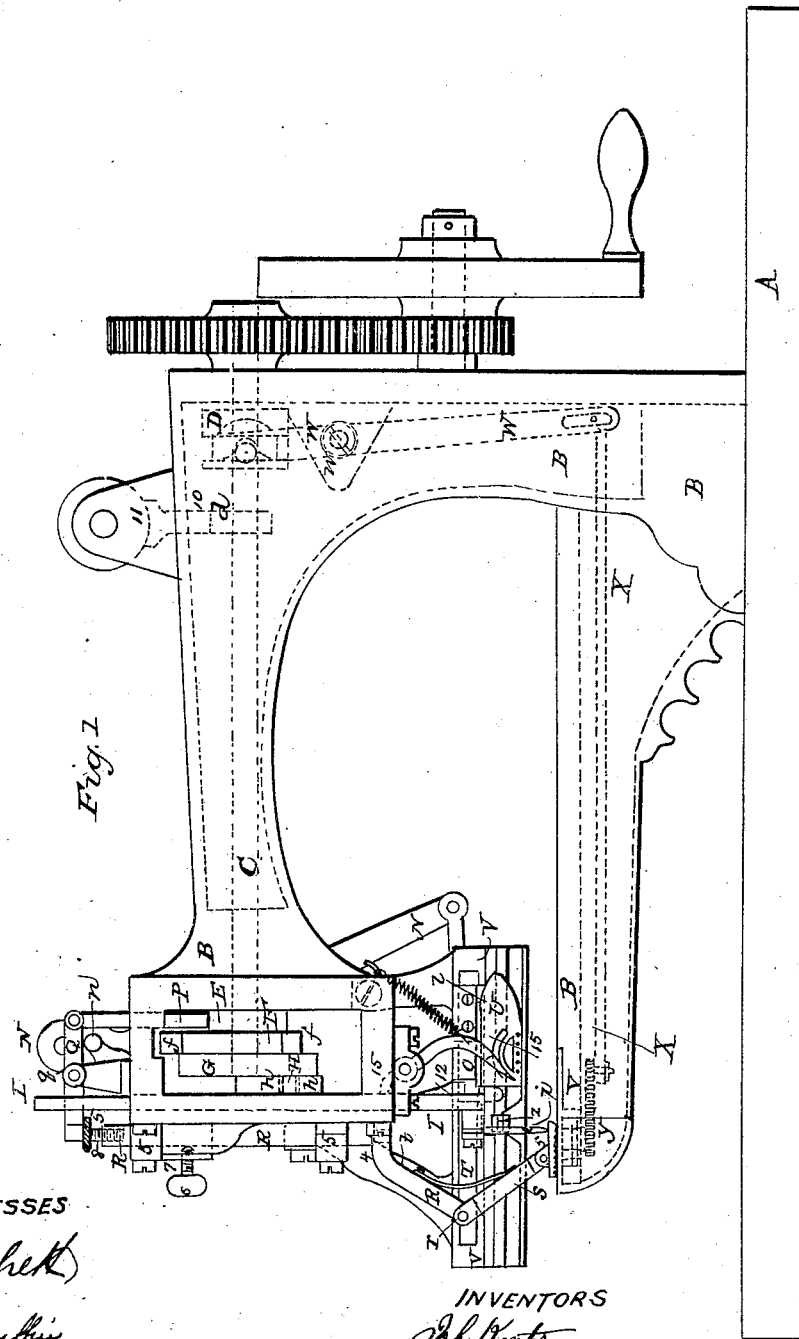


KEATS & CLARK
Sewing Machine.

3 Sheets—Sheet 1.

No. 50,995.

Patented Nov. 14, 1865.



