C. S. HILL.

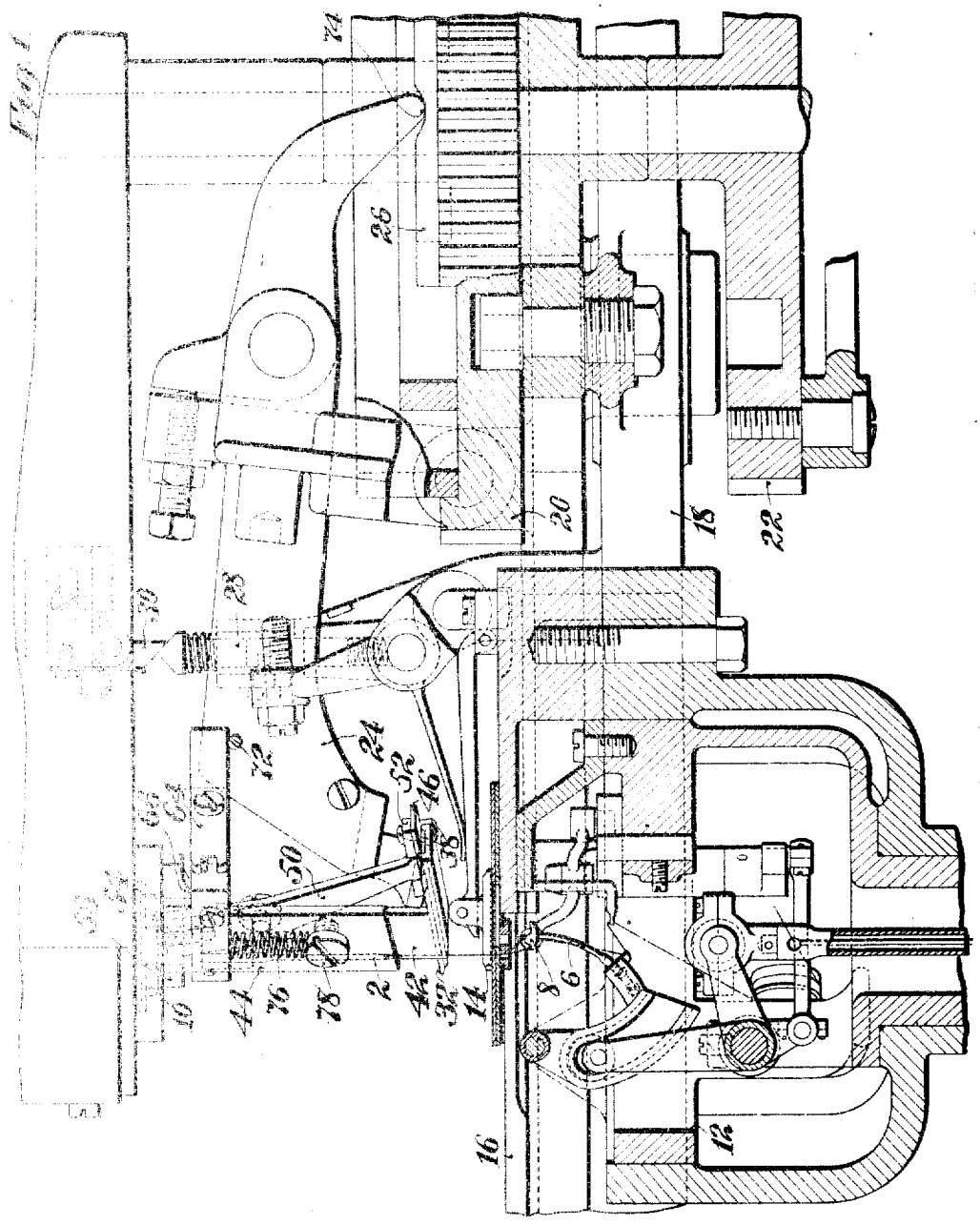
SEWING MACHINE.

