

E. SHAW.  
Sewing Machine.

No. 230,580.

Patented July 27, 1880.

Fig. 1.

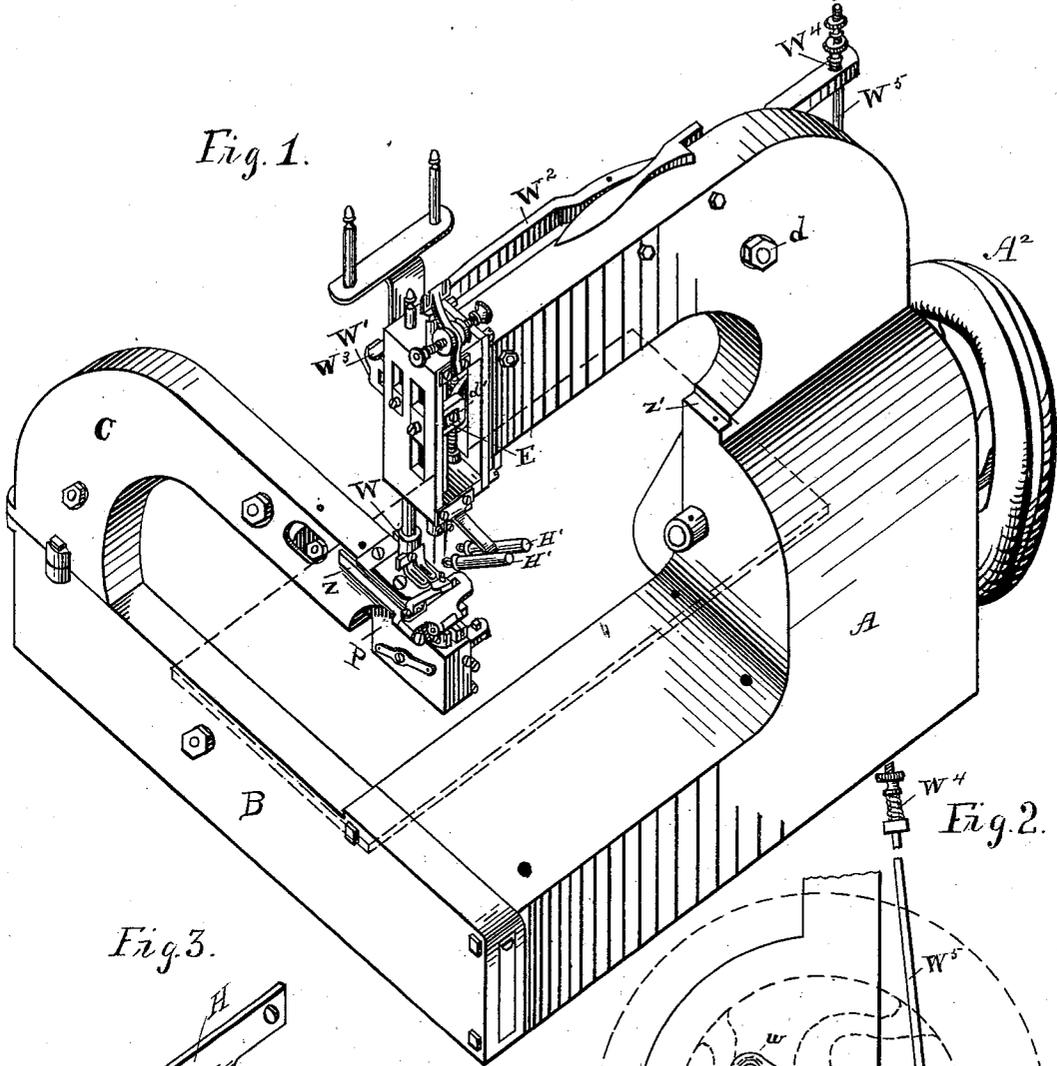


Fig. 2.

