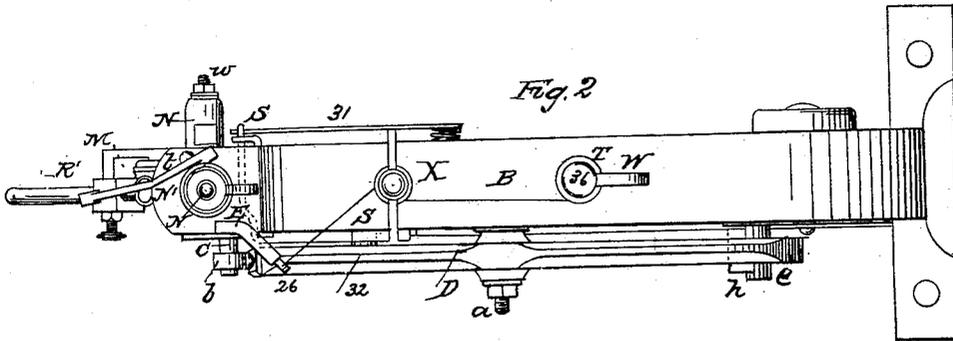
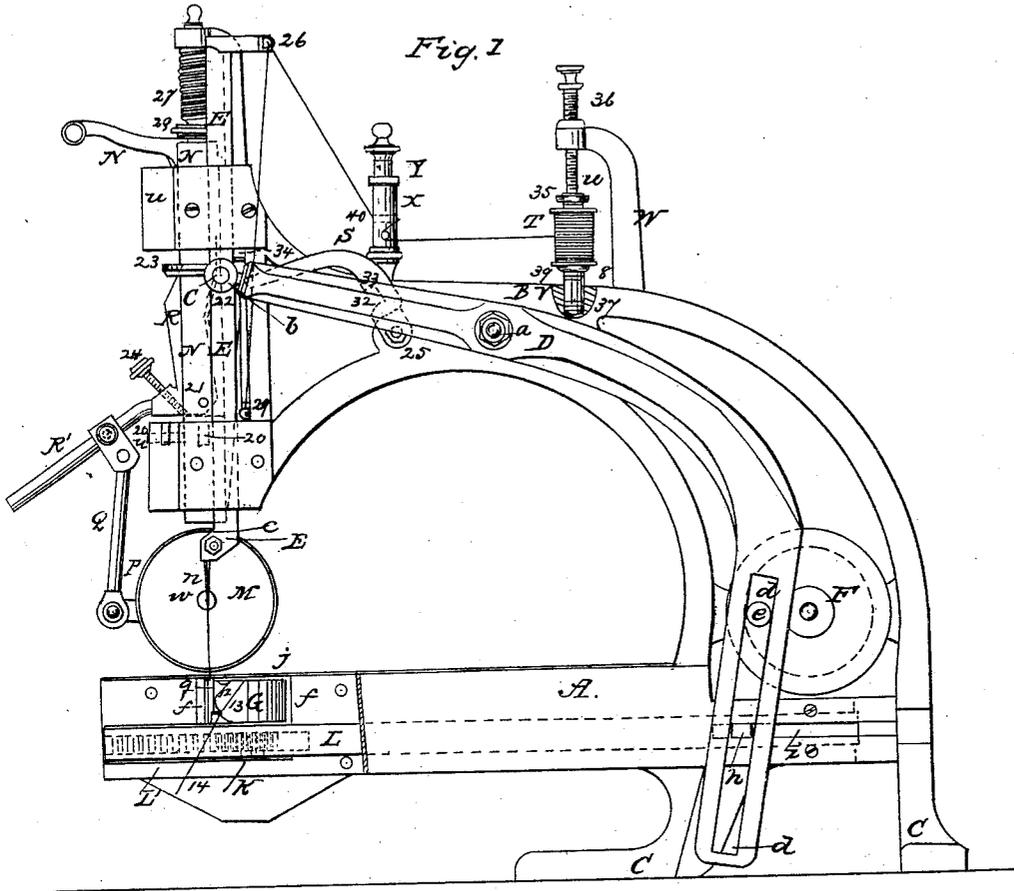


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Sewing Machine.

