G. S. HILL.

SEWING MACHINE.

APPLICATION FILED JULY 24, 1916.

1,358,847.

Patented Nov. 16, 1920.

3 SHEETS—SHEET 1.

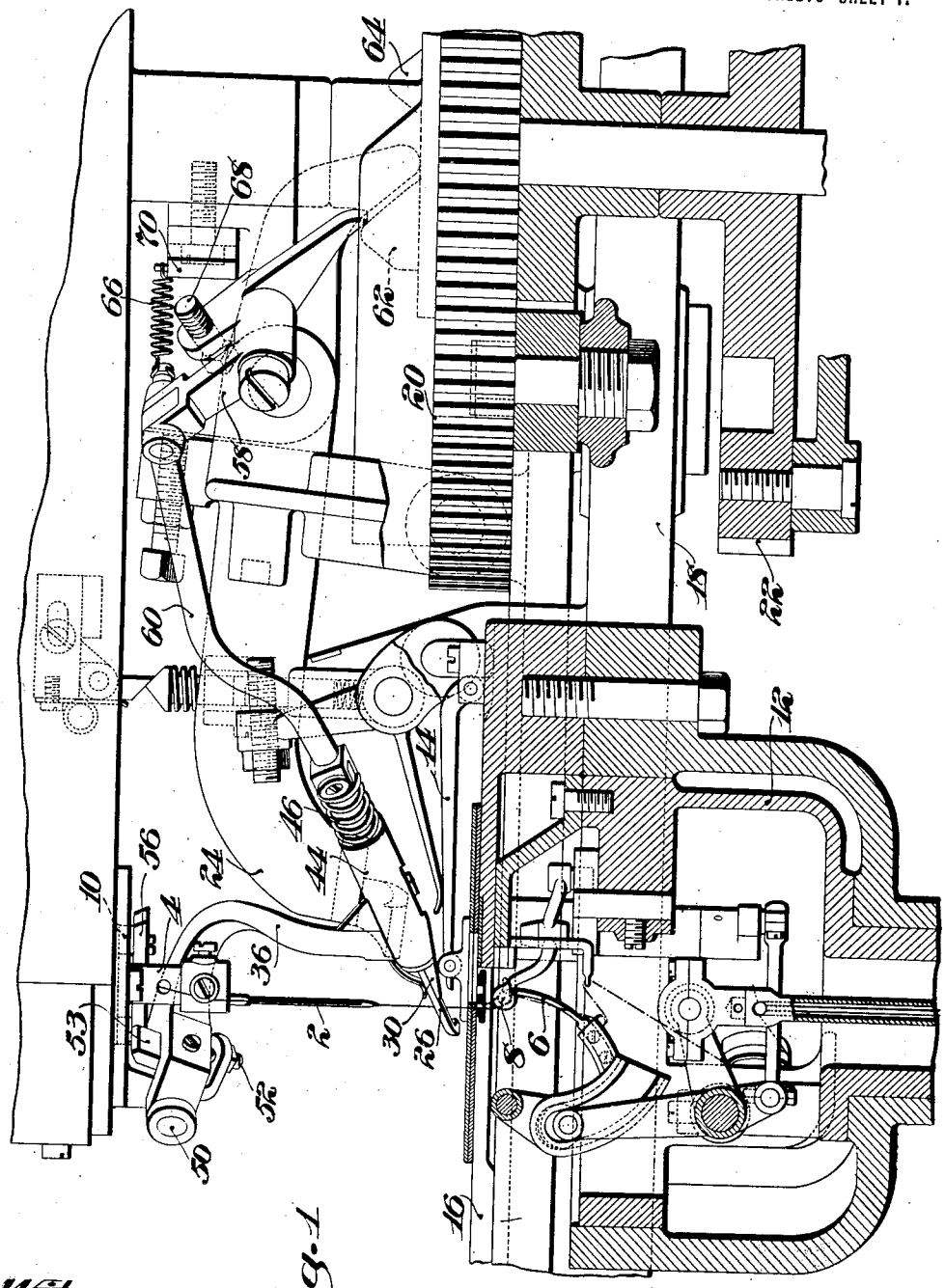


Fig. 1.