WITNESSES
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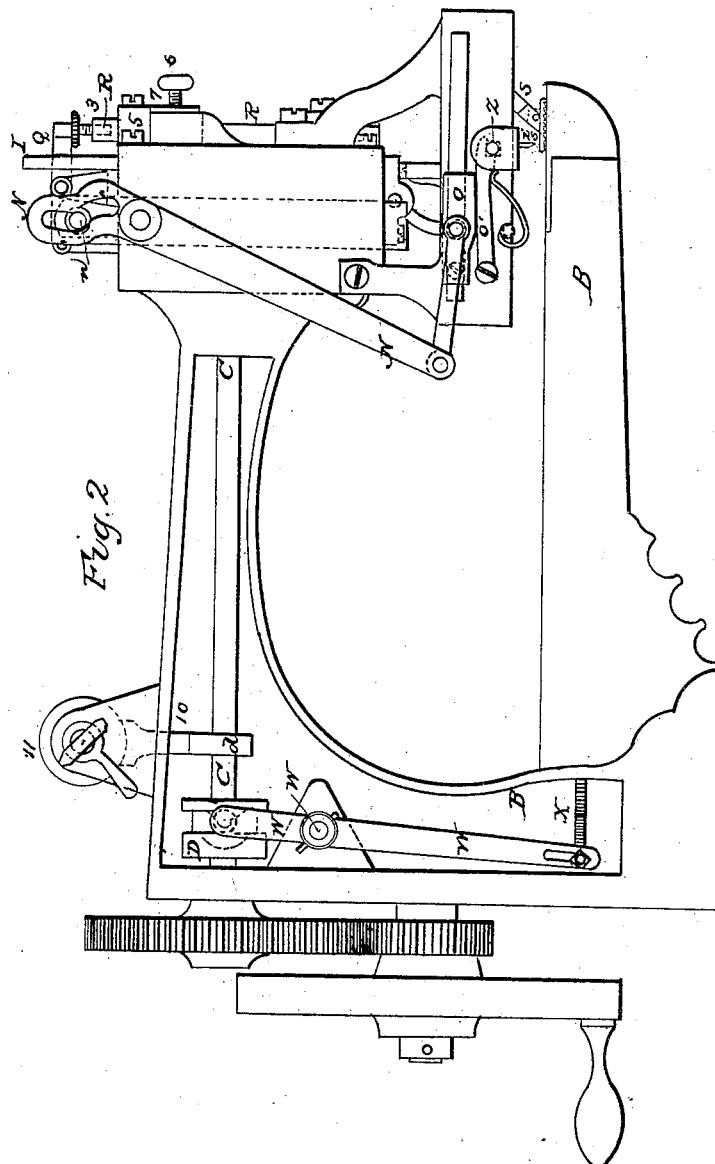
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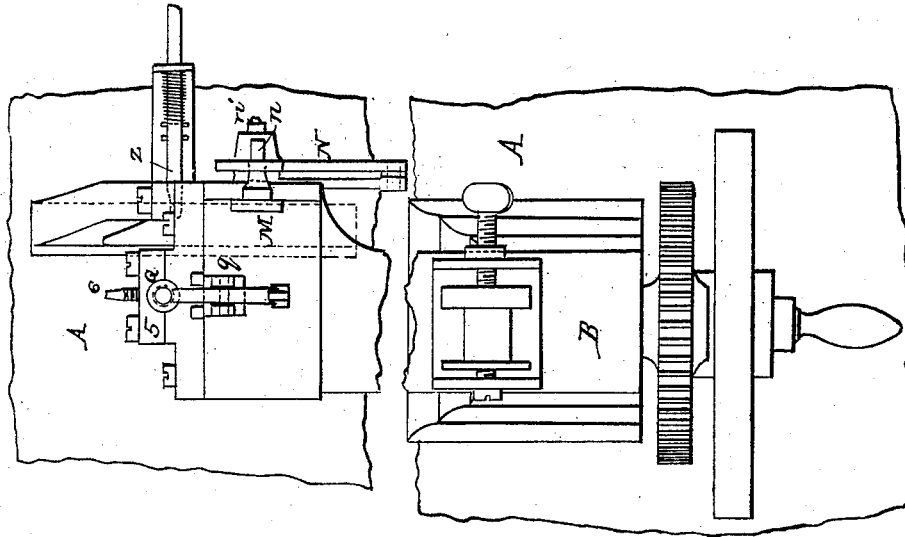
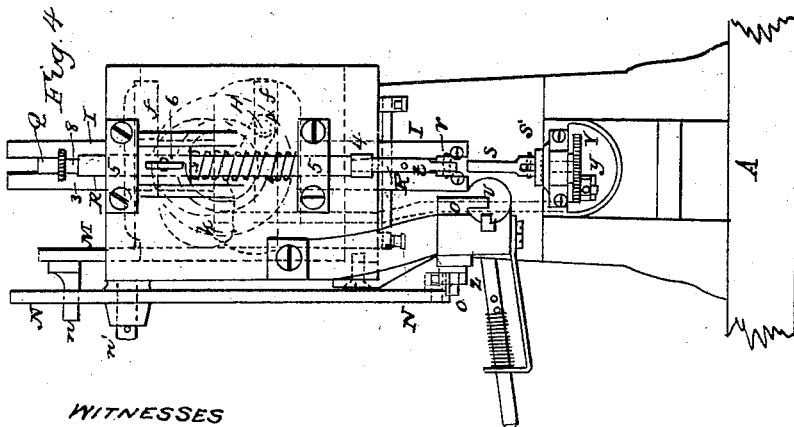


Fig. 5



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UNITED STATES PATENT OFFICE.

