No. 71,131.

C. CADWELL.

Sewing Machine.

2 Sheets—Sheet 1.

Patented Nov. 19, 1867.

Fig: 1.

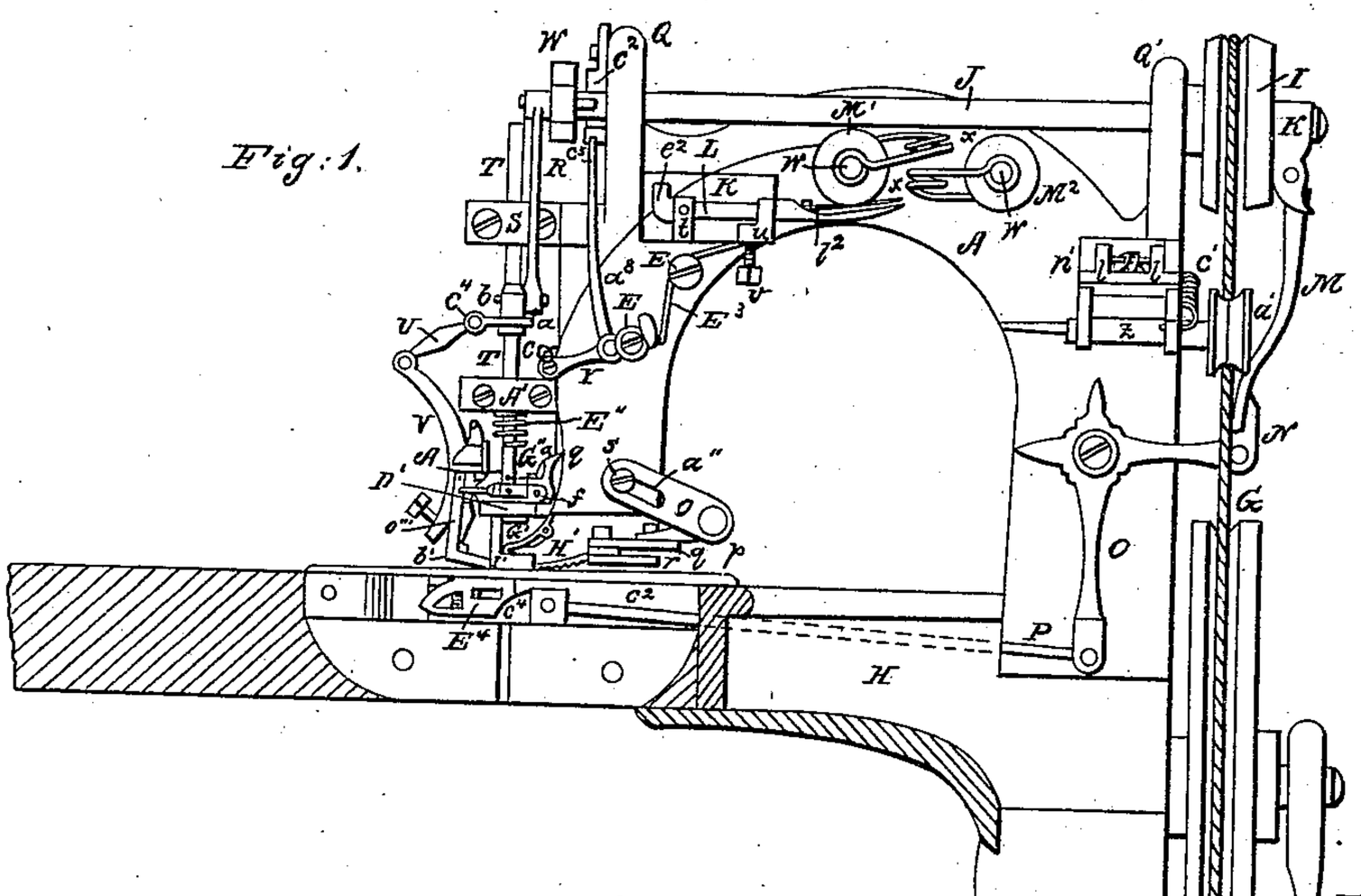
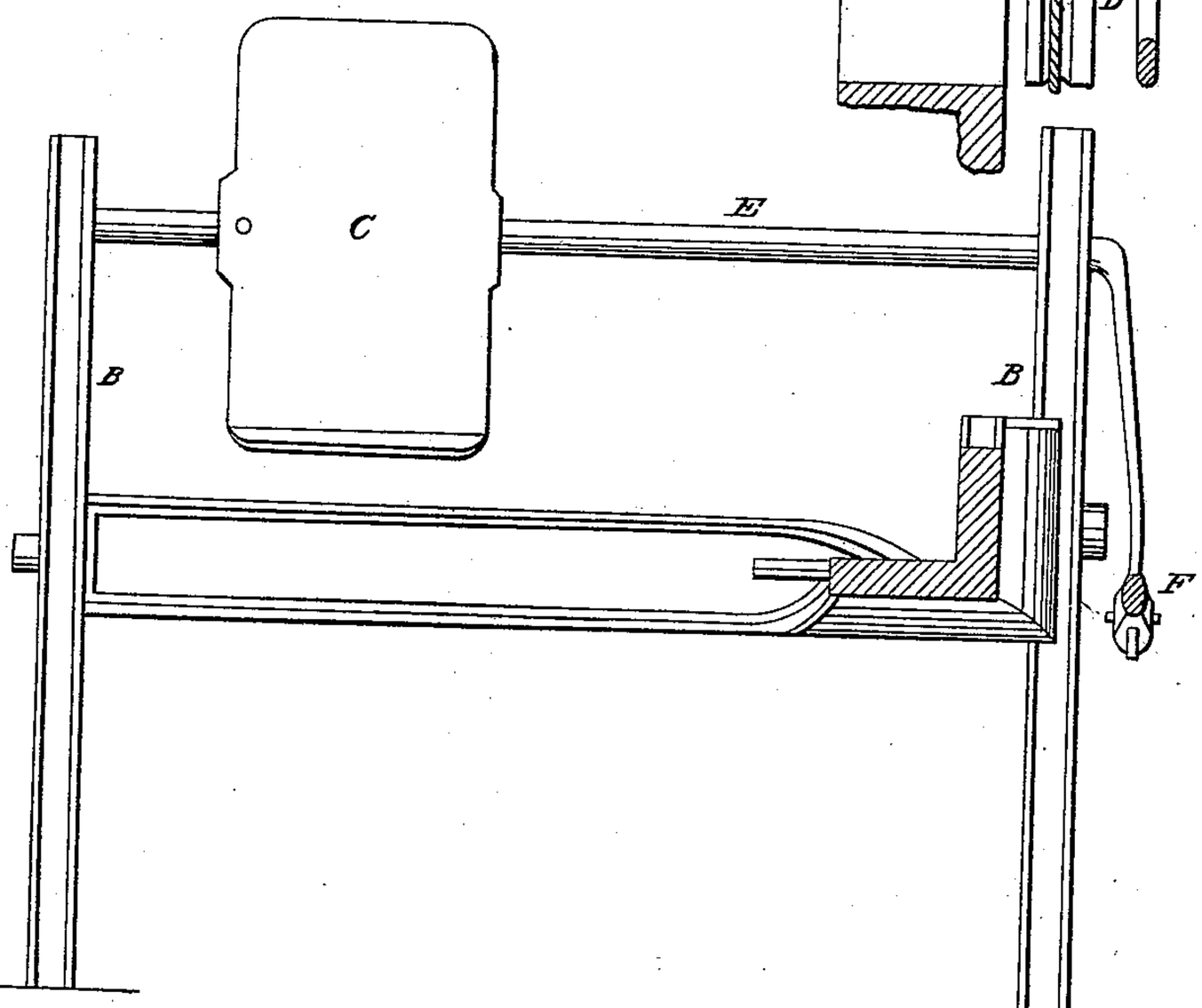


