3 Sheets—Sheet 1.

J. T. JONES.

Sewing Machine.

No. 90,552.

Patented May 25, 1869.

Fig. 1

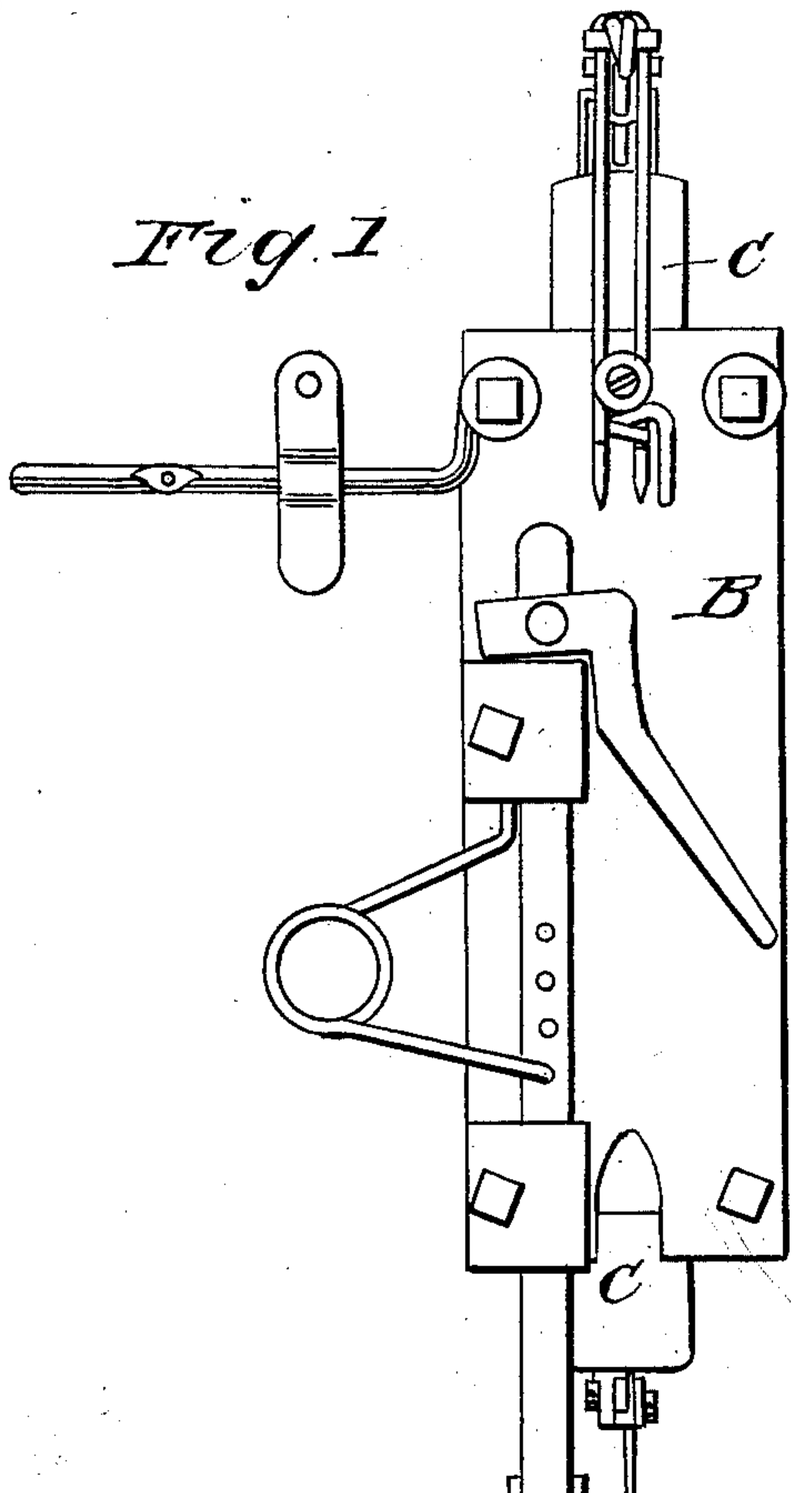
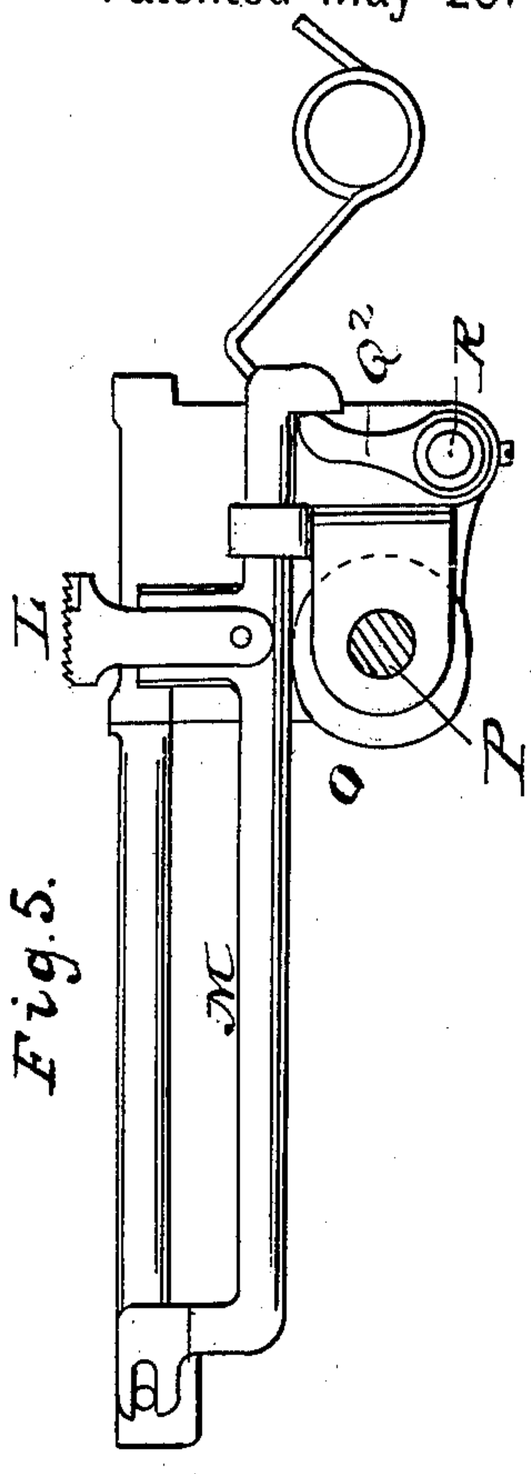