Witness

Frederick S. Greenleaf

Inventor

George S. Hill

by Phillips Van Everen & Fish

Attys

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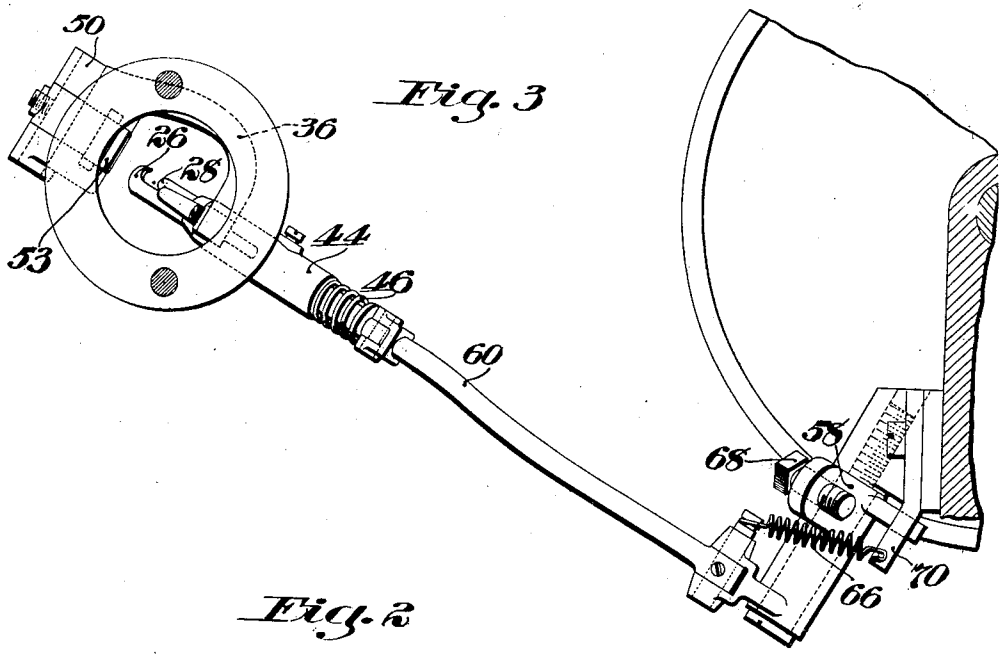


Fig. 3

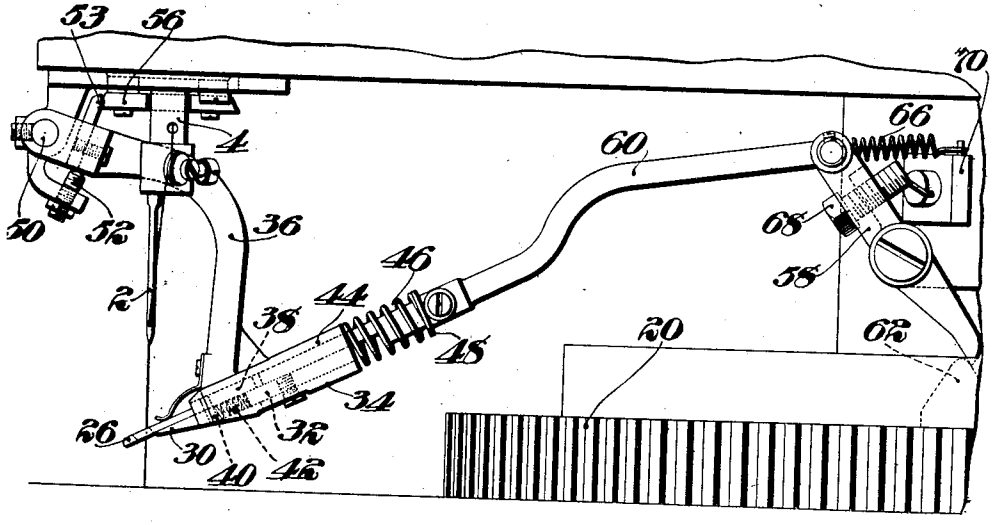


Fig. 2

Witness

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Inventor

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by Phillips Van Everen & Fish

Attys

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3 SHEETS—SHEET 3.

