

T. G. PLANT.
LOCK STITCH SEWING MACHINE.

APPLICATION FILED APR. 15, 1908. RENEWED APR. 14, 1909.

940,726.

Patented Nov. 23, 1909.

3 SHEETS—SHEET 1.

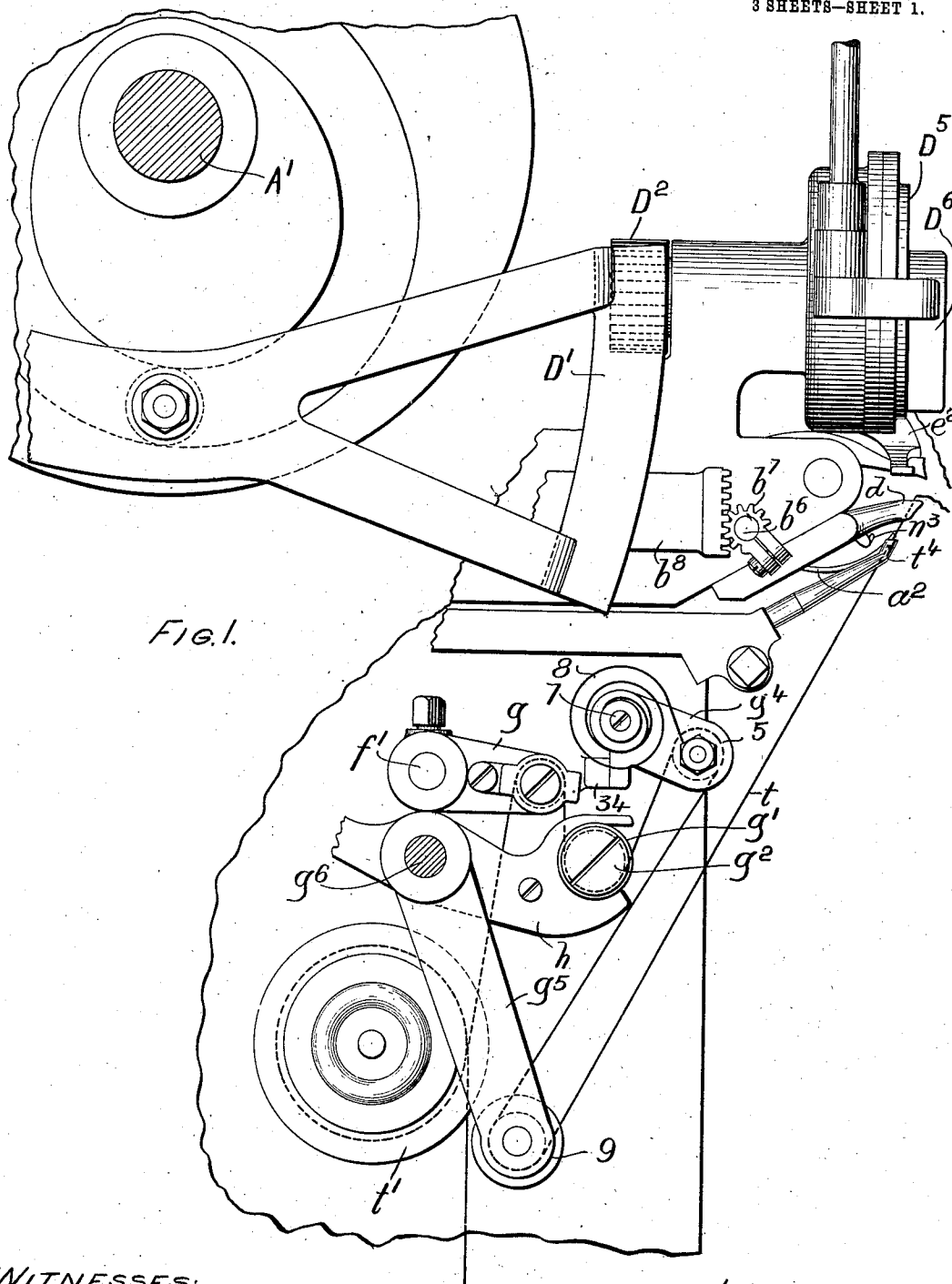


Fig. 1.

