No. 632,360. Patented Sept. 5, 1899.

G. J. NOPPER.

STITCH FORMING MECHANISM FOR BUTTONHOLE SEWING MACHINES.

(Application filed June 20, 1898.)

(No Model.) 2 Sheets—Sheet 1.

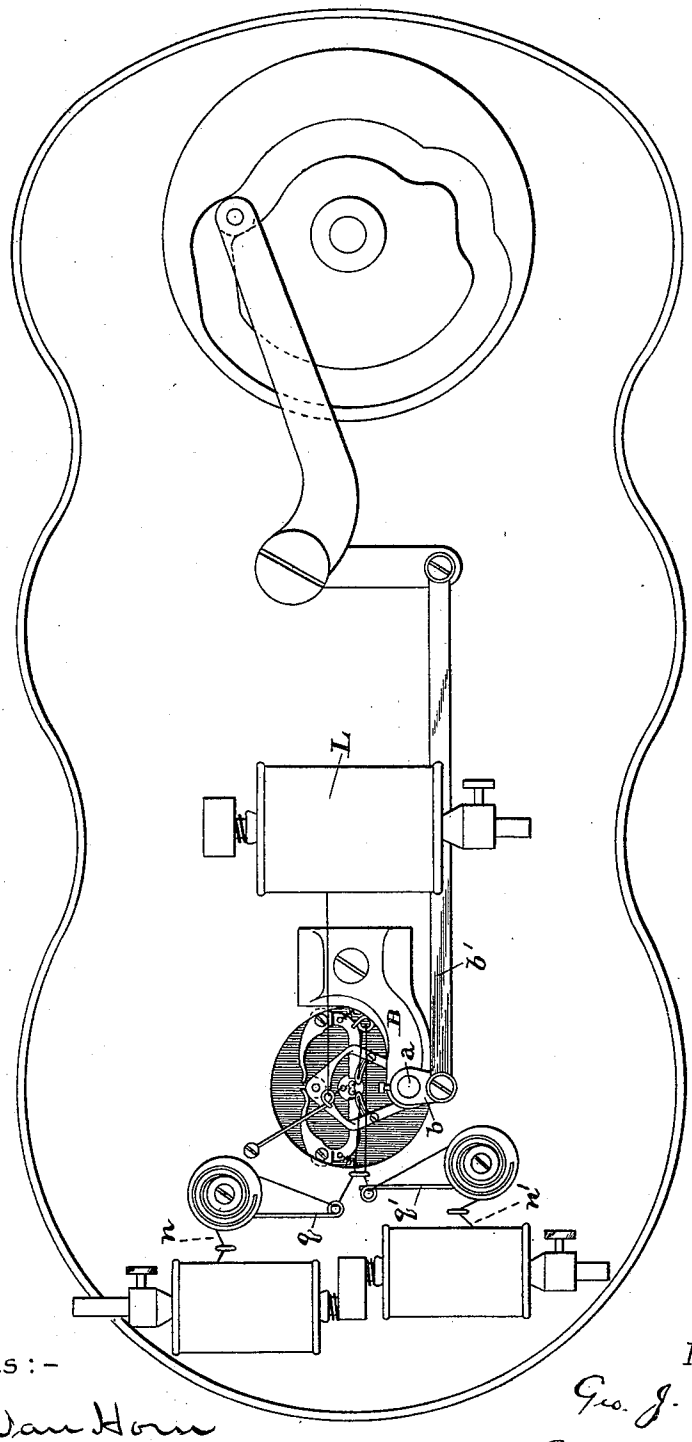


Fig. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

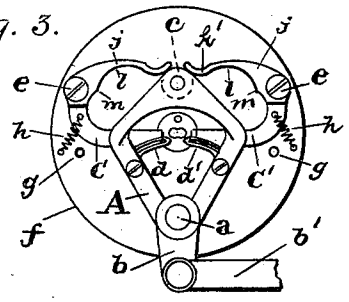


Fig. 4.

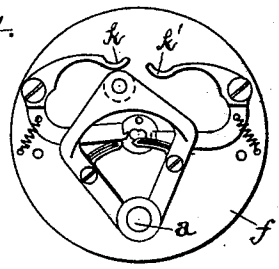


Fig. 2.

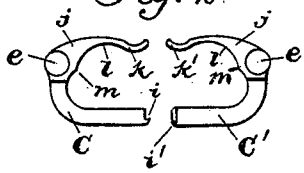


Fig. 5.

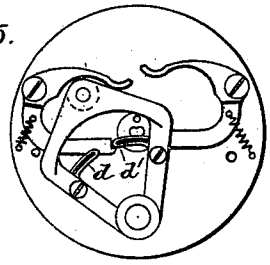


Fig. 6.

