E. J. RAY.

SEWING MACHINE.

APPLICATION FILED JULY 17, 1915.

1,332,683.

Patented Mar. 2, 1920.

2 SHEETS—SHEET 1.

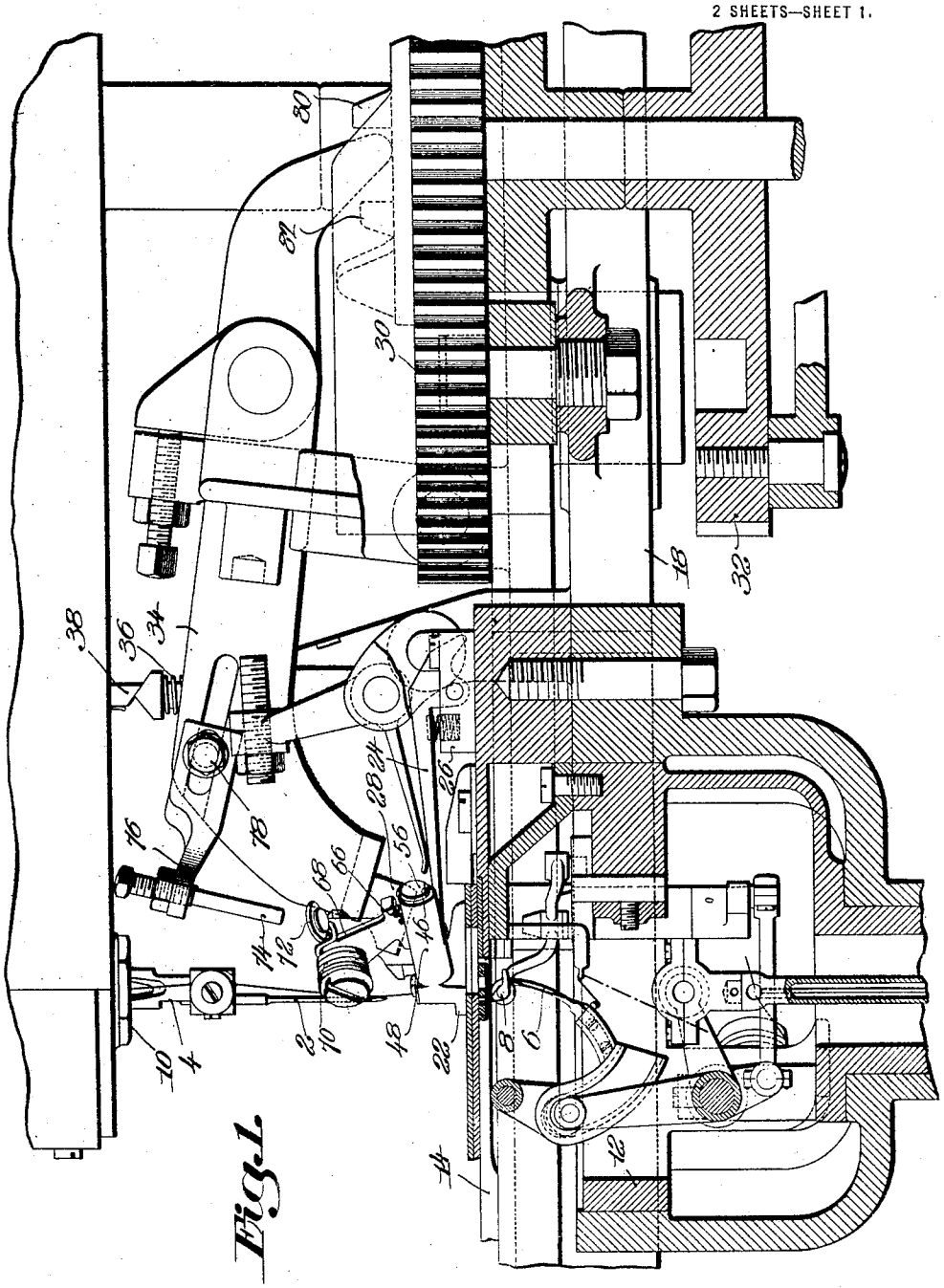


Fig. 1.

