G. S. HILL.

SEWING MACHINE.

APPLICATION FILED DEC. 8, 1913.

1,094,896.

Patented Apr. 28, 1914.

3 SHEETS-SHEET 1.

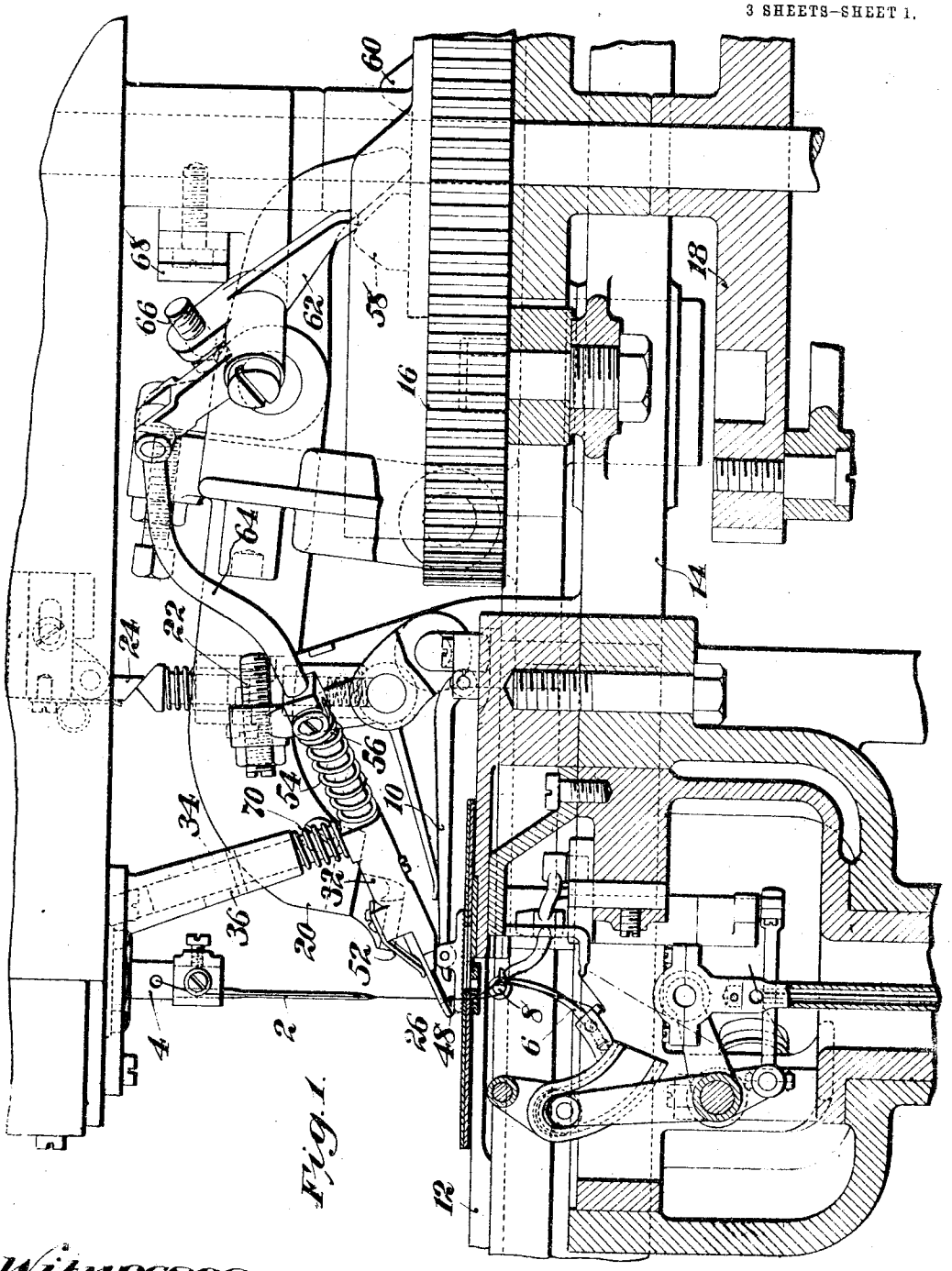


Fig. 1.

