

A. F. JOHNSON,  
Sewing Machine.

No. 15,635.

Patented Aug. 26, 1856.

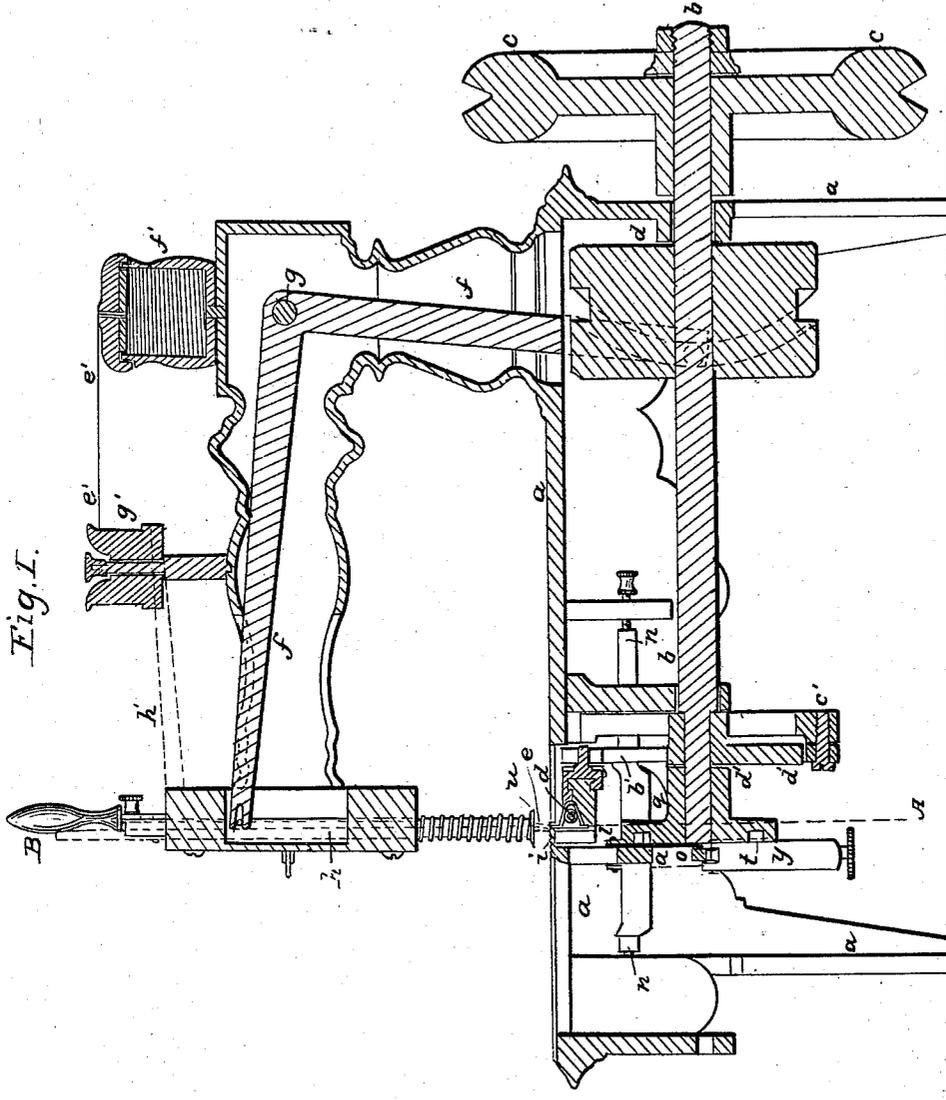


Fig. 1.

