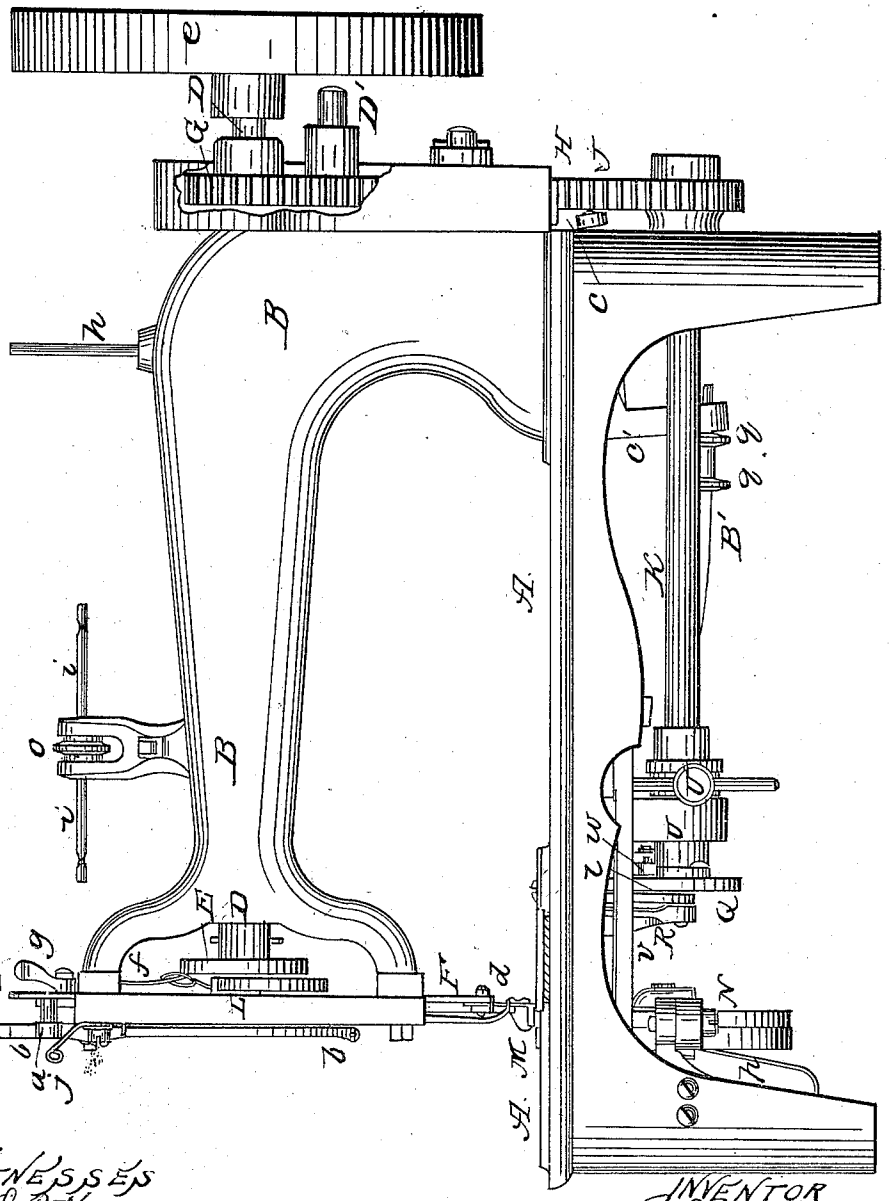
3 Sheets—Sheet 1.

C. PARHAM.

Sewing Machine.

No. 42,502. Patented April 26, 1864.



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3 Sheets—Sheet 2.