Fig. 5.



Witnesses

W. L. Bennem

John Rathbone Jr

Inventor

J. T. Jones

by his attorney

S. S. Renwick

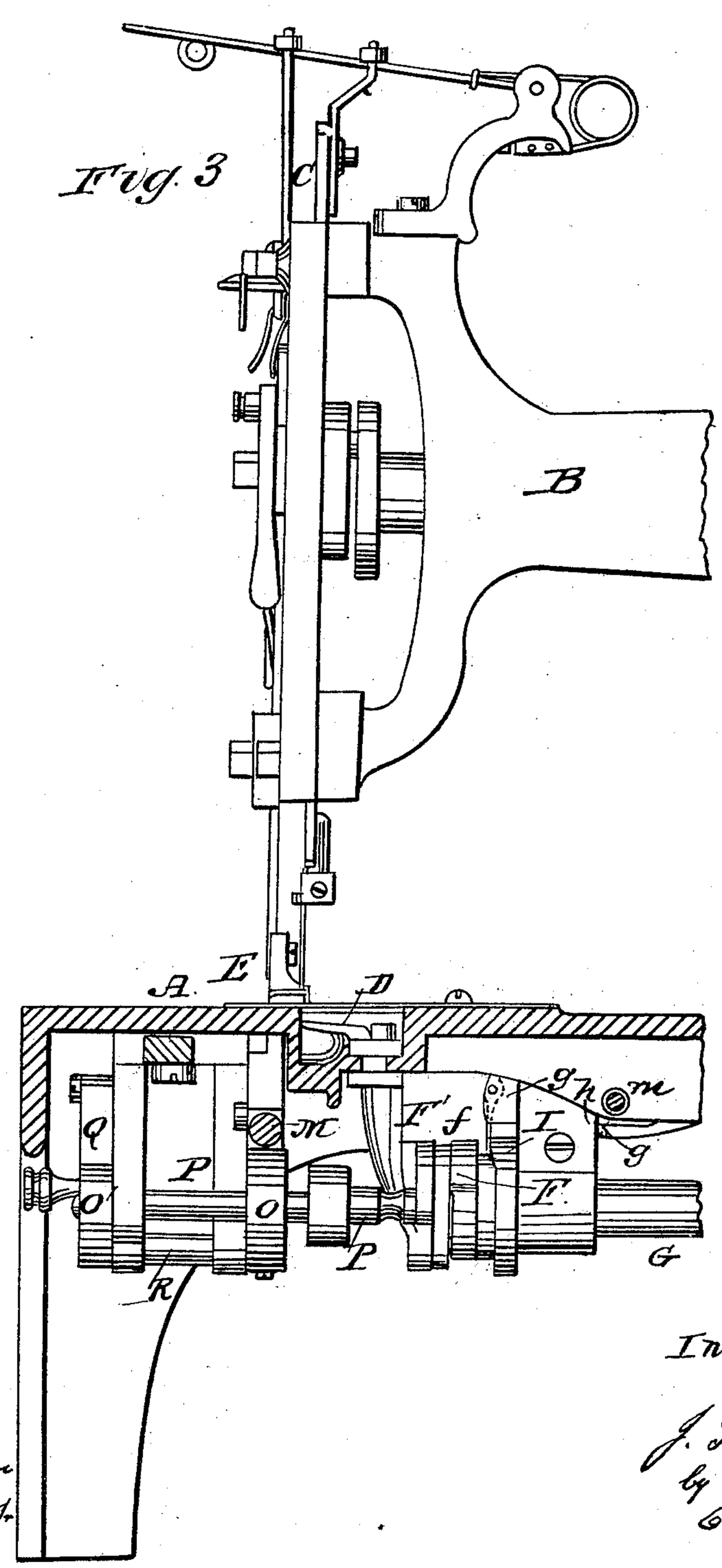
3 Sheets—Sheet 2.

J. T. JONES.

Sewing Machine.

No. 90,552. Patented May 25, 1869.

Fig. 3



Witnesses,

W. L. Bennett

John Rathborn Jr.

Inventor:

J. T. Jones
by his attorney
C. L. Riswick

3 Sheets—Sheet 3.

J. T. JONES.

Sewing Machine.

No. 90,552. Patented May 25, 1869.