Fig. 4

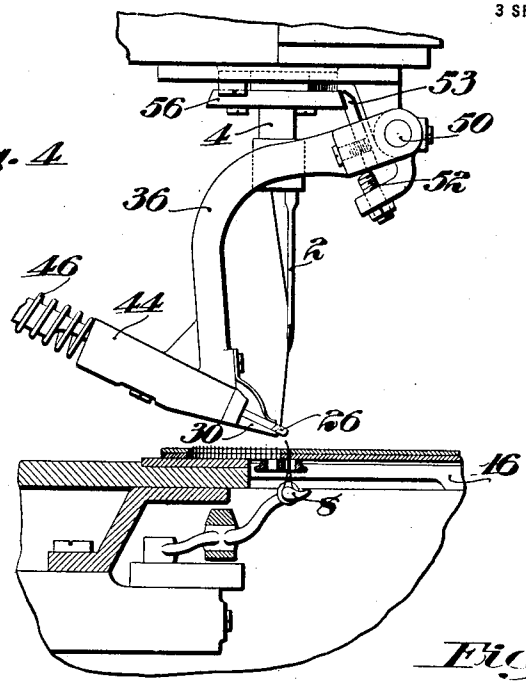


Fig. 5

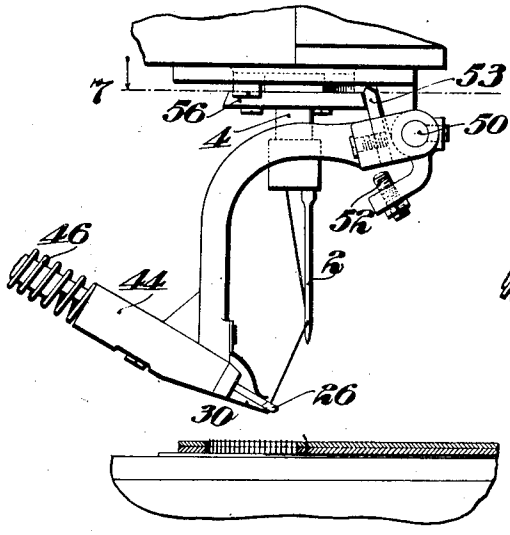


Fig. 6

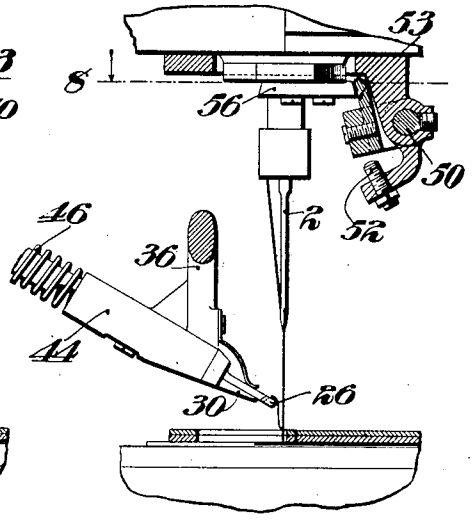


Fig. 7

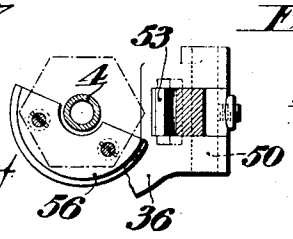
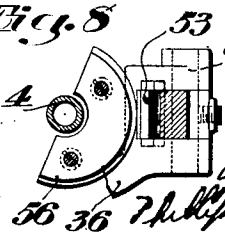


Fig. 8



Witness:

Frederick L. Greenleaf

Inventor

George S. Hill

By Phillips Van Etten & Fish

Attys.

UNITED STATES PATENT OFFICE.

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

SEWING-MACHINE.

1,358,847. Specification of Letters Patent. Patented Nov. 16, 1920.

Application filed July 24, 1916. Serial No. 110,937.

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 thread holding and severing mechanism for sewing machines.

The object of the invention is to provide novel and improved thread severing and holding means which will operate in a uniformly reliable manner to sever the standing needle thread close to the work, and which is well adapted for use in buttonhole sewing machines in which a work clamp and the sewing mechanism are relatively actuated to form overseam stitches along the sides and about the end or ends of the buttonhole.

To these ends 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 apparent to those skilled in the art from the following detailed description of the mechanism illustrated in the drawings, which embodies the invention in its preferred form.

In the drawings, Figure 1 is a sectional elevation showing so much of a buttonhole sewing machine as is necessary to illustrate the application of the present invention thereto; Fig. 2 is a side elevation of the thread severing and holding mechanism, the parts being shown in the same position which is illustrated in Fig. 1; Fig. 3 is a plan view of the parts shown in Fig. 2; Figs. 4, 5 and 6 are detail elevations showing the parts in different positions; Fig. 7 is a sectional plan view on line 7, Fig. 5; and Fig. 8 is a similar view on line 8, Fig. 6.

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 is mounted in a rotary head or carrier 10. The under needle and looper are mounted in a rotary turret 12 which is rotated in unison with the head 10. The work is held by clamps 14 pivotally mounted on the work supporting plates 16, which are in turn mounted on a clamp carrier 18. The clamp carrier is moved lengthwise of the buttonhole to bring the work into register with the cutter or with the sewing 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. The cutter 24 is operated from a cam on the cam gear, and when operated to cut a buttonhole, also acts to close the clamps. The clamps are held closed during the sewing by latching devices, and are released during the return of the cutter carriage to cutting position, 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 with the upper needle thread about the looper, as indicated in Fig. 1.

