(No Model.)

L. MUTHER.

METHOD OF FORMING ELASTIC STITCHING.

No. 344,492. Patented June 29, 1886.

Fig. 2.

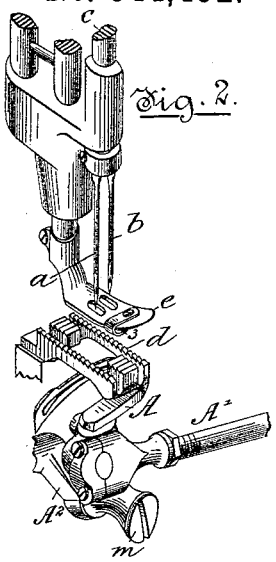


Fig. 1.

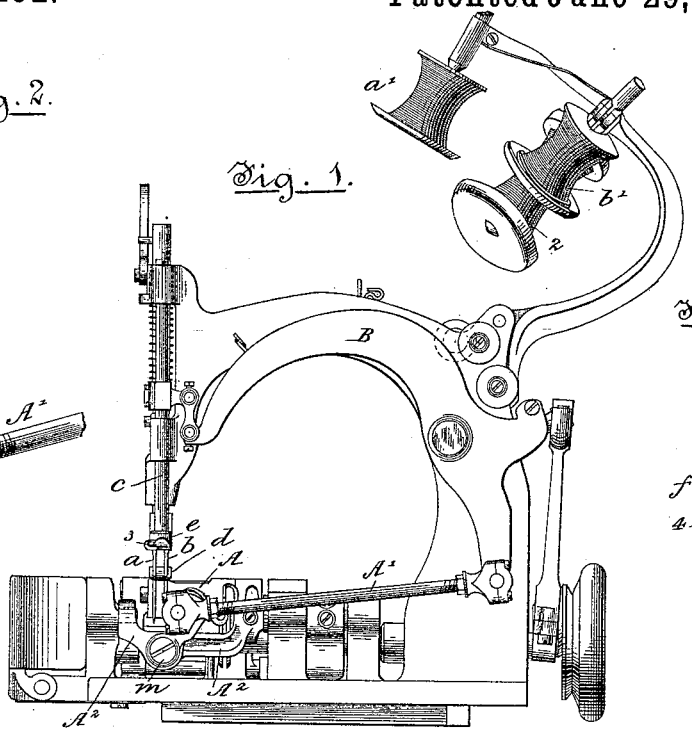


Fig. 2a.

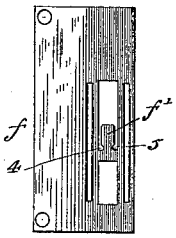


Fig. 3.

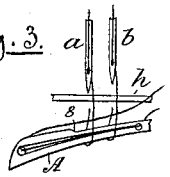


Fig. 4.

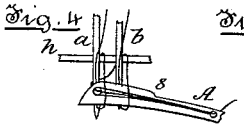


Fig. 5.

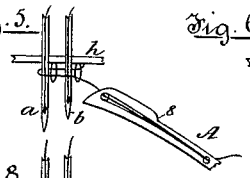


Fig. 6.

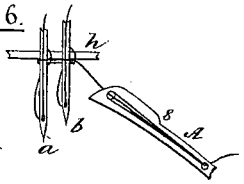


Fig. 7.

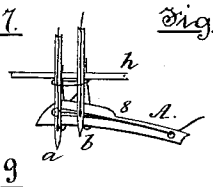


Fig. 8.

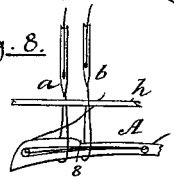


Fig. 9

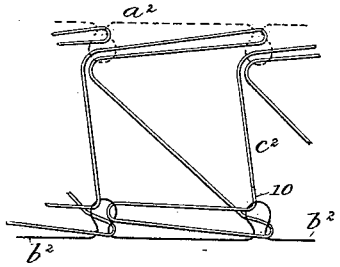
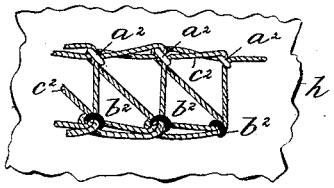


Fig. 10.



Witnesses:
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John F. C. Brinkhoff

Inventor;
Lorenz Muther,
Per: Crosby & Gregory
his Attys.

UNITED STATES PATENT OFFICE.

LORENZ MUTHER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNION BAG MACHINE COMPANY, OF SAME PLACE.

METHOD OF FORMING ELASTIC STITCHING.

SPECIFICATION forming part of Letters Patent No. 344,492, dated June 29, 1886.

Application filed August 31, 1885. Serial No. 175,737. (No model.)