Fig: 2.



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C. CADWELL.

Sewing Machine.

2 Sheets—Sheet 2.

No. 71,131.

Patented Nov. 19, 1867.

Fig: 3.

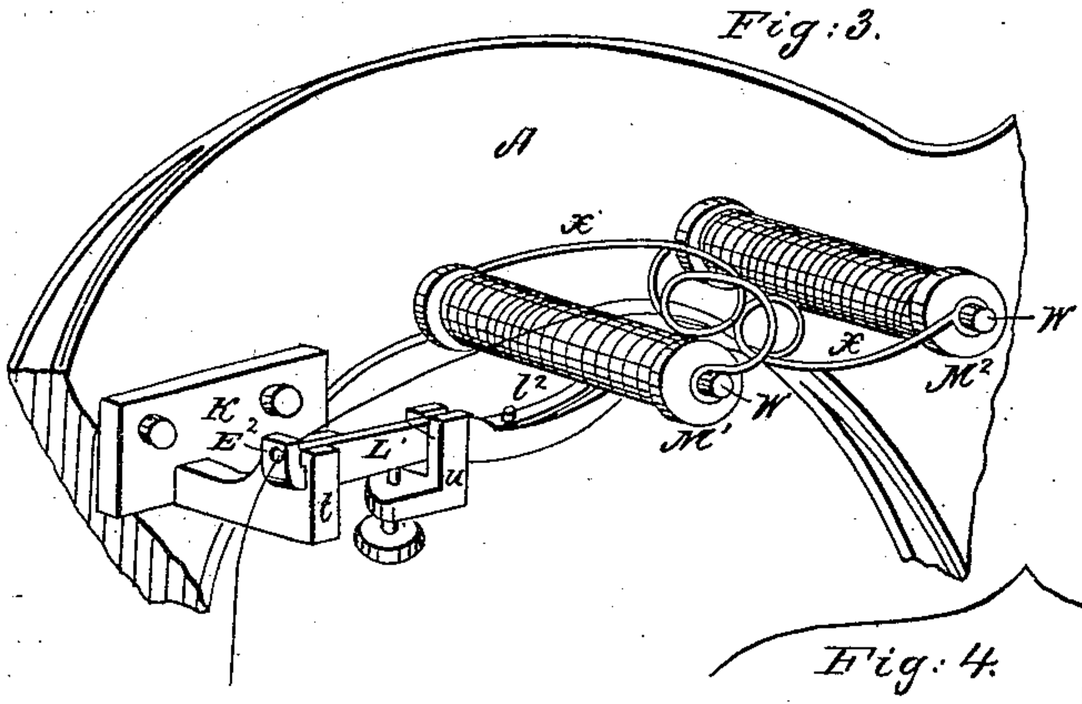


Fig: 4.

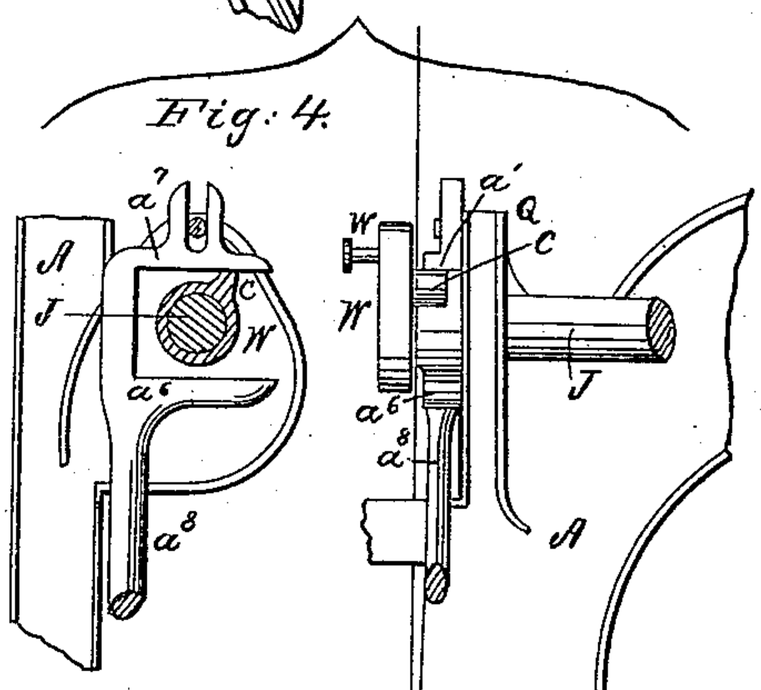
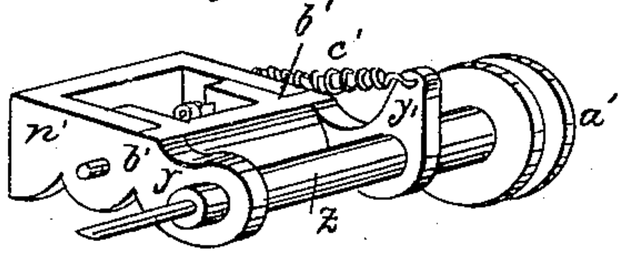
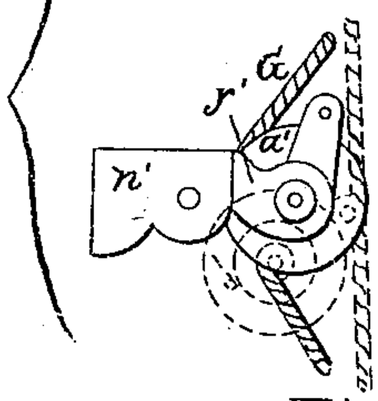