Witnesses:

E. C. Sundeman

H. D. McPhail

Inventor:

George S. Hill

by Phillips Van Everen & Fiske

Attys

G. S. HILL.

SEWING MACHINE.

APPLICATION FILED DEC. 8, 1913.

1,094,896.

Patented Apr. 28, 1914.

3 SHEETS—SHEET 2.

Fig. 2

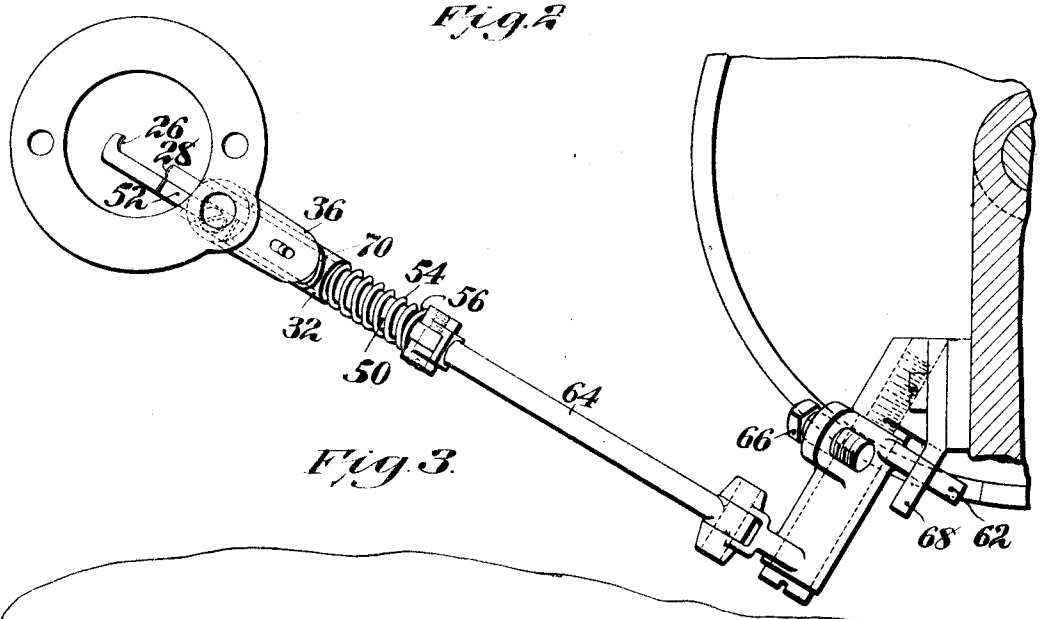


Fig. 3.