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Fig. 2

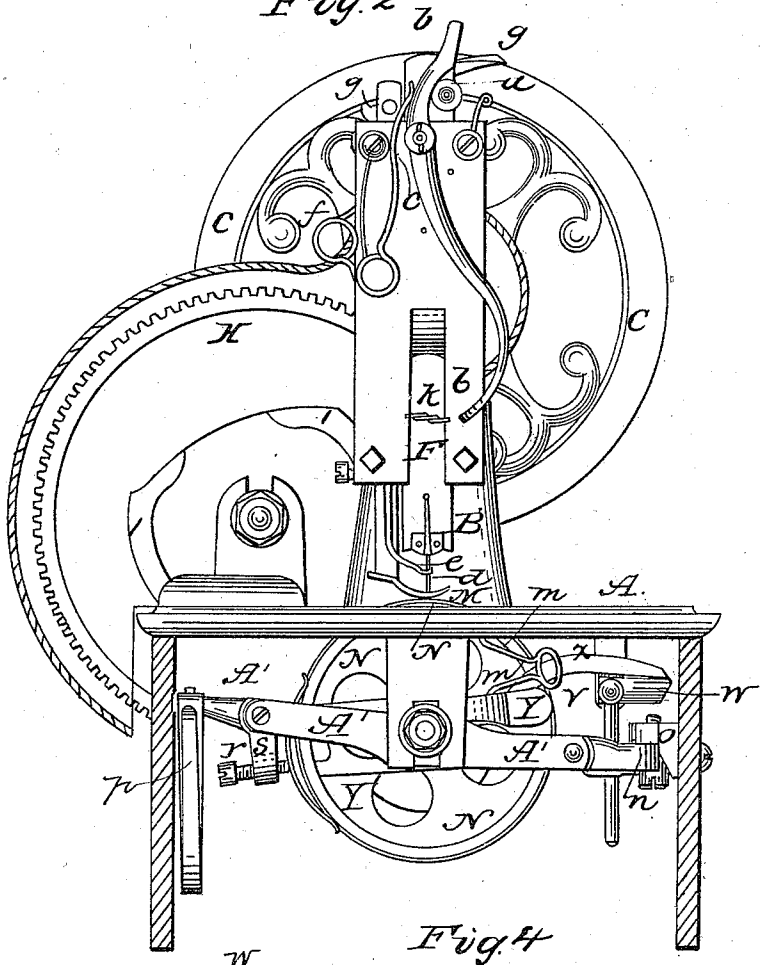
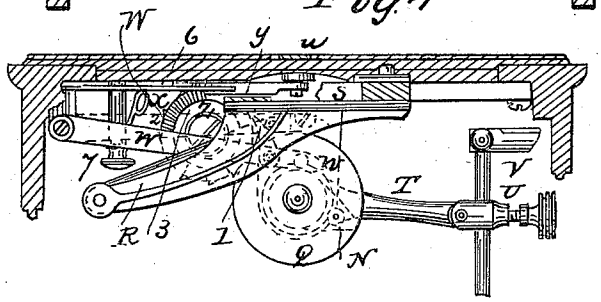


Fig. 4



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3 Sheets—Sheet 3.

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Sewing Machine.