Fig: 5.





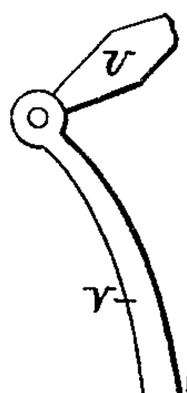


Fig: 6.

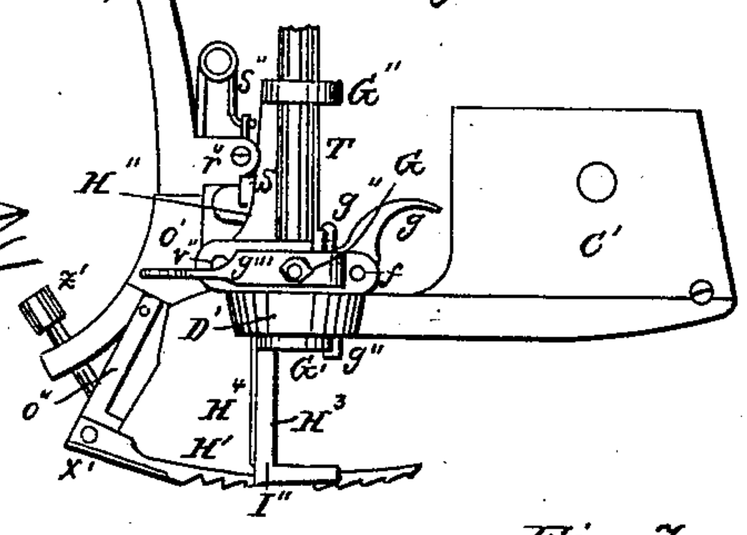


Fig: 9.

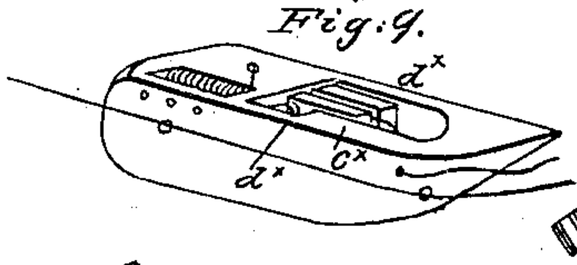
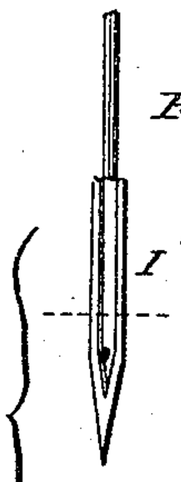


Fig: 8.



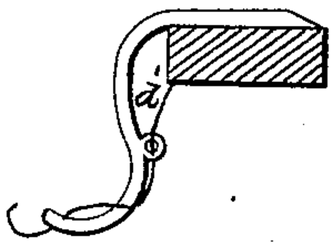


Fig: 7.

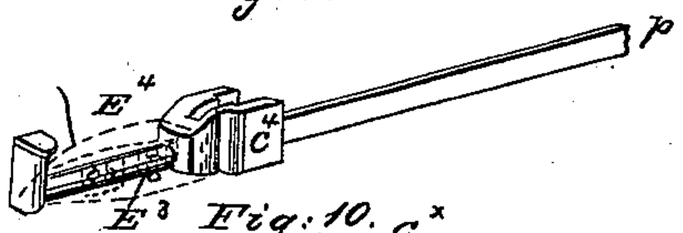
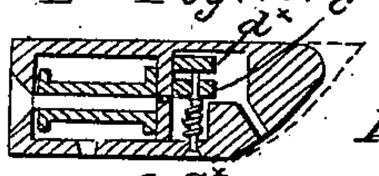


Fig: 10.



