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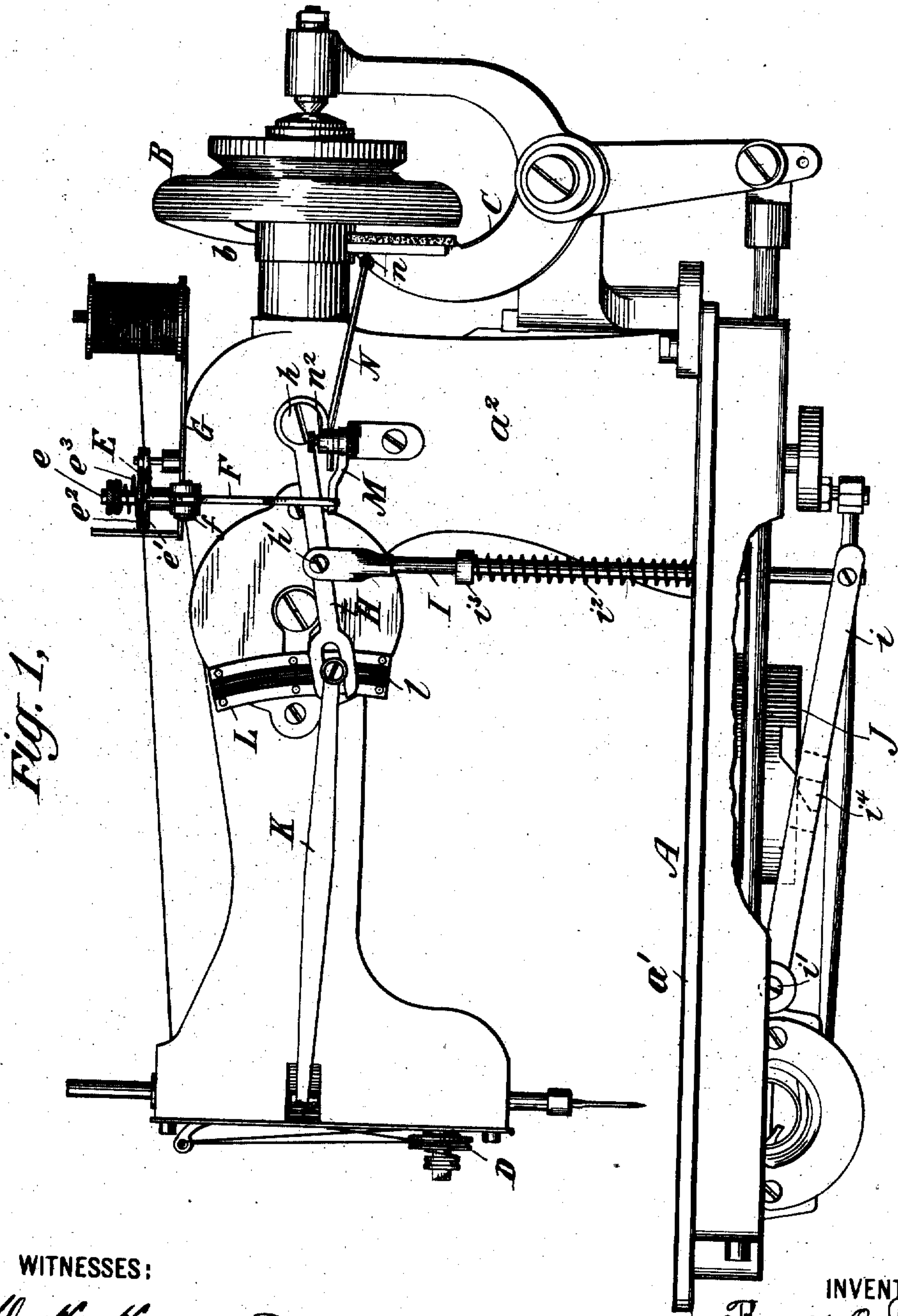
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T. O. QUIST & J. T. HOGAN.
TENSION DEVICE FOR SEWING MACHINES.