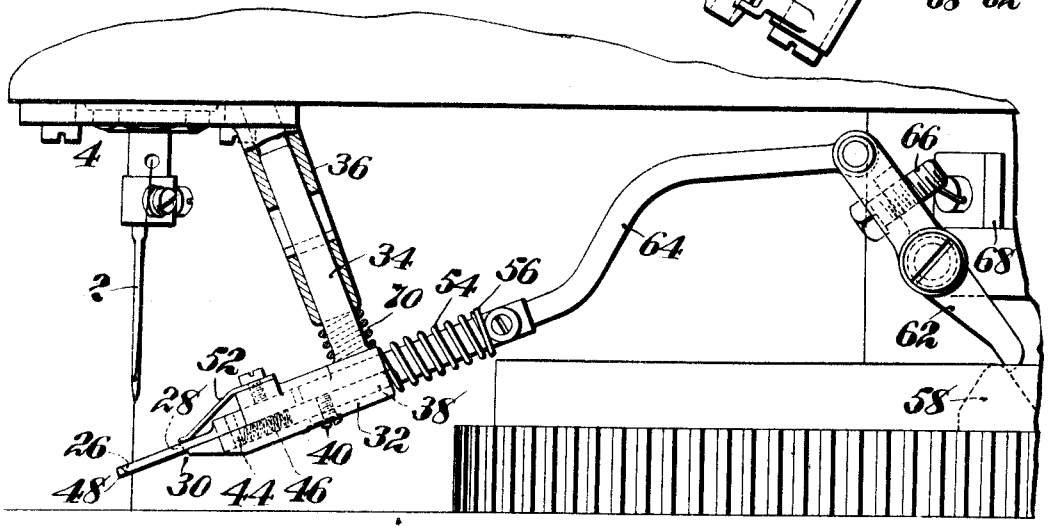


Fig. 4.

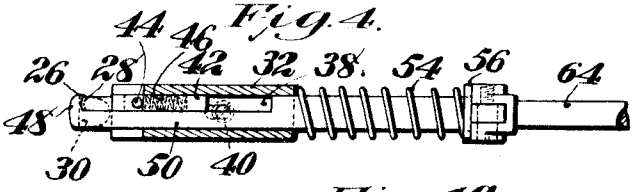
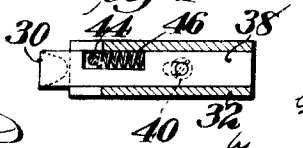


Fig 4a



Witnesses:

E. C. Wardeman

H. D. McGhail

Inventor:

George S. Hill

by Phillips Van Everen & Fish

Att'ys

G. S. HILL.

SEWING MACHINE.

APPLICATION FILED DEC. 8, 1913.

1,094,896.

Patented Apr. 28, 1914.

3 SHEETS—SHEET 3.

Fig. 5.

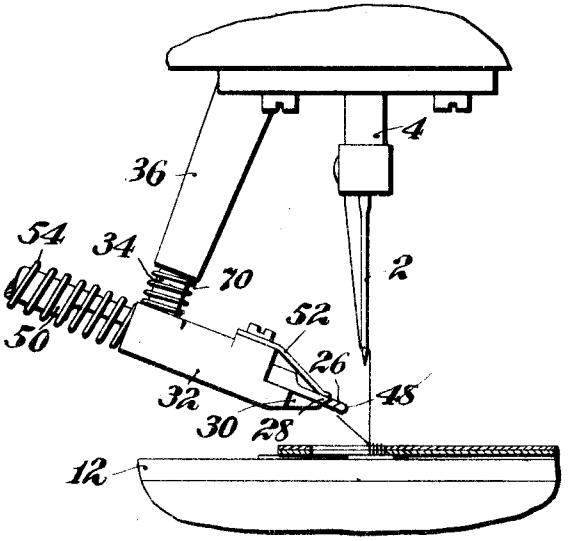


Fig. 7.

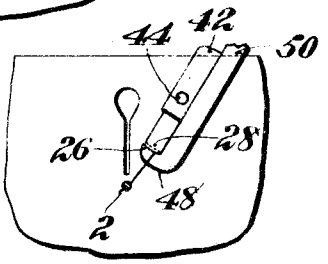


Fig. 6.