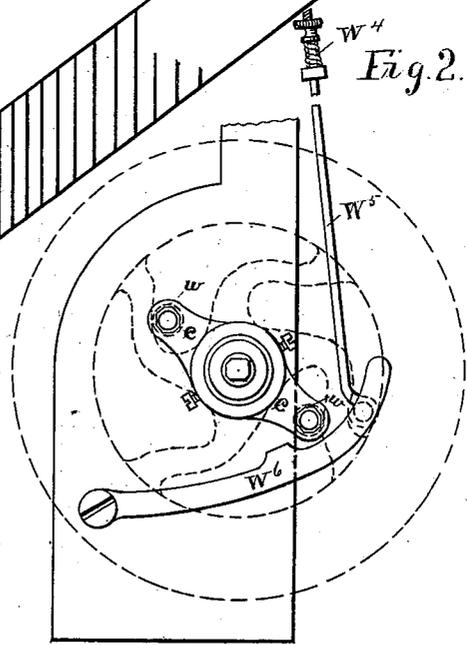
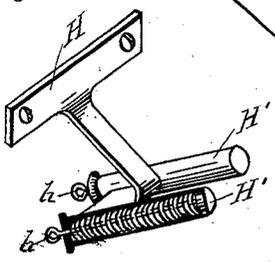


Fig. 3.



WITNESSES.

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INVENTOR.

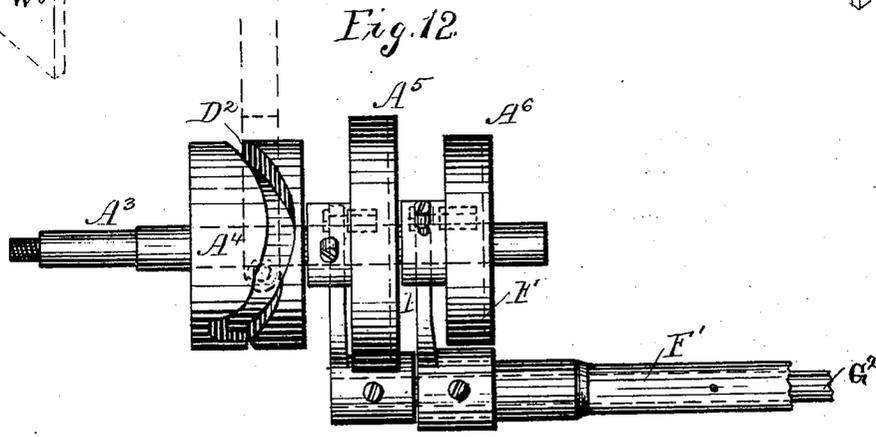
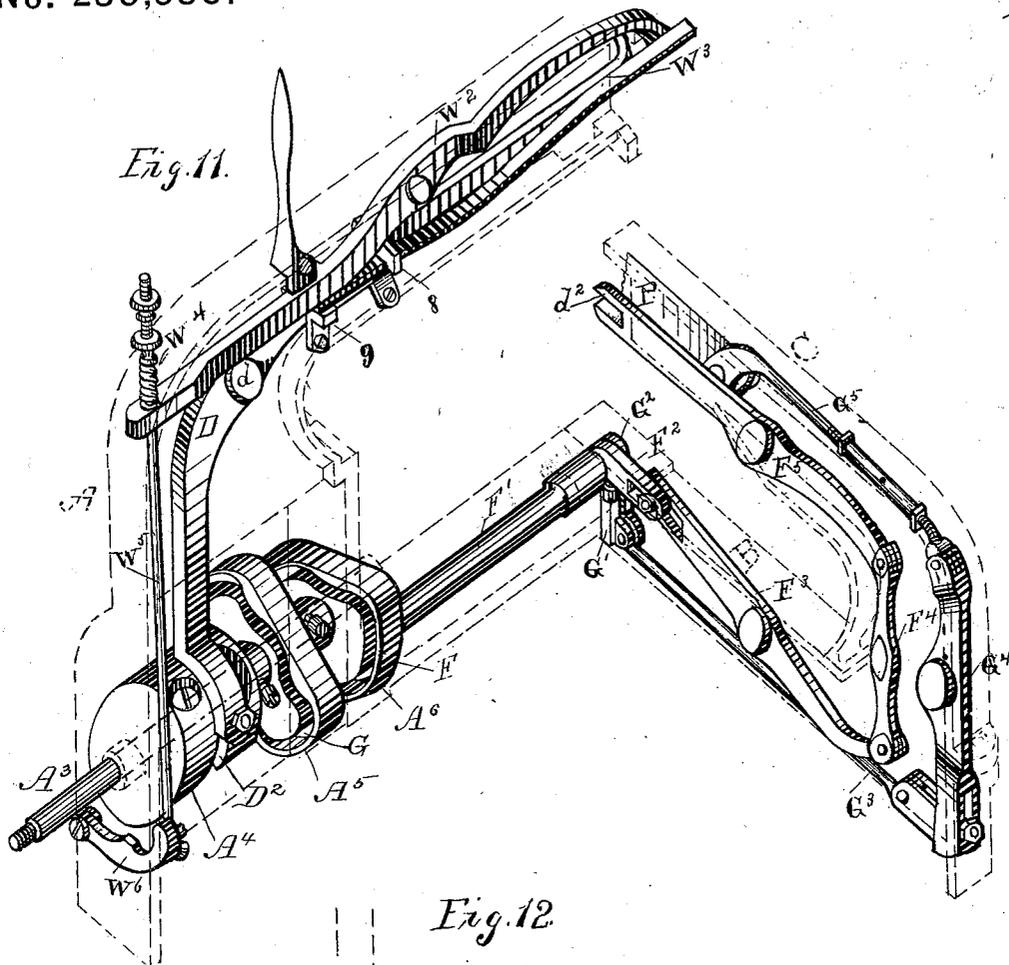
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Fig. 13.