(Application filed Mar. 10, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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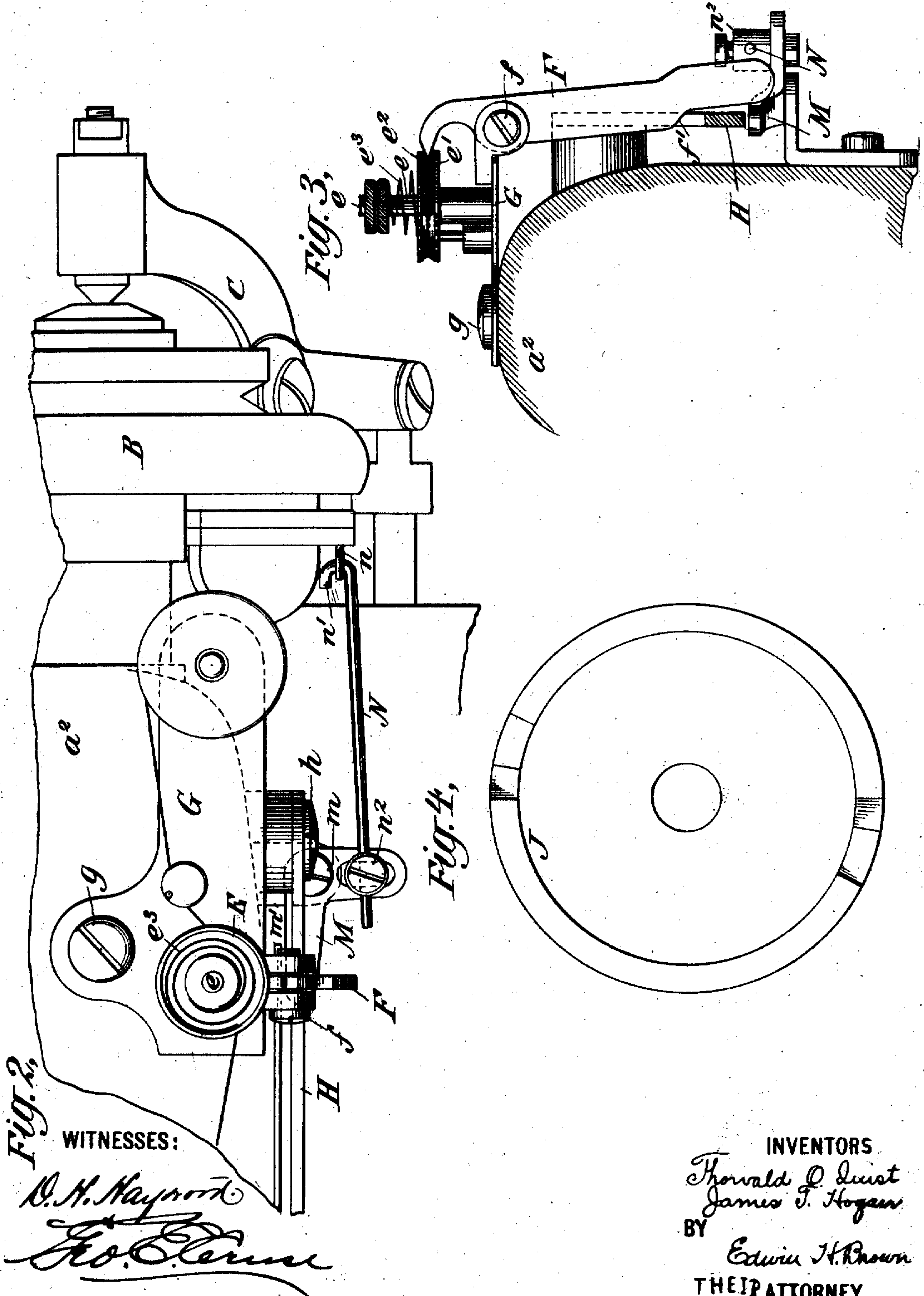
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UNITED STATES PATENT OFFICE.

THORVALD O. QUIST, OF NEW YORK, N. Y., AND JAMES T. HOGAN, OF JERSEY CITY, NEW JERSEY, ASSIGNORS TO THE NATIONAL MACHINE COMPANY, OF TROY, NEW YORK, A CORPORATION OF NEW YORK.

TENSION DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 689,226, dated December 17, 1901.

Application filed March 10, 1898. Serial No. 673,312. (No model.)

To all whom it may concern:

Be it known that we, THORVALD O. QUIST, residing in the borough of Brooklyn, city and State of New York, and JAMES T. HOGAN, residing in Jersey City, Hudson county, and State of New Jersey, citizens of the United States, have invented a new and useful Improvement in Tension Devices for Sewing-Machines, of which the following is a specification.

We will describe a machine embodying our improvement and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a front elevation of a sewing-machine embodying our improvement. Fig. 2 is a top view of a portion of the same upon an enlarged scale. Fig. 3 is a transverse section of certain parts and an elevation of others upon substantially the same scale as Fig. 2. Fig. 4 is an enlarged inverted plan of a cam comprised in the machine.

Similar letters of reference designate corresponding parts in all the views of the drawings.