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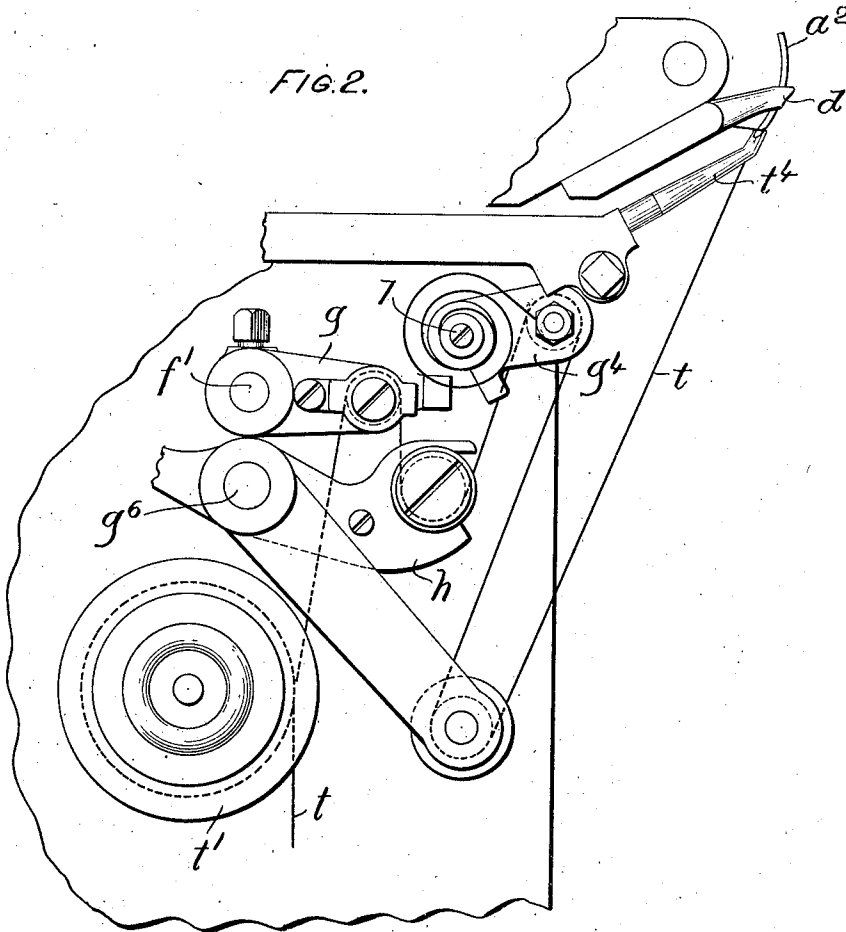
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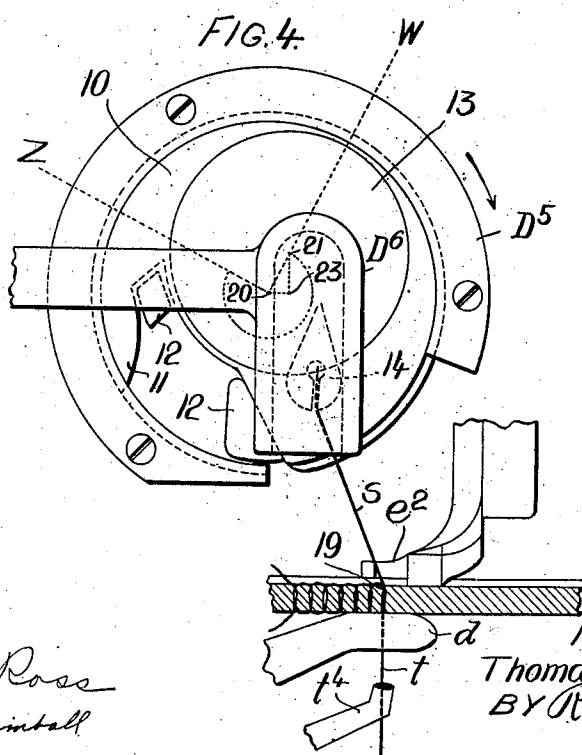
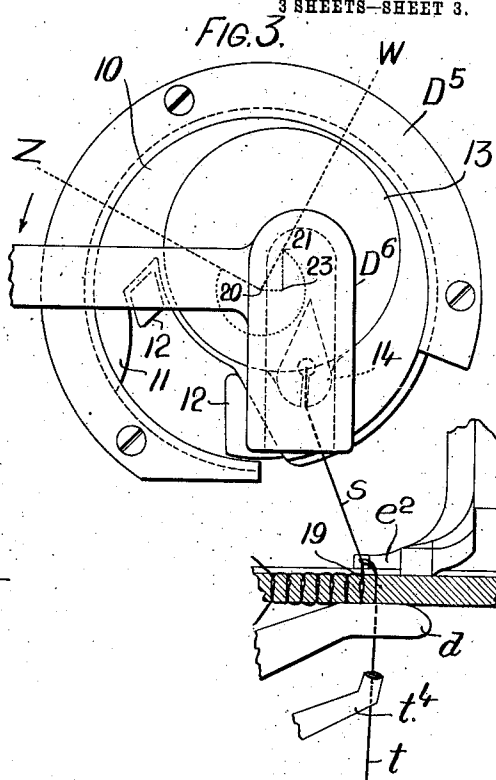
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE

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LOCK-STITCH SEWING-MACHINE.

940,726.

Specification of Letters Patent.

Patented Nov. 23, 1909.

Application filed April 15, 1908, Serial No. 427,234. Renewed April 14, 1909. Serial No. 489,396.

To all whom it may concern:

Be it known that I, THOMAS G. PLANT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Lock-Stitch Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The invention to be hereinafter described relates to shoe sewing machines of that general type using a shuttle and a needle thread which are interlooped to form lock-stitches. In setting the stitch in such type of machine, however, difficulty has been experienced in securing a uniform location of the interlooped or interlocked portions of the shuttle and needle threads with respect to the surface of the work. The importance of securing a uniform location of the stitch lock has been recognized and understood heretofore, and attempts have been made in lock stitch sewing machines to secure uniformity in this respect, various expedients being devised with such end in view. As well understood by those skilled in the art, it is desirable that the bobbin carrying the shuttle thread be disposed eccentrically in the shuttle with the shuttle thread delivery eye partaking only of a movement toward and from the stitch making point as the shuttle is oscillated to pick up and cast the loop of needle thread. In such type of machine, however, after the stitch has been set by a pull upon the needle thread, and the stitch setting means has given up slack to the needle thread in order that the thread finger might deflect the thread and the looper might properly carry the needle thread about the needle for the next stitch, the oscillation of the shuttle back to its initial position has caused the shuttle to pull thread from the shuttle bobbin for the next stitch, such pull being exerted by the shuttle thread on the thread-lock now held in position by a comparatively slack needle thread. The effect of this has been to pull up the thread lock more or less and in a line of stitching to present irregularities in the location thereof. In the attempts heretofore made to overcome this objection, the desirable characteristics of the machine have been largely sacrificed, as by additional mechanism to give bodily movements to the shuttle and its thread mass

toward and from the work, or by a concentric mounting of the shuttle, its bobbin case, and a delivery eye centrally disposed with relation to the shuttle combined with a shuttle thread-lock or take-up, all of which introduce objections well understood by those skilled in the art.

The present invention is designed as an improvement on these prior attempts whereby the desirable features of the machine as hereinbefore noted are retained, and means are provided and given characteristic movements whereby not only is the stitch set by a pull on the needle thread, but such pull is exerted on a taut shuttle thread and such stitch setting pull on the needle thread draws from the shuttle the entire amount of shuttle thread needed for the stitch, the effect of such operation being that the interlooped portions of shuttle and needle threads are uniformly located with respect to the surface of the work, and since the entire amount of shuttle thread is drawn from the shuttle by the needle thread as it sets the stitch, the stitch loop or lock is not thereafter disturbed by any pull by the shuttle thread, all as will hereinafter be more fully described and then definitely pointed out in the claims.