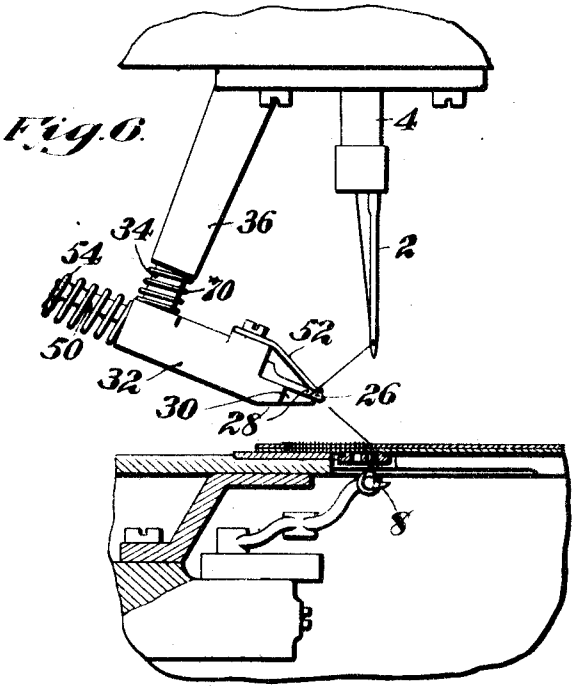


Fig. 8.

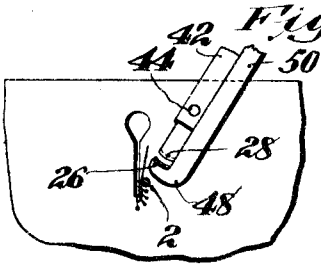
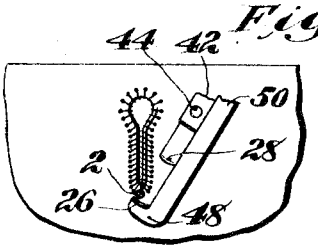


Fig. 9.



Witnesses:

E. C. Underman

K. D. McPhail

Inventor:

George S. Hill

by Phillips Van Everen & Fish

UNITED STATES PATENT OFFICE.

GEORGE S. HILL, OF STRAFFORD, NEW HAMPSHIRE, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

1,094,896. Specification of Letters Patent. Patented Apr. 28, 1914.

Application filed December 8, 1913. Serial No. 805,314.

To all whom it may concern:

Be it known that I, GEORGE S. HILL, a citizen of the United States, residing at Strafford, in the county of Strafford and State of New Hampshire, have invented certain new and useful Improvements in Sewing-Machines; 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 appertains to make and use the same.

The invention relates to sewing machines, and more particularly to buttonhole sewing or similar machines in which the sewing mechanism operates to form overseam stitches.

The primary object of the invention is to provide novel and improved means for holding or severing and holding the sewing thread in a machine of this type which will be uniformly reliable in its operation, and which will so coöperate with the stitch forming mechanism that trimming of the waste end of thread extending from the initial stitch of the seam will be unnecessary.

To these ends, one feature of the invention contemplates the provision in a machine forming overseam stitches of means for holding the end of the thread, or for severing and holding the end of the thread at the completion of a sewing operation in position to be covered by the stitches of the seam at the beginning of the next sewing operation. When the thread is thus held, the waste end which leads from the thread holder to the initial stitch of the seam at the beginning of the sewing is covered by the stitches of the seam, thus avoiding the necessity of trimming or cutting away the waste end, and also giving a better finish to the seam. It is desirable that the thread be severed as close to the finished surface of the work as practicable, and it is preferred therefore in embodying the invention in a machine in which the work is held by a vertically movable work clamp, to so mount the holding and cutting device that it may rise and fall with the clamp. This enables the cutter and holder to act on the thread close to the work when the clamp is closed, and to rise to accommodate the vertical movement of the clamp when the clamp opens.

In addition to the features outlined above, the invention also includes further novel features of construction and combinations of parts hereinafter described and set forth in the claims, the advantages of which will be apparent to those skilled in the art.

The features of the invention will be understood from an inspection of the accompanying drawings, and the following detailed description of the mechanism illustrated therein.

In the drawings Figure 1 is a vertical sectional elevation showing so much of a buttonhole sewing machine as is necessary to illustrate the embodiment of the invention therein; Fig. 2 is a detail plan view showing the thread cutting and holding devices; Fig. 3 is a sectional elevation of the same; Figs. 4 and 4ª are detail sectional views showing parts of the thread holding and cutting devices; Fig. 5 is a detail elevation showing the position of the parts after a few stitches have been sewed at the beginning of the sewing operation; Fig. 6 is a similar view showing the position of the parts after the sewing has been completed; and Figs. 7 to 9 are diagrammatic plan views showing the position of the thread holding and cutting devices with relation to the buttonhole and seam at different stages.

