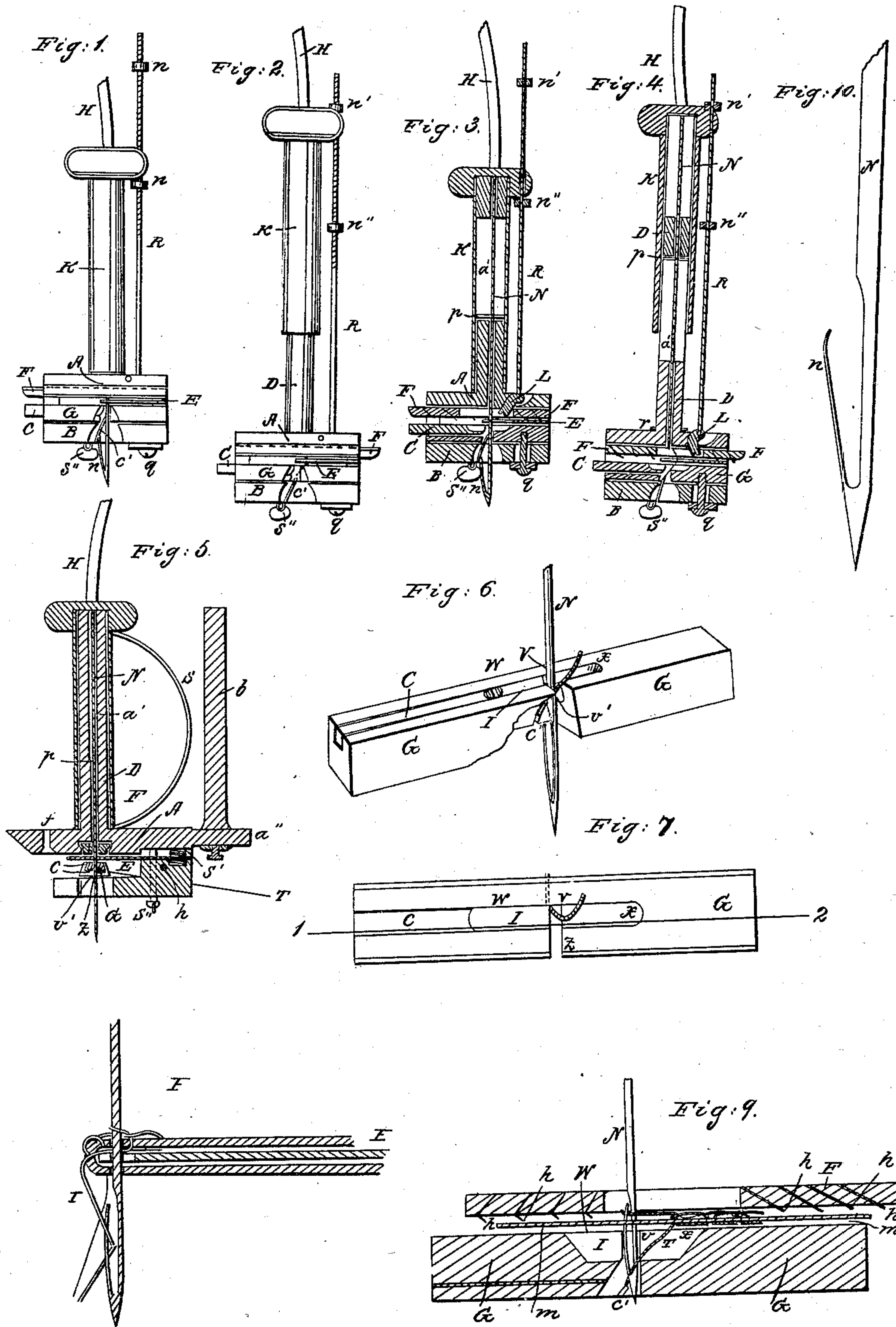


C. R. GARDNER.
Sewing Machine.

No. 15,695.