The invention is herein illustrated and described as embodied in a machine of the general type presented by the French and Meyer patent, No. 473,870, dated April 26, 1892, to which reference may be had for a full disclosure of characteristic structure in such machine.

In the drawings:—Figure 1 in side elevation represents sufficient of the machine to make clear the invention and its relation to the parts thereof; Fig. 2 is a view similar to Fig. 1, with the parts in a somewhat different position, and certain other parts omitted for clearness of illustration; Fig. 3 is a detail front view illustrating the position of the shuttle, in accordance with the present invention, as just completing its movement in the direction of the arrow to cast the loop of needle thread and prior to setting the stitch; Fig. 4 is a like detail view showing the shuttle as moving in the direction of the arrow to carry the nose of the shuttle to initial position for entering the next loop of needle thread, and the stitch as having just been set; Fig. 5 is a similar detail view showing the shuttle as having

completed its movement to initial position and about to start on its loop taking movement in the direction of the arrow, the needle thread at such time being manipulated by the thread finger and looper to carry the thread about the needle.

Referring to Figs. 1 and 2, the main shaft A' carrying the necessary cams, the rack D' engaging the pinion D² on the shaft of the shuttle driver, and operated from a cam on the main shaft A', the work support d, the looper t⁴ and its operating connections, the thread finger n², the needle a², the rack b², pinion b' on the shaft b⁶, the guide or arm D⁶ cooperating with the bobbin case and the presser-foot c², may be of the general character of the like parts in the patent to French and Meyer, 473,870, hereinbefore mentioned, except in so far as said parts and their operative relation are changed, as will be hereinafter fully set forth.

The tension device t', the main take-up arm g⁵ carrying the roll 9, mounted on the stud g⁶, and operated from the main shaft A'; the auxiliary take-up g⁴, mounted on the stud 7, its spring 8, and roll 5; the stop 34; the thread clamp h, the roller g' mounted on the stud g²; and the thread measure g, its mounting f' and connections, are or may be substantially as the like parts and associated devices in the said French and Meyer patent.

Referring to Figs. 3, 4 and 5, as representing the characteristics of applicant's invention the work is fed in the direction of the arrow, Fig. 5, and a looper t⁴, thread finger n², needle a², presser-foot c² and their operating connections are employed, as indicated in the French and Meyer patent to which reference may be had.

The shuttle 10 has the usual nose 11, and carries an eccentrically mounted bobbin case 13, provided with a shuttle thread delivery eye 14 projecting therefrom, and guided by a recess in the under face of the arm D⁶, so that the bobbin case is restrained from turning about its axis.

The center of the shuttle about which it oscillates is designated by 20, and 21 indicates the center of the bobbin or bobbin case, so that as the shuttle is oscillated to engage and cast the needle loop and then back to initial position, the center 21 of the bobbin or bobbin case moves in the arc of a circle from the position 21 of Fig. 5, to the position 21, Figs. 3 and 4, the vertical movement of the center 21 of the bobbin or bobbin case, and consequently the delivery eye 14, being the same.

In oscillating the shuttle contra-clockwise from the position indicated in Fig. 5 to that indicated in Fig. 3 to engage and cast the needle loop, and in returning it to its initial position, it will be noted that the center of the bobbin case moves through the arc of a circle indicated by the radial lines Z, W,

