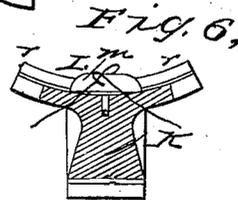
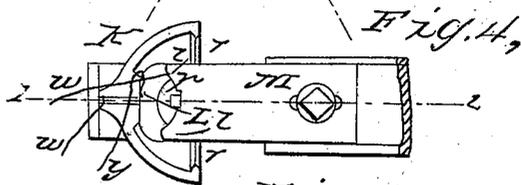
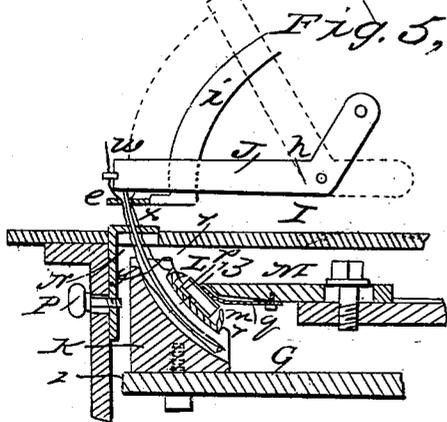
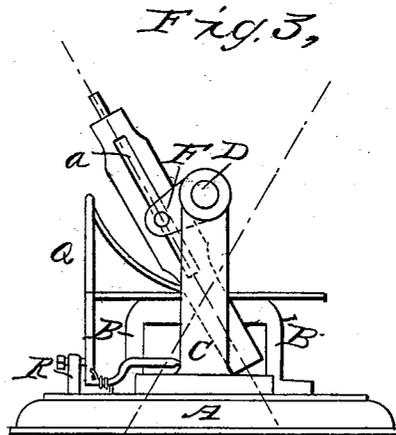
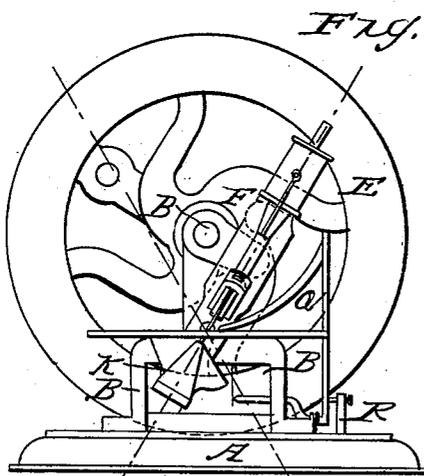
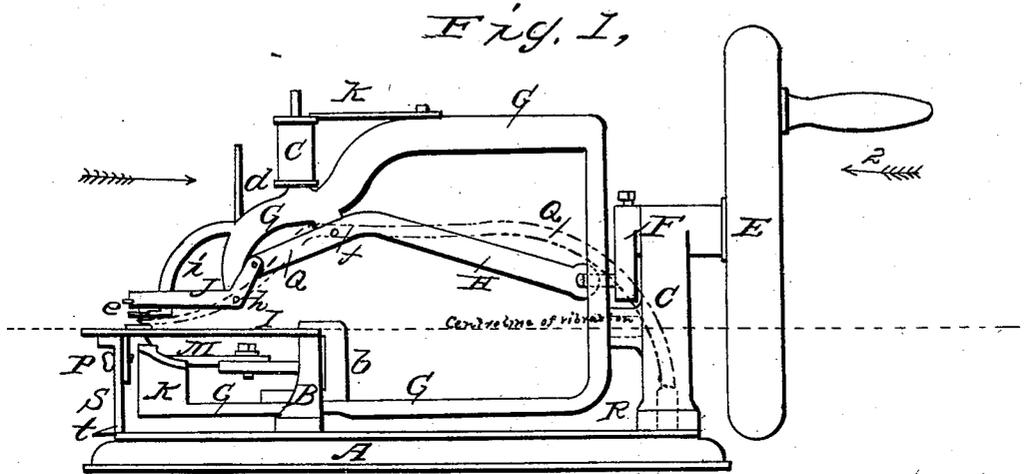


S. COMFORT, Jr.
Sewing Machine.

No. 20,699.

Patented June 29, 1858.



UNITED STATES PATENT OFFICE.

SAML. COMFORT, JR., OF MORRISVILLE, PENNSYLVANIA.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 20,699, dated June 29, 1858.