APPLICATION FILED DEC. 29, 1913.

1,269,710.

Patented June 18, 1918

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 2.

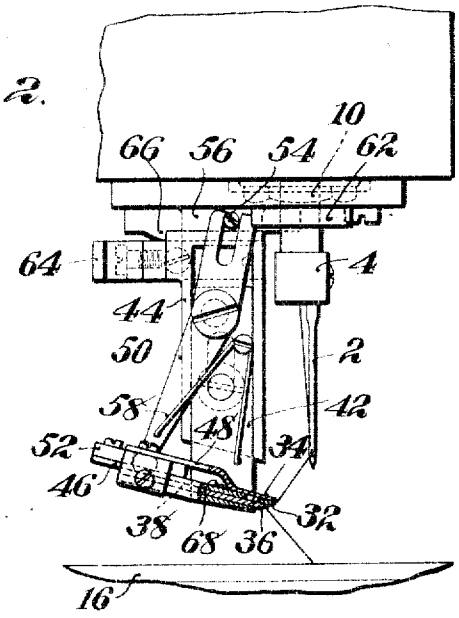


Fig. 3.

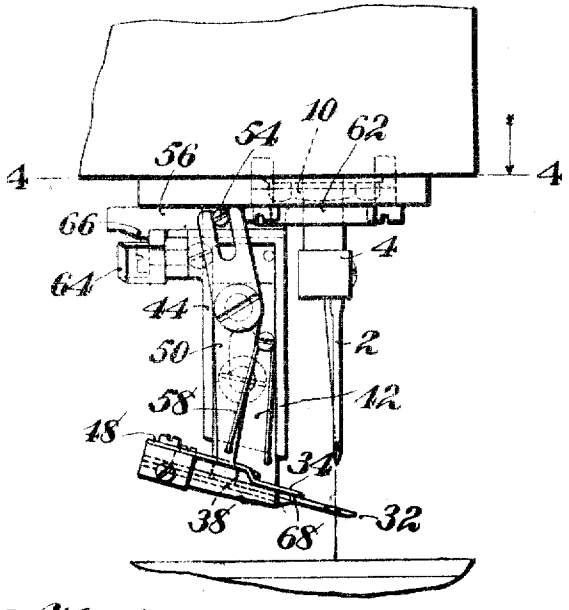
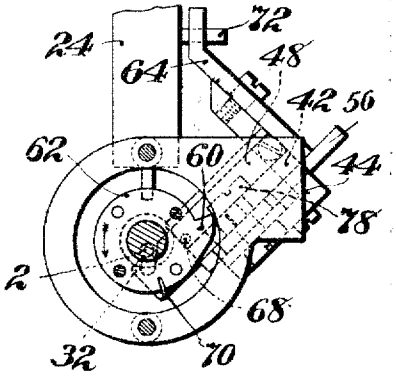


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

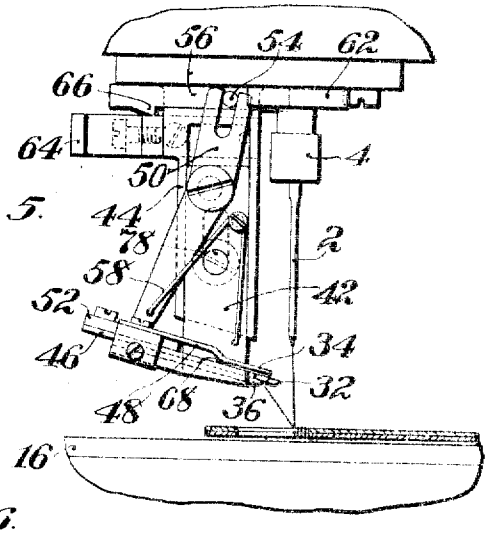


Fig. 6.