Witness

Frederick S. Grumbach

Inventor

Eugene J. Ray

by Phillips Van Everen & Fish

Attys

E. J. RAY.

SEWING MACHINE.

APPLICATION FILED JULY 17, 1915.

1,332,683.

Patented Mar. 2, 1920.

2 SHEETS—SHEET 2.

Fig. 2.

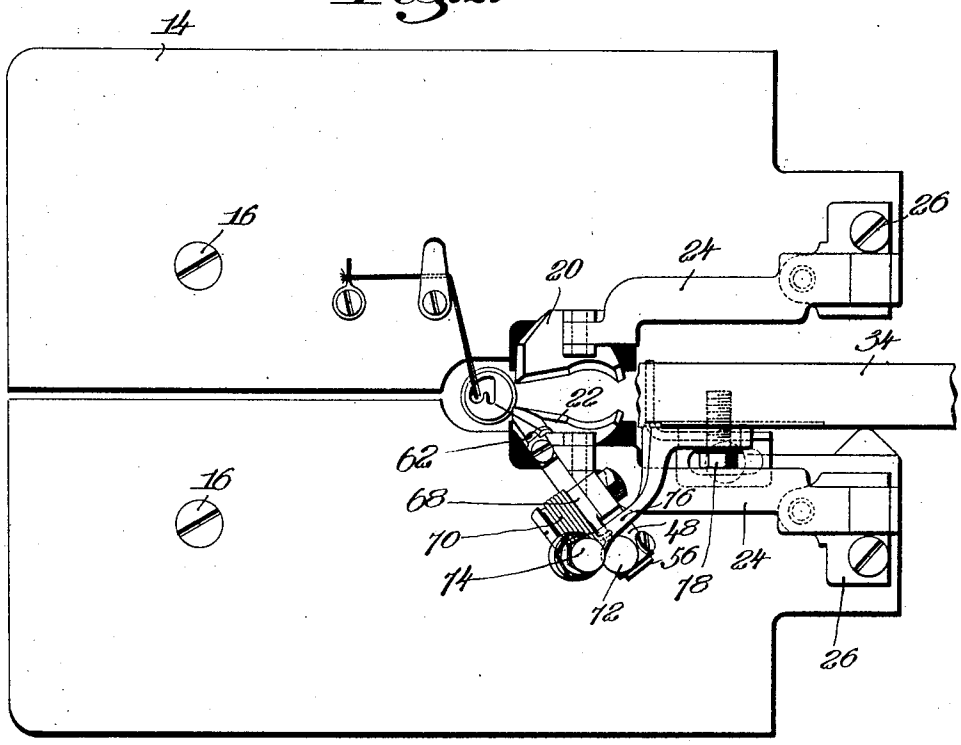


Fig. 4.

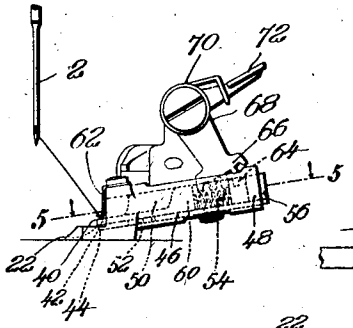


Fig. 3.

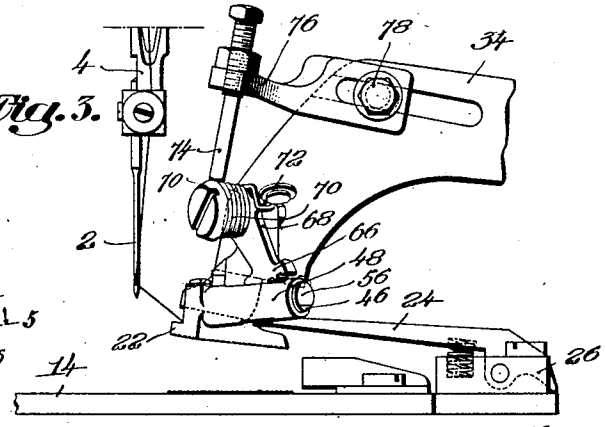


Fig. 5.

