

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN SEWING-MACHINES FOR UNITING THE EDGES OF KNITTED FABRICS.

Specification forming part of Letters Patent No. 172,478, dated January 18, 1876; application filed October 16, 1875.

To all whom it may concern:

Be it known that I, WILLIAM PEARSON, machinist, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Sewing-Machines for Seaming and Binding over the Edges of Hosiery and other looped fabrics; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof to enable a person skilled in the art to make and use the said invention, reference being had to the drawing annexed, and forming a part of this specification, and the letters of reference marked thereon.

The same letters of reference apply to the same parts in the several figures.

The nature of my invention consists in an improved cam for operating the needle-carrying and looping mechanisms; an improved construction of rack-bar for holding and carrying the work; an improved looping mechanism; and an improved device for actuating the needle-carrying mechanism and rack for feeding the work.

Figure 1 shows a plan; Fig. 2, a front elevation; Fig. 3, a left-side elevation. Figs. 4 and 5 show, respectively, in plan and side elevation, detached views of the cam G, for operating the looper and needle arm and needle-arm-fulcrum bearer. Figs. 6 and 7 respectively show in plan and front elevation the looper; and Fig. 8 shows a vertical transverse section of the rack-bar or carriage, and its bearing in the bed of the machine. Fig. 9 is a detail showing the cam for operating the feed-motion.

A represents the shaft, supported in bearings B B in the standards C C. D is a driving-pulley and fly-wheel, provided with a handle or crank-pin, E, to facilitate the turning of it by hand in adjusting the machine. F is a loose grooved pulley running on the shaft A, and serves to support the driving-band when not driving the machine. G is a cam securely fastened on the shaft A, and having a groove, G¹, cut in the left side, and a groove, G², cut in the cylindrical face, and projection G³. The grooves G¹ and G² are symmetrical—that is to say, they are each of the same form, repeated, and produce the same motions twice during one rotation of the cam. H is a bent

lever, mounted upon conically-pointed screws I in the frame C C, and provided with a set-screw, H', resting on the part of the cam G in the plane of motion of the projection G³, and when the screw H' is adjusted to touch the cam G the lever H rises and falls once during each rotation of the cam G. The front end of the lever H is forked, and provided with conically-pointed screws K¹, bearing the needle-arm K. The needle-arm K is provided with a curved eye-pointed needle, K², which is held in the aperture K³ by a set-screw, K⁴. A reciprocating motion is imparted to the needle-arm K by a connecting-rod, K⁵, attached at its rear end to a lever, K⁶, supported on a fulcrum, K⁷, on the frame C, and having a roller engaging in the groove G¹ of the cam G, from which it receives its motion.

In consequence of the groove G¹ in the cam G, the needle-arm K will, through the rod K⁵ and lever K⁶, make two double strokes for each revolution of the shaft A, and as the fulcrum-bearing lever H rises and falls once only during each rotation of the shaft, when the screw H' rests on the cam G³, the needle K² will pass back and forth at each alternate stitch in a higher and lower plane.

A groove or guide, L, is formed in the bed M of the machine, open at both ends, in which a bar, N, (shown in section in Fig. 8,) is fitted, so that it may slide through, preferably, from right to left, as in Figs. 1 and 2.

Teeth N¹ are cut in the bar at regular intervals, and equidistant notches N² are so made in the edge of the bar N that the distances between the notches N² exactly coincide with the distances between the rack-teeth N¹. Bent teeth N³, grooved on their upper surface, are inserted in the notches N², and are held and clamped there by a plate, N⁴, correspondingly grooved in the upper and inner surfaces, and attached to the bar N by screws N⁴. The bar N is moved or fed from right to left by a pawl, O, engaging in the teeth N¹, and operated by a lever, O¹, moved by a cam, O², on the shaft A. The cam O² is formed with recesses, in which are fitted blocks O⁴, held therein by screws O⁵, passing through slotted holes into the cam O². The blocks O⁴ can be adjusted so that the motion of the lever O¹ and pawl O may be changed to suit rack-teeth

of different distances, and by so adjusting one of the blocks O^4 the cam O^2 may be caused to make only one motion of the lever O^1 and pawl O at each rotation of the shaft A , so that a rack, N , may be fed one tooth at each alternate vibration of the needle-arm K , or at every vibration of the needle-arm. The relative adjustment of the needle K^2 and the grooved points N^5 is such that the needle passes into the groove of each point and over the edge of the bar N . The looper P (shown in Figs. 6 and 7 in detached views) is a pointed needle, having a hook, P^7 , near the end, and a hinged latch, P^1 , which turns at each alternate loop back and forth, so as to open or close the hook P^7 and permit alternate loops to pass over each loop that is in the hook P^7 . A cam, P^8 , being placed on the lever P^2 , guides the loops up and down alternately as the needle rises and falls at each alternate stitch. The looper is inserted in the end of a vibrating lever, P^2 , and held therein by a set-screw, P^3 , being adjustable horizontally and radially to its tang therein. The lever P^2 turns on a fulcrum, P^4 , and derives motion laterally from a roll, P^5 , fixed upon it, and engaging in the groove G^2 of the cam G . Thread for the sewing-needle is passed through a tension-clamp, T , from a ball or spool, down to the eye of the needle K^2 .

The operation of the machine is as follows: The loops which form the edges of the fabrics to be united are placed in pairs on the points N^5 , and successively pass under the needle by the action of the cam O^2 , lever O^1 , and pawl O , engaging in the teeth N^1 of the rack N . The feeding motion is intermittent, and when closing up seams should preferably move but once to each rotation of the shaft A . During one half-rotation of the shaft A , when the bar N is at rest, the needle K^2 passes a loop of thread above the loops of the fabric on the point N^5 , which loop of the sewing-thread, being caught by the looper P , is held in the

hook P^7 after the withdrawal of the needle, and during the next half-rotation of the shaft A , the needle-arm fulcrum being lowered by the projection G^3 of the cam G passing from under the screw H^1 , a loop of the sewing-thread is passed through the loops of the fabric to be united and over the loop, then in the hook of the looper by the combined action of the cam or guide P^8 and latch P^1 , thus making a chain-stitch whose loops alternately engage in those of the edges of the looped fabric, forming a seam identical in construction with that generally practiced in uniting looped fabrics by a crochet-needle, and of an elasticity similar to that of the fabric itself.

When the machine is to be used to bind over the edge of the fabric, the screw H^1 is retracted, and the blocks O^4 on the cam are so adjusted that the bar N is fed along one tooth at each half-revolution, so that a chain-stitch is produced, which at each loop engages in a loop of the edge of the knitted fabric.

What I claim as my invention is—

1. The cam G , having the grooves G^1 and G^2 , combined with the looper and needle operating mechanism, substantially as set forth.
2. The rack-bar N , combined with the points N^5 and plates N^3 , constructed to clamp said points, as and for the purpose set forth.
3. The combination of the hooked looper P , having the latch P^1 and guide P^8 of the needle K^2 , and actuating mechanisms, substantially as described and shown.
4. The adjustable cam O^2 , lever O^1 , pawl O , and rack N , combined with the double cam G , provided with the projection G^3 , and adjustable screw H^1 , and needle-actuating mechanism, as and for the purpose set forth and described.

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Witnesses:

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