No. 38,447.

Patented May 5, 1863.



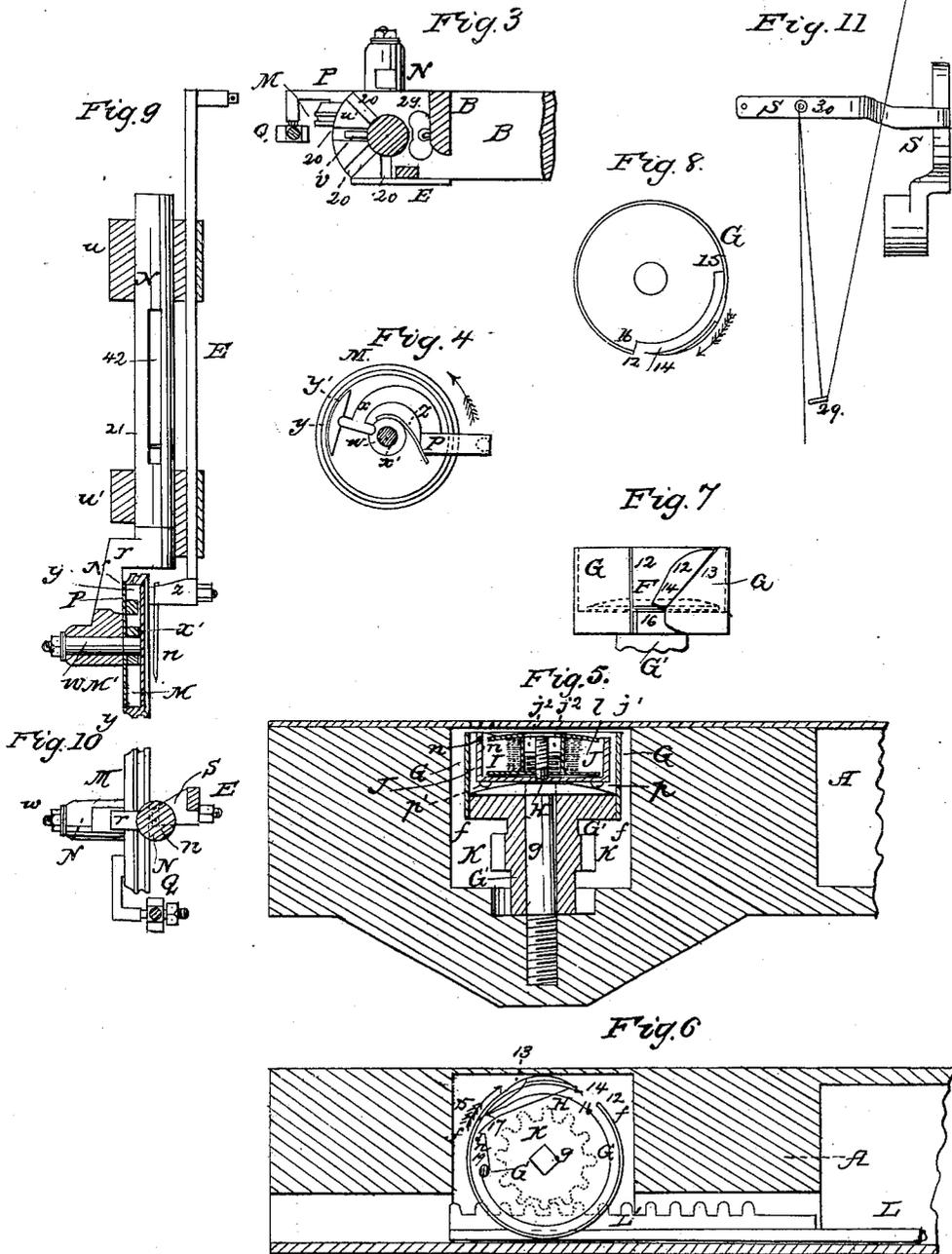
Witnesses
Mr. S. Partridge
Daniel Robinson

Inventor
F. W. Grote

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UNITED STATES PATENT OFFICE.

