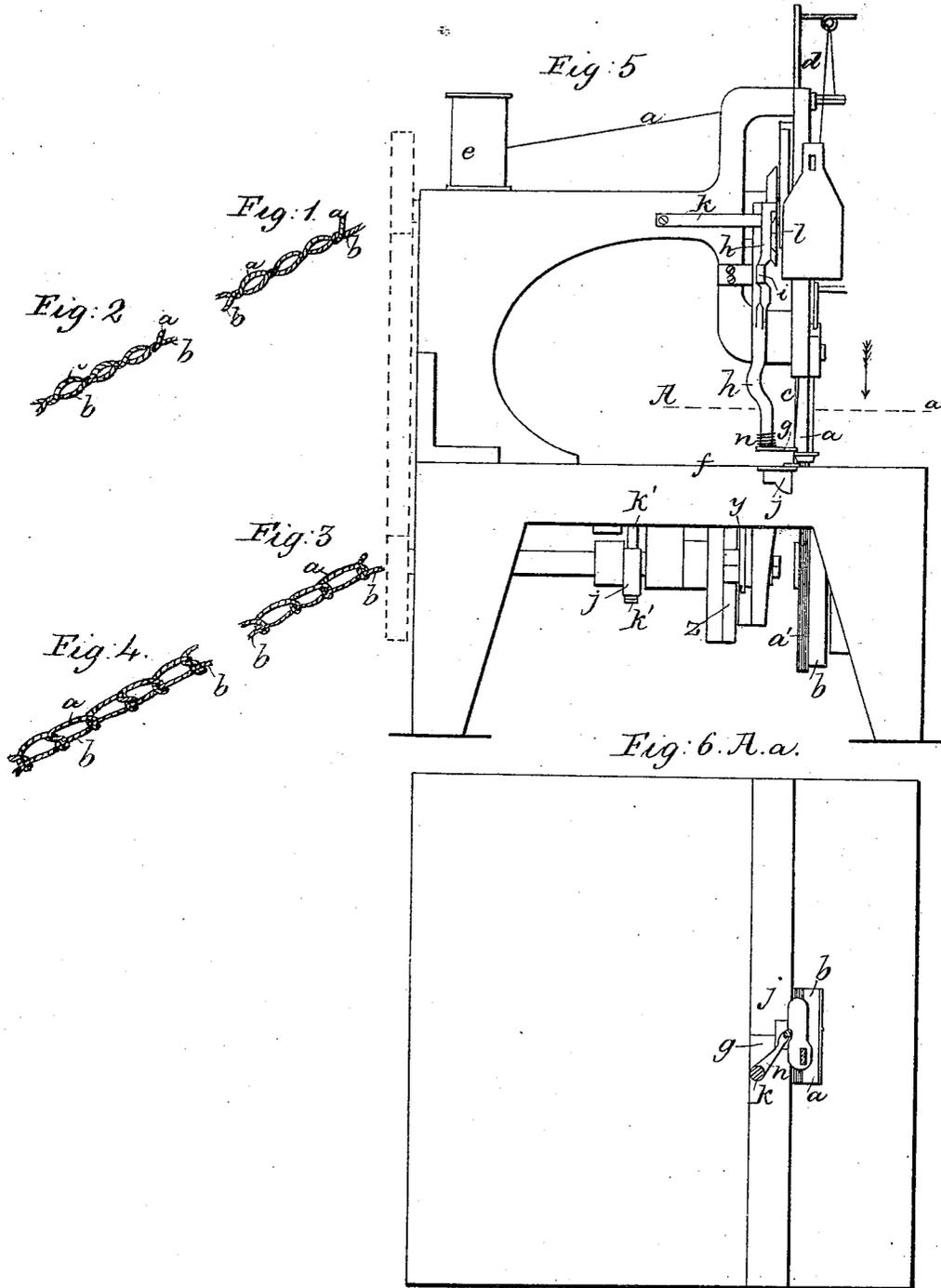


I. M. SINGER.
Sewing Machine.

No. 13,687.

Patented Oct. 16, 1855.