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United States Patent Office.

CALEB CADWELL, OF WAUKEGAN, ILLINOIS.

Letters Patent No. 71,131, *dated November* 19, 1867.

IMPROVEMENT IN SEWING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, CALEB CADWELL, of Waukegan, in the county of Lake, and State of Illinois, have invented new and useful Improvements in Sewing Machines; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a side elevation of the upper portion of the machine, embracing the operating mechanism.

Figure 2 is a plan of the lower portion and treadle by which the machine is operated.

Figure 3 is a detached view, showing in perspective the spools and tension device.

Figures 4, 5, 6, 7, 8, 9, and 10, are detached views, hereinafter more particularly referred to.

This invention is designed to effect improvements in the mechanism for feeding and guiding the cloth, regulating the tension and taking up the slack thread, and winding the thread upon the spools, and in the method of retaining the spools upon their axes, and operating the shuttle, all of which will be hereinafter fully set forth.

In the drawings, A is a metallic frame, arched at the top, having a projecting arm, H, directly beneath the arched portion of the frame, and in the same vertical plane with it; the whole resting upon foot-pieces B B. The upper surface of the arm H forms the working-table of the machine, and may be enlarged to any required extent by fitting it into a wooden table.

C is a treadle, by which motion is given to the foot-bar E and connecting-rod F, thence to the wheel D, which serves both as a driver and fly-wheel. A belt or band, G, runs from the wheel D to a pulley, I, near the end of the shaft J. A jointed block, K, upon the end of shaft J, gives motion to the shuttle E^4, through the medium of the connecting-rod M, block N, angular arm O, and rod P.

The shaft J, which runs through bearings Q Q′ on the opposite sides of the arch of the frame, carries on its projecting end a crank-wheel, W, and wrist-pin *w*, fig. 4, which by means of the rod R, bent to work around the bearing S, actuates the needle-shaft T.

Between the crank-wheel W and bearing Q a cam, *c*, is keyed to the shaft J, which gives motion to the thread-tightener a^8, (see fig. 4,) by acting alternately on the parallel arms a^6 and a^7, which project from the upper extremity of the thread-tightener, as represented.

The thread-tightener is jointed at its lower extremity to the lever Y, which is pivoted to the frame A. This lever is drilled near its opposite extremities, forming eyes for the thread. A spring, e^3, bearing against its inner extremity, is fastened to the frame by a screw, *e*.

The thread-tightener is operated as follows: The cam *c*, upon the shaft J, strikes the upper horizontal arm a^7, and the lever Y is thereby vibrated, and the thread between the eye of the thread-tightener and the needle, is thereby drawn taut, in which condition it is held by the action of the spring until the needle has nearly completed its downward motion, when the cam *c* comes in contact with the lower horizontal arm a^6, and restores the lever to its former position.

The needle-shaft T moves in the bearings S A′, and is actuated by the bent rod R, as described. A collar, *a*, encircles the shaft T immediately below the pin *b*, which connects the rod R with the needle-shaft. This collar *a* is secured in its position by the shoulder *e* and pin e^4. A connecting-rod, U, is pivoted at one end to a projection on the collar *a*, and at the outer extremity is likewise attached to the arm V, which operates the feed device H^1, (see fig. 6.)

A brass plate, c^1, fig. 6, is secured to the back side of the frame A by a screw, and bent around the side of the arch, terminating in a horizontal ring, D′, the centre of which must be situated directly over the point where the needle is to pierce the cloth. The ring D′ surrounds and supports another ring, G′, a shoulder upon which rests on the upper surface of the ring D′, and holds the inner ring up. This shoulder is provided with lugs *f* and *v″*, the former of which supports a thumb-piece, *g*, which operates a clamping-key, *g″*, working in grooves in the internal surface of the ring D′, and external surface of the ring G′, and the latter of which supports the arm V with its attachments. *g‴* is a thumb-piece, fixed to the shoulder of the ring G′, and acting against the supporting-ring D′ below it, by means of which the inner ring G′, and the parts attached to it, can be readily raised or depressed in order to adjust the cloth to the needle. The ring G′, which may

