W. M. SMITH.

Machine for Sewing Button-Holes, Overseaming, &c.

No. 225,199. **Patented Mar. 2, 1880.**

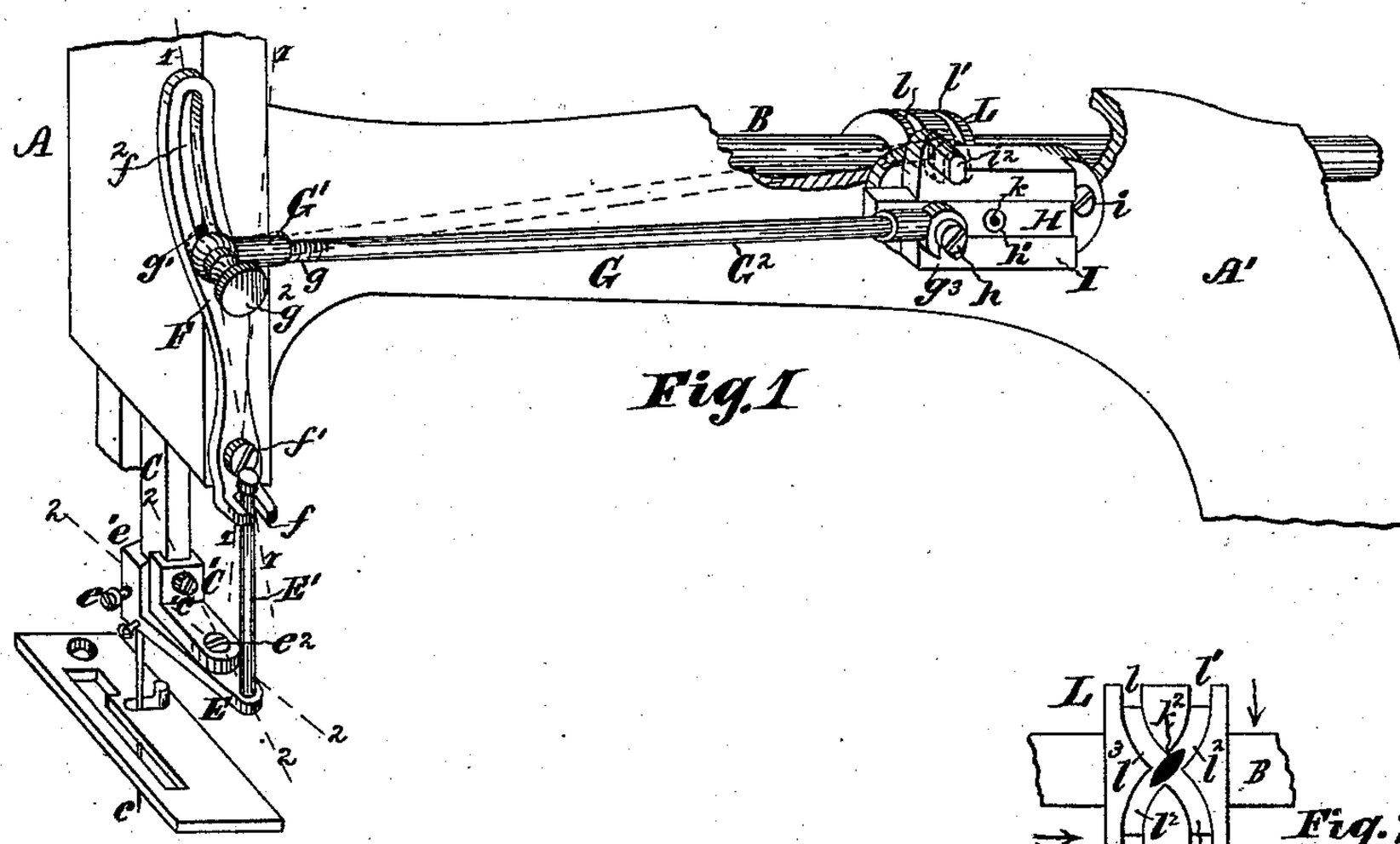

Fig. 1

Fig. 2

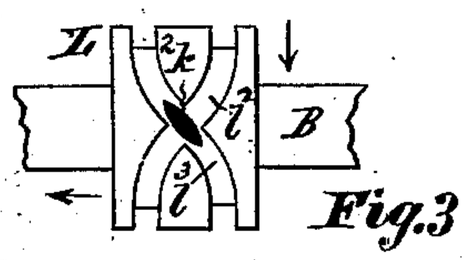

Fig. 3

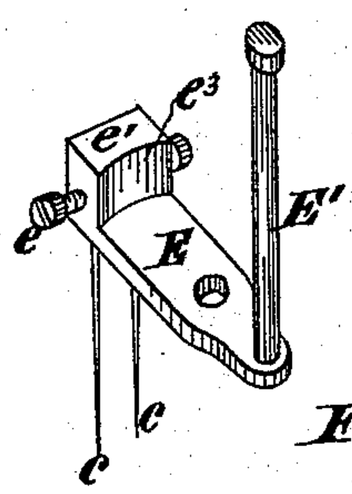

Fig. 5

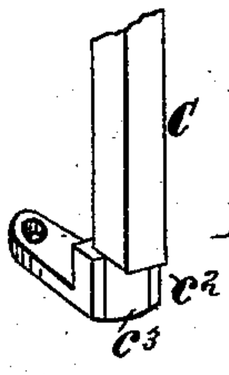

Fig. 6

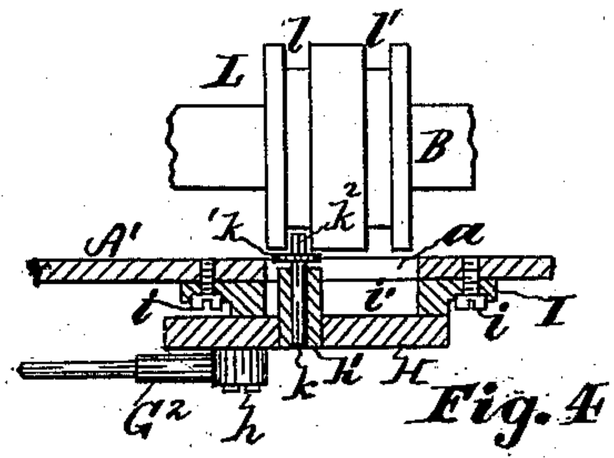

Fig. 4

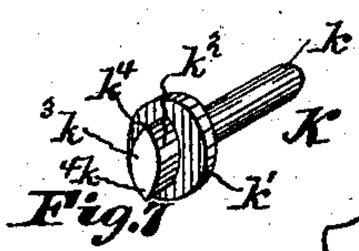

Fig. 7

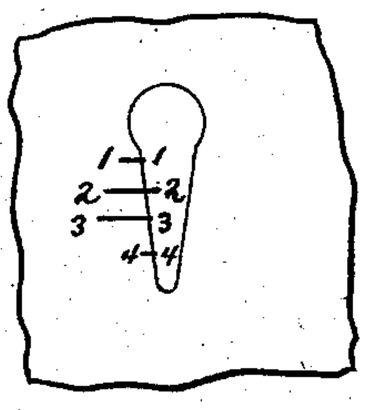

Fig. 8

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UNITED STATES PATENT OFFICE.

WILLIAM M. SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO CHARLES H. CRAWFORD, OF NEW YORK, N. Y.; SAID CRAWFORD ASSIGNOR TO C. E. L. HOLMES, OF SAME PLACE.

MACHINE FOR SEWING BUTTON-HOLES, OVERSEAMING, &c.

SPECIFICATION forming part of Letters Patent No. 225,199, dated March 2, 1880.

Application filed September 1, 1879.

To all whom it may concern:

Be it known that I, WILLIAM M. SMITH, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Sewing Button-Holes, Overseaming, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a perspective of an arm and head of a sewing-machine with main or driving shaft and my invention applied thereto. Figs. 2 and 3 are detail plans of cam-grooved pulley; Fig. 4, detail horizontal section of reciprocating mechanism of my invention; Figs. 5, 6, and 7, perspective details; and Fig. 8 is a plan of button-hole, illustrating variations in length and position of the lateral stitch.

My invention has relation to machines for sewing button-holes, overseaming, embroidering, and zigzag and other like fancy stitching; and it has for its object to provide means whereby, without moving the needle-bar laterally, the vibration of the needle from side to side, as it is vertically reciprocated, is effected by a positive movement imparted from a wheel or cylinder having cam-grooves formed in its face, said cylinder being secured to the driving or main shaft of the machine; to provide means for so adjusting the needle that any variation effected to increase or lessen the length of the lateral stitch will be produced to the one side or other of the center of vibration of the needle, and not equally so on both sides of said center.

My invention has for its further object to provide for the ready attachment of the device to ordinary sewing-machines and to readily alter the machine from a button-hole and overseaming to an ordinary machine sewing a plain straight stitch.

My invention accordingly consists in the novel construction, combination, and arrangement of parts, as hereinafter fully set forth and claimed.