In the drawings the invention is shown as embodied in a buttonhole sewing machine having the construction and mode of operation of the machine shown and described in Patent No. 1,063,880, dated June 3, 1913. In this machine the stitch forming mechanism comprises an upper needle 2 eccentrically mounted in a vertically reciprocating needle bar 4, an under needle 6, and a looper 8. The upper needle bar and the under needle and looper are mounted respectively in a rotary head and in a rotary turret which are rotated during the sewing about the end and eye of a buttonhole. The work is held by clamps 10 pivotally mounted on plates 12 which are in turn mounted on a clamp carrier 14. The clamp carrier is moved longitudinally to bring the work into register with the cutter or with the sewing devices, and to feed the work during the sewing, by a cam groove formed in the cam gear 16, which makes one revolution for each cycle of the machine. The clamp carrier is moved laterally, and the stitch forming mechanism is rotated during the sewing

through suitable connections from a gear 18 which makes one revolution during the sewing of the buttonhole. The cutter 20 is operated from a cam on the gear 16, and when operated to cut a buttonhole, also operates to close the clamps 10, which are held closed during the sewing by the latching devices indicated at 22. The clamp is released and opened during its return to cutting position by a stationary cam 24, as fully described in the patent above referred to.

At the completion of the sewing of a buttonhole the stitch forming mechanism is stopped with the upper and under needles in their retracted positions, and in accordance with the present invention the upper needle thread is automatically severed between the upper side of the work and the needle, and the free end of the needle thread is held, preparator to the beginning of the succeeding sewing operation. As shown, the devices for thus severing and holding the upper needle th ad comprise two gripping jaws 26 and 28 w hich first grip the thread and then carry it against a fixed cutter 30 which coöperates with the under edge of the jaw 26 to sever the thread between the jaws and the work. These devices are mounted in a support 32 formed at the lower end of a rod 34 which is mounted to slide vertically in a bearing 36. The support is arranged at the rear of the sewing point and rests on one of the clamps 10 so it will rise and fall with the clamp. It is also preferably arranged at an inclination as shown, so that the thread gripping jaws may engage the thread at a point nearer the upper surface of the work. The cutter 30 is formed on the front end of a semi-cylindrical bar 38 which is adjustably secured in the bore of the support 32 by a screw 40. The jaw 28 is formed on the front end of a slide 42 mounted in the bore of the support 32 above the bar 38, and provided with a depending pin 44 playing within a recess in the bar. A spring 46 is arranged in the recess, and tends to force the slide forward so that the jaw 28 is beyond the edge of the cutter 30. The jaw 26 is formed on the rear side of a finger 48 projecting laterally from a slide bar 50 which fits within the bode of the support 32 above the cutter bar 38 and to one side of the gripper slide 42. The front part of the gripper bar 50 is flattened and is engaged by a leaf spring 52 which holds the bar firmly down against the upper surface of the cutter bar 38. A spring 54 is interposed between the rear end of the support 32 and a flange 56 on the bar 50, and tends to hold the bar in retracted position. The bar is advanced at proper intervals by cams 58 and 60 on the gear 16 arranged to engage the lower end of a lever 62, the upper end of which is connected with the bar by a link 64. The connected position of the thread gripping jaws is determined by a stop screw 66 on the lever 62 which is arranged to engage a fixed stop 68.