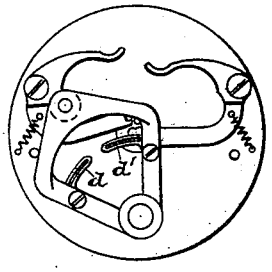


Fig. 7.

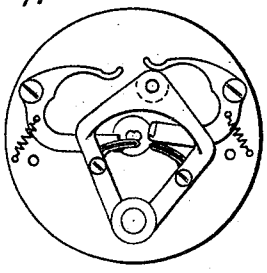
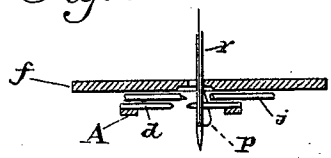


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE J. NOPPER, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, OF NEW JERSEY.

STITCH-FORMING MECHANISM FOR BUTTONHOLE-SEWING MACHINES.

SPECIFICATION forming part of Letters Patent No. 632,360, dated September 5, 1899.

Application filed June 20, 1898. Serial No. 683,947. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. NOPPER, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Stitch-Forming Mechanism for Buttonhole-Sewing Machines, of which the following is a specification.

This invention relates to improved stitch-forming mechanism for buttonhole-sewing machines.

The object of the invention is to provide improved mechanism for what is known in buttonhole-stitching as the "pearl-stitch," a close imitation of the best character of hand-worked buttonhole-stitching.

My improvements are designed to be attached to any of the well-known buttonhole-sewing machines in place of the other stitch-forming mechanism used thereon.

Machines of this class have heretofore employed two loopers, one of the loopers having an eye carrying a lower thread, and two spreaders. In these prior machines two threads have been employed, the upper one being carried by the machine-needle and the lower one by the looper having the eye. The features of my invention consist in providing the spreaders with a certain cam end, in providing each of the two loopers with an eye, and in employing two lower threads instead of only one, the improved machine thus employing three threads.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is an inverted or bottom view of the bed of a buttonhole-sewing machine, showing my invention. Fig. 2 is a view of the spreaders separately. Figs. 3, 4, 5, and 6 show the improved spreaders and the two loopers each with an eye, the parts, as shown, being in the inverted position. Said figures show the several successive positions the parts take in forming the right-hand half of a pearl-stitch, Fig. 3 showing the position of the parts at the beginning of the stitch. Fig. 7 is a view of the stitch-forming parts in position for making the left-hand half of a pearl-stitch. Fig. 8 is a vertical section of plate having the needle-slot and shows the needle and loop of upper thread.

It should be stated that my invention has nothing to do with mechanism for operating the needle, nor with the feed mechanism, nor yet with mechanism for operating the looper-carrier, it being understood that my present improvements may be employed in connection with any of the well-known mechanisms for the several purposes that are suitable.

Referring to the drawings, the letter L designates the ordinary cord-spool used in buttonhole-machines, and n n' designate the two lower threads, each being on a separate spool. The spool for the upper thread which passes to the needle is not shown. Two separate lower threads employed with the upper thread is therefore a feature of my improvement.

The looper-carrier A oscillates immediately below the two spreaders C C'. The looper-carrier is pivoted at a on a bracket-arm B, and projecting from said carrier is an arm b, to which is attached the rod b', that imparts movement. The looper-carrier A at a point opposite the arm b has a roller c, which acts on the cam-surfaces of the spreaders C C'. The two loopers d d' are of the same length instead of being, as usual, of unequal length, and each has a longitudinal groove and at its point has an eye. Thus each looper carries one of the two lower threads n n'.

The two spreaders C C' are each pivoted by a screw e to a plate f. Two stop-pins g are on the plate, one for each spreader to abut against, and a spring h acts on each spreader and serves to press it against the stop-pin.

The form of the spreaders is shown in the drawings. Each spreader has at its thread-operating end a notch which forms a hook by which one of the lower threads is engaged. The function of the hook i on the left-hand spreader C is to engage the lower thread n' of the right-hand looper d'. The function of the hook i' on the right-hand spreader C' is to engage the lower thread n of the left-hand looper d. Each spreader has a cam-arm j, on which the roller c of the looper-carrier acts. This general form of spreader is not my invention; but I have added to the cam-arm a new feature, consisting of a convex inward-curved cam end, (marked k on one and k' on the other arm.) Each of the cam-arms

j has at a point near its pivot e an inward shoulder m, and between the said cam ends k and the shoulders on each of said cam-arms is a hollow or concave portion l.

An ordinary take-up-spring device q is employed with the lower spool-thread n, and a similar device q' is employed with the other lower thread n'. These take-up devices draw back the slack and insure the proper tension on the threads.

