
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Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE H. DIMOND, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE
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TENSION-RELEASING DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 473,869, dated April 26, 1892.

Application filed November 25, 1890. Serial No. 372,573. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. DIMOND, of Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve and simplify the construction of that class of sewing-machines more especially adapted for over stitching, and my invention is shown as embodied in a machine for over stitching eye-let-holes.

In order to enable the machine to be operated rapidly and not distort the eyelet after being stitched and especially when moving from one to the next eyelet, I have provided the machine with a tension-releasing mechanism, so that when the presser-foot or work-clamp is elevated prior to changing the position of the work when working successive eye-let-holes the tension on the needle-thread is relieved and is kept off until the presser-bar has been lowered and the needle-bar descends to stitch the next eyelet-hole; or, in other words, the tension of the needle-thread is released by the act of raising the presser-bar and is restored by the descent of the needle-bar when the needle has nearly reached the lowest point to which it descends and when such descent is preceded by lowering of the presser-bar, so that there is no tension on the upper thread at any time when slack thread is required, and thus liability to distort or pucker the work is avoided.

My invention therefore consists, essentially, in a sewing-machine containing the following instrumentalities, viz: a spring-controlled tension device, a needle-bar, and a presser-bar, each provided with a projection, combined with a tension-releasing device moved by the projection on the presser-bar as the latter is elevated into inoperative position, the construction and operation of the parts being substantially as will be described, whereby the said releasing device, having been moved by the rising foot, will remain in inactive position and leave the needle-thread substantially

free from tension until after the needle-bar and presser-bar have both been lowered.

Other features of my invention will be herein described, and pointed out in the claims at the end of this specification.

Figure 1 is a side elevation, somewhat broken out, of a sewing-machine embodying my invention sufficient to enable the same to be understood; Fig. 2, a partial left-hand end elevation of the machine shown in Fig. 1; Fig. 3, a detail showing the needle-bar frame and needle-bar; Fig. 4, a section in the line x , Fig. 3; Figs. 5, 6, and 7, details of the segmental or vibrating arm; Fig. 7^a, a detail of arm d^5 ; Fig. 8, a partial under side view of the machine shown in Fig. 1, the rear end of the lower shaft being broken off, the loop-taker, its guide, and devices between it and the disk at one end of the shaft B^5 being omitted; Fig. 9 is a section in the line x' Fig. 8. Fig. 10, a partial section showing the presser-foot or work-clamp and throat-plate with the feed-wheel; Fig. 11, a partial section in the line x^2 , Fig. 8; Fig. 12, a top or plan view of the throat-plate with the cap removed; Fig. 13, a detail showing part of the usual feed-actuating devices of the Wheeler & Wilson machines; Fig. 14, the pawl-carrier-actuating plate; Fig. 15, a partial section of the throat-plate, feed-wheel, and part of the presser-foot or work-clamp; Fig. 16, a detail showing part of the head, the usual presser-foot lifting-lever, and part of the presser-bar.

Referring to the drawings, the frame-work consisting, essentially, of the bed-plate A, the overhanging arm A', and the head A² is common to the Wheeler & Wilson machine.

The rotating needle-bar-actuating shaft B in the overhanging arm is connected by a crank and link with a projection on a collar 2, fast to the needle-bar B', having a needle 3, which, as herein shown, is adapted to reciprocate in bearings of a needle-bar frame B², adapted to swing about vertical pivots B³, the said frame being shown separately in Figs. 3 and 4.

The shaft B is connected by a suitable link or links B⁶ with cranks of and so as to rotate the lower shaft B⁵, which in practice will be made to actuate a short shaft having a bevel-

gear, which, through a beveled intermediate gear in engagement with a bevel-gear on a short shaft substantially at right angles to the shaft B⁵ and provided with a loop-taker driver, will rotate said shaft and its driver to rotate the loop-taker G in a loop-taker guide G', all substantially as in United States Patent No. 419,541, dated January 14, 1890, to which reference may be had, and as the said parts are old and common further reference herein is considered unnecessary.

The rock-shaft B⁷, the link B⁸, having a loose stud or block B¹³ to enter a groove in the feed-actuating lever B⁹, fast on the short shaft B¹², the cam B¹⁰ for moving the lever B⁹, the cam B¹⁴ at the opposite end of the shaft B⁵, the forked arm B¹⁵, fast on the rock-shaft B¹⁶, having the arm B¹⁷ and acting to lift the feed-bar B¹⁸ and the arm B¹⁹ of the rock-shaft B⁷ and jointed to the feed-bar to reciprocate it, are all substantially as in United States Patent No. 331,174, dated November 24, 1885, and in the Wheeler & Wilson machines; but herein I have dispensed with the feed-point usually attached to the bar B¹⁸ and have attached to the said bar a plate *a*, (see Figs. 8 and 9,) the said plate, (see Fig. 14,) where the plate is shown by itself, having a hole *a'*, to be described.