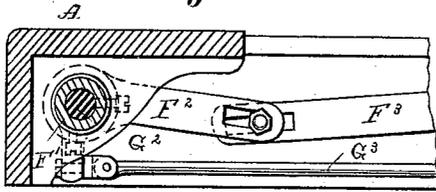


Fig. 14.

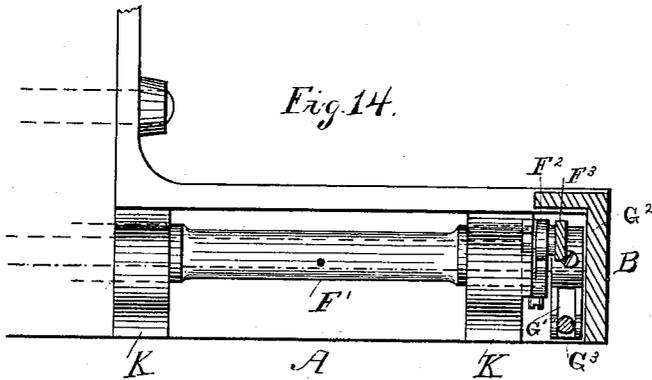
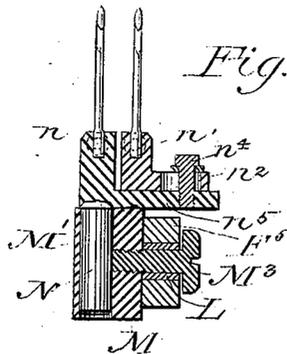


Fig. 15.



WITNESSES

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# UNITED STATES PATENT OFFICE.

ELIJAH SHAW, OF MILWAUKEE, WISCONSIN.

## SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 230,580, dated July 27, 1880.

Application filed July 28, 1879.

To all whom it may concern:

Be it known that I, ELIJAH SHAW, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a machine embodying my invention; Fig. 2, a detail view of part of the mechanism for operating the presser-foot; Fig. 3, an enlarged view of the take-up attachment, partly in section; Fig. 4, an enlarged view of my slide with needle and cast-off attachment in place; Fig. 5, a side view of part of the slide with needle and cast-off mechanism removed; Fig. 6, top view of part of the slide; Fig. 7, needle-carrier with needles in place; Fig. 8, perspective view of the cast-off mechanism; Fig. 9, detached view of one of my cast-offs; Fig. 10, vertical central section of cast-off mechanism; Fig. 11, cams and operating mechanism for operating the needles and slide, viewed from the rear. Fig. 12 is a detail view of the cam-grooved disks and arms for operating the shafts which actuate the slide and needles. Fig. 13 is a detail sectional view of a portion of the frame, showing one of the bearings of the hollow shaft  $F'$  and a portion of the lever  $F^3$ . Fig. 14 is a detail view of the bearings of the hollow shaft. Fig. 15 is a vertical central section of the needle-bar and its carrier, showing the construction whereby the needle-bar is rendered vertically adjustable.