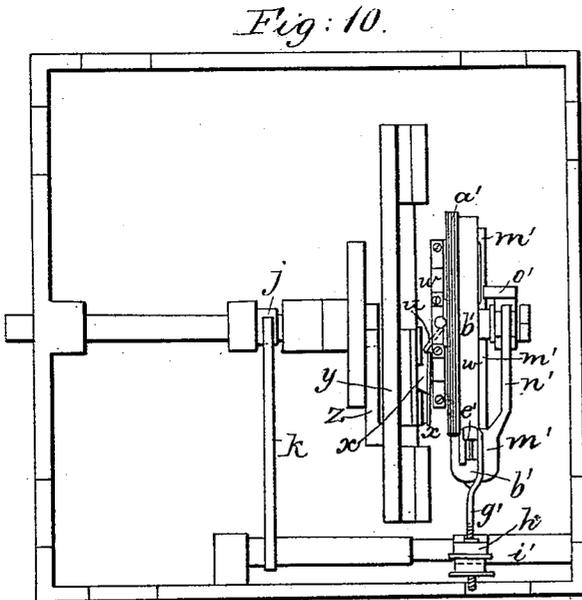
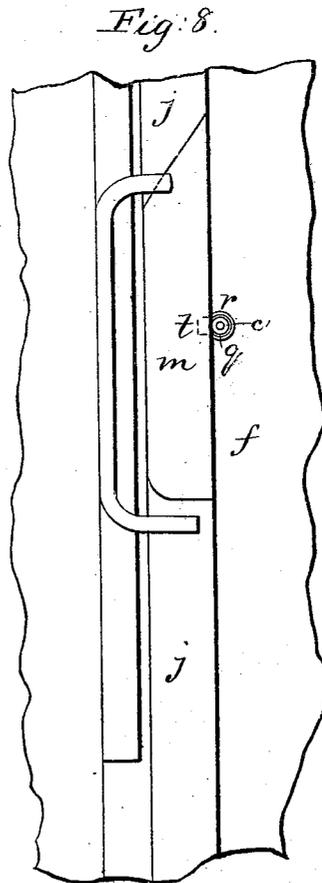
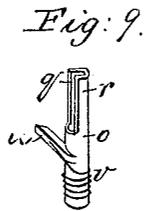
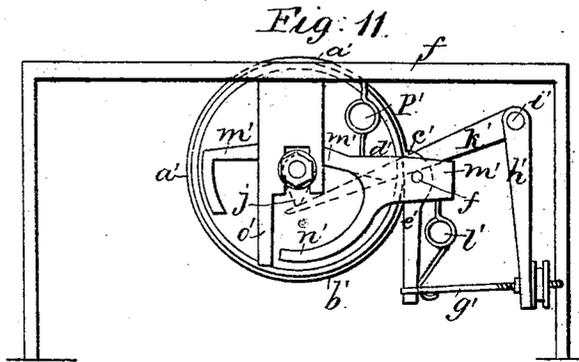
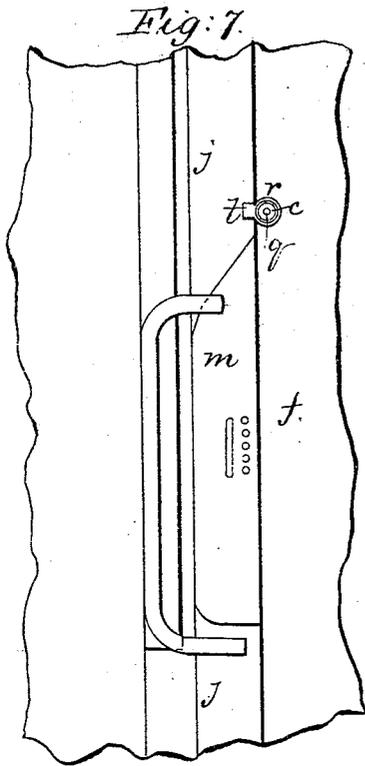
Witnesses
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UNITED STATES PATENT OFFICE.

ISAAC M. SINGER, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 13,687, dated October 16, 1855.

To all whom it may concern:

Be it known that I, ISAAC M. SINGER, of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1 and 2 represent the mode of interlocking the two threads in forming seams in the usual manner with what is known as the "shuttle-machine." Figs. 3 and 4 represent the manner in which the two threads are interlocked according to my improved method. Fig. 5 is a side elevation of the machine; Fig. 6, a horizontal section taken at the line A *a* of Fig. 5; Figs. 7 and 8, two horizontal sections just below the top of the table, and representing the shield in two different positions on an enlarged scale; Fig. 9, a separate view of the shield on an enlarged scale; Fig. 10, an inverted bottom view of the machine, and Fig. 11 a front elevation of the feeding apparatus.

The same letters indicate like parts in all the figures.

My invention relates to the method of protecting the point of the needle and preventing it from striking the shuttle as it descends, which frequently occurs in sewing-machines as heretofore made; and to this end the nature of this part of my invention consists in the employment of what I denominate a "shield-plate," which lies between the needle and shuttle as the needle descends, and which, so soon as the needle has descended, is moved out of the way to permit the needle-thread to spread out, that the shuttle may enter between the needle and its thread.