FREDERICK W. GROTE, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND
CLAUS O. TIETJEN, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 38,417, dated May 5, 1863.

To all whom it may concern:

Be it known that I, FREDERICK W. GROTE, of the city, county, and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view, partly in section, of a sewing-machine constructed according to the invention and embracing the several improvements. Fig. 2 is a top view of the same. Fig. 3 is a horizontal sectional view of a portion of the feed mechanism. Fig. 4 is a vertical sectional view of portions of the said mechanism. Fig. 5 is a vertical section of a portion of the stationary arm or bed on which the work is performed, and of the devices for extending the loops of the needle-thread and passing the locking-thread through them. Fig. 6 is a horizontal sectional view corresponding with Fig. 5. Fig. 7 is a side view of one of the loop-extending devices. Fig. 8 is a plan of the same. Fig. 9 is an elevation of the needle-bar and feed-wheel bar at right angles to Fig. 1. Fig. 10 is a horizontal section of the same. Fig. 11 is a view of the take-up at right angles to Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in certain novel devices for extending the loops of the upper or needle thread on the under side or back of the cloth or other material to be sewed, and carrying the under or locking thread through them; also, in a novel construction and arrangement of the feeding apparatus for feeding the cloth or other material in all directions, and in a novel mode of applying the needle in combination with such feeding apparatus to keep the planes of revolution of the feed-wheel always at the same distance from the line of motion of the needle.

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

A B C C is the framing of the machine, consisting of a long square arm, A, which constitutes the bed on which the cloth or other material is supported in the sewing operation; an

upper arm, B, which contains the guides for the needle-bar E, and carries the needle-operating lever D, the shaft F, and all the upper works of the machine and feet C C. The needle-operating lever is of curved form and works on a fulcrum-pin, a, secured in the arm B. Its shorter arm is connected by a sliding piece, b, and pin c with the needle-arm, and its lower arm has in its lower part a slot, d, which receives a crank-wrist, e, carried by the rotating shaft F, which works in a bearing in the lower part of the arm B. This crank gives the lever the necessary movement to operate the needle.

The devices for extending the loops of the upper or needle thread and passing the lower or locking thread through them consist of a peculiarly-constructed hollow upright open cylinder, G, (see Figs. 1, 5, and 6,) having an oscillating motion about its axis, a stationary hooked plate, H, arranged within and close to the bottom of the said cylinder, and a spool, I, which supplies the locking-thread placed in an open cylindrical case, J, which is arranged loosely within the cylinder G and supported upon the plate H, the whole being arranged within a suitable cavity, ff, in the arm or bed A in such a position that the needle n, passing through the hole j in the plate j', which covers the cavity f, may enter between the cylinder G and spool-case J. The cylinder G is furnished at its bottom with a concentric hollow shaft or sleeve, G', which is bored to fit easily upon the stationary upright pin, g, to which the stationary plate H is secured. This sleeve has upon it a pinion, K, which gears with a toothed rack, L', on a horizontal bar, L, which is arranged and fitted to slide longitudinally within the arm or bed A, and which derives a longitudinal movement from the needle-operating lever D by being furnished with a pin, h, which protrudes through a slot, i, in the front of the arm or bed B and enters the slot d in the lever D. The longitudinal movement of this bar L causes its rack L' so to act upon the pinion K as to produce an oscillating movement of the cylinder G about its axis once back and forth to the extent of about seven-eighths of a complete revolution for every downward and upward stroke of the needle. The hollow cylinder G has in one part of its circumference an opening, 12, and one side of this opening is chamfered off externally to a

sharp or nearly sharp edge, and finished off to a point, 14, the position of which is slightly above the upper edge of the plate H, as shown in Fig. 7, and which is turned slightly inward, as shown in Fig. 6 and 8, to enable it to pass close to the needle *n* after the latter has entered between the cylinder and the spool-case, and thereby to insure its catching the needle-thread for the extension of the loop.