Like letters refer to like parts wherever they occur.

My invention has reference to machines particularly adapted for sewing tubular material; and it consists in certain constructions of devices and combinations pertaining to the needle carriers and holders, the cast-offs and their holders, the presser-foot, and the mechanism for operating said parts, all as will hereinafter more fully appear.

I will now proceed to describe my invention more specifically, so that others skilled in the art to which it appertains may apply the same.

A indicates a frame provided with an arm,

B, at right angles thereto, and a goose-neck, C, and in said parts I arrange the mechanism for operating the needles, slide, &c., so that the pulley-wheel  $A^2$  of the driving-shaft  $A^3$  will be just at the operator's right hand and the machinery accessible.

$A^3$  indicates the driving-shaft, inclosed by and having its bearings on the frame A. Secured to the driving-shaft  $A^3$  are a series of disks—the first,  $A^4$ , for operating the lever D of the awls, the second,  $A^5$ , for operating the central shaft,  $G^2$ , and the third,  $A^6$ , for operating the hollow shaft  $F'$ . Each of said disks  $A^4 A^5 A^6$  has upon its face a suitable groove to receive a friction-roll upon the lever or crank-arm of the shaft which it operates.

D represents the lever for operating the awl or awls. This lever is pivoted at  $d$ , and extends down to and engages in a cam-groove,  $D^2$ , in the disk  $A^4$  on the driving-shaft  $A^3$ , where it is provided with a stud having a friction-roller. At the other end it is bifurcated, as shown at  $d'$ , to grasp an arm, E, of a lug through which the awl-rod passes, substantially as in my reissued patent bearing date January 4, 1876, No. 6,843.

$A^6$  is a disk having on its face a cam-groove, F, for imparting motion to the needle-operating mechanism. This groove receives a stud (provided with a friction-roller) on the arm I of the hollow shaft  $F'$ , which has bearings K on the frame A, and is connected with the needles by a slotted arm,  $F^2$ , lever  $F^3$ , link  $F^4$ , and a second lever,  $F^5$ , which latter is bifurcated at  $d^2$  to grasp loosely one end of a lug, L, by which the needle-carrier M is operated.

M indicates the needle-carrier. This carrier has a male dovetail,  $M'$ , and works up and down in a female dovetail,  $P'$ , in the slide P. The female dovetail is made larger than the male, so that a plate,  $p$ , may be inserted between them on one side, and as the parts wear away by constant friction they may be tightened by screws S S. Through a hole in the carrier M is inserted a needle-bar, N, which is preferably cylindrical and is held by a set-screw,  $M^3$ , which permits it to be adjusted vertically. This set-screw  $M^3$  also passes through lug L, by which the needle-carrier M is operated. On its top the needle-bar N is provided with holders  $n n'$  for the needles. The holder

$n$  is rigidly attached to or forms a part of the needle-bar  $N$ , and is provided with a hole in its top to receive the needle, and a second hole near its top, to receive a set-screw, by which the needle is retained in position. The holder  $n$  has also a horizontal arm or apron,  $n^5$ , which is grooved to receive a corresponding arm or apron,  $n^2$ , of the holder  $n'$ , which latter ( $n^2$ ) is slotted, as shown, and is bound to the arm or apron  $n^5$  by a set-screw,  $n^4$ .

The needle is held in the vertical arm of the holder  $n'$  exactly as in the holder  $n$ . The slot in the arm of the holder  $n'$  allows of its being adjusted laterally, with relation to the holder  $n$ , so that the needles may be placed either near together or far apart, as occasion may require.

The bar  $N$ , passing down into a round aperture in the carrier  $M$ , is adjustable vertically, and may be held in any desired position by the set-screw  $M^3$ , which also holds the lug  $L$  to the carrier  $M$ .

The slide  $P$  is operated from the driving-shaft  $A^3$  by a disk,  $A^5$ , having cam-groove  $G$ , and by mechanism of similar construction to that for operating the needle-carrier  $M$ , except that the shaft  $G^2$  is solid and passes through the hollow shaft  $F'$ , coming out beyond the arm  $F^2$ , after which it communicates to the slide  $P$  the motion given by the cam through links  $G^3$   $G^5$  and intermediate lever,  $G^4$ .