Patented Sept. 9, 1856.



No. 15,695.

UNITED STATES PATENT OFFICE.

CHARLES R. GARDNER, OF DETROIT, MICHIGAN.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 15,695, dated September 9, 1856.

To all whom it may concern:

Be it known that I, CHAS. R. GARDNER, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement 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 annexed drawings, making a part of this specification.

Figure 1 is a front view with the needle down; Fig. 2, a front view with the needle up. Figs. 3 and 4 are sections of Figs. 1 and 2. Fig. 5 is a section of Fig. 1 from the front back. Fig. 6 is a perspective of the thread-guide G. Fig. 7 is a plan of thread-guide G. Fig. 8 is a section showing the operation when the plate E is used. Fig. 9 is a section through the feed-bar and thread-guide in the line 1 2, Fig. 7, showing the operation of the machine in ordinary sewing.

A is the frame or support of the movable parts of the machine, and may be attached to a table or elsewhere by a screw at *f*, Fig. 5, or by setting the round pin *a''* horizontally in a socket provided with a binding-screw, and in the latter case the machine may be turned on the axis of the pin *a''*, and thus the machine may be adjusted to work the needle in a plane at any angle to the horizon, giving a change and variety of position not possessed by any sewing-machine in use. *a''* may be set in the socket of and at right angles to another round pin, *b*, which is set in the socket of a support to which it is desired to fasten the machine, both *a''* and *b* turning on their axes for adjustment, and when adjusted fastened by binding-screws in the sockets, thus forming a universal joint, on which the machine may be easily turned to any position that may be most convenient for the operator at the time, in which respect it differs from other sewing-machines.

The part of A marked D is a guide-post, in the center of which is the guide for the needle N, and on the outside is the guide for the knob K, which slides over the guide-post and carries the pin *p*, which passes through and carries the needle. *p* works in a slot, *a'*, in the post, and on reaching the upper end of the slot the pin *p* strikes and is stopped, thus preventing the further passage of the knob in that direction. This pin also prevents the turning of the knob and needle by passing

through them and the slot. By the use of two guides all the side strain is resisted on the outside of the post, and thus the strain and consequent wear are removed from the needle-guide, so that the needle may be accurately guided when the knob has some play on its guide.

A spring, S, of spiral or other form, may be used to carry or assist in carrying the knob in either direction, so that sufficient strength of the operator may be used in carrying the knob in one direction to strain the spring S, which will carry or assist in carrying the knob in the contrary direction. The reciprocating motion may be given to the knob by the hand of the operator; or a cord, H, may be attached to the knob, a loop of which passes to the operator's foot, when by setting the machine or passing the cord over a pulley, so as to bring the draft of the cord on the knob in a line with the post, the foot may be used for giving motion to the knob in one direction and a spring or other force for carrying it in the contrary direction. This differs from other sewing-machines in the use of the spring just described, and also in communicating the reciprocating motion to the needle without the use of crank, cam, or eccentric, the rotary motion in other sewing-machines being in this dispensed with, thus reducing the expense of construction, simplifying the machinery, and bringing the machine in a more compact form.

The form of the needle N, Fig. 10, differs from that of other needles in combining the flexible beard *n* and the sharp point in the same needle, and also in having a long shaft working in a separate guide, D, of its own.

Passing through and actuated by the knob is the feed-rod R, with adjustable nuts *n' n''*, one on each side of the portion of the knob through which it (R) passes. The knob strikes one of these nuts at the end of each stroke, and thus carries the feed-rod a short distance, which is adjusted by the position of the nuts. The feed-rod is connected with the short arm of the lever L, the other end of which connects with and actuates the feed-bar F, which slides in a guide in A, Fig. 5, and is slotted through the middle to admit the passage of the needle. The feed-bar differs from others in being provided with hooks *h h* in the face, which hook into and draw along the material

to be fed. The bar may be of wood and small steel tenter-hooks *h h* used, as represented in red in the left end of the feed-bar, Fig. 9, or an equally effective hook may be formed by fixing sharp points at the proper inclination in the face of the feed-bar, as shown in the other end of the bar in the same figure. The hooks, which should have a keen point, enter the material, and thus little surface is required on the face of the feed-bar. They act under slight pressure, and when the bar is back entirely lose their hold upon the cloth, leaving it free to be turned for sewing crooked seams.