Some distance behind the point 14 there is on the exterior of the said cylinder an inclined shoulder, 13, for catching the loop and causing one portion of it to pass over the top of the said cylinder and of the spool-case J and spool I, and another portion of it to pass under the spool-case; and in order to permit this there is an opening, 15 16, in the bottom of the said cylinder close to its inner periphery for the passage of the needle. The general form of the stationary plate H is that of a circle, somewhat smaller than and concentric with the interior of the cylinder G, except that it has projecting from its periphery two teeth, 17 18, something like saw-teeth, and a recess, 19, in front of the tooth 17, which is so situated that the needle passes down just in front of it. The tooth 18, which is a short distance behind the tooth 17, has its point turned slightly downward; but the tooth 17 conforms to the general surface of the plate H.

The spool I is made of metal and is arranged to turn freely within the case J, in which it is secured by a nut, *j*, fitted to a screw-thread on a central pin, *k*, which is firmly secured in the bottom of the case, and the said spool has friction produced upon it to prevent the locking-thread unwinding from it too freely by means of a spring, *l*, which is applied under the said nut within a central cavity provided in the said case, the said spring bearing upon a flange, *m*, provided at the bottom of the said cavity. The locking-thread (represented in blue color) passes from the said spool through two or more holes, *n n*, in one side of the spool-case J, being laced in and out through the said openings to produce friction upon it. The case J is made of an external diameter sufficiently smaller than the internal diameter of the cylinder G to allow plenty of room between them for the passage of the needle and the loop of the needle thread. The said case rests on the stationary plate H, and in order that it may have the smallest practicable bearing thereon it is made with two small rounded bases, *p p*, on its bottom. To keep the said case out of contact with the needle, there is a small fixed guard-bar, *q*, attached to the needle-plate *j'*, and entering the cylinder G between the said cylinder and said case.

The operation of the cylinder G and its contained parts in forming the stitch is as follows: While the needle is descending the cylinder G turns in the opposite direction to that of the arrow shown near it in Figs. 6 and 8, bringing the point 14 just beyond the needle, and as the needle rises the said cylinder turns in the direction indicated by the arrow. As the needle

commences its upward movement and the cylinder G its movement in the direction of the arrow, the portion of the thread on that side of the needle which is farthest from the center of the cylinder is left slack, and the point 14 enters between it and that portion of the thread, and as the movements of the needle and cylinder continue the shoulder 13 catches the said portion of the needle-thread and extends it in the form of a loop, as shown in Fig. 6, where, as well as in Figs. 1, 2, and 11, the needle-thread is shown in red color, after which the further-continued movement of the cylinder G carries the upper part of the so-extended loop over the top of the spool-case and spool, and the lower portion of the said loop under the spool-case, the latter portion entering the cylinder through the openings 15 16, and the loop being detained close to its neck at one side of the stationary plate H by means of the tooth 18 until the whole loop has passed the axis of the spool-case, when it has arrived in a position to pass over the tooth 17 and escape from the said plate, after which it is easily drawn over the rest of and entirely off the spool-case, which, having now passed through the loop of the needle-thread, has left the locking-thread encircled by the needle-thread. The slack of the loop is drawn up by the "take-up," which will be presently described. The stitch thus made is of the same character as that made by the shuttle sewing-machine.

The feeding device is what is known as a "top wheel," M, and the whole of the feeding mechanism is above the cloth or other material to be sewed. The wheel M, having a roughened or toothed periphery, is attached to the lower end of an upright bar, N, of which the portion above the wheel is made cylindrical and fitted to guides *u u'* in the arm B, in which it can move up and down to lift the wheel up from and bring it down upon the work, as well as turn freely to change the direction of the planes of revolution of the wheel to enable it to feed the cloth in various directions, as may be desired. The lower part of the said bar N is made with an offset at *r*, (see Fig. 9,) to bring the wheel on one side of the axis of the said bar, as shown in Figs. 9 and 10, and so enable the needle to be brought directly in line with the axis of the said bar N by giving the lower part of the needle-bar a proper bend or offset, as shown at *s* in the said figures and in Fig. 1, and thereby cause the feed-wheel to be always close to the needle, however the direction of its planes of revolution may be varied by turning the bar N. The feed-wheel is pressed down upon the cloth by means of a spring, 27, applied at the upper part of the bar N, the pressure being regulated by a nut, 28, fitted to a screw-thread on the bar, and the said bar is raised up to raise the feed-wheel and permit the introduction of the cloth under it, and permit the removal or adjustment of the same by means of a lever, N', attached to the bar N by a pin, *t*, the said lever having a cam-like end, which is brought into action on