During the sewing of a buttonhole the clamp 10 is closed, and the support 32 is held in its lower position by the weight of the parts, or by a spring 70, so that the thread holding and cutting devices may act on the thread close to the upper or finished side of the work. Assuming that the sewing of the buttonhole has been nearly completed, the gripping jaws will be in their retracted position at the rear of the sewing point, and to that side of the buttonhole which is first sewed, or in a position corresponding to that indicated in Fig. 7. The cam 58 will act upon the lever 62 and will advance the gripper bar 50, so that when the stitch forming devices are stopped at the completion of the sewing, the parts will be in the position indicated in Figs. 1, 2, 3 and 9, with the jaw 26 in front of the upper needle thread which leads from the seam down around the looper 8 and up through the work to the eye of the upper needle. The jaw 28 will be in its forward position in front of the cutter 30. As the cam 58 passes the lever 62 the gripper bar 50 will be retracted, and the jaw 26 will engage the thread and draw it against the jaw 28, so that the thread will be gripped between the jaws. After the thread is thus gripped, the continued rearward movement of the gripper bar 50 will further retract the jaws, carrying the thread against the cutter 30, so that it will be severed by the coöperation of the cutter with the lower edge of the jaw 26. The position of the parts after the thread has been thus severed is indicated in Fig. 6. Since the waste end of thread leading from the last stitch of the seam passes down about the looper, it will be drawn down through the work to the under side when the work is moved to bring it into position for the cutting and sewing of the succeeding buttonhole. The severed end of the needle thread will be held in the position indicated in Fig. 7, ready for the beginning of the next sewing operation. When the clamp is opened, the carrier 32 will rise with the clamp, but will return to the position indicated in Fig. 1 when the clamp is again closed upon the work. At the beginning of the next succeeding sewing operation the end of the upper needle thread will be held in the position indicated in Fig. 7, so that it will lead from the initial needle hole to the gripping jaws in a line lying between the edge of the buttonhole and the path of the upper needle in forming the initial stitches. The stitches formed at the beginning of the sewing operation will therefore be formed over the free or waste end of the upper needle thread as the seam travels away from the sewing point and grippers. After a number of stitches have been completed, the cam 60

engages the lever 62 and advances the gripper bar 50 sufficiently to release the end of the thread, as indicated in Figs. 5 and 8, and as the sewing continues, the waste end of thread is completely covered by the stitches, as indicated in Fig. 9. After the thread end has been released, the gripping jaws are immediately returned to their retracted position, where they remain until the sewing of the buttonhole is completed, when the cycle of operations above described is repeated.

While the invention has been shown and described as embodied in a machine in which the relative movements between the sewing mechanism and work are secured by moving the work clamp and rotating the stitch forming mechanism, it will be understood that the invention is not confined in its application to such machine, or to machines having the form of stitch forming devices shown and described, but may be embodied with advantage in machines in which the relative movements between the work and stitch forming devices are otherwise effected, or in machines embodying different forms of stitch forming mechanism. It will also be understood that the specific construction and arrangement of the thread severing and thread holding devices shown and described is not essential, and may be varied and modified without departing from the broader features of the invention.

Having explained the nature and object of the invention, and specifically described one form of machine in which it may be embodied, what I claim is:—

1. A sewing machine, having, in combination, stitch forming mechanism comprising a needle and devices coöperating therewith to form overseam stitches, and devices for severing the needle thread and holding its end in position to be covered by the overseam stitches.

2. A sewing machine, having, in combination, stitch forming mechanism comprising a needle and devices coöperating therewith to form an overseam stitch, and a thread cutter and holder arranged to hold the needle thread at the rear of the sewing point and in line with the initial part of the seam.

3. A sewing machine, having, in combination, stitch forming mechanism comprising a needle and devices coöperating therewith to form an overseam stitch, devices for severing the thread and holding its end in position to be covered by the overseam stitches, and means for operating the thread severing and holding devices to sever and hold the thread at the completion of a sewing operation and to release the thread after the formation of the initial stitches at the beginning of a sewing operation.