but that in such loop casting movement the vertical rise of the center 21 and consequently of the delivery eye 14 is greater than the vertical movement of the center 21 and delivery eye 14, as the shuttle moves from loop casting position, Figs. 3 and 4, back to initial position, of Fig. 5, the difference of such vertical movement being indicated by the difference in the vertical side of the triangle 20, 21 and 22 of Fig. 5, and 20, 21, and 23 of Figs. 3 and 4. This characteristic movement of the shuttle results from imparting thereto an oscillating movement in the arc of a circle to substantially the same extent on each side of a line connecting the stitch making point and center of oscillation of the shuttle, as indicated in Figs. 3, 4 and 5. In other words, as the shuttle is oscillated to engage and cast the needle loop which has been drawn up through the work by the needle, as in Fig. 3, and during the stitch setting movement, as in Fig. 4, the shuttle has carried the bobbin or bobbin case and consequently the delivery eye to a position at least as far from the stitch making point as it does when the said shuttle is returned to its initial position as in Fig. 5. The effect of this is that the interlock of the needle and shuttle threads is formed, as in Fig. 3, with the shuttle thread s taut, and as the needle thread is manipulated by the take-up to set the stitch, Figs. 1 and 4, the needle thread pulls from the shuttle all the shuttle thread needed for the stitch being formed, so that as the shuttle is oscillated back to initial position, as indicated in Fig. 5, preparatory to engaging a needle loop, the said shuttle does not pull from itself any shuttle thread, and consequently does not pull upon the thread lock 19.

As will be obvious to one skilled in the art, the distance between the center 21 and the stitch forming point will be substantially the same whether the shuttle is in its loop casting position or has returned to its initial position; and it will be likewise apparent that this characteristic relation of parts results from imparting to the shuttle oscillatory movements to substantially equal extent to each side of a line connecting the stitch making point and shuttle center, thus, instead of drawing the shuttle thread from the bobbin by a pull of such thread against a set stitch, the take-up is caused to not only set the stitch by a pull upon the needle thread, but also to draw from the shuttle the entire amount of thread required for the stitch and set the stitch against a taut shuttle thread.

Various modifications in the means employed may suggest themselves to those familiar with machines of this type, but providing means, such as the rack D' and pinion D², to give to the shuttle the characteristic movements with relation to the

action of the take-up or other stitch setting means, has been found practically, successful and advantageous.

What is claimed is:

5 1. In a shoe-sewing machine for making lock-stitches, the combination of stitch forming mechanism, including a shuttle and needle, means for oscillating the shuttle to pass the shuttle thread through the loop of needle thread and by said movement
10 draw the shuttle thread taut, means for pulling upon the needle thread to set the stitch against the taut shuttle thread and simultaneously to draw from the shuttle the entire amount of shuttle thread to form the
15 stitch, said oscillating means returning the shuttle to its initial position with the shuttle thread slack.

2. In a shoe-sewing machine for making
20 lock-stitches, the combination of stitch forming mechanism, including a shuttle and needle, a bobbin case eccentrically mounted in said shuttle, means to oscillate the shuttle through substantially equal arcs on each
25 side of a line passing through the stitch forming point and center of the shuttle, and means for pulling upon the needle thread to draw from the shuttle the entire amount of shuttle thread needed to form and to set the
30 stitch.

3. In a shoe-sewing machine for making
lock-stitches, the combination of stitch forming mechanism including a shuttle and
35 needle, said shuttle having a bobbin receiving recess eccentrically disposed therein, means to oscillate the shuttle to pass the

shuttle thread through the needle loop and raise the shuttle thread a maximum distance from the work, means to pull upon the needle thread to set the stitch and draw from
40 the shuttle the entire amount of shuttle thread to form the stitch, the return oscillation of the shuttle carrying the shuttle thread a less distance from the work than the loop casting oscillation.

4. In a shoe-sewing machine for making
lock-stitches, the combination of stitch forming mechanism, including a shuttle, said
45 shuttle having a bobbin receiving recess eccentrically disposed therein, a bobbin case having a shuttle thread delivery eye, means to restrain rotative movement of the bobbin case upon its axis, means to oscillate the shuttle to carry the shuttle thread through
50 the loop of needle thread and continue said movement to raise the shuttle thread a maximum distance from the work, and means to pull upon the needle thread to set the stitch and draw from the shuttle the entire amount
55 of shuttle thread to form the stitch the return oscillation of the shuttle carrying the shuttle thread no greater distance from the work than the loop engaging and casting oscillation.

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

THOMAS G. PLANT.

Witnesses:

AMELIA M. ROSS,
MARION F. KIMBALL.