The means shown for severing and holding the needle thread at the completion of the sewing comprise two thread gripping jaws 26 and 28, and a cutter 30, which are similar in construction to the thread gripping jaws and cutter of Patent No. 1,094,896, dated April 28, 1914. The cutter is formed on the front end of a semicylindrical bar 32 secured in a bearing 34 formed on the lower

end of a support 36. The jaw 28 is formed by the front end of a slide 38 mounted in the bearing 34 above the cutter bar 32, and provided with a pin 40 playing within a recess in the cutter bar and engaged by a spring 42. The spring tends to hold the pin against the end of the recess, in which position the jaw 28 is slightly beyond the edge of the cutter bar. The jaw 26 is formed by the face of a finger which projects laterally from a gripper bar 44 mounted to slide in the bearing 34 above the cutter bar and to one side of the gripper slide 38. A spring 46 is interposed between the rear end of the bearing 34 and a collar 48 on the rear end of the gripper bar 44, and tends to retract the bar in the bearing. The support 36 in which the gripper jaws and cutter are carried is mounted upon a fixed pivot 50 which is preferably so arranged that the jaws will move in an inclined direction toward and away from the standing thread or needle path when the support is moved about its pivot. The forward movement of the support is determined by an adjustable stop screw 52 arranged to engage the support near its pivot. The support is also provided with an arm 53 arranged to be engaged by a stop cam or disk 56 on the lower end of the rotary head 10 at certain times in the operation of the machine, for a purpose to be referred to hereafter. The support is advanced and retracted, and the gripper bar reciprocated in the support, through a cam lever 58, one arm of which is connected by a link 60 with the rear end of the gripper bar 44, and the other arm of which is arranged to be engaged by cams 62 and 64 carried by the cam gear 20. A spring 66 tends to hold the cam lever in position with the stop screw 68 which is secured therein in engagement with a fixed stop lug 70.

During the sewing of the major part of the buttonhole, the support 36 is held in retracted position by the spring 66, and the thread gripping jaws are held in closed and retracted position in the support by the spring 46. When the parts are in retracted position the support and gripping jaws are back away from the needle path and above the work clamps, where they will not interfere with the sewing mechanism or with the travel of the work clamp. As the sewing of the buttonhole is completed, or is about to be completed, the cam 62 engages the cam lever and swings the lever and connected parts into the position indicated in Figs. 1 and 2. During the first part of the movement of the cam lever the support 36 is swung forward, moving the thread gripping jaws and cutter forward in an inclined direction over the work clamp, and bringing them close to the standing thread or needle path. The forward movement of the support 36 is then arrested by engagement of the support with the stop 52, and thereafter the gripper bar 44 moves forward independently of the gripper slide 38, so that the gripper jaws are separated and embrace the standing thread when the sewing mechanism is stopped. As the cam lever rides off the cam 62, the spring 46 retracts the gripper bar 44 in the support, so that the jaws 26 and 28 grip the standing thread and then carry it against the cutter, severing the thread close to the work, and without any material deflection of the thread which would increase the length of waste end projecting above the work, as indicated in Fig. 4. After the thread has been thus gripped and severed, the spring 66 acts to retract the support 36 for the thread gripper and cutter, carrying the grippers away from the needle path and into such position that the waste end leading from the initial needle hole to the grippers at the beginning of the next buttonhole will be covered by the overseam, as indicated in Fig. 5. After the initial stitches at the beginning of the seam have been made, the cam 64 will engage the cam lever 58 and rock it in a direction to partially advance the gripper bar 44. At this time the stop disk 56 has turned into the position indicated in Fig. 8, and will act to prevent or arrest the forward movement of the support 36, so that the gripper bar 44 will be moved forward in the bearing 34 to release the end of the thread, as indicated in Fig. 6.

By so mounting the thread gripping jaws and cutter that they may be moved toward and away from the needle path, the thread may be severed close to the work, and without materially deflecting it, and the end of the needle thread then be carried back so that the holding and severing devices are out of the needle path and in position where they will not interfere with the operation of the work clamps, or materially obstruct the view of the operator when positioning the work in the clamps. This also enables the thread to be severed close to the work, and the end of the needle thread to be held by the holding devices in position to be covered by the overseam at the beginning of the next buttonhole. By mounting the thread gripping jaws to move in an inclined direction toward and from the needle path, they may be brought closer to the work at the sewing point, and still be at a sufficient height above the work when in retracted position to permit the proper operation of the work clamp, and to give a substantially unobstructed view of the work in the clamp.