the top of the upper guide, *u*, by raising the other end of the said lever. The bar *N* is secured to keep the planes of revolution of the feed-wheel in such direction as may be desired, and prevented from turning to change the direction of the feed until desired to do so by means of a pin, *v*, which is firmly secured in the said bar, and which enters any one of a series of notches, 20 20, (see Figs. 1 and 3,) in the top of the guide *w*. To change the direction of the feed, the bar *E* is raised by the lever *N* high enough to withdraw the pin *v* from the notches 20 20, then turned to bring the said pin over another notch, and afterward allowed to descend.

The axle *w*, to which the feed-wheel is firmly secured, is fitted to turn freely in a bearing in the lower part of the feed-bar *N*, and the feed-wheel is operated to produce the feed by means of a lever, *P*, which has one extremity constructed to form a double-pointed dog, *x*, as shown in Fig. 4, one of the points of the said dog entering a notch in a collar, *x'*, which is loose on the axle *w* of the feed-wheel, and the other entering a notch in a shoe, *y'*, which is fitted in the interior of the rim *y* of the feed-wheel. By raising the outer end of the lever *P* its dog *x* is caused to press the shoe *y'* against the rim of the wheel, and so turn the wheel in the direction of the arrow shown upon it in Fig. 4, and by depressing the said end of the lever it is caused to release the dog from the rim and move it upward thereon without moving the wheel.

The collar *x'* has attached to it a spring, *z*, which presses against a corner on the lever *P* in such manner as to support the weight of the said lever and at the same time exert a tendency to keep the dog from pressing against the shoe *y'* when not desired to press against it. The collar *x'*, shoe *y'*, and lever *P* are kept in place by means of a plate, *M'*, (see Fig. 9,) which is fitted loosely both to the axle *w* and to the interior of the rim *y*, and which is kept in place by being arranged between the feed-wheel and the bar *N*. The lever *P* works through an opening in this plate. The said lever has its movement, by which the feed-wheel is operated, produced by being connected by a rod, *Q*, with the lower arm, *R'*, of an elbow-lever, *R R'*, which is pivoted to the bar *N* by a pin, 21, and the upper arm, *R*, of which is partly received within a vertical slot in the said bar. A spring, 22, is applied within the slot to the upper arm, *R*, in such manner as to tend to throw it out from the bar *N*; but the said arm is pressed inward every time the needle-bar *N* descends by means of a wiper, 23, attached to the needle and partly surrounding the bar *N*; and by this means the lower arm, *R'*, rod *Q*, and lever *P* are raised and the feed-wheel turned. The length of feed is regulated by a screw, 24, which is screwed through the said lever *R R'* to come in contact with the bottom of the slot in the bar *N*, and thereby regulate the distance to which the arm *R* of the said lever is forced out by the spring 22; or, in-

stead of the length of feed being regulated in this way, it may be regulated by shifting the connection of the rod *Q* along the arm *R'*.