The base B is connected to A by the pin *h*, Fig. 5, which passes through B and ears of A, extending down on each side of B in the region of *h* to form a hinge. The piece G serves as a guide for the thread and the needle-point in its downward passage, and also to hold the material up to the hooks of the feed-bar. The guide G is adjustable on and fastened to the base B by the binding-screw *q*, which passes through a slot in B, as seen in Figs. 3 and 4. The distance between the faces of the guide G and the feed-bar F is adjusted by the thumb-screw *S''*, the end of which bears against A, Fig. 5, where it is held by the action of the spring *S'*, which must be stiff enough to keep the parts in this position, and thus prevent enlarging the space between the pieces G and F by the action of the needle in passing through the cloth, my purpose being not to form a yielding pressure against the cloth, but to form an easy adjustment of the distance (between G and F) for the passage of the material to be sewed, and to relieve the parts of the pressure and consequent friction incident to the method of holding the cloth by a yielding pressure, thus leaving the cloth more free for turning in sewing crooked seams. It will be seen that the purpose of the screw *S''*, by turning which the space for the passage of the material is adjusted, is different from that of the binding-screw used in some sewing-machines for fastening the parts after the space has been adjusted by other means, the method herein described admitting of a nicer adjustment, of making a change of space with greater facility, and of opening the space by pressure upon the base B for introducing the cloth without turning the screw *S''*. The needle passes through the middle of G and through the base B, as shown in Figs. 1 and 3, and for the more convenient inspection of the operation of the needle and thread in the passage the portion of these pieces in front of the passage are cut away, and for the same purpose the passage through B is much enlarged.

In the middle of the left half of the face of the piece G there is a groove, which may be some wider at the bottom than on the face, and in this groove is fitted the adjustable slide C, which fits tight enough in the groove to keep its position, or may be otherwise fastened. The end of this slide toward the needle is cut square off on the upper side, and the lower half or two-thirds is beveled upward and to-

ward the needle, and the slide is so adjusted that in the upward passage of the needle its beard *n* shall strike and be closed in sliding past the beveled end of the slide *c*, Fig. 8, so as to pass through the cloth without catching therein. The form of the piece C is not material, and may be greatly varied. The advantage of the adjustable slide to close the beard is apparent, as in changing needles of different sizes there is a necessity of an adjustable means of closing the beard which is not found in other machines. The thread is guided into the needle-passage through G by a channel, *C'*, just at the left of the point of the needle on its downward passage, Fig. 9, so as to guide the thread near to and on the same side of the needle as is the beard. It should be remarked that in adjusting the position of the piece G it should be so placed that the needle in its downward passage will keep next the sides of the angle *w v z*, Fig. 7. In sewing, ordinarily, the thread would without the incline *I* lie close to the side of the passage *w x*, Fig. 6, in a line from *C'* to *v*, in which case, by forming the side of the guide G at the right of the needle in Fig. 5, inclining slightly in the direction of dotted line *i*, the point of the needle may be made to hug or rake the side of G, so inclined in its downward passage as to pass between that side and the thread, but a more convenient arrangement is to throw the thread away from the side *w x*, so as to permit the needle to pass easily between the thread and the side of the passage, and when the thread is carried to the left, as in Fig. 8, to throw the thread across the track of the beard, so as to be caught thereby in its upward passage. I form an incline, *I*, which starts from the top of the piece G and from the farther side of the needle-passage, Figs. 6, 7, and 9, and, extending both on the left, *w*, and right, *x*, of the needle, runs obliquely down in the direction of the line *v'*, Fig. 5. The thread *T*, which is represented in red in the drawings, being drawn up by the needle nearly in the line the needle occupies in the figures, is, when the cloth *m* is fed along, thereby carried along in ordinary sewing toward *x*, thus drawing the thread over the edge formed by the needle-passage and the incline, and slides from *v* down the incline *I*, and is thus carried away from the side *w x*, leaving the angle at *v* open for the passage of the needle, as shown in Fig. 7 and also in Figs. 6 and 9. This method of guiding the thread, which is applicable to sewing-machines using either hooked or bearded needles, differs from other machines using either of these forms of needle in so guiding the thread that it shall be in position to be caught by the hook or beard, as the case may be, of the needle, thereby dispensing with the machinery commonly used for "laying" the thread against the needle or in the hook or beard, that operation being rendered automatic by the guide operating as herein described.