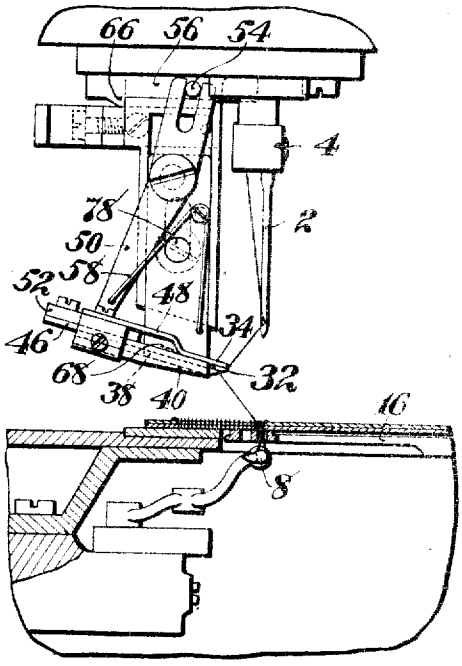


Fig. 8.

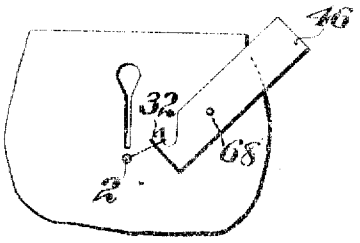


Fig. 8.

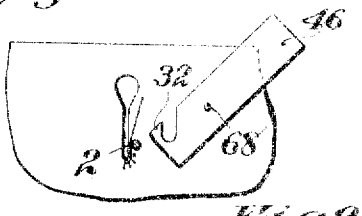
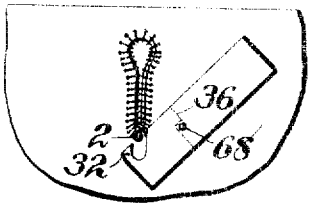


Fig. 9.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

1,269,710. Specification of Letters Patent. Patented June 18, 1918.

Application filed December 29, 1913. Serial No. 809,272.

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 overedge stitches.

The object of the invention is to provide novel and improved means for automatically severing, holding, or severing and holding the upper thread which is uniformly reliable in its operation, and which may be readily incorporated in machines in which a work holding clamp and stitch forming mechanism are relatively moved to sew about a buttonhole.

To this end the invention consists in the features of construction and combinations of parts hereinafter described and referred to in the claims, the advantages of which will be obvious 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 application of the present invention thereto; Figs. 2 and 3 are side elevations of the thread cutting and holding devices, looking at the parts from the side opposite to that shown in Fig. 1; Fig. 4 is a sectional plan view on line 4—4, Fig. 3; Figs. 5 and 6 are side elevations showing the mode of operation of the cutting and holding device; and Figs. 7, 8 and 9 are diagrammatic plan views showing the position of the thread holding and cutting device 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 arranged respectively in a rotary carrier 10 and a rotary turret 12, which are rotated during the sewing about the end and eye of the buttonhole. The work is held by clamps 14 mounted on work supporting plates 16, which are in turn mounted on a clamp carrier 18. The clamp carrier is moved longitudinally to bring the work into register with the buttonhole cutter or with the stitch forming mechanism, and to feed the work during the sewing, by a cam groove formed in the cam gear 20, 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 22 which makes one revolution during the sewing of a buttonhole. A cutter carrying lever 24 is operated from a cam 26 on the gear 20, and when operated to cut a buttonhole, closes the clamps 14, which are held closed during the sewing by latching devices indicated at 28. The clamp is released and opened during its return to cutting position by a stationary cam 30, 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 the upper needle thread is acted upon by a thread cutter which automatically severs the thread between the upper side of the work and the needle eye, and by a thread holder which holds the free end of the needle thread, preparatory to the beginning of the succeeding sewing operation. As shown, the thread cutter and thread holder comprise a cutting and holding jaw 32, the upper side of which coöperates with a spring jaw 34 in holding the thread, and the lower edge of which coöperates with a cutter 36 formed on a cutter plate 38 in severing the thread. The cutting and holding devices are mounted upon a support 40 carried on the lower end of a slide 42, which is mounted to move vertically in a