While it is preferred to employ the specific construction and arrangement of parts shown and described in embodying the invention in the machine of the patent above referred to, 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 machine in which it is to be incorporated.

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

1. A sewing machine, having, in combination, stitch forming mechanism including a reciprocating needle, thread gripping jaws movable toward and away from the needle path, a coöperating thread severing device, and mechanism for simultaneously advancing the jaws and severing device to bring them close to the needle path, and for continuing the advance of one jaw independent of the other to embrace the standing thread, and for retracting the jaws to grip and sever the thread and thereafter carry the held end away from the needle path.

2. A sewing machine, having, in combination, stitch forming mechanism including a reciprocating needle, a support, thread gripping and severing jaws mounted to reciprocate in the support, and mechanism for advancing and retracting the support and for actuating the gripping and severing jaws to grip and sever the thread when the support is in advanced position.

3. A sewing machine, having, in combination, stitch forming devices comprising a needle and devices coöperating therewith to form overseam stitches, a work clamp, mechanism for relatively actuating the clamp and stitch forming mechanism to sew about a buttonhole, thread gripping jaws mounted to move over the work clamp toward and away from the needle path, a coöperating thread severing device movable with the jaws, and mechanism for operating the jaws to grip and sever the standing thread while the jaws and severing device are in advanced position and for thereafter retracting the jaws to carry the held end of the thread away from the needle path.

4. A sewing machine, having, in combination, stitch forming devices comprising a needle and devices coöperating therewith to form overseam stitches, a work clamp, mechanism for relatively actuating the clamp and stitch forming mechanism to sew about a buttonhole, thread gripping jaws mounted to move in an inclined direction over the work clamp toward and away from the needle path, a coöperating thread severing device movable with the jaws, and mechanism for operating the jaws to grip and sever the standing thread while the jaws and severing device are in advanced position and for thereafter retracting the jaws to carry the held end of the thread away from the needle path.

5. A sewing machine, having, in combination, stitch forming devices comprising a needle and devices coöperating therewith to form overseam stitches, a work clamp, mechanism for relatively actuating the clamp and stitch forming mechanism to sew about a buttonhole, thread gripping jaws mounted to move toward and away from the needle path, a coöperating thread severing device, mechanism for actuating the jaws at the completion of a buttonhole to grip and sever the standing thread while the jaws and severing device are in advanced position, and for thereafter retracting the jaws to carry the held end of the thread away from the needle path and hold it in position to be covered by the overseam at the beginning of the next buttonhole.

6. A sewing machine, having, in combination, stitch forming devices including a reciprocating needle, a support movable toward and away from the needle path, a gripper bar mounted in the support to slide in the direction of movement of the support and provided with a thread gripping jaw, a coöperating jaw on the support, a thread severing device on the support, and mechanism for advancing and retracting the support and for reciprocating the bar in the support.

7. A sewing machine, having, in combination, stitch forming devices including a reciprocating needle, a support movable toward and away from the needle path, a gripper bar mounted to slide in the support in the direction of its movement, coöperating gripping and thread severing devices on the support, mechanism for reciprocating the bar and support to grip and sever the thread at the completion of the sewing and to carry the held end of the thread away from the needle path, and means for preventing forward movement of the support and for advancing the bar to release the held end at the beginning of the sewing.

8. A sewing machine, having, in combination, stitch forming mechanism including a reciprocating needle, thread gripping jaws movable toward and away from the needle path, mechanism for advancing the jaws to bring them close to the needle path and for continuing the advance of one jaw independently of the other to embrace the standing thread and for retracting the jaws to grip the thread and thereafter carry it away from the needle path, and means for severing the thread while the jaws are in advanced position close to the needle path and prior to their final retraction.

9. A sewing machine, having, in combination, stitch forming devices comprising a needle and devices coöperating therewith to form overseam stitches, a work clamp, mechanism for relatively actuating the clamp and stitch forming mechanism to sew about a buttonhole, thread gripping jaws mounted

to move toward and away from the needle path, mechanism for actuating the jaws at the completion of a buttonhole to grip the standing thread while the jaws are in advanced position close to the needle path and for thereafter retracting the jaws to carry the end of the needle thread away from the needle path and hold it in position to be covered by the overseam at the beginning of the next buttonhole, and means for severing the thread while the jaws are in advanced position close to the needle path.

GEORGE S. HILL.