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Fig. 3

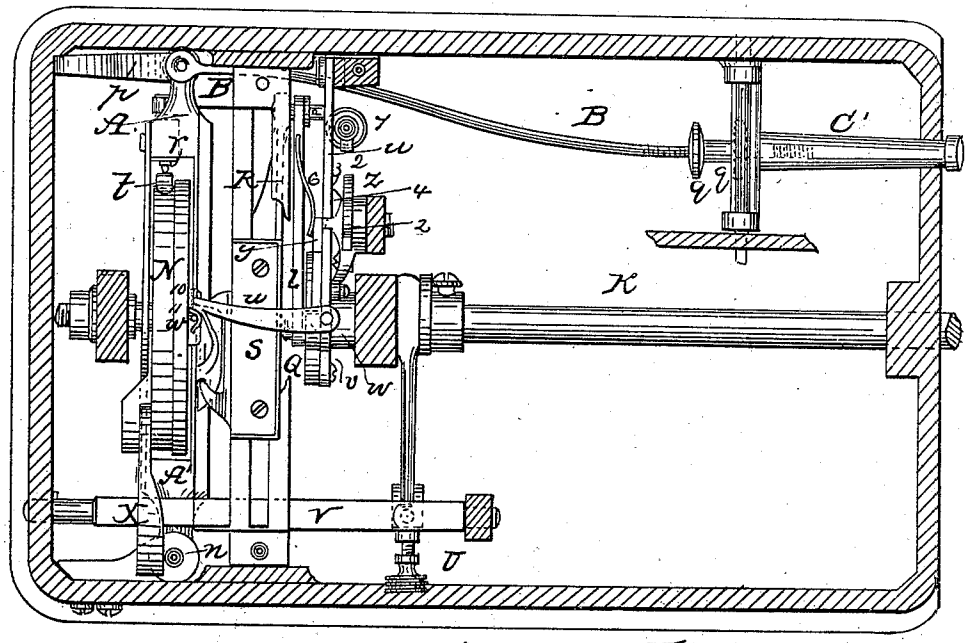


Fig. 5

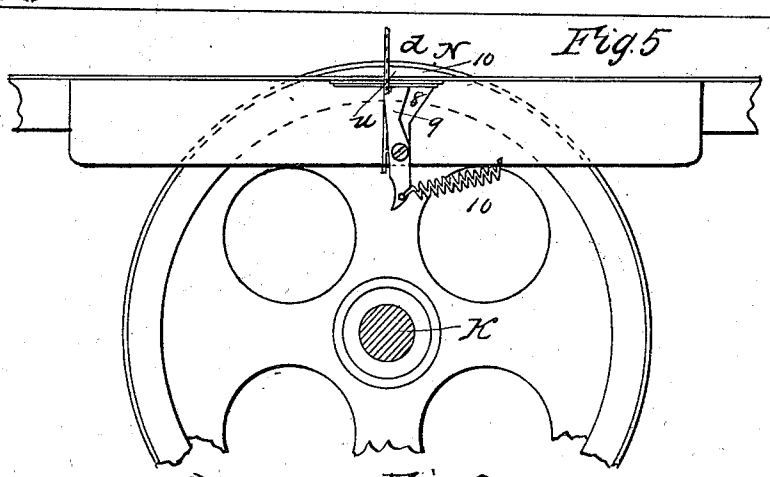
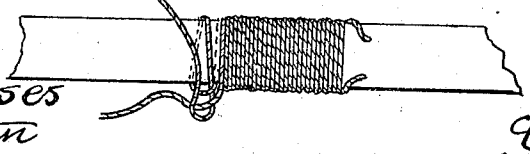


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES PARHAM, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 42,502, dated April 26, 1864.

To all whom it may concern:

Be it known that I, CHARLES PARHAM, of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Sewing-Machines designed for doing both plain work and making button-holes; and I hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a side view of the machine. Fig. 2 represents an elevation of the front end of the machine, part of the frame or stand being shown in section. Fig. 3 represents a top view of the mechanism underneath the table, the table being represented as cut away for the purpose of showing the parts underneath it. Fig. 4 represents a broken section, taken vertically behind the shuttle-race. Fig. 5 represents detached the device for closing the needle-recess to prevent at certain times the shuttle from catching its thread. Fig. 6 represents the manner of making the button-hole stitch.

Similar letters of reference, where they occur in the several separate figures, denote like parts of the machine in all the drawings.

My invention relates to the construction and operation of certain mechanism applied to a sewing-machine, whereby the same machine may be used for working button-holes, as well as for sewing plain seams.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents the table and frame of the machine, and B the arm for supporting the needle and thread mechanism, and through the hollow of which arm the needle and thread mechanism is operated.

The band-wheel C, by which the machine may be driven, is placed on the rear end of the shaft D, which extends through the hollow of the arm B and carries upon its forward end the wrist-pin and crank-wheel E, by which the needle-bar F is vibrated. On the shaft D, near its rear end, there is a gear-wheel, G, that takes into and turns a larger gear, H, having cam-ledges I I upon its face, which operates the cloth-feeding mechanism under certain circumstances, as will be hereinafter explained. The large gear H works with and turns a gear, J, on the shaft K, placed underneath the table A, said shaft K operating the shuttle, and at times certain mechanism which is used in connection with the needle and shuttle for working or making a button-hole stitch.

The needle-bar F is raised and lowered by a wrist-pin in the disk or crank-wheel E, which works in a cam-slot arranged in the piece L on the back of said needle-bar. On the top of the needle-bar there is a stud or pin, *a*, that strikes against a vibrating thread-take-up arm, *b*, and moves it against the action of a spring, *c*, which returns it to its original position again when the needle-bar and its stud descends. The needle *d* is placed in the lower end of the bar F and works through a guide, *e*, which also steadies it in its operation.