4. A sewing machine, having, in combination, stitch forming mechanism including a needle and devices coöperating therewith to form overseam stitches, and means for holding the end of the needle thread in position to be covered by the overseam.

5. A sewing machine, having, in combination, stitch forming mechanism including a needle and devices coöperating therewith to form overseam stitches, and a thread holder arranged to hold the needle thread at the rear of the sewing point in position to be overstitched.

6. A sewing machine, having, in combination, stitch forming mechanism, feeding mechanism for producing relative movements between the stitch forming mechanism and the work to form an overseam about the edge of a buttonhole, and means for holding the end of the sewing thread at the beginning of the sewing in position to be covered by the overseam.

7. A sewing machine, having, in combination, stitch forming mechanism, feeding mechanism for producing relative movements between the stitch forming mechanism and work to form an overseam about the edge of a buttonhole, thread severing and holding devices, and mechanism for actuating the devices to sever the sewing thread at the completion of a buttonhole and to hold the thread end in position to be covered by the seam at the beginning of the succeeding buttonhole.

8. A sewing machine, having, in combination, stitch forming mechanism comprising an upper needle and coöperating under thread mechanism, a work clamp, mechanism for relatively actuating the clamp and stitch forming mechanism to sew about a buttonhole, a thread holder arranged to hold the end of the upper needle thread in position to be covered by the initial stitches of the seam, and means for actuating the holder to engage and hold the thread at the completion of a buttonhole.

9. A sewing machine, having, in combination, stitch forming mechanism, a work clamp, mechanism for relatively actuating the stitch forming mechanism and work clamp to sew about a buttonhole, and thread cutting and holding devices overlying the clamp mounted to move vertically with the clamp and retained in fixed relation to the sewing point during the relative travel of the clamp and stitch forming mechanism.

10. A sewing machine, having, in combination, stitch forming mechanism, a work clamp, mechanism for relatively actuating the stitch forming mechanism and work clamp to sew about a buttonhole, and thread cutting and holding devices mounted to rise and fall with the clamp as it is opened and closed, and held in fixed relation to the sewing point during the relative travel of the clamp and stitch forming mechanism.

11. A sewing machine, having, in combination, stitch forming mechanism, a work

clamp, a support above the work clamp, a cutter on the support, a gripper slide above the cutter, a coöperating gripper bar, mechanism for advancing the bar to bring its gripping jaw into position to engage the thread and for retracting the bar to draw the thread against the gripper slide and thereafter carry it against the cutter.

12. A sewing machine, having, in combination, stitch forming mechanism, a work clamp, a support above the work clamp, a thread cutter on the support, a bar provided with a gripping jaw arranged to slide over the cutter, a coöperating gripping jaw, and means for advancing the bar to bring its jaw into thread engaging position and for retracting the bar to draw the thread against the coöperating jaw and cutter.

13. A sewing machine, having, in combination, stitch forming mechanism, a work clamp, mechanism for relatively actuating the stitch forming mechanism and clamp to sew about a buttonhole, a vertically movable support resting on the clamp and held in fixed relation to the stitch forming mechanism during the relative travel of the clamp and stitch forming mechanism, and thread severing and holding devices mounted on the support.

14. A sewing machine, having, in combination, stitch forming mechanism, a work clamp, a support above the work clamp, a thread cutter on the support, a bar provided with a gripping jaw arranged to slide over the cutter, a coöperating gripping jaw, a cam and connections for advancing the bar to bring its jaw into thread engaging position, and a spring for retracting the bar to draw the thread against the coöperating jaw and cutter.

15. A sewing machine, having, in combination, stitch forming mechanism, a work clamp, a vertically movable support above the work clamp, a cutter on the support, a bar provided with a gripping jaw arranged to slide over the cutter, a coöperating gripping jaw, and means for advancing and retracting the bar.

GEORGE S. HILL.

Witnesses:
CHESTER E. ROGERS,
JOHN H. RIGBY.