guideway formed in a bracket 44. The support is mounted at the rear of the sewing point, and rests upon one of the clamps 14 so that it will rise and fall with the clamp. The support is also preferably arranged at an inclination, so that the thread holding and severing devices will operate upon the thread at a point as near the upper surface of the work as practicable. The cutting and holding jaw 32 is formed on the front end of a plate 46 mounted to slide in the support 40, and resting upon the upper surface of the cutter plate 38. The jaw 34 is formed by the depending end of the leaf spring 48, and presses upon the upper surface of the plate 46, so that the plate is held firmly against the upper surface of the plate 38. The plate 46 is advanced and retracted through a lever 50, the lower end of which engages a groove formed in a block 52 secured to the plate, and the upper end of which is provided with a slot engaging a pin 54 which projects laterally from a slide bar 56. The lever 50 is pivoted on the vertical slide 42, and is forced in a direction to retract the slide 46 by a spring 58.

During the sewing of the greater part of the buttonhole the slide 46 is in retracted position. During the sewing of the latter part of the buttonhole, the forward end of the slide bar 56 is engaged by a cam shoulder or tooth 60 formed on a disk 62 which is secured to the lower end of the rotary carrier 10. The continued rotation of the carrier in the direction of the arrow, Fig. 4, then causes the tooth 60 to force the slide bar 56 back from the position indicated in Fig. 2 to the position indicated in Fig. 3, thus advancing the slide 46 from the position indicated in Fig. 7 to the position indicated in Fig. 9. During this advance of the slide 46 the rotation of the upper needle carrier 10 swings the needle into the notch formed in the plate in front of the holding and cutting jaw 32, so that the upper thread stands in the notch when the sewing mechanism is arrested. After the slide 46 is advanced by the tooth 60 it is retained in advanced position until the sewing is completed and the rotation of the carrier 10 ceases, by a latch lever 64 which is pivoted on an arm secured to the bracket 44, and is arranged to engage a shoulder 66 on the under side of the bar 56. The end of the latch lever 64 normally rides against the under side of the bar 56, and swings up in front of the shoulder 66 when the shoulder passes beyond the end of the lever. After the sewing mechanism has been arrested, the latch lever 64 is rocked to release the slide bar 56 so that the slide 46 may be retracted by the action of the spring 58. When this occurs, the upper needle thread is engaged by the jaw 32, and is drawn between the upper surface of the jaw and the spring jaw 34. The rearward movement of the jaw 32 also carries the edge of the jaw across the cutting edge 36, so that the thread is severed by the lower edge of the jaw 32 and the cutting edge. The slide 46 may be provided with a slight projection 68 on its upper face, and will lift the spring jaw 34 as the thread is drawn under it, and will then pass to the rear of the jaw and allow the jaw to spring forward against the upper surface of the jaw 32 to firmly clamp and hold the thread. The position of the parts after the thread has been clamped and severed is indicated in Fig. 6. Since the waste end of thread leading from the seam passes down about the looper, it will be drawn down through the work at the under side when the work is shifted to bring it into position for the cutting and sewing of a succeeding buttonhole. The severed end of the needle thread will be held in the position indicated in Fig. 7 until the beginnning of the next sewing operation. When the clamp is opened, the support 40 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 sewing operation the end of the upper needle thread will be held by the thread holding devices, and these devices are preferably so arranged that the waste end of thread will lead from the initial needle hole to the thread holder in a line lying between the edge of the needle hole and the path of the upper needle in forming the initial stitches, as indicated in Fig. 7. The stitches formed at the beginning of the sewing operation will therefore be formed over the waste end of the upper needle thread as the seam travels away from the sewing point and thread holder. After a number of stitches have been completed, the slide 46 is temporarily advanced sufficiently to release the thread, as indicated in Fig. 5, by a cam shoulder or tooth 70 on the disk 62 which engages the end of the slide bar 56 and forces it back slightly. The continued rotation of the upper needle carrier and disk 62 carries the tooth beyond the end of the bar so that the bar is released allowing the slide 46 to return to normal position where it remains until it is again advanced by the cam tooth 60 as above described.