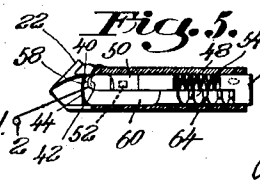
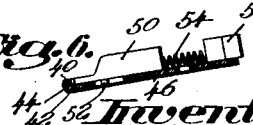


Fig. 6.



Witness
Frederick L. Grunsfeld

Inventor
Eugene J. Ray
By Phillips Van Orman & Finch
Attys.

UNITED STATES PATENT OFFICE.

EUGENE J. RAY, OF BEVERLY, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

1,332,683. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed July 17, 1915. Serial No. 40,395.

To all whom it may concern:

Be it known that I, EUGENE J. RAY, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, 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 cutters and holders for sewing machines, and more particularly for machines in which a work holding clamp and a stitch forming mechanism are relatively movable to sew about a buttonhole.

The object of the invention is to provide novel and improved means for automatically severing the upper needle thread close to the work at the completion of the sewing, and for holding the severed end at the beginning of the next succeeding seam, and to this end the invention comprises the features of construction and combinations and arrangement of parts hereinafter described and referred to in the claims.

The invention will be readily 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; Fig. 2 is a partial plan view showing the work holding devices and thread holding and cutting devices; Fig. 3 is a side elevation of the parts shown in Fig. 2; Fig. 4 is a detailed side view of the thread holder and cutter; Fig. 5 is a detailed sectional view on the line 5—5 of Fig. 4; and Fig. 6 is a vertical sectional view showing the thread clamping jaws and cutter.

In the drawings the invention is shown as embodied in a buttonhole sewing machine having, in general, 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 vertical 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 carrier 12 which are rotated during the sewing about the end and eye of the buttonhole. The work clamping device comprises work supporting plates 14 pivoted at 16 to the clamp carrier 18, so that they may be spread after the work clamps are closed. Clamping jaws 20 and 22 are pivoted on the forward ends of the clamp arms 24, the rear ends of which are pivoted to blocks 26 secured on the plates 14. The clamp carrier is moved longitudinally to bring the work into register with the buttonhole cutter 28 or into register with the stitch forming mechanism, and to feed the work during the sewing, by a cam groove formed in a cam carrying gear 30, 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 32 which makes one revolution during the sewing of a buttonhole. The buttonhole cutter 28 is secured in the forward end of a cutter lever 34 which is operated from a cam on the gear 30. When the cutter lever is operated to cut the buttonhole slit, it also acts to close the clamping jaws 20 and 22 which are held in closed position during the sewing by latching devices indicated at 36. The latching devices are operated to cause the opening of the clamp by a stationary cam 38, 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 then severed close to the work by a thread cutting and holding device mounted in the work clamping jaw 22.

As shown, the thread cutting and holding devices comprise two gripping jaws 40 and 42 which first grip the thread and then carry it against a fixed cutter 44 which coöperates with the under edge of the jaw 40 to sever the thread between the jaws and the work. The cutter 44 is formed on the front end of a plate 46 secured in the lower part of a cylindrical bearing 48 which is formed on the jaw 22. The jaw 42 is formed on the front end of a slide 50 mounted within the bearing 48 above the plate 46 and is pro-

vided with a depending pin 52 playing in a slot in the plate. A spring 54 is interposed between the rear end of the slide 50 and the forward end of a block 56 which is secured in the rear end of the bearing. The spring tends to force the slide 50 forward so that the jaw 42 is beyond the edge of the fixed cutter 44. The jaw 40 is formed on the rear side of a finger 58 projecting laterally from a slide 60 which is mounted within the bearing 48 to one side of the slide 50 and above the cutter plate 46. The front part of the slide 60 is flattened and is engaged by a leaf spring 62 which holds the slide firmly down against the upper surface of the cutter plate 46.

The slide 60 is provided on its upper side with a rack 64 engaged by a gear segment 66 formed on one arm of a bell crank lever 68 which is pivoted to a bracket formed on the jaw 22, and is forced in a direction to retract the slide by a spring 70. The other arm of the bell crank lever is provided with a bearing plate 72 which is arranged to underlie a pin 74 carried by the cutter lever 34 when the work holding clamp is in the position which it occupies at the completion of the sewing of a button-hole. The pin 74 is adjustably secured in an arm 76 so that it may be adjusted vertically and the arm is adjustably secured to the cutter lever by a clamping bolt 78 so that the pin may be adjusted forward or back to bring it into position to register properly with the bearing plate on the arm of the bell crank lever 68.