Fig. 4

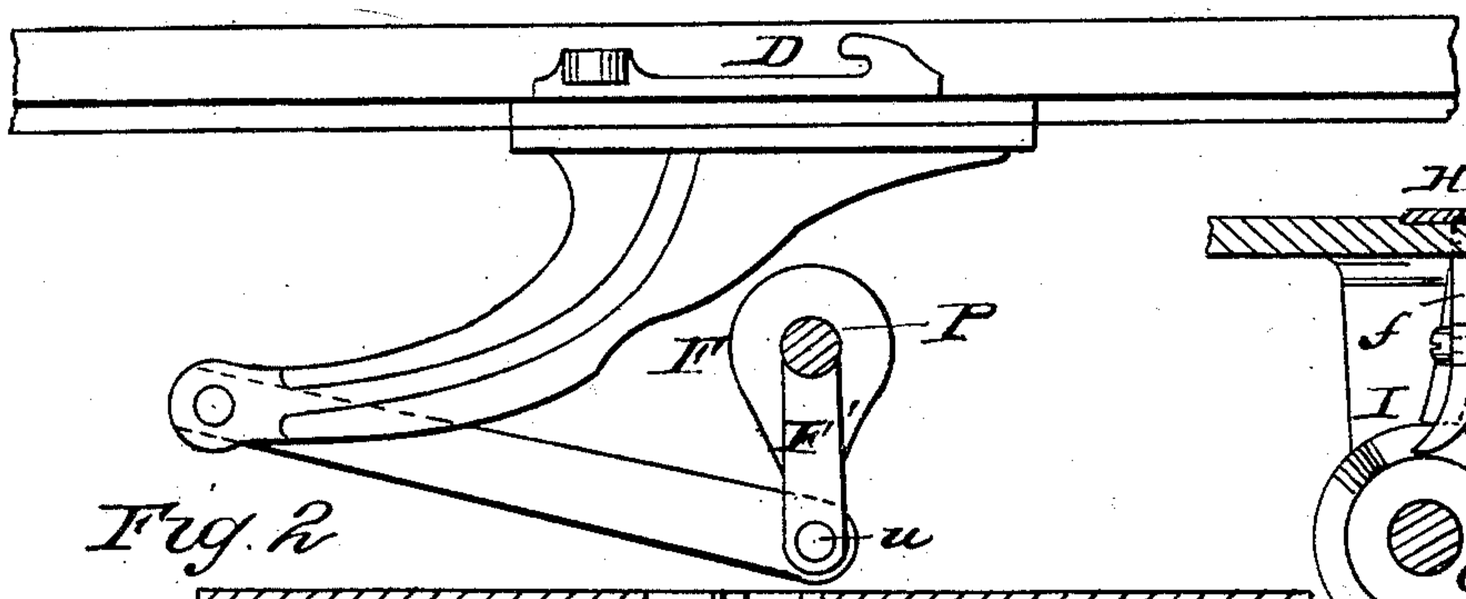
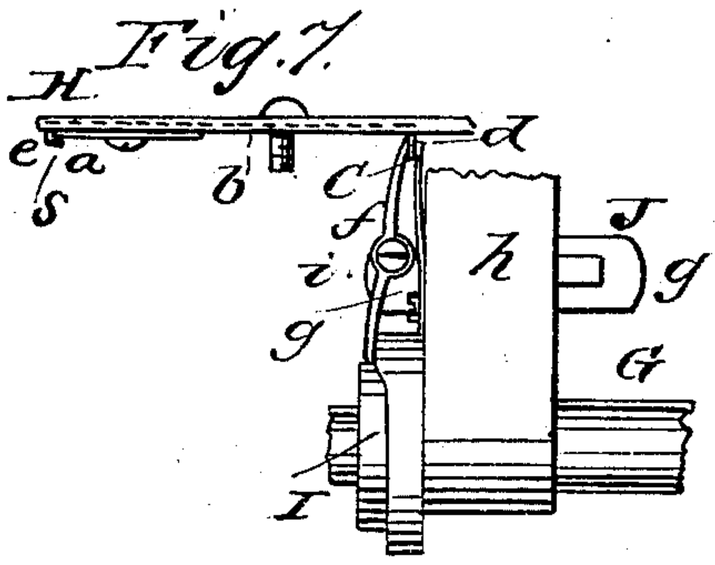


Fig. 2

Fig. 6.

Fig. 7.



Witnesses
W. L. Bennett
John Rathbone Jr

Inventor
J. T. Jones
by his attorney
E. S. Renwick

UNITED STATES PATENT OFFICE.

JOHN THOMAS JONES, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINE.

Specification forming part of Letters Patent No. **90,552**, dated May 25, 1869.

To all whom it may concern:

Be it known that I, JOHN THOMAS JONES, of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines, some of said improvements being applicable to other purposes; and that the following is a full, clear, and exact description and specification of my invention.

The first of my said improvements has reference to the control of the tension of the shuttle or under thread in a sewing-machine. In the earliest sewing-machines the shuttle-thread was held during the pulling tight of the stitch by means of a clipping-piece, which clipped or griped it against the side of the shuttle. This mode was defective in many respects, and particularly so because it required that the shuttle should be moved through the loop of needle-thread with great speed, and should then remain at rest until the stitch was pulled tight. Hence it was speedily abandoned. Of later years it has been customary to control the shuttle-thread wholly by tension instrumentalities carried by the shuttle, and this system is attended with various disadvantages. In the first place the space in which the tension mechanism can be placed is very small, and the construction of the mechanism must be such as can be placed in the space afforded. Then the tension at the stitch is affected by the elasticity of the thread extending from the stitch to the shuttle-eye, and as this elasticity varies the appearance of the stitch is not uniform. Moreover the machine must be stopped and the shuttle must be taken out whenever the tension upon the shuttle-thread is to be varied.

The object of my invention is to obviate the above-mentioned defects of preceding machines; and it consists of the combination of the throat-plate of the sewing-machine with an intermittent nipper to make tension upon the shuttle-thread between the throat through which the needle passes and the shuttle, so that the shuttle-thread is controlled by tension instrumentalities that are independent of the shuttle, and that any desired amount of tension may be applied to the shuttle-thread at the time the stitch is being drawn tight, while the shuttle-thread is left practically free at other times.

The next improvement relates also to the means of making tension upon the shuttle-thread, and its object is to enable the tension to be varied without stopping the machine.