By making the shaft  $F'$  hollow and running the shaft  $G^2$  through it, I utilize space, and in making one shaft furnish bearings for the other I get a more direct connection and a more symmetrical arrangement of parts.

The slide  $P$  supports the needle-carrier and cast-off devices, and the horizontal reciprocation of the slide effects the feed of the material being sewed.

By the specified arrangement of the operating cams, shafts, levers, and links I am enabled to use an arm upon which I can readily slip the smallest boot-leg or other work upon which I may be engaged, can have access to the driving-shaft and cams without moving from my seat, and effectually secrete and protect the mechanism for operating the needle-carrier and slide.

The cast-off mechanism consists of a rod, 3, which forms part of a holder, 4. This holder is squared down on one side to make a projection or apron, 5, which is grooved to accommodate another holder, 6, having a corresponding projection or apron. Each of the holders has a ledge,  $x$  and  $x'$ , respectively, and is grooved, as at  $y$   $y'$ . Between, and resting on the respective ledges  $x$   $x'$ , I place my cast-offs  $J$   $J$ . I make these cast-offs with a body of solid metal and a semi-cylindrical projection,  $j'$ , of like material, slightly rounded at the top, in the concave sides of which projections the needle is intended to work. In the base of each cast-off I make a dovetailed slot,  $j^2$ , through which a dovetailed or tapering nut,  $j^3$ , on the screw-bolt  $j^4$  works, and by which each cast-

off is bound to its holder. The dovetailed nuts  $j^3$  have also offsets or ribs, which fit in the grooves  $y$   $y'$  of the holders.

The holder 6 is attached to the holder 4 by means of a tongue working in a groove and a screw-bolt passing through a slot, 7. By this means the two cast-offs may be adjusted with relation to the needles and to each other.

The base of each of the cast-offs rests upon one of the ledges  $x$   $x'$ , and is held firmly by the dovetailed nut, as before stated, so that while they may be moved backward and forward they cannot by any possibility be tilted so as to throw the projections  $j'$  out of a perpendicular.

The rod 3 rests in a cylinder,  $T$ , in which it is capable of vertical adjustment, and is retained in any desired position to suit the needles by the set-screw  $q$ .

Upon the extreme end of the slide  $P$ , I provide a circular opening for the reception of the cylinder  $T$ . This opening is slotted at  $t$  to accommodate the arm  $q'$  of the cylinder  $T$ . A binding-lug,  $t'$ , controlled by a spring and set-screw, bears against the cylinder to give it the proper steadiness and to hold it in place against its weight. A stop,  $t^2$ , is held in the mouth of the opening  $t$  by a suitable bolt, to prevent the displacement of the cylinder.

An arm,  $q'$ , on the cylinder  $T$ , serves to support a bar,  $V$ , which is enlarged at  $v$  to fit upon said arm. From the enlargement  $v$  project rods  $v'$   $v^2$ , and upon these rods I place the adjustable lugs  $V'$   $V^2$ , by which the motion of the needle-carrier is communicated to the cast-offs. These lugs  $V'$   $V^2$  are held in place by set-screws, and may be moved up and down to allow for their proper adjustment to regulate the throw of the cast-offs; and as the cylinder  $T$  is vertically adjustable independently of the adjustment for the throw just specified, and the cast-offs are also adjustable in their holders, it follows that any desired adjustments of the cast-offs can be had.

$W$  represents a presser-foot, of about the construction shown in my patent before referred to, from which extends the usual bar. Near the top of the bar, and projecting from it, is a lug,  $W'$ , which is notched to receive the end of the operating-lever  $W^2$ , and a depressing-spring,  $W^3$ , the rear end of which is attached to the frame by a bracket having lugs 8 and 9.

Depending from the operating-lever  $W^2$ , and working loosely in it, is a rod,  $W^5$ , which supports one end of a pivoted lever,  $W^6$ , in such position that the lever will be within reach of the roller-studs  $w$   $w$ , with which the tappets  $c$   $c$  are provided. Said tappets  $c$   $c$  are attached to and revolve with the driving-shaft  $A^3$ . Between a nut screwed on the top of the rod  $W^5$  and operating-lever  $W^2$ , I place a coiled or rubber spring,  $W^4$ , which acts as a cushion to give steadiness and regularity to the motion of the parts and prevent vibration.