A designates a sewing-machine head of ordinary construction, a' being the base-plate and a^2 the arm. This sewing-machine is of that kind in which are stitched buttonholes having two parallel rows of side stitches arranged upon opposite sides of the buttonhole-opening and two sets of barring-stitches crossing the ends of the opening and the two rows of side stitches. It has been found that if the same thread tension is employed for making the barring-stitches as for making the two rows of side stitches a puckering of the fabric in which the buttonhole is formed will result. We therefore wish to provide in a simple manner for lessening the tension during the formation of the barring-stitches relatively to that which is employed during the formation of the side rows of stitches. An important advantage resulting from the use of this tension device is that the shuttle-thread is mainly used to form the side rows of stitches, while the needle-thread is mainly used to form the barring-stitches. When the needle-thread is coarser than the shuttle-

thread, as is usually the case in buttonhole-sewing machines of the type to which our improvement is applied, a buttonhole having side stitches of relatively finer thread is produced, while at the same time the increased strength of the coarser thread is obtained in the bars of the buttonhole.

B designates a hand-wheel upon the main shaft. In the present instance this is provided with a projection b upon that side which is toward the arm of the sewing-machine head, and that projection coöperates with a lever C, comprised in a stop mechanism.

D designates a tension device of any appropriate form which will constantly act upon the thread passing through the needle.

E designates another tension device for operating upon the thread. As here shown, this tension device consists of two disks e' e^2 , between which the thread passes. The upper disk e^2 is impelled toward the other by a spring e^3 , surrounding a spindle e , extending from the lower disk and receiving the upper disk upon it. A nut applied to the spindle may serve to adjust the force of the spring. The tension of this device is preferably greater when it is in operation than the tension of the device on the thread of the shuttle of the machine.

F designates a lever fulcrumed to a pin or screw f . As here shown, this pin f and the spindle e are supported upon a plate G, that is affixed by a screw g to the arm a^2 of the sewing-machine. The upper end of the lever is somewhat pointed, so that it may enter between the plates e^2 e' for the purpose of separating the former from the latter. Normally the lever has no effect upon the disks, and then the full force of the spring e^3 will operate to press the disk e^2 toward the disk e' , and the full tension will be put upon the thread. Whenever the lever is oscillated, so that its upper end will move toward the disk and move the upper farther away from the lower, there will be no tension exerted by the disks upon the thread.

Near the lower end of the lever F it has on that edge which is toward the arm of the

sewing-machine head an incline f' , which co-operates with a lever II at such times as the latter occupies an appropriate position.

It is intended that the tension D should operate continuously, but that the tension E should only operate periodically and during the sewing of the two side rows of stitches.

The lever H is fulcrumed by a screw or pin h to the arm of the sewing-machine head. With it is pivotally connected by a pin or screw h' one end of a rod I, which extends down through the base-plate a' of the sewing-machine head, where it is pivotally connected to a lever i , that is fulcrumed by a pin or screw i' to a bracket extending from the underside of the said bed-plate. A spring i^2 surrounds the rod I between the bed-plate and a collar i^3 , which is fastened to said rod, thus giving an upward tendency to the rod, and consequently to the levers H and i . Adjacent to the lever i is a cam J, with which a follower i^4 , attached to the lever i , coöperates. The cam is a rim-cam and is provided with a notch into which the follower i^4 may rise when free to be moved upwardly by the spring i^2 .

When the lever H is moved upward, it will coöperate with the incline f' of the lever F to move the upper end of the lever F inward for the purpose of releasing the thread from the tension device E. When the lever H is lowered, the lever F will be free to move outward again. It is evident that the greater the distance the rod K is from the fulcrum l of lever L the amplitude of the jogging movement of the needle-bar will be greater, and consequently the barring-stitches will be longer than the side stitches. The lever H in this example of our improvement has the additional function of moving a rod K to different points lengthwise of a lever L, which is fulcrumed on a shaft or fulcrum l in the arm of the sewing-machine head. The office of the rod K is to oscillate a frame carrying the needle-bar for the purpose of positioning the needle for different stitches. When the lever H raises the rod K toward the upper end of the lever L, it adjusts it for the tension of the barring-stitches of a buttonhole, and consequently it is at this time that the tension E will be rendered inoperative by said lever H. The thread of the needle co-operates with the thread of the shuttle to form stitches in the usual manner. The shuttle is operated from the main shaft by the usual mechanism, and the usual tension device is provided for the thread carried thereby. The tension of the device E should preferably be greater when it is acting on the needle-thread than the tension of the device provided for the shuttle-thread.