Referring to the accompanying drawings, A represents the head, and A′ the arm, of a sewing-machine; B, the main or driving shaft, operating to give a vertical reciprocation to the needle-bar C. The needle *c* is not directly attached to the said bar C, but is secured by the screw *e* in the head *e′* of a lever, E, pivoted at e^2 to a bracket, C′, fastened by a screw, *c′*, to the end of the bar C. The latter is shown as cut away or recessed at c^2, and formed with a convex face or side, c^3, in said recess, which receives and bears against a corresponding concave face or side, e^3, on the head *e′* of said lever E, thereby forming guides to give steadiness of movement to the lever E as it vibrates from side to side.

E′ is a guide-post arising from the end of the lever E, as shown. Said guide-post enters and vertically reciprocates in the bifurcated end *f* of the lever F, which is pivoted at *f′* to the head of the machine, and is provided with a curved slot, f^2. The bifurcated end *f* of said lever F also acts a presser-arm to move said guide-post E′ from side to side to vibrate the needle-carrying lever E when the lever F is oscillated on its pivotal point.

G is a rod made in two sections, G′ G^2, united by the screw-threads *g*, formed on the ends of said sections, as shown. Said rod is connected at one end to the lever F by the screw *g′*, which passes through the curved slot f^2 of lever F, and is provided with an adjusting-nut, g^2, by means of which the end of said rod G can be raised or lowered and held secured at any desired position in said slot to alter or vary the amount of the lateral vibration of the needle, to increase or decrease the length of the lateral stitch. The other end of said bar G is slotted at g^3, and is secured to a slide, H, by attaching said slotted end g^3 onto the screw *h*. Said slide H dovetails into a bracket, I, fastened to the arm A′ of the machine by screws *i i*. Said bracket is provided with a pin, i^2, and is slotted at *i′*, as is also the arm A′ at *a*, for the passage of a stud, *h′*, attached to or formed on the slide H. Said stud is constructed with an opening for the reception of the shank *k* of a guide-pin, K, which is formed with a shoulder, *k′*, and a head, k^2, made a double-wedge or oval shape, having a thick middle

part, k^3, and pointed ends k^4 k^4. The head k^2 of said guide-pin K projects beyond the inner wall of the arm A′ and enters one of the two grooves l l', formed on the face of the cam-cylinder L, secured to the shaft B. Said grooves are plain straight grooves running around said pulley for about three-quarters of its periphery, when they then cross or intersect with each other, as shown in Figs. 2 and 3, thereby forming cam-grooves l^2 l^3, uniting the grooves l l', which have the effect, as the cylinder L revolves, of guiding the head k^2 of the pin K from one straight groove to the other, thereby moving said head from side to side and reciprocating the slide H the length of the distance that the grooves are apart.

It will be seen that the lever E and its appliances may be attached to the needle-bar C of an ordinary sewing-machine with but little alteration of said needle-bar; that the lever F may be secured to the head of the machine by simply drilling a hole to receive the pivot f'; that the cam-cylinder L may be bolted directly on the driving-shaft, and the bracket I may be applied after cutting the slot a in the arm. The devices are thus constructed for ready attachment to machines of a certain common construction without any radical change or alterations other than an ordinary mechanic can make in a short time at little expense.

The operation is substantially as follows: All of said parts being attached to a sewing-machine, as shown, the shaft B being revolved, the bar C and needle-carrying lever E are reciprocated vertically, the post E′ moving up and down in the bifurcated end f of the lever F. On the ascent of the needle the head k^2 of the guide-pin K passes through one of the straight grooves l l' until the needle has nearly completed its ascent; but, before doing so, said head k^2 enters one of the cam-grooves l^2 l^3, and is thereby moved from side to side, passing out of groove l into the groove l', or vice versa, thereby reciprocating the slide H and moving the rod G forward or backward, oscillating the lever F either to the right or to the left, as shown in dotted lines 1 1, Fig. 1. As said lever F oscillates the bifurcated end f moves the guide-post E′ from side to side, thereby vibrating the needle-carrying lever E on its pivotal connection to reciprocate the needle c, to make a lateral stitch in the direction shown in dotted lines 2 2 of Fig. 1, when the needle then descends in a different plane from that in which it ascended. When the needle again ascends the head k^2 is reversely moved or reciprocated by the grooved cylinder, thereby reversing the movement of the slide H, rod G, lever F, post E′, and needle-carrying bar E, to vibrate the needle back to the first described position or plane, and the lateral stitch is completed. The movements of said parts are so timed that the head k^2 will not be reciprocated until the needle has nearly completed its ascent, when the lower part of the guide-post E′ is then well up within the forks of the lever F, at which position said post can be more steadily and easily moved to vibrate the needle-carrying arm E without straining the same.