To all whom it may concern:

Be it known that I, LORENZ MUTHER, of Chicago, Cook county, State of Illinois, have invented an Improvement in Methods of Forming Elastic Stitching, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In accordance with my improved method of forming stitches two needle-threads are carried through the material to form loops at the under side thereof. These two loops are entered by a looper or under-thread carrier, which, as the needles rise, holds the loops below the material, and the needles having risen above the material the looper is moved laterally opposite the direction of the feed-bar enough to place the looper at the opposite side of the path of reciprocation of the needles, and the feed takes place, and while the looper yet holds the loops of needle-thread, the feeding movement having been completed, the two needles descend at the rear side of the looper and enter the loop of looper-thread at the left or farthest side of each of the loops of needle-thread while they are yet held on the shank of the looper, and while the needles are depressed below the material the looper is withdrawn from the loops of needle-thread, and at the same time is moved slightly laterally or in the direction of the feed of the material, and is again moved quickly forward into the loops of needle-thread, the needles having been raised only far enough to form loops, and thereafter the needles are raised while the looper holds the loops and after the needles have been raised above the material the looper (it yet holding the loops of needle-thread) is again moved laterally or opposite the direction of movement of the feed for a sufficient distance to place the rear side of the looper in the path of the descending needles, and the feed is made to operate as before, and the material having been moved the distance of a stitch the needles again penetrate it, and the outer or left-hand needle enters the loop of under thread, each needle descending through the said loop of under thread at the left or farthest side of the loop of its own thread, then held upon the looper, and the latter is then retracted and at the same time moved laterally backward in the direction of the feed and again moved quickly forward into the loops of needle-thread.

Seams in elastic goods—such as knitted fabrics—must have substantially as much elasticity as has the material in which the stitching is made, and in such work, as well as embroidery work, it is frequently desired to show most prominently a better or more expensive under thread. In accordance with my invention the better or more expensive thread is displayed by making more tension on the needle-thread than upon the looper or under thread, the latter being made not only to extend through the loops of the upper thread but also to extend from one to the next stitch in the line of stitching, the said looper-thread extending across the material from one to the other line of stitching and from one to the other points at which the needles penetrate the material. A difference in tension upon the said threads will vary the appearance of the stitch as to the eye, but not its elastic property or strength, which is the main object of my invention.

Prior to my invention I am aware that loops of thread carried by two needles have been entered by a shuttle, the thread of the latter thus connecting two parallel rows of stitches; but such a stitch has not a proper amount of elasticity for use in connection with knitted goods.

My invention in method of forming an elastic stitch from three threads therefore consists, essentially, in passing two loops of upper thread in parallel lines of stitching through the material and through a loop of under thread, and immediately thereafter, while the loops of upper thread are yet in the material, passing a loop of thread through the two loops of upper thread below the loop of looper-thread, then taking up the loops of upper thread while entered by the loops of under thread, and thereafter, while holding the loops of upper thread below the material, feeding the material for a new stitch. The upper threads are then again made to descend and enter the loop of the looper-thread, as before such method of operation, leaving at the under side of the material two parallel lines of

stitching, enchained by a third thread, which permits the material in which the stitching is made to stretch without liability of breaking the stitches.

Figure 1 in side elevation represents a sewing-machine by which to practice my invention, the cloth and throat plates being removed. Fig. 2 is a detail of the presser-foot, the two needles, the looper or under thread carrier, and part of the feeding-bar. Fig. 2^a shows the throat-plate detached. Fig. 3 shows the looper in position for the loops of upper thread to descend through the loop of under thread at the rear side of the looper. Fig. 4 shows the needles and loops of upper thread entering the loop of under or looper thread. Fig. 5 shows the looper retracted from the loops of upper thread preparatory to moving the looper laterally in the direction of the feed. Fig. 6 shows the needles and loops of thread thrown out from the eyes of the needles by a full descent and partial rise of the needles. Fig. 7 shows the looper and the loop of its thread as passed through the two loops of thread carried by the two needles, the looper passing close to the rear sides of the two needles or the farthest sides of the two needles in the direction of the feed. Fig. 8 represents the two needles raised and the feed as taking place, the loops of needle or upper thread being held closely by the looper. Fig. 9 is a detail of the stitching, the material being supposed to be transparent, the different threads being shown by different lines; and Fig. 10, a view of the side of the material on which the looper or under thread is shown most prominently.