E is a plate between A and B, which may be

fastened so as to have the folding or front edge on either side of the needle. It may be attached by screws to B, and its purpose is to provide an edge over which the cloth in Fig. 8 is folded, to allow the needle to pass through the fold thereof, the edge of E being notched to permit the passage of the needle and thread. This folding edge differs from the cogs or teeth used in some machines to corrugate the cloth for a running stitch, as on this the folding edge is a single one, by which the cloth passes as it is advanced the length of a stitch, each succeeding stitch being formed over the same edge, and the length of the stitches formed over this single edge is adjustable. Besides, the forms of stitch made when it is used are new, all the work formed on both sides of the cloth when sewed in a machine without the plate being, when the plate is used, formed on one side—that is, the one on the outside of the fold or double. The length of the stroke of the needle may be adjusted by adding or removing rings *r*, Fig. 4, around the bottom of the post D, against which the lower end of the knob may strike and be stopped.

I proceed to describe the operation of the machine first for sewing the ordinary chain-stitch, for which the plate E is not used, and may be detached. The needle being drawn up, as in Fig. 2, the base B is pressed down by the hand, by which the spring S' is flexed and the space between the feed-bar F and the guide G is opened for introducing the cloth, which being done and the pressure of the hand removed from the base, the spring S', acting upon the base B, closes the space between the feed-bar and the guide until the point of the screw S'' strikes the frame A, where the parts remain. The screw S'' should be so adjusted as to allow the face of the guide G to make a slight pressure against the cloth to hold it up to the feed-hooks, so that they may operate. The thread may be drawn into the groove C', as shown in Fig. 5, when motion may be given to the machine in any convenient way. It may be operated by the hand-hold of the knob K by forcing the knob down, which carries the pin *p*, and that the needle N, the point of which passes through the cloth *m*, Fig. 9, and between the channel C' and the line *v z*, Fig. 7, the upper or free end of the beard passing below the thread, and the knob, when nearly down, striking the nut *n''*, and thus carrying down the feed-rod R, which moves the lever L, and that the feed-bar F to the left, Figs. 1 and 3. Next the needle is withdrawn by raising the knob, when the beard catches the thread, as in Fig. 8, and then strikes, and in passing the incline of the closing-slide C the free end of the beard is pressed up against the shaft of the needle and thus closed, in which position the needle is withdrawn from the cloth, carrying a loop of the thread with it, and when the point of the needle is out above the cloth the knob strikes the upper nut, *n'*, and carries the feed-bar forward, the hooks *h h* in the face of which,