The presser-bar C, adapted to rise and fall in bearings forming part of the usual head of the overhanging arm, has fixed to its lower end a hollow cone-shaped presser-foot or work-clamp C', adapted to bear upon and clamp the work outside of the eyelet-hole to be stitched.

Instead of employing the feed-bar B¹⁸ and its actuating mechanism, (shown and described,) which constitute a part of the regular feeding devices of the Wheeler & Wilson machine, I may employ any other usual devices for moving a feed-bar so that the same shall have a reciprocating movement, the up and down motions of the feed-bar not being essential or necessary in connection with my invention.

In place of the usual throat-plate common to the Wheeler & Wilson machine, it being slotted for the passage of the needle and the usual feed-point, I have mounted upon the machine, by a suitable screw in a hole *b*, a throat-plate *a*². (Shown detached in Fig. 12.) This throat-plate has a circular or annular raceway *a*³, and at its center a hub *a*⁴, provided with a slot *a*⁵, through which the needle 3 passes. The throat-plate also has a guide-way or groove *a*⁶, in which is placed a pawl-carrier *b*², having a pawl *b*³, which, as represented, is acted upon by a spring *b*⁴, a stud *b*⁵, extended from the lower side of the said pawl-carrier, entering the hole *a'* in the plate *a*. The slotted hub of the throat-plate receives a spur *b*⁶, which is grooved, preferably, at one side to aid in guiding the needle, the spur being preferably sharp-pointed, so as to readily pass through the material or to enter an eyelet-hole previously cut therein. This spur has

its base attached to the throat by screws 6, so that the spur may be detached and another one of a different diameter be applied to suit the particular sized hole to be left for the eyelet. The raceway in the throat-plate receives a feed-wheel *c*, having its upper side concave (see Figs. 10 and 15) and provided near its edge with a series of points *c'*, preferably sharp, upon which is impaled the material in which the eyelet-hole is to be worked. As represented herein, the periphery of this feed-wheel is provided with teeth, which are engaged intermittingly by the pawl *b*³, the latter thus rotating the feed-wheel step by step, retrograde motion of the feed-wheel being prevented by means of the detent *c*². The feed-wheel is retained in the raceway by means of a cap or guard *c*³, shown as applied to the top of the throat-plate and confined by proper screws *c*⁴. During the reciprocations of the bar B¹⁸, which in this instance is the source of motion for the carrier *b*², the pawl *b*³ is made to engage and rotate the feed-wheel step by step.

The needle-bar frame B² has an ear *b*^x, which receives a stud-screw *d*, upon which is placed loosely a block *d'*, to which is jointed at *d*² the link *d*³, the said link being connected by screws *d*⁴ in an adjustable manner with an arm *d*⁵, having a slide-block *d*⁶, (see Fig. 7^a,) which block enters the groove *d*⁷ of the segment-lever *e*. The arm *d*⁵ referred to is slotted at *d*⁸ to receive the screws *d*⁴, so that by loosening the said screws the effective length of the link *d*³ may be altered—that is, it may be made longer or shorter—so as to vibrate the needle-bar frame more or less, in order that the needle 3, carried by the needle-bar, shall in its passage through the material impaled upon the pins of the feed-wheel pass more or less near the center of rotation of the feed-wheel, such adjustment enabling the needle to penetrate the material just at the point where the inner edge of the eyelet-hole is to appear, this adjustment being made to adapt the stitching to eyelet-holes of varying sizes. The length of the depth stitch produced by the vibration of the needle-bar may be regulated by adjusting the slide-block *d*⁶ in the slot of the segment-lever *e*, such adjustment being usual.

The segment-lever *e* has a stud *e'*, mounted in a suitable bearing on the arm A', and it also has a shoe *e*², which enters the grooves of the switch-cam hub B⁴, the latter in its rotation vibrating the lever *e*. This lever *e* and its actuating devices are in common use, and instead of the exact lever and switch cam shown I may employ any usual equivalent. The presser-bar collar, upon which rests the usual presser-bar spring, has a projecting stud *e*⁶, and the needle-bar B' has also a collar provided with a stud *f*. The studs *e*⁶ and *f* are extended out through slots in the face-plate *f'*. The face-plate has pivoted upon it at *h* a tension-releasing lever *h'*, herein shown as having its upper end wedge-shaped, so as to enter between the two usual disks 7 8, con-

stituting the chief parts of the tension device, and thus release the thread from tension, the effective strength of the tension device being controlled by a spring 10 and nut 12 on a stud 13.

The inclination of the wedge-shaped end of the lever h' , while sufficient to enter between and separate the tension-disks to release the needle-thread from tension, is not so great as to result in any tendency of the disks to eject the lever from between them when not held up by the stud on the presser-bar. This tension device is of usual construction. The tension-releasing device h' has a shoulder h^2 , and it also has attached to it a spring 14. The face-plate has a pin 15, which limits the movement of the tension release away from the tension device.