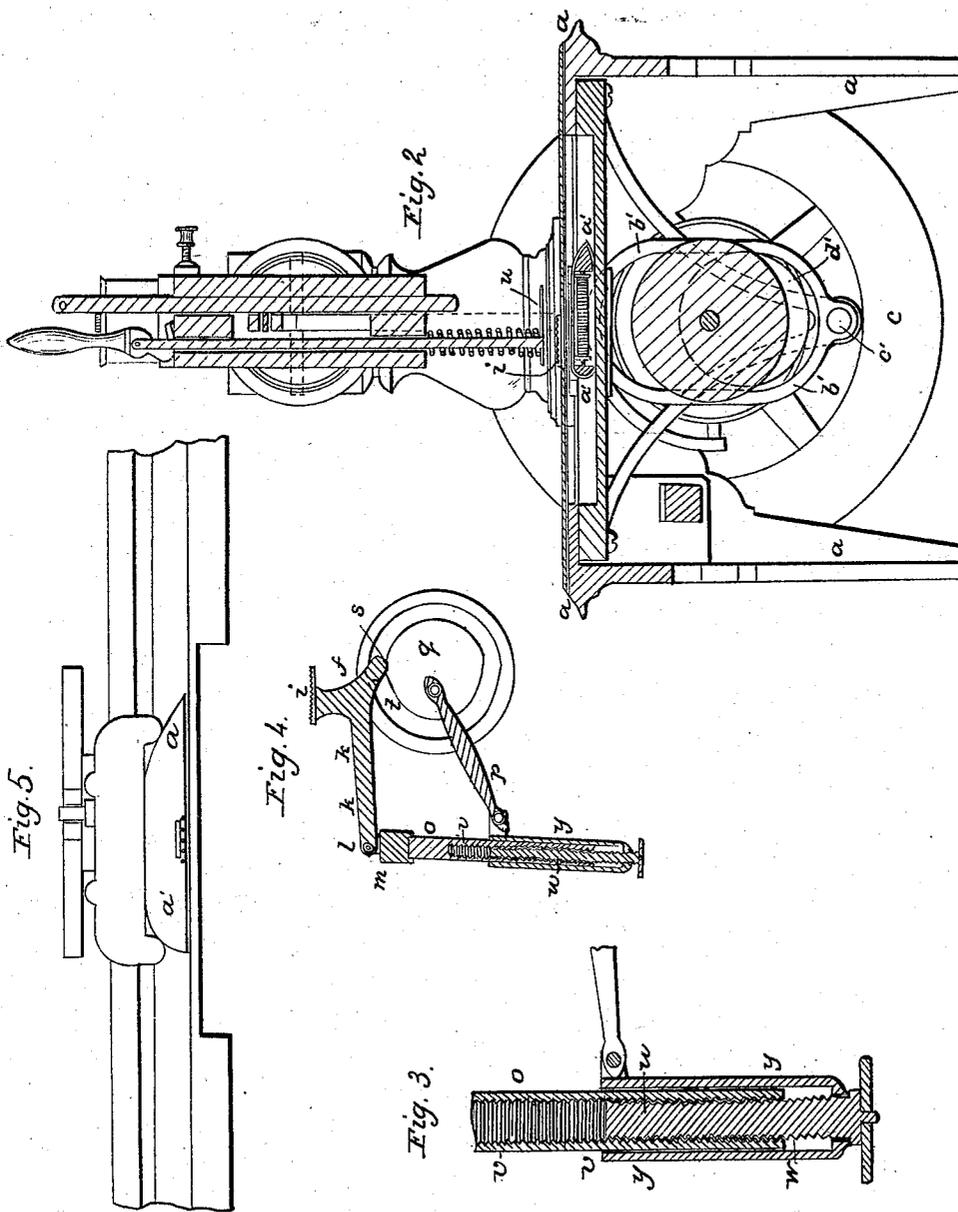
Witnesses:  
Eug. Lincoln  
Samuel A. Piper

Inventor:  
A. F. Johnson

A. F. JOHNSON.  
Sewing Machine.

No. 15,635.

Patented Aug. 26, 1856.



Witnesses:  
Eug. Lincoln  
Samuel C. Piper

Inventor:  
A. F. Johnson

# UNITED STATES PATENT OFFICE.

A. F. JOHNSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND  
F. A. HOUGHTON, OF SAME PLACE.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 15,635, dated August 26, 1856.

*To all whom it may concern:*

Be it known that I, A. F. JOHNSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

The figures of the accompanying plate of drawings represent my improvements.

Figure 1 is a longitudinal central vertical section of my improved sewing-machine. Fig. 2 is a transverse vertical section of the same, taken in the plane of the line A B, Fig. 1. Figs. 3, 4, and 5 are views of parts in detail, to be hereinafter referred to.

The essential features of the present invention consist in effecting all the necessary movements by devices having a positive motion, in imparting such a motion to the shuttle that it shall move faster while going through the loop than in traveling back, thereby giving more time for taking up the slack of each stitch and requiring less stopping of the needle while the shuttle is passing through the loop, and in an arrangement of devices for varying the length of the stitch at pleasure by adjusting the length of the feed-motion.

*g a a a* in the drawings represent the framework of the machine. *b b* is the driving-shaft, and *c* the fly-wheel or drum. *d* is a grooved cam secured to the shaft and giving motion to the needle *e* (shown by dotted lines in Fig. 1) through the right-angular lever *f f*, turning on a fulcrum at *g*, and the vertical needle holder or bar *h h*.

A positive motion is imparted to the feeding-plate *i i* as follows: The feeding-plate *i i* is attached to or forms a part of an arm, *k*, Fig. 4, which arm is attached by a pivot-joint, *l*, to a projection, *m*, of a rocker-shaft, *n n*, Fig. 1, the said pivot-joint *l* being outside of the axis of the rocker-shaft *n n*. To the rocker-shaft *n n* is attached a vertical shaft, *o o*, Figs. 1, 3, and 4, to which is secured a connecting-rod,

*p p*, Fig. 4, that is actuated by a cam, *q*, on the main shaft *b b*. The bent portion *r* of the arm *k k*, before referred to, has on it a roller or stud, *s*, that plays in the cam-shaped groove *t t*, Fig. 4, formed outside of the cam *q* and of the same shape. From this description it will be seen that by the revolution of the cam *q* the feeding-plate *i i* will, through the connecting-rod *p p*, vertical shaft *o o*, and arm *k k*, receive a positive forward-and-back motion. As the pivot-joint *l* is outside of the axis of the rocker-shaft *n n*, a lever-power will be secured.