The presser-foot M is held down and clamps the material to be sewed between itself and the feed-wheel N by a spring, *f*, and at the top of the presser-foot bar there is a pivoted lever, *g*, by which the presser-foot may be raised and held up. The bobbin that carries or furnishes the thread for the needle is placed on the stem *h*, and its thread passes first through and around the tension-rod *i*, upon which any suitable number of turns may be taken by means of the thumb-nut O. Thence it passes through the guide *j*, thence down through an eye in the lower end of the take-up bar *b*, thence through one or both of the eyes *k*, and thence to and through the eye of the needle *d*.

The shuttle P is driven by means of the shaft K, as follows: On the forward end of the shaft K there is a wheel, Q, that has in it a wrist-pin, to which one end of a pitman, *l*, is connected, the other end thereof being attached to an arm, R, that projects from the under side of the shuttle-driver S, and thus the shuttle is driven through its race. The shuttle carries a bobbin, as is common in such cases, with proper appliances for putting proper tension upon it. On the shaft K there is also a cam, around which a strap on the rod T works to give the rod motion. This rod T is connected by a hinged and adjustable contrivance at U, so that it will give a rocking motion to the shaft V, supported in suitable bearings underneath the table A.

On the rock shaft or bar V there is an arm, W, that works against the tail of a lever, X,

that operates the clamping-arms Y for turning the feed-wheel N, said lever X being held down and thrown down by a spring, *m*, the adjusting mechanism at U regulating and defining the extent of motion of the feed-wheel, and thus regulating the length of the stitches at pleasure.

The feed-wheel N is hung in a frame, A′, that is pivoted at its end *n* to a projection, *o*, on the frame or stand A, and its other end is controlled by a bent spring, *p*, and is, moreover, when the machine is arranged for working button-holes or the like, so connected to a rod, B′, that is moved by a crank-lever, C′, that gets its motion from the cams I I on the gear wheel H, as to be operated by said rod B′. When, however, the machine is adapted to plain sewing, the rod B′ is disconnected from the action of the bell-crank by running forward the thumb nuts or nuts *q*, which thumb-nuts also regulate the extent of motion of the rod B′, as also the vibration of the frame A′ and the feed-wheel N hung in it. The object of vibrating the feed-wheel toward and from the needle while working button-holes is that, in addition to its rotation to feed along the material under the sewing mechanism, it may carry the material to and from the sewing-line to bring the loops of the needle-thread to the edge of the cloth, or to the line of the button-hole loops or locks, and thus lay the needle-thread at right angles to the line of feed, and to prevent any backlash of the feed-wheel a set-screw, *r*, passes through an arm, *s*, on the frame A′, and bears against a friction-break or spring, *t*, that rubs against the perimeter of the feed-wheel with sufficient friction to hold it from turning, except when turned by the positive feeding mechanism.

u, Fig. 3, is a hook or looper, which, when the machine is adapted to the working of button-holes, works in concert with the needle and shuttle to accomplish this object. Its object is to catch and retain the first loop of the needle-thread until a second loop of the same thread is passed through the first loop, and then the shuttle, passing its thread through the second loop, forms the lock, which, when drawn up tight, makes the button-hole stitch, the material at the same time being moved forward and back by the lateral throw of the feed-wheel to properly place these stitches at right angles to the length of the worked button-hole.

The hook or looper *u* is operated as follows: On the disk or wheel Q there is a cam, *v*, that strikes against a pivoted lever, *w*, and raises said lever against the action of a spring, *x*, that returns it whenever the influence of the cam *v* upon it ceases to its normal position. The lever *w* carries a pawl, 1, that works in a ratchet, 2, upon the periphery of a wheel, *z*, and turns said wheel at stated intervals. On the face of this wheel *z* there is a series of elevations and depressions, 3 4, each elevation at its apex having a slight depression, as seen in Fig. 3, and against these elevations and depressions 3 4 the tooth 5 of a pivoted lever, *y*, works, it being held against them by the spring 6, and thus this lever at stated intervals and by measured movements is moved around its pivoted point, and, being connected to the hook or looper *u* at its pivoted point, so that the two operate like a bell-crank, the hook *u* thus receives its motion. The object of the nick or depression in the apices of the elevations 3 is for the tooth 5 to take into and hold the wheel *z* from any accidental and all other motions except that it receives from the pawl and ratchet.