S is the take-up lever, working on a fixed pin, 25, which secures it to the front of the arm *B*, and having an eye, 30, at its extremity, through which the needle-thread is rove after passing through an eye, 26, in the head of the needle-bar *E*, and through a stationary eye, 29, secured in the arm *B*. The arrangement of the thread in the take-up is shown best in Fig. 11, which is a view of it at right angles to Fig. 1, and it will be there seen that the thread is trebled between the eye 26 of the needle-bar *E* and the stationary eye 29. The lever *S* has applied to it a spring, 31, which only requires to be strong enough to hold it up when unsupported by the needle-operating lever *D*. The said lever is drawn down by the action of the cylinder *G* in the extension of the loops of the needle-thread, and is raised up to draw back the slack of the loop through the cloth by the action upon it of a pin or projection, 32, on the back of the needle-operating lever *D*, and owing to the trebling of the needle-thread between the eyes 26 and 29 a considerable quantity of thread is kept in reserve between the top of the needle-bar and the eye of the needle, and the depression of the lever *S* is caused to yield up this thread as freely as required to permit the extension of the loop on the under side of the cloth by the action of the cylinder *G*, and the raising of the said lever is caused to draw back the said thread as rapidly as required to draw back the slack of the loop, the movement of the thread through the cloth permitted and produced by the said lever being three times as great and as quick as the movement of the eye 30 at the end of the lever. The large size to which the loop requires to be extended, owing to the large size of the spool *I*, renders such a movement of the thread, as is above described, very desirable. By using a large spool, *I*, the necessity of frequently rewinding the thread is obviated, and this is one of the advantages of the within-described construction and arrangement of the devices for extending the loops of the needle-thread and passing the locking-thread through them.

To obtain as great as practicable a movement of the lever *S*, the said lever is made with a projection, 33, on its under side for the pin 32 on the needle-operating lever to act upon, and the face of this projection, upon which the said pin 32 acts, is tangential to a circle described from the fulcrum-pin 25, so that in the movement of the pin 32 upon the said surface in raising the lever *S*, its distance from the fulcrum-pin 25 increases very little, and hence the movement of the end of the lever becomes very little slower as it proceeds, as would be the case if the surface on which the pin 32 acted were radial or nearly so with the fulcrum-pin.

Above the lever *S* there is a fixed stop, 34, attached to the arm *B* to prevent the said

lever from being raised by the spring 31 higher than is necessary while the needle-operating lever is descending.

The device for producing and regulating the tension on the needle-thread is shown in Fig. 1. The spool T which supplies the said thread is placed upon a spindle, U, and secured firmly against a fixed collar, 38, upon the lower part of the said spindle by means of a nut, 35, working on a screw-thread on the upper part thereof. The lower end of the said spindle is fitted into a bearing in a piston, V, which fits to a cylindrical hole in the top of the arm B, and the upper end of the said spindle is kept in place by the point of a center-screw, 36, which screws through the head of a goose-neck standard, W, secured on the top of the arm B. Under the piston V there is applied within the same cylindrical hole a spiral spring, 37, which presses the said piston upward against the collar 38, and produces friction between the said piston and collar, and this friction is made greater or less by screwing down the screw 36 more or less, and so producing a greater or less compression of the spring, and the tension on the thread is in proportion to the friction so produced. A washer, 39, of cloth or leather is placed between the piston and the collar 38 to enable the latter to work smoothly and render the friction uniform.

Between the tension device and the needle-bar there is arranged upon the arm B a device for oiling the thread which in sewing leather and some other materials is generally desirable. This device consists of a deep cup, X, screwed into the top of the arm B and a piston, Y, fitted easily into the top thereof. The cup has a hole, 40, drilled transversely through

it for the thread to pass through, and the piston has attached to its lower end a piece of woolen cloth, sponge, or other material which will hold a small quantity of oil and which is pressed down upon the thread by the weight of the piston, so that the thread in passing through the cup may have its surface oiled. The thread may be wound partly or wholly round the cup, which may thus be made a means of producing friction upon it by turning it upon its axis to cause the thread to be wound upon it more or less.

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

1. The combination of the cylinder G, the spool-case J, spool I, and stationary plate H, the whole constructed and arranged to operate substantially as and for the purpose herein specified.

2. The construction, combination, and arrangement of the bar N, carrying the feed-wheel and the needle-bar E, substantially as herein specified, whereby the feed-wheel is enabled to be adjusted around the needle to feed in various directions, and always kept close to the needle.

3. Operating the feed-wheel by means of a dog-lever, P, applied to the said wheel, a lever, R R', attached to the bar N, which carries the feed-wheel and connected with the dog-lever P, and a wiper, 23, attached to the needle-bar, the whole combined and arranged to operate substantially as herein specified.

F. W. GROTE.

Witnesses:

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