$H$  represents a bracket, to which are at-

tached two tubes, H' H'. These tubes are inclined at an angle of about forty-five degrees, and are to contain the take-ups *h h*. These take-ups are surrounded by spiral springs, which  
 5 tend to draw or retract them into the tubes H', and therefore keep up a constant tension on the thread, preventing any entanglement on account of slack.

Upon the arm or neck C, at its front end, is  
 10 a shoulder, Z, and upon the frame, just above the bearing of the driving-shaft, is another shoulder, Z', for the reception of a work-table, when such a table is necessary.

By the use of the tappets *c c* the lever W<sup>6</sup>,  
 15 rod W<sup>5</sup>, and spring W<sup>4</sup>, instead of the steady up-and-down motion given by the cams usually employed, I get a sudden drop-motion of the presser-foot, which tends to hammer and compress the material together as the stitch is being  
 20 drawn up, thus making a tighter seam, and this without undue vibration of the parts, as will occur if the cushion W<sup>4</sup> is omitted.

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

1. The combination, with the presser-foot and presser-bar, of an operating-lever, W<sup>2</sup>, and its depressing-spring, the rod W<sup>5</sup> and cushion-spring W<sup>4</sup>, the pivoted lever W<sup>6</sup> and  
 30 tappets for depressing said lever, and the driving-shaft to which the tappets are attached, substantially as and for the purpose specified.

2. The combination, with the needle-carrier, of a needle-bar vertically adjustable in the  
 35 needle-carrier and a needle-holder horizontally adjustable on the needle-bar, substantially as and for the purpose specified.

3. The combination, with a needle-carrier and needle-bar, of two needle-holders, said  
 40 holders being vertically adjustable in the carrier, and one of said needle-holders being horizontally adjustable on its fellow, substantially as and for the purpose specified.

4. The combination of the needle-carrier, the needle-bar, vertically adjustable in the carrier, the lug L, and the set-screw, common to  
 45 both the needle-bar and lug L, substantially as and for the purpose specified.

5. The combination of two cast-off holders,

said holders being vertically adjustable in the  
 50 carrier and one of said holders being horizontally adjustable upon its fellow, substantially as and for the purpose specified.

6. The cast-off holder having a ledge or shoulder for the reception of the base of the  
 55 cast-off and a groove for the clamping-nut, in combination with a cast-off having a dovetailed slot, a dovetailed or tapering nut, and a bolt for securing the parts, substantially as and for the purpose specified. 60

7. The cast-off holder 4, having the grooved apron or projection 5, in combination with the cast-off holder 6, having a corresponding apron or projection, and a set-screw for securing and  
 65 adjusting the parts, substantially as and for the purpose specified.

8. In a sewing-machine, the combination of a cast-off holder vertically adjustable in its carrier with a carrier having devices by which  
 70 its throw can be adjusted, substantially as and for the purpose specified.

9. The cylinder or cast-off carrier T, having an arm *q'*, bar V, rods *v' v'*, and adjustable  
 75 lugs V' V<sup>2</sup>, in combination with the needle-carrier M, provided with the lug L, substantially as and for the purpose specified.

10. In a sewing-machine, two needle-holders, said holders vertically adjustable in their carrier, and one holder horizontally adjustable  
 80 on its fellow, in combination with two cast-off holders, said holders being vertically adjustable in their carrier, and one holder being horizontally adjustable on its fellow, substantially as and for the purpose specified.

11. The frame A, provided with the arm B  
 85 and goose-neck C, in combination with the inclosed hollow shaft F', having bearings on the frame, levers F<sup>3</sup> F<sup>5</sup>, and links F<sup>4</sup>, central shaft, G<sup>2</sup>, lever G<sup>4</sup>, links G<sup>3</sup> G<sup>5</sup>, and mechanism for operating said parts, substantially as and for  
 90 the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 3d day of July, 1879.

ELIJAH SHAW.

Witnesses:

JOSHUA STARK,  
 S. S. STOUT.