JOHN KEATS AND WILLIAM STEPHENS CLARK, OF STREET, COUNTY OF SOMERSET, ENGLAND.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **50,995**, dated November 14, 1865.

To all whom it may concern:

Be it known that we, JOHN KEATS and WILLIAM STEPHENS CLARK, of Street, in the county of Somerset, England, subjects of the Queen of Great Britain, have invented or discovered new and useful Improvements in Sewing-Machines; and we, the said JOHN KEATS and WILLIAM STEPHENS CLARK, do hereby declare the nature of the said invention, and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement thereof—that is to say—

This invention has for its object improvements in sewing-machines, and relates to that description of sewing-machines in which two threads are employed, a loop from one of which is drawn up through the material being sewed by means of a hook, and a shuttle containing the other thread is then passed through the loop so drawn.

The improvements also chiefly have reference to so constructing a sewing-machine that the machine may be worked with two waxed threads. For this purpose the hook is carried at the bottom of a slide which moves vertically to and fro in guides carried on the end of an arm. This arm projects from a standard carried by the bed-plate of the machine. The arm is made hollow, and through it an axis passes, from which motion is communicated to the different parts of the machine. Motion is communicated to the axis by a pulley fixed upon its end which passes out beyond that end of the hollow arm that is fixed to the standard. The outer end of the hollow arm is made of a forked shape, and the axis projects out between the forks, one of the forks being above and the other below the axis. On the end of the axis that is between the forks is a crank-pin, for giving motion to the slide that carries the hook; also, a cam for giving motion to the apparatus for moving the material to be sewed, and also an eccentric for moving the shuttle. The crank-pin gives motion to the slide that carries the hook by its working in a cam-groove cut in a piece attached to the slide, the pin having, by preference, a roller upon it to reduce the friction. The cam gives motion to the stopper or instrument that gives motion to the material being sewed, in the following manner.

The stopper is composed of a plate notched on its under side. This plate is pin-jointed to one end of a rod, the other end of which is pin-jointed to the lower end of a slide that can be moved vertically to and fro between guides carried by the forks at the end of the hollow arm. The rod being retained at an angle to the slide, the slide is constantly pressed upward by a spring; but when the notched plate is to be pressed on the material being sewed, the slide is forced down by its upper end being acted on by one arm of a lever, the other arm being acted on by the upper end of a rod, the lower end of which is acted on by the cam. As the slide is forced downward the notched plate will be pushed forward, as it is prevented from descending by the material that is being sewed and by the table that it rests upon, and as the slide moves forward it will push forward the material with it. The notched plate is kept pressed down on the material being sewed by a spring carried by the lower end of the slide.

In place of employing a notched plate at the bottom of the rod that is jointed to the slide, the end of the rod may be made fork-shaped, the fork being used to push forward the material.

The table that the material rests upon is composed of a small plate that is carried by an inclined support from the bed-plate of the machine, the plate being at a distance above it.

In order that the notched plate may be enabled to move the material being sewed in different directions, the slide which carries it is composed of a circular rod, so that by turning the rod partly round the notched plate can be made to point in different directions, and the slide can be retained in any of its positions by means of a set-screw. In order that the distance may be varied that the notched plate is caused at each of its movements to push the material forward, the length of the rod that is acted on by the cam can be varied.

The arrangement above described for giving motion to the fabric is applicable to other sewing-machines than the one herein described.

Motion is transmitted from the eccentric to the arm that moves the shuttle in the following manner: The eccentric works between two projections on a slide that is capable of moving vertically to and fro in guides carried

by the forks of the hollow arm. The upper end of this slide is connected to one arm of a bell-crank lever which turns on a pin above the upper fork. The other arm of the bell-crank descends downward, and at its lower end is pin-jointed to the arm that moves the shuttle. The shuttle is moved to and fro above the plate which supports the material being sewed, and is formed with a dovetailed recess along its back, so that the shuttle may be supported by and moved to and fro along a dovetailed projection. This dovetailed projection is formed upon a concave plate or race that fits the back of the shuttle. At the back of the shuttle a groove is also formed, which commences at its nose or point, and which proceeds along the back until it connects and becomes continuous with the dovetailed recess. Through a break or interruption in the dovetailed projection a spring loop-spreader formed on the end of a slide projects. The point of this spreader is on a line with the nose of the shuttle and it enters the groove in its back. The end of the spreader is also close to the hook of the needle, so that when the hook has drawn up a loop of the under thread through the material being sewed, and the shuttle commences to pass through the loop, the point of the spreader shall stop the loop being drawn, the spreader entering the groove at the back of the shuttle and being pressed back by the shuttle as the shuttle moves past it.