To all whom it may concern:

Be it known that I, SAMUEL COMFORT, JR., of Morrisville, Bucks county, Pennsylvania, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to improvements in sewing-machines for forming the lock-stitch; and it consists in certain novel appliances for imparting to the needle a lateral vibratory motion, combined with an upward and downward movement, said needle acting in conjunction with a discoidal shuttle confined in a concave vibrating shuttle-race; also, in a mode of retaining the needle rigidly during the time it imparts the feed motion to the fabric, as fully described hereinafter.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of my improved machine; Fig. 2, an end view looking in the direction of the arrows, Fig. 1; Fig. 3, an end view looking in the direction of the arrow 2, Fig. 1, with the driving-wheel removed; Fig. 4, a plan view of the shuttle-race and retainer; Fig. 5, a sectional elevation of a portion of the front of the machine on the line 1 2, Fig. 1; Fig. 6, a section on the line 2 3, Fig. 5.

Similar letters refer to similar parts throughout the several views.

A is the base of the machine, to which are secured the two standards B and C. In the top of the latter turns the driving-shaft D, on one end of which is secured the driving-wheel E, and on the opposite end the crank F, the pin of which fits in a slot, *a*, Fig. 3, formed in the end of the rocking frame G. This crank-pin also fits into the forked end of the lever H, which moves within the slot *a*, and which is hereinafter alluded to. To the lower arm of the rocking frame G is secured the bracket *b*, from the top of which projects a pin adapted to a box formed on the top of the standard B, and from the perpendicular portion of the rocking frame projects a pin fitting into a hub on the standard C. A line drawn longitudi-

nally through the centers of these pins is the center line of vibration of the rocking frame, and this center line should be parallel with the center line of the driving-shaft, with the surface of the cloth-plate, and with that of the top of the base-plate. The upper arm of the rocking frame carries the lever H, the bell-crank, needle-lever J, the spool of needle-thread *c*, and the thread-guides. The lever H has its fulcrum at *f*, and the end of its short arm is so connected to the end of the short arm of the bell-crank lever J that one must move simultaneously with the other. The lever J has its fulcrum at *h*, and is so forked as to fit snugly on each side of, and therefore be guided by, the segmental end *i* of the rocking frame. The end of the lever J has a guide, *j*, for the needle-thread, and is furnished with the ordinary sewing-machine needle, the curve of which forms part of the circumference of a circle, of which the fulcrum *h* of the lever J is the center. The spool *c* turns on a pin attached to the rocking frame, and receives the necessary pressure from a spring, *k*. To the end of the lower arm of the rocking shaft G is secured the concave shuttle-race K.

L is a discoidal shuttle, consisting of an exterior casing, *m*, containing the spool *p*, which is hung on a pin projecting from the bottom of the casing, the top plate, *n*, of the spool projecting slightly above the edge of the said casing.

M is a plate, so secured to a projection on the standard B as to be readily adjusted longitudinally, and on the end of this plate are two projections, *ll*, so arranged with regard to the shuttle that the latter can have but very slight lateral play in the race. Under the retaining-plate M, I secure a spring, *q*, the bent end of which bears against the top *n* of the spool, for the double purpose of keeping the spool within the casing and preventing the shuttle from jumping in the race. This spring is so light, however, that the loop of the needle-thread can pass between it and the top of the shuttle without any undue friction being imparted to the thread. A curved lip, *r*, formed on the bottom of the race, and another curved lip, *r*, on the top of the same, prevent the shuttle from rising or falling. Down the middle of the race is cut a curved slot, *v*, for receiving the needle, which fits as closely to the sides of the slot as possible, for a pur-

pose which will be apparent hereinafter. The inner edge of the needle, when down, is near enough to the concave surface of the race to insure the needle-thread catching over the lower edge of the shuttle prior to passing over the same.

I, the cloth-plate above alluded to, is so constructed as to be readily removed and replaced in the following manner: The back end has a recess, the sides of which are dovetailed so as to slide horizontally onto dovetailed projections on the top of the standard B. The front of the plate is secured to and retained by a standard, *s*, the bottom of which is also dovetailed, so as to slide horizontally between dovetailed projections on the front of the base-plate. A spring-latch, *t*, connected to the base-plate, effectually retains the cloth-plate in its position. By depressing this latch its notch is removed from the bottom of the standard *s*, when the plate may be easily withdrawn. It will be understood that this removing and replacing of the plate must take place when the needle is raised. In the cloth-plate I, and immediately in the neighborhood of the needle, is an opening for receiving the upper end of the angular plate N, which is arranged to fit against the inside of the vertical bar *s*. The upper surface of that portion of this plate which passes through the opening in the cloth-plate I is serrated and has a suitable orifice for the passage of the needle. A thumb-screw, P, passes through an oblong slot in the standard *s* and screws into the plate N, so that the latter may be raised and lowered at pleasure, and its upper serrated surface be made to project more or less above that of the cloth-plate I.