To vary the length of the stitch the end of the rod G is moved up and down the slot f^2. To shorten the stitch the end of the rod is raised to the upper part of said slot. If depressed down toward the lower part of the slot the stitch is lengthened.

If at any time the attachment is not desired to be used, by lifting and removing the slotted end g^3 from the screw h and securing it on the pin i^2 of the bracket I, as shown by dotted lines, Fig. 1, the rod G will be disengaged from the slide H, and the needle will then be vertically reciprocated only, as in the ordinary sewing-machine, the needle being held fixedly in position for that purpose by reason of the slotted end g^3 of the bar G being immovably secured to the stationary pin i^2. By unscrewing the nut g^2 and slipping the forward end of the rod G off of the screw g', and turning the section G′ of said rod to the right or left, said sections G′ G² are adjusted to increase or decrease the length of the rod G, which, when again connected to the lever F, has the effect of altering the degree of the angle of inclination of the same without varying the length of the stitch. Said variation in its inclination is communicated to the post E′, thence to the needle-carrying arm E, and the needle is thereby shifted so that it will sew close up to the edges of the button-hole or fabric to be overseamed. Thus, for instance, if the parts of the attachment are so adjusted that the needle has been making a stitch of the length shown at 1 1, Fig. 8, and the rod G is adjusted in the slot f^2 to increase the length of said stitch to the size indicated by line 2 2 in said figure, this increase would be equally distributed on both sides of the center of the length of said stitch, or of the center of vibration of the needle, and the latter would make one of its descents in the middle of the opening of the button-hole, as shown, thereby forming a much longer thread-loop than is required to bind the edge of the button-hole.

If, now, the rod G be shortened, as described, the upper end of the lever F will, by such action, be slightly moved toward the rear of the machine, varying its degree or angle of vibration, and moving the guide-post E′ to shift the needle-carrying lever E, thereby moving the needle toward the edge of the button-hole, so that it will reciprocate in one of its planes adjacent to the said edge, as indicated by lines 3 3 of Fig. 8, thereby avoiding the unnecessary length of thread-loop to bind said edges, and obtaining a greater hold upon the cloth. If, however, the length of the stitch is varied to be less than that shown by lines 1 1, Fig. 8, the needle would then pierce the cloth in both of its descents. Hence the rod G must in such cases be lengthened, thereby moving the upper end of the lever F outward to alter the angle of inclination of said lever to the reverse of that already described, so as to shift

the needle toward the edge of the button-hole, as indicated by line 4 4, Fig. 8. By altering the length of the rod the stitch may be thrown to either edge of the button-hole. If desired, two or more needles may be employed, as shown in Fig. 5. I thus laterally reciprocate the needle, for the purpose described, by a positive movement from the shaft of the machine.

I do not here claim the combination, with the vertically-reciprocating needle, of devices for reciprocating it horizontally and for changing its horizontal working position in respect to a shuttle traveling in a fixed race, as this forms the subject of a separate application for Letters Patent filed by me January 15, 1880.

What I claim as my invention is—

1. The combination of the bar C, bracket C′, and needle-carrying lever E, pivoted to said bracket, substantially as shown and described.

2. The combination, with the needle-bar and bracket, needle-carrying lever E, and its post E′, of a lever, F, with a forked end, embracing the post, and appliances for vibrating the said lever F, substantially as specified.

3. The combination, with the needle-bar C, bracket C′, and needle-lever E, having the post E′, of a lever, F, slide H, means for supporting said slide, pin K, connecting-rod G, and cam-cylinder L, constructed to reciprocate the slide, substantially as set forth.

4. The combination of the needle-bar C and bracket C′, needle-carrying lever, cam-cylinder L, and intermediate appliances whereby the needle is moved horizontally by the action of said cylinder, and adjusting devices whereby the needle may be set to operate in different positions without varying the length of the stitch, as specified.

5. The combination, with the bracket C′ and the needle-bar, of the lever E, carried by said bracket, post E′, the lever F, pivoted to the overhanging arm to operate the lever E, slide H, connecting-rod G, bracket I, adapted for attachment to the overhanging arm, pin K, and cam-cylinder L, arranged to operate the slide, substantially as set forth.

6. The combination of the needle-bar C, bracket C′, lever E, its post E′, lever F, slide H, means for supporting and operating said slide, and connecting-rod G, capable of being extended and contracted in length, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 30th day of August, A. D. 1879.

WILLIAM M. SMITH.

Witnesses:
CHAS. F. VAN HORN,
W. P. BURCHELL.