thus be raised or lowered, has three long arms, one, H^2, projecting perpendicularly upwards, and terminating in another ring, G″, the centre of which falls directly over the centre of the ring G′, and the other two, H^3 and H^1, fig. 6, projecting perpendicularly downward, parallel to each other, and with a small space between them, and bent round at the bottom to a horizontal position, still parallel to each other, thus giving the arms the form of a boot. The bottom of these arms I shall hereafter speak of as a foot, and designate by the letter I″. The needle-shaft T plays vertically through the rings above described, the lower end of it, holding the needle vertically between the parallel sides of the foot I″. *c″* is a spiral spring, placed between the bearing A′ and the ring G″, keeping the rings G″ and G′, and the arms attached to them, in place, and pressing the foot I″ down upon the cloth.

The feeding-attachment is composed of the arm V, pivoted just below its centre, on a pin in the lugs *v″*, and bent in the form of a bow, the convex side towards the needle-shaft, together with the following devices attached: first, in a lateral slot in the lower part of the arm *o′*, the bar *o‴* is pivoted on a pin at its top, and jointed at its bottom to the feed-foot H^1; and, secondly, the lugs *r″*, holding the short lever *s″*, which is kept in place by the spring *s‴*, and, as the upper part of the arm V moves inward, bears upon the inclined surface of the bar H^2, pressing that bar downward, and again permitting the bar to rise when the upper part of the arm V moves outward again. The feed-foot H^1 moves backward and forward in the space between the parallel sides of the foot I″, and is held in place by the little spring *x′*, operating on the heel of the bar *o‴*. The feed-foot H^1 is bifurcated, to permit the play of the needle, and has ratchet-teeth along its lower surface, to move the cloth in the proper direction. The length of the stitch is regulated by means of the screw Z′, which causes more or less cloth to be fed to the needle at a single stitch, in proportion as it is screwed in or unscrewed.

In the lower end of the needle-slide T, the needle I′ is secured, said needle I′ being made square, with deep grooves in two of its sides, (see fig. 8,) one below, and one above its obliquely-drilled eye. The corners or edges of the needle are rounded sufficiently to prevent cutting. This form allows the thread to slip freely and work through the cloth without chafing. The thread-guide d^3 is a small, bent strip of iron, secured to the frame A, below the plate c^1, whence it passes to the front, near the needle, (see fig. 6.) This guide is provided with two eyes, one near the needle, the other in a line with the eye, in the thread-tightener above. This guide serves to conduct the thread from the thread-tightener to the needle.

The cloth-guide consists of the pieces *o*, *p*, *q*, and *r*, the upper part, *o*, being secured to the frame A by a screw, *s*, in the slot a^5. By means of this slot the guide may be raised or lowered to suit cloth of different thickness, and the several parts of the guide are so connected that the lower guide-plate *r* may be adjusted to conform to the position of the feed mechanism. The tension device, (see figs. 1 and 3,) consists of the plate K, projections *t u*, and lever L′, and is secured to the frame A by screws passing through the plate K. In the projections *t u* are formed slots, in which the tension-lever L′ rests. This lever is pivoted at *t*. At the extremity farthest from the spool, an eye, e^2, is drilled, through which the thread from the spool is conducted to the eye in the thread-tightener. A screw, *v*, passes through the projection *u*, by means of which pressure is applied to the lever L′, and the degree of tension thereby regulated. A flat spring, l^2, is secured to that part of the lever which presses against the spool, which may have thimbles to fit inside to cause them to move more evenly upon the shaft.

The spools M^1 M^2 revolve upon short shafts *w w*, in which position they are retained by the pressure of wires *x x*, each bent into the form represented, to increase its elasticity. I prefer to have two spools, so that different kinds or sizes of thread may be used to wind on the shuttle-spool if desired. The spring wires *x x* fit loosely on the outer extremities of the shafts *w w*, so that they will press gently against the spools to retain them in position, without retarding their movements, and are adapted to be sprung off out of the way while the spools are being changed.