When it is desired to throw out of action the hook *u* and fit the machine for plain sewing the lever *w* may be held up out of reach of the cam *v* by turning the button 7, which holds it up, as shown by the red and dotted lines in Fig. 4, this being in addition to the throwing out of action the rod B′ for laterally moving the feed-wheel N.

In the face of the raceway, against which the shuttle works, there is a recess, 8, Fig. 5, made, in which a gate or cut-off, 9, is pivoted and held, when not otherwise acted upon, by a spring, 10′. The object of this gate or cut-off 9 is to close the space between the needle and shuttle at a certain period in the making of the button-hole work, and thus prevent the shuttle from taking the first loop of the needle-thread; but when the needle has passed the second through the first loop, then the gate is thrown back and the shuttle carries its thread through the second loop, and the whole is drawn up into a tight stitch, the interlockings forming the edge of the button-hole. The gate is thrown back as follows: A projection, 10, on top of the gate 9 is caught by a shoulder, 11, on the looper or hook *u*, and as the looper moves back it carries back the gate with it, and in this position opens up communication between the needle and shuttle; allowing the shuttle to pass its thread through the loop of the needle-thread. When, however, the looper *u* has moved forward to catch and retain the first loop of the needle-thread until the needle passes a second loop through its first one, and the cloth or other material has been properly moved to place the stitch in position, then the gate is closed by the spring 10′, and the shuttle, which during this period makes a throw or pass, is prevented from passing through the first loop on this account; but on its next pass, the second loop being formed, it passes its thread through it and completes the lock, and when the thread or loops are drawn up forms the button-hole stitch.

I have shown in a spread-out manner in Fig. 6 how the threads are interlocked to form the button-hole stitch. The red represents the needle-thread and the blue the shuttle-thread.

This machine, from its peculiar construction and facility for throwing out of or into action certain parts of the sewing mechanism, is capable of doing three distinct kinds of sewing. It will make the ordinary needle and shuttle two-thread stitch. It will make the ordinary needle and hook single-thread stitch, (by omitting to use the shuttle-thread,) and it will make

the button-hole stitch by introducing the hook or looper to work in connection with the needle and shuttle, as explained, the lateral feed of the cloth being essential in this last mentioned kind of work. The driving-gear is so arranged as that there shall be four revolutions of the gears G J to one revolution of the large gear H, and as the cam I, which has two beats or throws, is upon the face of the gear H the needle, shuttle, and feed-wheel will have two motions to every one motion of the laterally-feeding mechanism. This is important, as it times the lateral feed-motion with regard to the needle and shuttle and straight-forward feed-motion.

The power to drive the machine may be applied to the wrist-pin D′ in the large gear H.

Having thus fully described the object and purpose of my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The looper *u*, constructed and operating in connection with the needle and shuttle thread, substantially as herein described and represented, to form a button-hole stitch.

2. A gate or cut-off placed in the race of the machine for shutting off the shuttle from the needle-loop to prevent the former from passing through the loop of the latter at every alternate throw, substantially as and for the purpose described.

3. The opening of the gate or cut-off by the action of the hook while it is closed by a separate mechanism, substantially as described.

4. In combination with the looper, the wheel *z*, with its ratchet and elevations and depressions for operating and holding at intervals said looper, substantially as described.

5. Hanging the feed-wheel in a pivoted frame, so that the wheel and frame may be moved toward and from the needle or sewing-line to form a button-hole, substantially as described.

6. In combination with the feed-wheel and its pivoted frame, the rod B′ and spring *p*, for giving them their lateral and adjustable movement or for suspending their movement, substantially as described.

7. In combination with the feed-wheel and its pivoted frame susceptible of a lateral movement toward and from the needle or sewing-line, an independent mechanism, such as described, for turning said feed-wheel at stated intervals upon its journals or axle to feed the material along, substantially as described.

8. A rotary feed-wheel that has two motions communicated to it at one and the same time—viz., a rotary motion around its axis and a laterally-reciprocating motion around a pivoted point—substantially as and for the purpose herein described.

9. The arrangement of the gears G H and double cam I, so that there shall be two actions of the needle to one action of the lateral feed, and for getting the correct time and movements of the lateral feed, as herein described and represented.

CHARLES PARHAM.

Witnesses:

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WELLS WALTON.