It consists of the combination of the throat-plate of the sewing-machine and the intermittent nippers, as above set forth, with a spring to press one of the jaws of the nippers toward the other and a device to vary the tension of said spring. The device which I prefer to use for the last purpose is a wedge controlled by a screw and nut, the last connected with a bed-plate of the machine, so that the tension may be varied by turning said nut without taking out the shuttle or stopping the machine.

My improvements may be used either collectively or separately, and may be embodied in various forms of sewing-machines, the construction of the mechanism being varied to suit the particular sewing-machine to which the improvements are applied. I prefer to use them in connection with a Singer sewing-machine, and have represented in the accompanying drawings a sufficient portion of such a machine, with my improvements applied to it, to enable my invention to be fully understood.

Figure 1 represents a transverse section of the machine. Fig. 2 represents a plan of a part of the machine with the top of the bed-plate removed. Fig. 3 represents a longitudinal section of the front end of the machine. Figs. 4, 5, 6, and 7 represent views of parts of the machine disconnected from the residue, and designated by the same letters of reference as the same parts in the other figures.

The bed-plate A and needle-arm B of this machine are of the ordinary form of those of a Singer sewing-machine of the same class, and the needle-bar C, shuttle-driver D, presser-foot E, and their appurtenances are operated as is customary in the Singer sewing-machine, the needle being driven by a crank-pin revolving in a hollow heart-shaped cam secured to the needle-bar, and the shuttle-driver being driven by a crank, F, secured to a shaft, G, which is constructed to revolve under the top of the bed-plate A.

In order that my first improvement may be

embodied in the machine, a projection, *a*, is secured to or formed upon the under side of the throat-plate H, in the immediate vicinity of the throat, through which the needle passes, and at one side of the line in which the shuttle-thread extends from said throat to the shuttle, when the shuttle-eye, during the forward movement of the shuttle, has passed by said throat. This projection constitutes the stationary jaw of the nippers, which is to make tension upon the shuttle-thread.

The movable jaw *e* of the nippers is arranged opposite the fixed jaw *a*, so that the shuttle-thread extends between the two. It is formed upon the end of a slide, *b*, which extends crosswise to the line of travel of the shuttle, is constructed to slide in a groove in the under side of the throat-plate H, and has a lug, *c*, projecting from its under side. This lug is acted upon by a spring, *d*, which moves the slide and opens the nippers by forcing the movable jaw *e* from the fixed jaw *a* whenever permitted to do so in the operation of the machine. The movable jaw is drawn toward the fixed jaw, so as to gripe and make tension upon the shuttle-thread extending between them, by means of a face-cam, I, which is mounted upon the shaft G of the shuttle-driver, and operates upon the lug *c* of the nipper-slide *b* through a spring-lever, *f*, which vibrates upon a pivot, *i*.

When the machine is in operation, the forward movement of the shuttle-eye past the throat causes the shuttle-thread to extend between the jaws of the nippers, which at that time are held open by the action of the spring *d*, but which are immediately afterward caused to seize the thread by the operation of the cam I and to hold it until the needle, in its upward motion has drawn the stitch tight, the pressure of the jaws of the nippers, during this operation, exerting tension upon the shuttle-thread between the throat and the shuttle, while at other times the jaws are opened by the action of the spring *d*, so as to leave the shuttle-thread free. In this operation the amount of pressure of the nippers upon the shuttle-thread, and consequently the force of the tension, depend upon the strain of the spring-lever *f*, which intervenes between the movable jaw and the cam I. In order that the tension thus made upon the shuttle-thread between the throat and the shuttle may be adjusted so as to determine precisely how far the shuttle-thread shall be drawn into the work by the upward pull of needle-thead, the spring-lever *f* is pivoted to a slide, *g*, which has a hole in it, in which a wedge, J, is constructed to slide crosswise.

The wedge bears against a projection, *h*, of the bed-plate, and is fitted with a screw-rod, *m*, which extends through a hole at the rim of the bed-plate and is fitted with a nut, K. By turning this nut K in one direction the wedge is moved through the slide *g*, and is caused to move it and the spring-lever *f*, pivoted to the slide, farther from the cam I, so as to strain the spring-lever and cause the nipper-jaw operated by it to gripe the shuttle-thread with increased force.