The vertical or up-and-down motion of the feeding-plate *i i* is effected by means of the cam-shaped groove *t t* and stud *s*, Fig. 4, thereby bringing the feeding-plate and cloth against the spring clamp-plate *u*, Fig. 1. It will be observed by inspection of Fig. 4 that by the shape of the cam *q* the rise and fall of the feeding-plate *i i* is effected while the connecting-rod *p p*, that moves the rocker-shaft *n n*, is passing the dead-points.

The distance that the feeding-plate *i i* traverses, and consequently the length of the stitch, is regulated at will in a positive manner by varying the position of either end of the connecting-rod *p p* with regard to the center of the cam *q*. The devices for effecting this adjustment are represented in Figs. 3 and 4. On the interior of the vertical shaft *o o*, that moves the rocker-shaft *n n* and arm *k k*, is formed a female screw, *v v*, Fig. 3, in which is moved up or down at pleasure a screw-shaft, *w w*, thereby raising or lowering a loose collar or hollow shaft, *y y*, to which one end of the connecting-rod *p p* is attached. Thus the length of the feed-motion and the length of the stitch can be regulated at will.

I will next proceed to describe the arrangement of devices for giving a positive motion to the shuttle.

I am aware that a shuttle has received a positive motion before; but by the present improvement, in which the shuttle has a short reciprocating rectilinear motion by positive means, the shuttle is made to travel faster in going through the loop than in traveling back, thereby enabling the machine to sew more rapidly, as no delay to the needle occurs while the shuttle is passing through the loop. This arrangement also gives more time for pulling

up the slack of each stitch. This peculiar movement is imparted to the shuttle  $a' a'$ , Figs. 2 and 5, by means of an eccentric shuttle-thrower,  $b' b'$ , Fig. 2, of an elliptical shape, turning on a pivot or bearing,  $c'$ , at its lower end, and actuated by a cam,  $d'$ , on the driving-shaft  $b b$ . By inspection of Fig. 2 it will be seen that when the cam  $d'$  bears on the part of the shuttle-thrower  $b' b'$  nearest its pivot  $c'$  the shuttle  $a' a'$  will be moved through a longer space in the same time, or the same space in a quicker time, than when the cam  $d'$  is at the most remote point from its pivot  $c'$ , thereby causing the shuttle to travel faster in passing through the loop than in going back. The ease and certainty of operation obtained by this mode of throwing the shuttle will be readily apparent.

The thread  $e' e'$  is conducted from a spool or cap,  $f'$ , once or twice around a secondary spool or pulley,  $g'$ , to which friction is applied by a spring,  $p'$ . (Shown by dotted lines in Fig. 1.) By the ordinary mode employed of conducting the thread from a spool to the needle it prevents the thread from receiving a uniform tension, as the spool is of varying diameters when full and when practically exhausted of its thread, and the only means heretofore employed has been to lessen the friction upon the spool of thread as it lessened in diameter. By the present engagement the thread makes one or two turns only around the pulley  $g'$ , upon which a constant and uniform friction is maintained. The result is to keep the thread to a uniform degree of tension at all times.

Having thus described my improvements, I shall state my claims as follows, premising that I do not claim the whole feed-motion as

such herein described and operated in the drawings, and that although eccentric shuttle-throwers have been used before, I cannot find that a pivoted swinging ellipse as a thrower has so been combined with a cam which operates it as to get a quicker motion of the shuttle when the cam operates near the pivot, and in throwing the shuttle forward through the loop than when it is drawing it back.

What I claim, therefore, as my invention, and desire to have secured to me by Letters Patent, is—

1. The combination of a swinging ellipse as a shuttle-thrower, hung on a pivot, with a cam on the driving or other rotary shaft, so operating with said swinging ellipse as that when the cam is bearing upon it near its pivot it shall move the shuttle faster or through a larger space in the same time than when it is bearing upon the other parts, for the several purposes hereinabove set forth.

2. The combination of the rocker-shaft and its arm  $k k$  and connecting-rod with the grooved cam, operating together for giving the required motion to the feeding-plate, substantially as described.

3. The means employed for varying the length of the feed-motion and consequently the length of the stitch at pleasure, the same consisting of a screw-shaft working in the hollow vertical shaft that moves the rocker-shaft, and raising or lowering a loose collar to which the connecting-rod  $p p$  is attached.

A. F. JOHNSON.

Witnesses:

EZRA LINCOLN,  
SAMUEL N. PIPER.