In the accompanying drawings, Fig. 1 represents the manner in which the two threads are interlocked in forming the seam with a needle and a single-acting shuttle, and Fig. 2 a like representation of a seam formed with a needle and a double-acting shuttle; and Figs. 3 and 4 are like views of seams formed according to my improved method, Fig. 3 with a single and Fig. 4 with a double acting shuttle. In the four figures the cloth is supposed to be cut away to exhibit the manner in which the two threads are interlocked, the needle-thread being represented in red and the shuttle-thread in black color. From this it will be seen that

the needle-thread *a* in Figs. 1 and 2 passes down on one side of the shuttle-thread *b*, then under it and up the other side, and then goes to form the next stitch, the only difference being that in Fig. 1 the needle-thread *a* always descends on the same side of the shuttle-thread *b*, while in Fig. 2 the needle-thread *a* passes down alternately on opposite sides of the shuttle-thread *b*; but by my improved mode of operation, as represented in Figs. 3 and 4, the needle-thread *a* passes down on one side of the shuttle-thread *b*, then under it and upon the other side, and then, instead of passing to the next stitch at top, it passes between itself and the shuttle-thread, thus forming a hitch around the shuttle-thread before forming the next stitch. By reason of this hitch, instead of simply passing around the shuttle-thread when drawn tight into the cloth or other substance, the two threads are held together much more firmly, and if either or both of the threads be cut the seam will not rend, as it does when made in the manner represented in Figs. 1 and 2.

In the accompanying drawings, representing the sewing-machine, *c* represents the usual eye-pointed needle, attached to and operated by a carrier, *d*, in the usual manner. The thread *a* passes from a suitable spool, *e*, down to and through the eye of the needle, and passes out at the back. In the process of sewing, the end of the thread that passes through the needle becomes secured in the cloth, and when the needle is drawn up out of the cloth lying on the table *f* the thread is stretched from the last stitch formed in the cloth to the eye of and back of the needle. The thread thus situated is pushed around the point of the needle diagonally to the front as the needle descends to form the next stitch, and this operation is performed by a finger, *g*, the forward end of which is bifurcated to insure the catching of the thread, its rear end being connected with and turning horizontally on the lower end of a lever, *h*, which turns on a fulcrum-pin at *i*, the axis of the said fulcrum-pin being diagonal to the line of the shuttle-race *j*, so that as the lever vibrates the said finger shall move in a line diagonal to the line of motion of the shuttle.

The upper end of the lever *h* is kept by the tension of a spring, *k*, against the face of a cam, *l*, so formed as to carry the finger *g* for-

ward, and with it the needle-thread, so soon as the needle reaches the end of its upward motion, and then to permit the tension of the spring to carry it back, which takes place so soon as the needle enters the cloth in its next downward motion. By this operation the thread is held in a loop forward of the point of the needle as it enters the cloth, and carries down the thread to form the loop in the usual manner below the cloth to permit the shuttle *m*, with its thread *b*, to pass between the needle and its thread, so that, after the passage of the shuttle, by the rising of the needle the needle-thread *a* is found to have passed around the shuttle-thread, and then through between itself and the needle to form the hitch before described. The finger *g* in its forward movement passes directly under the point of the needle; but just back of the bifurcated end it is cut out, as shown in the drawings, to permit the descent of the needle before the back movement of the finger, which must move laterally to pass the needle toward the end of its back motion, and this is effected by having the finger to turn in one direction on its connection with the lever, a helical spring, *n*, attached to the lever and bearing against the finger, forcing it back to its original position so soon as it passes the needle. It is by reason of thus carrying the needle-thread forward before the needle enters the cloth that the hitch is formed in the needle-thread, and as the shuttle carries the shuttle-thread through the loop formed in the needle-thread below the cloth, it follows that the hitch is formed around the shuttle-thread.

It will be obvious from the foregoing that this hitch can be formed at every stitch, as described, or at certain desired intervals, by changing the periods of motion of the finger—as, for instance, if the finger *g* be operated but once for every two operations of the needle, every second stitch will be a hitch-stitch; if only once for every third operation of the needle, then every third stitch will be hitched—that is, whenever a stitch is formed without the operation of the finger the stitch will be of the usual kind. And it will also be obvious that this apparatus for forming the hitch-stitch can be worked in connection with a double-pointed shuttle working in both directions, as well as with one having but one point and forming the stitch in one direction, and with this difference only, that in the return operation of the shuttle the hitch will be double, as represented in Fig. 4—that is, the needle-thread, after forming the hitch by passing between itself and the shuttle-thread, passes once more around itself. And, again, in the machine as fully described above, the shuttle operates to form the stitch when moving in the direction of the progress of the seam; but if, instead, its action be reversed, the effect will be to carry the needle-thread once around itself after forming the stitch, as represented in Fig. 4. All these, however, are only given as indicative of the many changes which may

be made within the range of the first part of my invention.