in passing, enter the cloth and carry it along the length of a stitch when the pin *p* reaches the top of the slot *a'*, and the further motion of the knob in that direction is stopped in positions shown in Figs. 2 and 4. In feeding the cloth the thread, which was drawn by the needle in nearly a straight line from the thread-channel to the point of the needle, is carried by the cloth along with it into the position shown in Fig. 4, in doing which the thread under the cloth is drawn over the edge of the incline I, Figs. 6, 7, and 9, and slips down over the incline away from the side *w x*, as seen in Figs. 6 and 7, when the knob is pushed down again, and the needle-point passes down between the thread and the side *w x*, leaving the loop carried up on the top of the cloth and around the shaft of the needle, Fig. 9. When fully down, the beard is open, and in passing up again catches the thread and is closed, and carries the newly-caught loop through the cloth and the previously-formed loop, which slips off the needle as the new one is drawn through it, in the manner of all sewing with bearded and hooked needles, and these operations are repeated for each stitch until the desired work is done. In slipping back the hooks of the feed-bar lose their hold of the cloth, which may then be easily turned for sewing crooked seams.

In using the plate E the cloth *m* is drawn over the edge thereof by the feed-hooks, and the needle passes through the fold of the cloth *m*, as shown in Fig. 8, from which it will be seen that, though the action of the needle is the same, the work produced is quite different from that when the plate is not used, as the thread, instead of being carried by the cloth to the right, is carried to the left, where the action of the incline on that side of the needle also throws the thread out from the side *w x* of Fig. 6 and across the track of the beard in its upward passage, so that it (the thread) is caught by the beard, as shown in Fig. 8. It will also be seen that the work of the thread showing on the under side in Fig. 9 is, although formed on the under side of the fold when the plate E is used, still on the same side of the cloth—*i. e.*, the outside of the fold—as the loops of the stitch are formed on, while on the other side of the cloth—*i. e.*, on the inside of the fold—there will show the double of the thread for every stitch. The plate may be placed on the other side of the needle from that shown in Fig. 8, in which case the loops would pass around from the top side of the fold by the feed and be carried by the edge and on the under side of the plate, when they might be again pierced by the needle and bound by the stitch formed on the under side of the fold, which would form a stitch less liable to ravel. I contemplate applying the plate to other machines, whether forming chain or other stitches ordinarily.

In adjusting the position of the machine I prefer to set it so as to sew the cloth lying in a plane obliquely to the horizon and perpendicularly, or nearly so, to the line of vision

of the operator, directed to the work when the operator is in a convenient position for running the machine, whereby I obtain a better view of the working of the machine and a more easy position for the operator than when the cloth or other material is sewed lying in a horizontal or perpendicular position, or nearly so, as is the case in other sewing-machines, for the cloth can be more conveniently guided than when passed along horizontally, and it is more easy and natural to move the knob either by the hand or foot in an oblique than in a perpendicular line.

When the machine is used with the needle pointing downward, as it is drawn and referred to in this specification, the spring S, if used, may be attached to carry the knob up; but when the knob is downward and moved by the foot the spring should be so attached as to carry the knob upward, and be flexed when the knob is drawn down by the foot.

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

1. The sharp-pointed needle having a flexible beard, as herein described, for sewing in woven, felted, or other close fabrics, in the manner set forth.

2. The adjustable slide C, so arranged as to close the beard of any sized needle that may be used in the machine.

3. The guide G, consisting of the thread-channel C' and the needle-passage, with the side thereof either slightly inclined, as described, or provided at the top with the inclined groove I, and so operating that the feed motion given to the cloth shall carry the thread in proper position that it shall be caught by the hook or beard of the needle, in the manner described.

4. The folding plate or its mechanical equivalent, for the purpose specified.

5. I do not claim running several folds or corrugations on the needle at the same time, as is done in machines for sewing with a running stitch; nor do I claim sewing along parallel with the fold, as is done in hemming, binding, and forming welts, where the length of the stitch is parallel with the fold; but I claim sewing with a machine through one fold or corrugation of the material at a time, the cloth being fed along at right angles, or nearly so, to the line of the fold, substantially as herein described.

CHAS. R. GARDNER.

Witnesses:

JOHN S. HOLLINGSHEAD,
JOHN DAVIS.