In order to insure that the point of the shuttle shall enter the loop drawn up by the hook, the slide that carries the hook is formed at its lower end with a small incline upon it, which, just before the slide completes its upward motion, acts on a small blade or instrument and causes its lower end to enter into and expand the loop, the bottom of the blade coming just above the top of the shuttle, so that the shuttle can be moved to and fro below it. As soon as the point of the shuttle has entered the loop the blade is drawn back by a spring; or, in place of this arrangement, the blade may be pressed forward at the proper time by a spring and be drawn back by the slide that carries the hook. In order that the lower thread may be laid onto the hook when it has descended through the material being sewed, the hood is caused to pass down through a hollow axis, on the exterior of which is a toothed wheel. This wheel is immediately below the small table or surface upon which the material rests. The lower thread is led through a hole in this wheel, and also through a small eye carried by it on its under side. When the hook has descended down through the hollow axis the axis is caused to revolve, and the thread is thus lapped around the hook.

The axis is caused to revolve in the following manner: With the toothed wheel on the hollow axis a toothed wheel of larger diameter gears. On this larger toothed wheel is a crank-pin, to which one end of a rod is jointed. This rod extends along the side of the support that carries the plate or table upon which the material

being sewed rests, and the rod at its outer end is provided with a pin which enters a slot in the lower end of a lever which passes up through the standard that carries the hollow arm, the standard being made hollow for this purpose. The upper end of this lever is acted on by a cam on the main shaft, which passes through the hollow arm, and is by it caused to move to and fro. This causes the rod jointed to its lower end also to be moved to and fro, and thus gives an alternate partial-rotary motion to the wheel which gears with the wheel on the hollow axis. The hollow axis is thus also caused partially to revolve. The upper end of the lever that is acted on by the cam is made of a forked shape, the prongs of which come one on one side of the cam and the other on the other, and the cam is formed by inclines or projections fixed or formed on opposite sides of a disk that is fixed on the axis, the inclines on the opposite sides of the disk being so formed that the cam is in all its parts of the same width, so that both the prongs always rest against its sides.

Having thus stated the nature of the said invention, we will proceed more fully to describe the manner of performing the same.

In the accompanying drawings, Figures 1 and 2 represent the two opposite sides of our machine in elevation. Fig. 3 is a plan view of the front and back ends of the machine, and Fig. 4 is a view of the front.

A A is the base of the machine, supporting the arm B B B B, the upper portion of which carries the shaft C C, from which the motive power is communicated to the cam D and to the eccentric-wheels E and F of the dial G.

The vertical hook *i* is attached to a sliding bar, I I, which moves up and down in a guide-box on the front of the upper portion of arm B, being operated by means of a bowl, *h*, on the stud H, which bowl works in a slot, *k*, cut in a plate, R, attached to the needle-slide I I. When therefore rotary motion is imparted to the shaft C the consequent rotation of the dial G will cause the bowl *h* to give an up-and-down motion to the needle-bar I I, and with it to the hook *i*. At the same time the eccentric F, rotating between the forks *f f*, will impart a perpendicular motion to the slide M M. Near the top of the slide M M is fixed a stud, *n*, which works in a curved slot near the end of the lever N N, causing it to rock on the fulcrum *n'*, and thus give to the shuttle-driver O, with which it is connected by the stud *o*, the motion required to drive the shuttle U backward and forward in the race V. At the same time the eccentric E, in the course of its rotation, comes in contact with the rod P, and through it raises one end of the lever Q, which, by rocking on the fulcrum *q*, causes the other end to force down the rod R R. The rod R R is connected by a knee-joint, *r*, with a second rod, S, at the lower end of which is the serrated plate *s*, connected with it by a hinge-joint. The serrated plate *s* is held in its position on the arm B by a spring, T, fixed to bar R by the pin *t* at such an angle that the upward pull of the hook *i* through any

material placed under the serrated plate *s* is not sufficient to move the bar *S* from its normal position. From this arrangement it follows that when the rod *R R* is depressed in the way described above, the motion is communicated by the rod *S* to the serrated plate *s*, thus feeding forward any material placed between it and the arm *B* in any direction within certain limits, at the will of the operator, as hereinafter described. When the rotation of the eccentric *E* relieves the pressure on rod *R R* the spring *T* causes the serrated plate *s* to return to its normal position. The rod *R R* is of cylindrical form from 3 to 4, and thus moves freely in the bearings 5 5 unless turned upon its axis and fixed to feed in the required direction by tightening the screw 6, which passes through block 7. The block 7 is arranged to slide in a slot cut in the plate at the front of the needle-box.