Referring to the drawings, the looper-frame A^2, the looper A, pivoted thereto, the pivot *m*, the pitman A′, and the needle-bar-actuating arm B are substantially the same as in United States Patent No. 299,568, to which reference may be had, the looper herein shown partaking of the movements described in the said patent and co-operating with the eye-pointed needles *a b*, carried by the needle-bar *c*, in the same time with relation to the reciprocations of the needles and of the movement of the feeding-bar *d* as does the looper in the said patent; but herein the looper co-operates with two rather than with one eye-pointed needle, which results in the formation of two parallel lines of stitching joined by a third thread, as will be described, the stitching being such as not to interfere with the elasticity of the material in the line of stitching. The upper thread entering the eye of the outermost or left-hand needle *a*, viewing Fig. 1, is taken from the spool *a′* and led through usual thread-guides. The upper thread, to enter the eye of the inner or right-hand needle, *b*, is taken in like manner from the spool *b′* and the thread for the looper A from the spool 2. The looper has two eyes, and the loop of its thread is taken therefrom by the needles *a b* when the latter descends at the rear side of the looper in the direction of the feed of the material, the looper, when it enters the loops of needle-thread, passing to the rear sides of the said needles in the direction of the feed, the looper thus occupying at different times while the needles are below the material positions both at the front and at the rear side of the said needles.

The presser-foot *e* is shown as provided with two needle-holes, one for each needle, and herein the said foot is shown as provided with a guide, 3, to receive the edge of the upper one of two pieces of knitted or other material to be united in the machine, the said edge merely overlapping the edge of the other piece of material.

The throat-plate *f* (shown detached in Fig. 2^a, and to be secured to the cloth-plate in usual manner) is provided with two needle-passages, 4 5, and with a tongue, *f′*, between, to prevent the material from being puckered as the stitch is drawn taut, also having openings for the passage of the points or teeth of the feed-bar.

In case the machine is used for embroidery stitching the guide 3 of the presser-foot will be omitted.

The throat herein described and shown forms the subject-matter of another application, Serial No. 175,740, filed August 31, 1885, and therein it is claimed together with two needles and a looper, such as herein shown but not claimed. Supposing the two needles and the looper to be threaded each with its own thread and a stitch to have been made in the material lying on the usual bed-plate, (not shown,) and supposing the two needles to be descending toward the material *h* and the feed to have taken place, with the parts referred to in the positions stated the looper will occupy the position Fig. 3 with relation to the needles, and to make the next stitch the needles will descend at the rear side of the looper A and pass into the loop of looper-thread, each needle entering the said loop at the farther or left-hand side of the loop of its own thread, yet held on the looper-shank, as shown in Fig. 4. In this condition the needles *a b* will continue to descend, as shown in Fig. 5, and the looper will be drawn backward to the right past the needle *b*, and will then be moved somewhat laterally in the direction of the feed of the material, and the needle-bars, commencing to rise, will throw out their loops of needle-thread, as in Fig. 6, in usual manner, and the looper A, coming forward as the needles *a b* rise, will enter both loops of upper or needle thread at the rear sides of the needles in the direction of the feed of the material, as in Fig. 7, and the looper having engaged the loops of needle-thread the needles will be fully lifted, drawing their loops closely about the looper, and the feed will then take place, and as the feed takes places the looper will be moved slightly in the direction opposite the direction of feed, to thus enable it to occupy a position at the front side of the needles as the lat-

ter again descend to form a new stitch, the said needles again entering a new loop of looper-thread.

In the formation of the stitching herein described the stitch is completed by the pull on the threads in the production of the succeeding stitch; or, in other words, one stitch is not made and set fully into the material before the next stitch is commenced.

The shoulder 8 on the looper A and the general shape of the looper are such as to cause the looper as it is vibrated in the loops of upper thread to draw the loop of thread upon it, and extending from the needle to one side far enough to permit the needle *a* to descend through the loop of looper-thread at the left-hand side of the loop of its needle-thread then on the looper.

The feed-bar *d* may be moved by devices such as shown in the said patent, and the tension on the threads be governed by like devices.

In practice the under or looped thread will be acted upon by a take-up, as in United States Patent No. 299,569, to which reference may be had.

In the stitch the thread from needle *a* is marked a^2. The thread from needle *b* is marked b^2, the looper-thread being marked c^2; and by an inspection of the drawings, Figs. 9 and 10, it will be seen that the threads carried by the needles *a b* have their loops drawn close up to the under side of the material, substantially as in the usual shuttle-stitch, and each loop of looper-thread by the manipulations described, and by the excess of tension on the needle-threads, is made to extend entirely through two loops of needle-thread, and the end or bight of the loop is entered at a distance of one stitch by a loop of needle-thread, a part of the said loop of looper-thread, as at 10, being carried away from its other half or part by a second loop of needle-thread.

I claim—

The herein-described method of forming an elastic stitch from three threads, which consists in passing two loops of upper or needle thread through the material and through a loop of under or looper thread, and immediately thereafter, while the loops of upper thread are yet in the material, passing a loop of looper-thread through the two loops of upper thread below the said loop of looper-thread, then taking up the loops of upper thread while entered by the loop of under thread, and thereafter, while the loops of upper thread are held below the material, feeding or moving the material for a new stitch, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LORENZ MUTHER.

Witnesses:

W. S. NORTH,

E. P. HATCH.