When the nut K is turned in the other direction the wedge J is moved backward in the slide *g* by the action of a helical spring, *n*, that is coiled upon the screw-rod *m*, and the strain upon the spring-lever is reduced.

The adjustment of the tension of the shuttle-thread can therefore be readily varied without the necessity of taking out the shuttle, or even stopping the machine, by turning the adjusting-nut K.

In order that the shuttle-thread, when once seized by the jaws of the nippers, may not escape until the tension is to be relaxed by the turning of the cam I, the movable jaw *e* is constructed with a lip, *s*, Fig. 7, which underlaps the shuttle-thread and prevents it from slipping downward between the jaws.

The reciprocating feeding-instrument of the machine is the toothed plate L, which projects upward through an opening in the bed-plate from a bar, M, which is constructed to rise and descend and to move to and fro under the bed-plate.

The end *j* of the shank of the reciprocating bar M is constructed to slide in a groove under the bed-plate with sufficient freedom to permit the bar to be vibrated up and down for the purpose of raising and lowering the toothed feed-plate L.

The feed-bar rests upon a cam, O, which is secured to a rotating shaft, P, beneath the bed-plate, so that the feed-plate is raised and lowered as the said cam revolves with the shaft P.

In order that the feed-bar may be moved to and fro, the feed-shaft P is provided with a second cam, O′, which operates upon a vibrating arm, Q, which is pivoted to a projection of the bed-plate above.

Immediately opposite this vibrating arm, and at a short distance from it, there is a second vibrating arm, Q^1, which projects upward from a rock-shaft, R, and is fitted with a movable block, S, which is interposed between the two vibrating arms Q and Q^1, so as to bear against the first, Q, and transmit the motion of that arm to the second, Q^1.

The block can be slid along the arm Q^1, so as to vary its position relatively to the rocking axes of the arms, and it can be secured in any desired position by means of a clamp-screw, *r*.

The rock-shaft R of the second vibrating arm, Q^1, is provided with an additional arm, Q^2, Fig. 5, whose extremity bears against a snug, *t*, projecting from the feed-bar M, so that when the cam O′ moves the arms the feed-bar and feed-plate are moved forward, so as to advance the cloth, and when the cam in its revolution presents a less protuberant part of its rim to the vibrating arm Q, the feed-bar and feed-plate are permitted to move backward.

The backward movement of the feed-bar

and its descent are both determined by a spring, T, which thus acts antagonistically to both the cams O and O′.

In the above mechanism, the first vibrating arm, Q, is moved to and fro with a constant range of motion, determined by the throw of the cam O′; but the distance to which the second vibrating arm, Q¹, is moved, and consequently the extent of movement of the feed-plate L, which receives its movement through the second vibrating arm, is determined by the position of the movable block S, because the nearer this block is set to the rocking axis, or the pivot of the first vibrating arm, Q, the less will it be moved, and consequently the less will the feed-plate be moved, while the farther the said block is set from the rocking axis or pivot of the said arm Q the greater will be the extent of movement transmitted to the feed-plate.

The first vibrating arm might be moved to and fro by a crank, or by other means than a cam, but the rotating cam O′ is a simple and effective instrument for the purpose.

In constructing the mechanism it is expedient to arrange the two arms Q Q¹ in such manner that their adjacent faces, between which the feed-block is interposed, are parallel when the cam is at its position of least throw, because when the arms are so arranged the feed-plate always starts from and returns to the same place, however much the length of feed may be varied.

The feed-shaft P is arranged in line with the shuttle-driver shaft G, and is fitted at one end with a crank, F′, whose end is connected with the crank-pin *u* of the crank F, that moves the shuttle-driver, so that the feed-shaft P is driven from the shuttle-driver shaft G by the crank of the shuttle-driver.

Having thus described the mode in which I prefer to embody my improvements, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the throat-plate and the intermittent tension-nippers to make tension upon the shuttle-thread, the whole being constructed to operate upon the under thread, substantially as before set forth.

2. Also, the combination of the throat-plate, the spring-nippers, and the mechanism for adjusting the tension of the spring that presses one jaw of the nippers toward the other, the whole being constructed to operate substantially as before set forth.

In testimony whereof I have hereto set my hand this 12th day of November, A. D. 1868.

J. T. JONES.

Witnesses:
PHILIP O. REILLY,
WM. CLITUS WITTER.