The spool-winder *w′* is secured to the frame at the base of the lug or bearing Q′. The projections *y y′* form bearings in which the shaft *z* may rotate, (see figs. 1 and 5.) The outer or projecting extremity of said shaft *z* bears a pulley, *a′*, directly in the plane of revolution of the wheel B and pulley *c*, while the opposite end is designed to hold the spool during the operation of refilling it. The projections *y y′* are hinged at *b′ b′*, so that they may be turned down out of the way when not in use, (see red lines in fig. 5.) The spiral spring *e′* retains the shaft *z* and connections in either position, horizontally, extended, or dependent. When in use, it is turned up against the band, and the shaft *z*, with its bearings, occupies the extended position, and when the operation of winding is completed, the shaft *z* and projections *y y′* are turned down, as stated, and are out of the line of the band.

The shuttle (see figs. 9 and 10) is made by drilling a hole in a solid block, of sufficient depth for a spool and head of the pin that holds it. A square hole is cut out of the upper face next to the needle, and an oblong hole below it, and an oblong hole near the centre, on top. Then some three or more holes are made near the upper inside corner, that can be used as eyes through which the thread is passed, to regulate its tension. A tension device is also put into the space forward of the spool, the same consisting of a pin or screw, $a^{\times}$, inserted in such a manner that one end of a coil or other spring may be made to bear against the side of the space nearest the head of the pin or screw $a^{\times}$, the other end of the spring bearing against a loose block, $c^{\times}$, on the other side, block $d^{\times}$ being fitted on a screw-thread on the lower end of the pin. The block $d^{\times}$ is thus made to bear against the thread in a proper manner to produce the necessary tension between the blocks, the thread passing obliquely through a hole to the top of the shuttle. The block is cut away as thin as practicable, making the point as near a line with the lower side as proper. The pin that holds the spool may have a screw that holds the end in the centre, near the fore part of the shuttle, and has a head fitting the shuttle at the back end, being rounded at the end, so that the thread may pass without catching.

The shuttle-driver is a block made to fit the race c^7, at or near the back end of the shuttle, and jointed to the connecting-rod. This driver is cut away for a portion of its length, but leaving bearings for the back and forward ends of the shuttle, so that the shuttle is held against the face, and at the same time the thread is allowed to pass readily. The fore part bears loosely against the angle of the shuttle, being of such shape as not to catch the thread. The shuttle-race c^7 may be a piece of metal, cast in proper shape, and screwed to the working table. The top plate is a thin plate, a part of which is fixed so as to draw or turn to form an opening to take out the shuttle, and may be held together by a spring.

Having thus described my invention, the following is what I claim as new, and desire to secure by Letters Patent:

1. I claim the combination of the shaft J, crank W, and crooked connecting-rod R, the cam or projection c, arms a^6 a^7, and rod a^8, and the link K, rod M, and angular lever, said parts being arranged substantially as described, and employed to operate the needle-slide, thread-tightener, and shuttle, as explained.

2. I claim the combination of the needle-bar T, collar a, connecting-rod U, and arm V, for operating the feeding-foot H^1, substantially as described.

3. I claim the feeding attachment, composed of the bent forked lever V, the perpendicular bar H^2, operated by the short lever s'', and the spring s''', the pivoted bar o''', bearing the feeding-foot H^1, the gauge-screw Z′, and the spring x', all arranged and combined in their operation substantially as and for the purpose described.

4. I claim the ring G′, supported in the outer ring D′, in which its position is regulated by the clamping-key g'', the thumb-piece g''', and the spring e'', having the arm H^2, to support the upper ring G″, and the double arm H^3 H^4, to guide the feed-foot H^1, and bearing the feeding attachment, all constructed and arranged substantially as and for the purpose specified.

5. I claim a thread-tightener device, consisting of the parts a^6 a^7 a^8, e e^3, and Y, arranged and operating substantially as described.

6. I claim a shuttle, constructed as herein described, and having an internal tension device, consisting of the parts $a^\times$ $c^\times$ $d^\times$.

7. I claim the bracket K, with its bearings t u, in combination with pivoted lever L′, spring l^2, adjusting-nut v, and spool, constructed and arranged as herein described.

8. I claim the spring x, applied to the spools M^1 M^2, in the manner and for the purpose specified.

9. I claim the bobbin or spool-winder n', with the shaft z, pulley a', adjustable bearings y y', hinged at b', and spring c', when constructed and operating as herein described.

CALEB CADWELL.

Witnesses:
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R. J. HULL.