It is desirable to free the thread from the effect of the tension device E when the sewing-machine is stopped, and consequently we combine with the lever F a bell-crank lever M, fulcrumed by a pin or screw m to a bracket m' , extending from the arm of the sewing-ma-

chine. One arm of the bell-crank lever M crosses at the lower end of the lever F, and the other arm is connected by a rod N with the lever C. As here shown, the lever C is provided with a screw-eye n , and the rod N is provided with a hook n' , suitable for engagement with the said eye n . The other end of the rod N passes into a screw-clamp n^2 , which engages with a slide portion of the bell-crank lever, so that it may be adjusted toward and from the fulcrum of the latter. When the sewing-machine stops, the upper end of the lever C moves to the right, and thus swings forwardly that end of the bell-crank lever M which crosses the lever F, and consequently forces the upper end of the lever F inwardly, so that it will raise the upper disk of the tension device and relieve the thread, and when lever C is moved to the left in starting the machine the bell-crank lever M is moved out of contact with lever F, and the pinching effect of the disks e' e^2 forces the upper end of the lever F out from between said disks, thus applying the tension to the thread.

The operation of the machine, briefly stated, is as follows: The machine when it is started sews one of the side rows of stitches at which time the tension device E is in operation upon the needle-thread. The effect of the stronger tension upon the needle-thread is to pull the thread out of the shuttle, thereby mainly using the thread of the shuttle to form the stitches at the sides of the buttonhole. The needle-thread during this operation lies along the edge of the buttonhole, and the shuttle-thread will be whipped over it, so that the effect obtained along the side of the buttonhole is that of a "purl-stitch." When the tension device E is operated to relieve the tension upon the needle-thread, which is when the barring-stitches are to be formed, the machine will stitch with the tension device D operating on the needle-thread. As the tension of this device is not as strong as the tension on the shuttle-thread, the needle-thread will mainly be used in the bars, the shuttle-thread acting merely to lock the stitches. The shuttle-thread will therefore be saved to a great extent in making these long stitches, thus reducing the necessity of stoppages for supplying shuttle-thread.

What we claim as new, and desire to secure by Letters Patent, is—

1. In a machine for making buttonholes which have side rows of stitches and barring-stitches, the combination of a work-support and means to feed the same lengthwise of a buttonhole, a needle and concomitant parts, means for producing a vibratory movement of the needle to form the side stitches and a vibratory movement of greater amplitude to form the barring-stitches, a tension device for the needle-thread and a tension-controller therefor connected to and operated by the means which vary the amplitude of vibration of the needle.

2. In a machine for making buttonholes

which have side rows of stitches and barring-stitches, the combination of a work-support and means to feed the same lengthwise of a buttonhole, a needle and concomitant parts, means for producing a vibratory movement of the needle to form the side stitches and a vibratory movement of greater amplitude to form the barring-stitches, a tension device for the needle-thread, means comprising a cam to vary the amplitude of vibration of the needle, and a tension-controller connected to and operated by said means to change the tension on the needle-thread when the amplitude of vibration of the needle is increased.

3. In a machine for making buttonholes which have side rows of stitches and barring-stitches the combination of a needle and concomitant parts, a work-support, means for producing a relative jogging movement between the needle and work-support for forming the side rows of stitches and a relative jogging movement of greater amplitude between the needle and work-support for forming the barring-stitches, a tension device for the needle-thread, means for changing the tension on the needle-thread and means for simultaneously controlling the means for producing the different relative jogging movements between the needle and work-support and the means for changing the tension on the needle-thread for the sewing of one set of stitches.

4. In a machine for making buttonholes which have side rows of stitches and barring-stitches, the combination with a needle and concomitant parts, of means to vibrate the needle, a tension device for the needle-thread, a lever to vary the amplitude of vibration of the needle and at the same time to operate the tension device to change the tension on the needle-thread, and means to actuate said lever, substantially as described.

5. In a sewing-machine for making buttonholes which have side rows of stitches and

barring-stitches, the combination of a needle and concomitant parts, a work-support, means for producing a relative jogging movement between the needle and work-support to form the side rows of stitches and a relative movement of greater amplitude between the needle and work-support for forming the barring-stitches, and comprising a lever H, a tension device for the needle-thread, a lever F adapted to be engaged by the lever H, and a cam for operating the lever H.

6. In a sewing-machine the combination of a needle and concomitant parts, a tension device for the needle-thread, a protuberance on the main driving-shaft, a stop mechanism comprising a lever to frictionally engage said protuberance to stop the machine, a second lever adapted to engage the tension device to change the tension, and a third lever intermediate the first and second named levers and actuated by the former to operate the tension-changing lever when the machine is stopped, substantially as described.

7. In a sewing-machine the combination of a needle and concomitant parts, a tension device for the needle-thread, a protuberance on the main driving-shaft, a stop mechanism comprising a lever to frictionally engage said protuberance to stop the machine, a bell-crank lever connected to and actuated by said first-named lever, and a third lever actuated by said bell-crank lever to engage the tension device and change the tension on the thread when the machine is stopped, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THORVALD O. QUIST.
JAMES T. HOGAN.

Witnesses:

ORVILLE T. TOBEY,
JOHN J. SHAW.