It will be seen that the direction in which the work is propelled will depend upon the position to which the serrated plate is turned and secured by the adjustment of rod *R*.

The length of the stitch is regulated by the screw 8 at the top of the rod *R R*. The cam *D*, in the course of its rotation, gives a rocking motion to the rod *W W*, that works on the fulcrum *w*. This motion is communicated by the horizontal rod *X X*, which passes through the lower portion of arm *B* to a cog-wheel, *Y*, thus giving the required rotation to a smaller cog-wheel, *y*. The cog-wheel *y* is provided with a guide to supply the under thread to the hook *i*, which descends through the center of the cog-wheel *y*.

On the shaft *C* is an eccentric, *d*, that in a portion of its revolution raises the slide 10, forcing it against the bottom of the reel 11, on which the under thread is wound. The incline on the lower edge of the slide *O*, as shown in Fig. 2, forces down the lever *o'*, which, by entering a notch or slit in spreader *Z*, holds it back until the slide has passed forward sufficient to release *o'* from the notch in *Z*.

Having thus described the principal parts actuated by the main shaft of the machine, we now proceed to state in what manner the stitch is formed.

Supposing the material to be fixed in the position to be sewed on the arm *B*, under the serrated plate *s*, by the rotation of the shaft *C* the hook *i* will be forced through it to the required depth through the center of the cog-wheel *y*. At this time the propeller *S s* is released by the rotation of the eccentric *E* and recovers its normal position, as described above. As the hook ascends the under thread, supplied by the bobbin through proper guides to the carrier, is laid in it by the rotation of the cog-wheel *y*, actuated, as before described, by cam *D*, and the eccentric *d* forces the slide and presses 10 against the bobbin 11, thus enabling the hook to pull the thread released, as hereinafter described, from the heel of the shuttle *U*, and so over the thread supplied by the shuttle, forming a lock-stitch in the center of

the material. Before the hook *i* has reached its highest point the shuttle-driver *O* has carried the shuttle *U* to the end of the race *V*, and the eccentric *d* in its rotation has released the slide 10 from its pressure against the bobbin 11, and a projection, 12, at the back of the needle-slide *I I*, by knocking against the upper portion of the loop-former 13, forces its lower end under the point of hook *i*, thus dividing the threads which it has brought up through the material. At this time the point of the shuttle begins to enter between the divided threads, the hook makes a slight descent, and then rests awhile, relieving the strain on the thread, which, as the shuttle proceeds, is caught by the spreader *Z*, fitting in the groove at the back of the shuttle, in the position described above. The hook now continues its descent, and at the same time the propeller moves the material. The thread is released from the hook and held in its position over the shuttle by the spreader *Z* until the shuttle has reached its farthest point. During the next ascent of the needle it is pulled tight over the shuttle-thread, as before described, thus forming, with two wax-threads, the ordinary shuttle or lock stitch.

Having now set forth the nature of our improvements in wax-thread sewing machinery and explained the manner of carrying the same into effect, we wish it to be understood that we claim—

1. The combination, in a sewing-machine, of the following instrumentalities, viz: a table on which the material rests and is supported, a reciprocating feeding-instrument to move the material along said table, and a hook, rotating guide, and shuttle, to produce a lock-stitch with two threads, all operating in combination substantially as set forth.
2. The combination, in a machine for making a lock-stitch, of a shuttle and hook, both arranged on the upper side of the table, substantially in the manner described.
3. The arrangement of the shuttle and shuttle-race of sewing-machines above the table or surface on which the material to be sewed rests.
4. The arrangement of the apparatus herein described for operating a hook, a shuttle, and a feeder from eccentrics in one needle-box, as above described.
5. The arrangement of the apparatus herein described for dividing the loop of thread that is drawn up by the hook, and for spreading the loop over the shuttle.
6. The arrangement of the apparatus herein described for shortening or lengthening the stitch, and for feeding the work in different directions, in the manner above described.

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WILLIAM STEPHENS CLARK.

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