Q is a pad-lever hung at the back end between the standard C and bracket R, and furnished with a suitable spring. As the opposite end of this pad is formed in a similar manner to that of ordinary pads, and as it performs similar functions, a further description of it here will be unnecessary. The needle-thread *w* passes from the spool *c* through the thread-guide *d*, through one orifice in the thread-guide *j* on the lever J, through the thread-guide *e*, thence upward through a second orifice in the guide *j*, through the eye of the needle, and from thence to the fabric. The object of this peculiar traverse from guide to guide will be apparent hereinafter. The shuttle-thread *y* passes from the spool *p* through an orifice in the case *m*, back through another orifice, and out again through a third orifice to the fabric. This passage through the various orifices being a well-known mode of imparting a tension to the thread, needs no further description.

On turning the driving-shaft D the following movements will be imparted to the operating parts of the machine, namely: a lateral vibratory motion to the rocking frame G, and consequently to the needle, through the action of the pin of the crank F on the sides of the slot *a*, and a simultaneous vibratory motion,

but in a contrary direction to that of the rocking frame, to the levers H and J by the action of the same crank-pin. At the same time the shuttle-race, being below the center of vibration of the rocking frame, must have a lateral vibratory motion only, and that in a direction contrary to that of the upper portion of the frame. It will now be seen that the concavity of the shuttle-race must represent a portion of a hollow sphere, the center of which must be in the center line of vibration of the rocking shaft. When the crank F is in the position shown in Fig. 1, the rocking frame will be in a perpendicular position, the needle at the limit of its downward movement, and within the curved slot *v* of the shuttle-race. Before the needle had quite arrived at this position, however, and as it was about recovering its perpendicularity, it had passed its loop by its lateral motion partially over the shuttle, as seen in Fig. 4. As the driving-shaft continues to turn the needle begins to rise, at the same time, by moving laterally, passing its loop across the shuttle, thereby interlocking the loop with the shuttle-thread and drawing the interlocking threads toward the fabric, so that when the needle has reached its highest point a tight lock-stitch has been produced. The needle then descends, passes through the fabric, and, before it reaches its lowest destination, has again passed its loop partially over the shuttle, when a repetition of the above-described operation takes place.

Feeding of the fabric.—It has been already observed that the upper surface of the cloth-plate I coincides with the center of vibration of the rocking frame, so that the needle, at the part immediately coinciding with this surface, can have at no time during the movement of the machine any lateral vibratory movement; but if the fabric is elevated above the center of vibration of the rocking frame by means of the plate N, hereinbefore alluded to, the lateral movement of the needle at this point must be imparted to the fabric. Before the needle penetrates the fabric it has so nearly reached the limit of its vibration that any further movement has no practical effect as regards changing the position of the fabric. When the needle has penetrated the fabric and entered the slot *v* in the shuttle-race, it commences its reverse vibratory motion, and carries with it the fabric, through which the needle begins to rise as it approaches the limit of its reverse vibration. As the needle unsupported is scarcely sufficiently rigid to impart this movement to the fabric, I have, as before remarked, made the curved slot in the shuttle-race but little wider than the needle is thick; and as the needle is never out of the slot during the time the feed motion is imparted to the fabric the slot must act as a guide to the needle and prevent it from being sprung laterally.

Taking up the slack of the needle-thread.—It has been shown that the needle-thread passes from the spool through the guides *d j e*, upward

from the latter again through the guide *j*, and thence through the eye of the needle. This passage of the thread twice through the guide *j* causes it to be retained by the said guide to such an extent that when the lever *J*, with the guide *j*, rises the latter carries with it the slack of the needle-thread, and thus the auxiliary lever employed for the same purpose in many sewing-machines is dispensed with.

I do not claim, broadly, the passing of the loop of the needle-thread over a shuttle by a lateral movement of the needle, nor the imparting of a feed motion to a fabric by a similar motion of the needle, nor the exclusive use of a discoidal shuttle, in which the spool is central with the case, as the devices for accomplishing these objects are set forth in patents already granted; but

I do claim and desire to secure by Letters Patent—

1. The rocking frame *G*, as operated by the crank *F*, and constructed substantially as de-

scribed, with its concave shuttle-race, in combination with the stationary shuttle.

2. Imparting to the needle an upward and downward combined with a lateral vibratory movement by means of the rocking frame *G* and levers *H* and *J*, as operated by the crank *F*, substantially in the manner herein set forth.

3. The vibrating concave shuttle-race *K*, with its lips *v* and *v'*, in combination with the discoidal shuttle *L* and adjustable retaining-plate *M''*.

4. Sustaining the needle in the slot *v* of the shuttle-race during the time that the said needle is, by its lateral motion, imparting the feed motion to the fabric.

In testimony whereof I sign my name to this specification before two subscribing witnesses.

SAMUEL COMFORT, JR.

Witnesses:

HENRY HOWSON,
HENRY ODIORNE.