During the sewing of the buttonhole, the gripper slide 60 is retracted and the parts of the thread holder and cutter are in the position indicated in the drawings. As the sewing of the buttonhole is being completed, the cutter lever 34 is rocked by a cam 80 on the cam carrying gear 30 to engage the pin 74 with the bell crank lever 68, and rock the lever so that the gripper slide 60 is advanced into position to bring the jaw 40 beyond the thread leading from the work to the eye of the upper needle. After the sewing of the buttonhole has been completed and the sewing mechanism brought to rest, the cutter lever is rocked to release the bell crank lever 68, and when this occurs, the gripper slide 60 is quickly retracted by the spring 70. As the slide is retracted, the jaw 40 engages the standing thread and draws it against the jaw 42 and then continued rearward movement of the slide 60 further retracts the jaws carrying the thread against the cutter 44 and severing it close to the work, the end of the severed needle thread being retained between the jaws 40 and 42. The devices for releasing and opening the work clamping jaws may be so arranged that the jaws are released and the work unclamped either before or after the thread holder and cutter is operated to grip and sever the thread. In case the clamp opening devices are operated previous to the operation of the thread holding and cutting devices, the jaw 22 will be held close to or in engagement with the work by the engagement of the pin 74 with the bell crank lever until the pin is raised to release the bell crank lever, when the thread holding and cutting jaws will quickly grip and sever the thread as the gripping jaw 22 rises into the position indicated in Fig. 3. The thread holding jaws will continue to hold the end of the needle thread until the sewing of the succeeding seam has begun. After several stitches have been made at the beginning of the seam, the cutting lever may be rocked by a cam 82 to advance the gripper slide 60 sufficiently to release the needle thread so that the end of the thread may be covered by the stitches of the seam, or the thread may be withdrawn from between the gripping jaws by its engagement with the stitches of the seam.

In the above construction the lower edge of the jaw 40 forms a cutting device which reciprocates in the work clamp jaw so that the thread may be severed close to the work, and the face of the jaw, together with the jaw 42, forms means for holding the severed thread end on the work clamp so that there will be but a short waste end at the beginning of the next buttonhole seam.

The bearing 48 for the thread holding and cutting devices is preferably arranged so that the gripper slides move in an inclined direction toward the sewing point and thus grip and sever the thread closer to the upper surface of the work. The bearing is also preferably so arranged with relation to the sewing point, that the thread leading from the initial needle hole to the jaws of the thread holder is held in position to be covered by the initial overedge stitches formed at the beginning of the seam, as with this arrangement the waste end of the thread is covered and secured, thus adding to the strength and appearance of the seam.

While it is preferred to employ the specific construction and arrangement of the 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 construction of a machine in which it is to be embodied.

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, a clamp carrier, work supporting plates mounted for lateral spreading movement on the carrier,

clamping arms mounted on the plates, clamping jaws pivoted on the ends of the arms, mechanism for relatively actuating the stitch forming mechanism and clamp carrier to sew about a buttonhole, thread cutting and holding devices mounted in one of the clamping jaws, and mechanism for automatically actuating said devices to sever and hold the thread at the completion of a buttonhole.

2. A sewing machine, having, in combination, stitch forming mechanism, a clamp carrier, work supporting plates pivoted on the carrier, a pivoted clamp arm mounted on each plate, a clamping jaw on each arm, mechanism for relatively actuating the stitch forming mechanism and clamp carrier to sew about a buttonhole, thread cutting and holding devices mounted on one of the clamping jaws, and mechanism for automatically actuating said devices to sever and hold the thread at the completion of a buttonhole.

3. A sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising work supporting plates and clamping jaws mounted on the plates, a buttonhole cutter, thread cutting and holding devices mounted on one of the clamping jaws, and connections for operating said devices from the buttonhole cutter.