The operation of forming the stitch is as follows: The needle r comes down through the fabric adjoining the slit of the buttonhole, and then by a slight upward motion of the needle the upper thread is thrown out laterally into the form of a loop p, (see Fig. 8,) through which one of the lower threads—say n'—is carried by the right-hand looper d', moving from right to left. (See Fig. 4.) The left spreader C at this juncture is moved slightly horizontally by the roller c bearing against its convex cam end k. The hook i on the left spreader is thereby moved aside sufficiently to permit the lower thread n of the left looper to pass beneath the said left spreader, and thus prevent said thread from engaging with the hook i on the left spreader, and this is the function of the new convex cam end k or k'. The next position in succession is shown in Fig. 5, which represents the roller c in the concave portion l of the cam-arm j, thus permitting the said spreader C to be drawn into contact with the stop-pin g by the spring h, and in which position of the spreader the lower thread n of the left looper d is still beneath the said spreader C, and the parts are now in position for the hook i on the left spreader to engage the lower thread n' of the right looper d'. As the looper-carrier A continues to swing toward the left to complete its oscillation the roller e will contact with the inward shoulder m on the cam-arm, and thereby the left spreader is moved to the full extent of its throw to the position shown in Fig. 6 and is retained in this position until the needle has passed down through the loop formed by the lower thread n' of the right looper d', held in the hook i of the left spreader C. As the needle descends and throws out a lateral loop of the upper thread the left looper d swings toward the right (see Fig. 7) and the thread-loop of the upper thread which encircles the right looper d' slips off and is drawn upward toward the fabric by the descent of the needle through the buttonhole-slit in the fabric and the action of the upper take-up spring, which is of ordinary construction. As the left looper swings toward the right the lower thread n' remains around the needle in its position at the left-hand end of the needle-slot. The said lower thread n' has thus formed a loop about the loop of the upper thread brought down by the needle through the buttonhole-slit. Furthermore, as the left looper d swings fully to the right it passes through the lateral loop of the upper thread and its lower thread n is carried through and the roller c will strike the inward shoulder m of right spreader C' and throw it aside to its fullest extent, the hook i' of the right spreader carrying the lower thread n between the left looper and the fabric, so as to form a loop through which the needle may descend in passing down through the fabric. As the needle descends and then throws out a lateral loop of the upper thread the left looper swings toward the left and the loop of the upper thread which encircles the left looper slips off the point and is drawn up toward the fabric by the descent of the needle through the fabric and the action of the take-up device on the upper thread, together with the action of the right looper.

The operation is the same with the right and left spreaders and the right and left loopers.

Any buttonhole-sewing machine may be altered and the parts herein described as my construction may be substituted.

It is obvious that the form of looper-carrier here shown may be varied and that the construction of the spreaders may also be varied.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a buttonhole-stitch-forming mechanism, the combination of a looper-carrier having two loopers each carrying a different lower thread; a needle carrying an upper thread; two separately-pivoted spreaders each of which engages a different lower thread, and mechanism for operating the said elements, whereby a stitch is formed by the employment of three threads.

2. In a buttonhole-stitch-forming mechanism, the combination of a looper-carrier having two loopers of equal length and each carrying a different lower thread; a needle carrying the upper thread; two spreaders each having a hook which engages the lower thread of a different one of the loopers and mechanism for operating the said elements.

3. In a buttonhole-stitch-forming mechanism, the combination of a looper-carrier having two loopers termed "left-hand looper" and a "right-hand looper" each carrying a different lower thread; two spreaders, to wit, a left and right, each having a hook, the hook of the left spreader arranged to engage the lower thread of the right-hand looper, and the hook of the right spreader arranged to engage the lower thread of the left-hand looper; a needle carrying an upper thread, and mechanism for operating the said elements.

4. In a buttonhole-stitch-forming mechanism, the combination of a looper-carrier having two loopers of equal length and each carrying a different lower thread; two separately-pivoted spreaders each having a cam-arm provided with an inward-curved cam end, k, or, k', an inward-projecting shoulder, m, near the pivot, and a hollow or concave curve, l, between said cam end and shoulder; a roller on the looper-carrier said roller acting on the parts of the cam-arm of the spread-

ers; a needle carrying an upper thread, and mechanism for operating the said elements.

5. In a buttonhole-stitch-forming mechanism the combination of a looper-carrier having two loopers each carrying a different lower thread; a needle carrying the upper thread; and separately-pivoted spreaders each having a cam-arm provided with an inward-curved cam end and an inward-projecting shoulder near its pivot, mechanism for operating the said elements whereby a pearl-stitch is formed by the two lower threads interlocked by the upper thread passing through the loops of said two lower threads.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE J. NOPPER.

Witnesses:
CHAS. B. MANN,
CHARLES B. MANN, Jr.