There is a hole made in the table directly under and in a line with the needle, to which is fitted the "shield-plate *o*," as it is termed. The said shield is a cylindrical piece (represented separately in Fig. 9) made hollow for the needle to play in freely as it moves up and down, and a portion of the tube-like part is cut out, as at *q*, and the part *r*, by the side of the part cut out, is properly the shield, as will be seen presently. The hole in which the shield is fitted is just in front of and close to the shuttle-race *j*, and there is a narrow vertical slit, *t*, in this face of the shuttle-race, corresponding with the cut-out portion *q* of the shield-tube when in the position represented in Fig. 7, so that the needle-thread, when the parts are in that condition, can spread out from the body of the needle, that the point of the shuttle may enter between the needle and its thread; but when the shield is turned in the position represented in Fig. 8, then the slit *t* is covered by the shield, which is thus interposed between the needle and the shuttle during the descending motion of the needle, so that its point cannot in any manner strike the shuttle; but so soon as the needle has descended the shield is turned out of the way, that the needle-thread may pass out of the slit to permit the point of the shuttle to enter between it and the needle.

The lower end of the spindle of the shield is provided with a spur, *u*, and with a helical spring, *v*, the tension of which keeps the shield over the slit *t*, and the outer end of the spur slightly projecting from a plate, *w*, so that it shall be acted upon by the end of a spring-catch, *x*, attached to and moving back and forth with the shuttle-carrier *y*, operated in the usual manner by a cam, *z*. From this it will be seen that as the needle is descending the shield is kept over the slit to prevent the point from striking the shuttle, which is then receding, the spring-catch passing over the spur *u*, and as the shuttle begins to make its back movement the spring-catch comes in contact with the spur of the shield and turns the shield to open the slit, that the point of the shuttle may enter between the needle and its thread. In this way the needle is fully protected during its descent by the interposition of the shield.

It will be obvious from the foregoing that the mode of constructing and giving motion to the shield may be greatly varied without changing the principle or mode of operation of this part of my invention—as, for instance, instead of making the shield rotate, it may be flat and have a rectilinear motion; but I have described the mode which I deem the best.

The feeding-wheel *a'* is made and located as in many machines in use for some years back. Its rim *b'* projects from a disk, and is embraced between two jaws, *c'* and *d'*, (shown by dotted lines in Fig. 11,) the one, *c'*, on the upper end of a grip-lever, *e'*, which turns on a fulcrum-

pin at f' , the lower end being connected by an adjustable screw-rod, g' , with one arm, h' , of a rock-shaft, i , operated by the action of a tappet, j' , on another arm, k' , of the rock-shaft. A spring, l' , acts on the lever e' to relieve the jaw c' from the rim of the wheel the moment the tappet has passed. The other jaw, d' , acts on the inner face of the rim, and is attached to or made part of a bar, m' , to which the fulcrum-pin of the grip-lever is attached, the two jaws being directly opposite each other. This bar extends over and rests on the axle of the feed-wheel, or, if desired, may rest on some body interposed, and it is provided with an arm, n' , the end of which strikes against a bracket, o' , of the frame to prevent the bar from being carried beyond a certain point on its return motion by the tension of a spring, p' . From this it will be seen that when the tappet strikes the arm k' of the rock-shaft the lower arm of the grip-lever is drawn forward, which brings the jaw c' in contact with the outer periphery of the rim, at the same time drawing forward the bar m' , bringing its jaw d' in contact with the inner periphery of the rim of the feed-wheel, which is thus gripped between the two jaws, so that the further motion of the grip-lever

must turn the feed-wheel to give the required feed motion to the cloth on the periphery thereof, and as the two jaws are so near as just to clear the rim of the wheel when liberated the slightest motion of the grip-lever will cause the rim to be gripped, so that nearly all the motion given to the lever will impart motion to the feed-wheel. By means of the adjusting-screw on the connecting-rod, more or less motion can be given to the grip-lever, and hence to the feed-wheel. In this way a positive feed motion can be given, which can be varied and regulated at will.

What I claim as my invention, and desire to secure by Letters Patent, is—

The method, substantially as herein described, of protecting the needle from all injury by the interposition of a movable shield between the needle and shuttle, which is removed after the needle has descended, to permit the shuttle to pass between the needle and its thread, as set forth.

ISAAC M. SINGER.

Witnesses:

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ANDREW DE LACY.