4. A sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising work supporting plates and clamping jaws, thread gripping and cutting slides mounted in one of the jaws to move in an inclined direction toward the sewing point, mechanism for relatively actuating the stitch forming mechanism and work clamp to sew about a buttonhole, and mechanism for operating the slides to grip and sever the thread at the completion of the sewing.

5. A sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising work supporting plates and clamping jaws, a bearing in one of the jaws inclined toward the sewing point, and thread gripping and cutting slides mounted in the bearing.

6. A sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising work supporting plates and vertically movable clamping jaws, a bearing in one of the jaws, thread gripping and cutting slides mounted in the bearing, an operating lever pivoted on the jaw, and a buttonhole cutter lever provided with a pin for operating the lever on the jaw.

7. A sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising work supporting plates and clamping jaws, thread severing and holding devices mounted in one of the jaws and arranged to hold the end of the thread in position to be covered by the initial stitches at the beginning of a buttonhole, mechanism for moving the work holding clamp and for rotating the stitch forming mechanism to sew about a buttonhole, and mechanism for automatically operating the thread severing and holding devices to sever and hold the thread at the completion of a buttonhole.

8. A buttonhole sewing machine, having, in combination, stitch forming mechanism, a buttonhole cutter, a clamp carrier, work supporting plates mounted for lateral spreading movement on the carrier, clamping arms moving with the plates, work clamping jaws pivoted on the ends of the arms, mechanism for actuating the buttonhole cutter and for relatively actuating the stitch forming mechanism and clamp carrier to sew about a buttonhole, a thread cutting device mounted on a work clamping arm to reciprocate above the lower face of the work clamping jaws, means on the clamping arm for holding the severed thread end above the thread cutting device, and mechanism for automatically actuating the thread cutting device and thread end holding means to sever and hold the thread at the completion of a buttonhole.

9. A buttonhole sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising work supporting plates and coöperating vertically movable clamping members, thread severing devices, and means mounted on the clamp for holding the severed thread end, and a rotary cam carrier provided with cams for reciprocating the work clamp and for automatically actuating the thread severing device and thread end holding means at the completion of a buttonhole.

10. A buttonhole sewing machine, having, in combination, stitch forming mechanism, a buttonhole cutter, a work clamp comprising spreading work supporting plates and coöperating vertically movable clamp arms, thread severing and thread end holding devices on one of the clamp arms, mechanism for reciprocating the clamp and rotating the stitch forming mechanism to sew about a buttonhole, and mechanism for automatically actuating the thread severing and thread end holding devices to sever and hold the thread at the completion of a buttonhole.

11. A buttonhole sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising work supporting plates and coöperating vertically movable clamping members, thread severing devices and thread end holding means on one of the vertically movable members, mechanism for rotating the stitch forming mechanism and relatively moving said mechanism and the work clamp to sew about a buttonhole, and mechanism for automatically actuating the thread severing device and thread holding means at the completion of a buttonhole.

12. A buttonhole sewing machine, having, in combination, stitch forming mechanism, a traveling clamp carrier, lower work clamping members mounted on the carrier for lateral movement toward and from each other, vertically movable upper clamping members movable laterally with the lower members, thread severing and thread end holding devices on one of the vertically movable members, and mechanism for automatically actuating the thread severing and the thread end holding devices to sever and hold the thread at the completion of a buttonhole.

13. A buttonhole sewing machine, having, in combination, stitch forming mechanism, a work clamp, mechanism for relatively reciprocating the clamp and stitch forming mechanism and for rotating the stitch forming mechanism to sew along the sides and about the eye of a buttonhole, thread cutting and thread holding devices on the work clamp, and actuating means brought into operative relation to the thread cutting and thread holding devices by the relative travel of the work clamp and stitch forming mechanism.

14. A buttonhole sewing machine, having, in combination, stitch forming mechanism, a work clamp comprising lower work engaging members and coöperating vertically movable upper clamping members, a reciprocating thread holder on one of the upper clamping members provided with a thread engaging finger projecting transversely of its line of reciprocation, a coöperating holding member against which the thread is drawn by the finger, and mechanism for automatically actuating the reciprocating thread holder at the completion of the sewing.

EUGENE J. RAY.