The head of the machine (see Fig. 16) has pivoted to it in usual manner a presser-foot-lifting lever g , one end of which acts upon a projection g' , extended from the usual presser-bar collar. When an eyelet-hole has been finished, the operator engages the presser-foot-lifting lever g and raises the presser-bar in usual manner, so as to lift the presser-foot from contact with the material. As the presser-bar rises, the stud e^6 , carried thereby, meets the shoulder h^2 of and causes the releasing device h' to be turned or actuated to open or release the tension device, so that the needle-thread is free to be drawn through the eye of the needle, while the presser-foot or work-clamp is lifted and the material is being changed to bring another portion of the material where another eyelet is to be worked in proper position on the feed-wheel. When thereafter the presser-foot or work-clamp is permitted to descend upon the work and the machine is again started, the stud f of the needle-bar as it descends to penetrate the material meets the spring 14 and causes the tension-releasing device to be moved in the direction to effect the release of the tension device and enable it to again clamp the needle-thread, the latter being relieved from tension until such time as the projection on the descending needle-bar, the presser-bar having been first lowered, acts on the said spring. The employment of the spring 14 enables the operator, if she desires, the presser-foot being lifted, to turn the machine by hand and raise and lower the needle-bar without withdrawing the wedge-shaped end of the lever from between the disks; but when the presser-foot has been let down then the contact of the projection with the spring will move the said lever and enable the tension device to act and hold the thread. The lever h' having been moved by the lifting of the presser-foot to effect the release of the tension on the needle-thread, the presser-foot may thereafter be lowered and raised, as desired, entirely independent of the lever h' and without moving said lever to put tension on the needle-thread, and the lever will be moved away from the tension device only as the needle-bar de-

scends, and then only when the descent of the needle-bar is preceded by the lowering of the presser-foot.

In the drawings the head of the machine is provided with a slack-thread controller, consisting, essentially, of a wire m ; but this slack-thread controller need not be specifically described herein, as it is common to United States Patent No. 405,205, and to the Wheeler & Wilson machine.

From the foregoing description it will be understood that the tension on the needle-thread is released whenever the presser-bar is fully lifted and that thereafter so long as the presser-bar remains lifted the said thread is left free from tension until the needle-bar in its descent strikes the spring 14 and moves the lever h' , and thereafter the thread may be freely drawn from the tension device through the eye of the needle.

It is customary to make eyelets in cloth at but a slight distance apart, and by employing an automatically-operating device to release the tension strain on the eyelet is avoided, its shape is better preserved, and speed of operation is also gained.

It will be understood in my invention that the feed-wheel has only a motion of rotation and by the pins at its sides constantly engages the material being stitched.

It is not intended to limit this invention to the exact form shown of presser-foot or work-clamp to bear on and hold the material being stitched.

I have shown the tension-releasing mechanism as containing a lever operated in one direction by a lug upon the presser-bar and in the other direction by a lug upon the needle-bar; but it is not intended to limit this invention to the exact construction of the parts forming the tension-releasing mechanism, as the same may be modified in various ways by substituting other equivalent forms of device without departing from my invention, as I am not aware, prior to my invention, that the tension-releasing mechanism has ever been operated in one direction by the presser-bar and in the other direction by the needle-bar.

I claim—

1. A spring-controlled tension device, a needle-bar, and a presser-bar, each provided with a projection, combined with a tension-releasing device moved by the projection on the presser-bar as the latter is elevated into inoperative position, the construction and operation of the parts being substantially as described, whereby the said releasing device having been moved by the rising foot will remain in active position and leave the needle-thread substantially free from tension until after the needle-bar and presser-bar have both been lowered.

2. A sewing-machine containing the following instrumentalities, viz: a thread-tension device, a needle-bar provided with a lug, a presser-bar provided with a lug, and a thread-tension-releasing lever pivoted upon the head

of the machine in position to be moved in one direction by the lug e^6 on the presser-bar to release the tension on the needle-thread when the presser-bar is lifted and in the opposite direction by the lug f on the needle-bar as it descends on the formation of a stitch to thus restore the tension on the needle-thread, substantially as described.

3. In a sewing-machine, the face-plate f' , slotted at 30 and 31, the tension-releasing lever h' , pivoted on the said face-plate, and the tension device, combined with the needle and presser bars, having lugs extended through the said slots and adapted to co-operate with the said tension release to operate substantially as described.

4. The combination, with a needle-bar and needle, and a presser-bar and tension device, of tension-releasing mechanism operated in one direction by or through the presser-bar to release the tension on the needle-thread and in the other direction by or through the needle-bar to restore the tension on the needle-thread, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE H. DIMOND.

Witnesses:

A. R. LACEY,

C. N. WORTHEN.