The latch lever 64 is operated to release the slide bar 56 as above described by a pin 72 projecting from the side of the cutter lever, and arranged to engage the latch lever when the rear end of the cutter lever rides into a depression 74 in the cam 26. The support 40 may be held in engagement with the clamp 12 by the weight of the parts, or by the weight of the parts assisted by a spring 76 engaging the head of a screw 78 which passes through a vertical slot in

the bracket 44 and retains the slide 42 in its guideway.

While it is preferred to employ the specific construction and arrangement of parts shown and described, it will be understood that this construction and arrangement is not essential to the broader features of the invention, and may be varied and modified as found desirable or best suited to the construction of the machine in which the invention is embodied.

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

1. A sewing machine, having, in combination, stitch forming mechanism comprising a rotary needle carrier, and a thread cutting and holding device operated by the rotation of the carrier.

2. A sewing machine, having, in combination, stitch forming mechanism comprising a rotary needle carrier, a thread holding jaw, devices coöperating therewith to sever and hold the thread, and means through which the jaw is advanced into position to act on the thread by the rotation of the carrier.

3. A sewing machine, having, in combination, stitch forming mechanism comprising a rotary needle carrier, a thread cutting and holding device, a cam on the carrier, and connections for operating the cutting and holding devices from the cam.

4. A sewing machine, having, in combination, stitch forming mechanism comprising a rotary needle carrier, a thread holding jaw, devices coöperating therewith to sever and hold the thread, a cam on the carrier for advancing the jaw into position to engage the thread, and means for retracting the jaw.

5. A sewing machine, having, in combination, stitch forming mechanism comprising an upper needle and a rotary carrier therefor, a thread holding jaw, devices cooperating therewith to sever and hold the thread, a cam on the carrier for advancing the jaw into position to engage the thread, a spring for retracting the jaw, a latch to retain the jaw in advanced position, and means for operating the latch.

6. A sewing machine, having, in combination, stitch forming mechanism, a work clamp, a support mounted above the clamp to move vertically therewith, a cutter plate on the support, a clamping and cutting jaw above the plate, a stationary clamping jaw above the movable jaw, and mechanism for moving the clamping and cutting jaw between the stationary jaw and cutter to clamp and cut the thread.

7. A sewing machine, having, in combination, stitch forming mechanism comprising a rotary needle carrier, a thread holding jaw, devices coöperating therewith to sever and hold the thread, a cam on the carrier for advancing the jaw into position to engage the thread, means for retracting the jaw, and a cam on the carrier for advancing the jaw to release the thread.

8. A sewing machine, having, in combination, a stitch forming mechanism including a rotary needle carrier, a work clamp, a support mounted above the clamp, a thread holding jaw, devices coöperating therewith to sever and hold the thread, a lever for operating the jaw, a slide engaging the lever, and a cam on the carrier for actuating the slide.

9. A sewing machine, having, in combination, stitch forming mechanism including a rotary needle carrier, a work clamp, a support above the clamp, a work holding jaw mounted in the support, devices coöperating therewith to sever and hold the thread, a lever for operating the jaw, a slide engaging the lever, a cam on the carrier for actuating the slide, and a latch for retaining the slide in position.

10. A sewing machine, having, in combination, stitch forming mechanism comprising an upper needle carrier, mechanism for rotating the carrier, and thread cutting devices operated by the rotation of the carrier.

11. A sewing machine, having, in combination, stitch forming mechanism comprising an upper needle carrier, mechanism for rotating the carrier, and thread holding devices operated by the rotation of the carrier.

12. A sewing machine, having, in combination, stitch forming mechanism comprising a rotary needle carrier, thread cutting devices, a cam on the carrier, and connections for operating the cutter from the cam.

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