B. T. LEVEQUE.

WORK SPACING MECHANISM IN BUTTONHOLE SEWING MACHINES.

APPLICATION FILED NOV. 14, 1919.

1,428,598. Patented Sept. 12, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

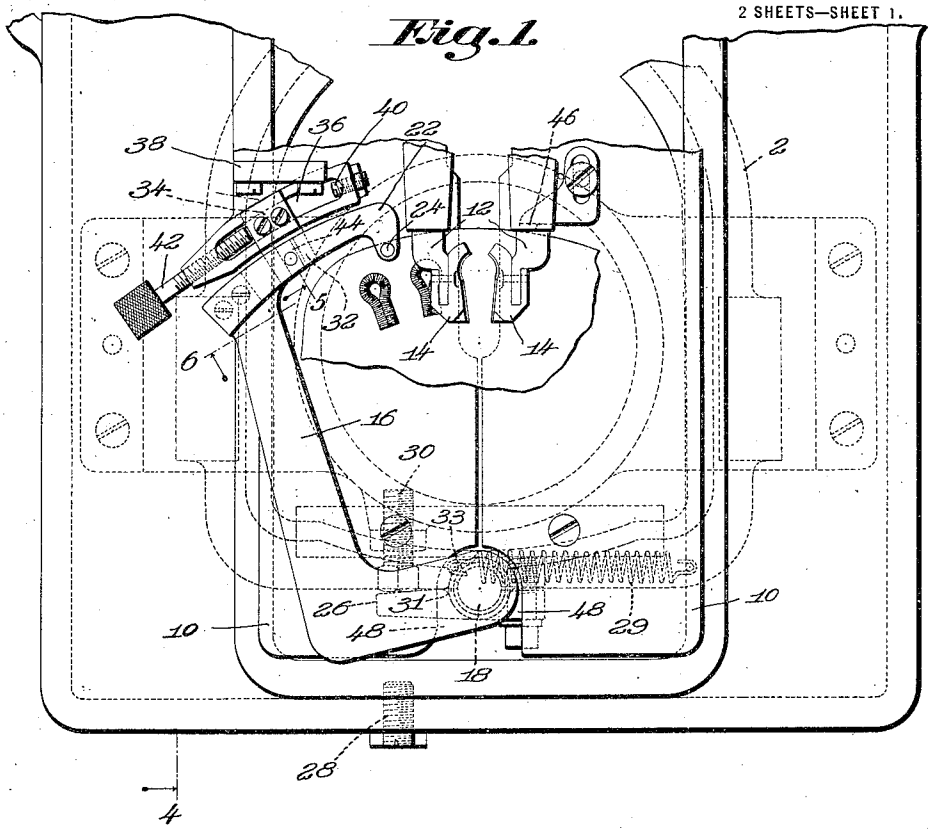
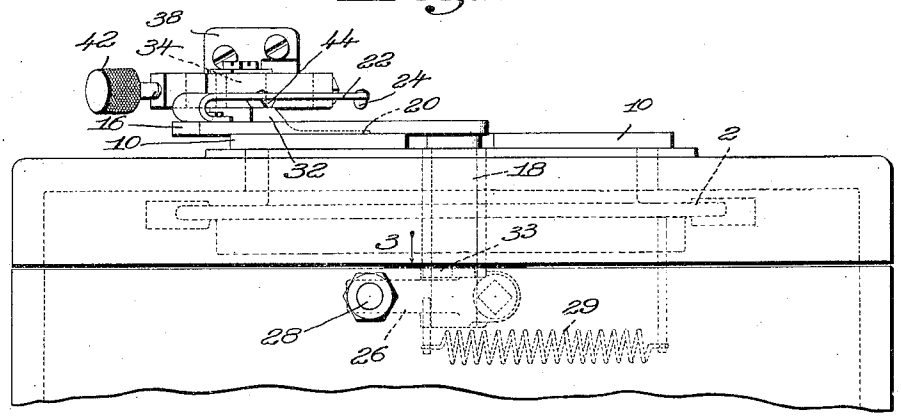


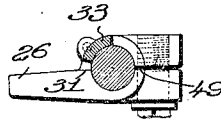
Fig. 2.



Witness

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Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

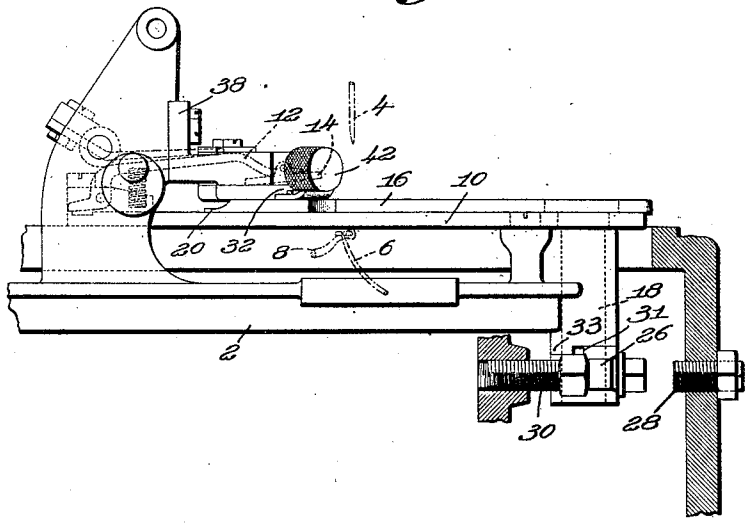


Fig. 5.

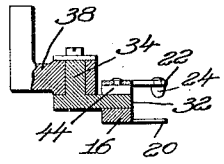
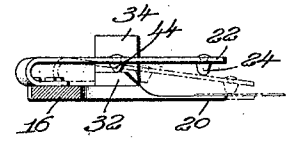


Fig. 6.



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UNITED STATES PATENT OFFICE.

BERNARD T. LEVEQUE, OF WENHAM, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WORK-SPACING MECHANISM IN BUTTONHOLE-SEWING MACHINES.

Application filed November 14, 1919. Serial No. 337,983.

To all whom it may concern:

Be it known that I, BERNARD T. LEVEQUE, a citizen of the United States, residing at Wenham, in the county of Essex, and State of Massachusetts, have invented certain new and useful Improvements in Work-Spacing Mechanism in Buttonhole-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 work spacing mechanism for buttonhole sewing machines and more particularly to mechanism for spacing the work in machines having a work clamp and a rotary stitch forming mechanism, which are relatively removable to sew along the sides and about one or both ends of an eye-ended buttonhole.

The objects of the invention are to provide a construction which is well adapted for automatically spacing the work between successive buttonhole making cycles in a machine of the above type and also to provide a construction which may be readily incorporated in machines which are already in commercial use.

A preferred form of the invention is shown in the accompanying drawings applied to a buttonhole sewing machine having substantially the construction and mode of operation of the machine shown and described in Patent No. 1,063,880 to G. S. Hill dated June 3, 1913.

In drawings Fig. 1 is a plan view of so much of the machine as is necessary to illustrate the application of the present invention thereto. Fig. 2 is a front elevation of the same. Fig. 3 is a detailed sectional view on line 3, Fig. 2. Fig. 4 is a sectional elevation on line 4, Fig. 1. Fig. 5 is a detailed section on line 5, Fig. 1, and Fig. 6 is a detailed section on line 6, Fig. 1.

The machine illustrated in the drawings comprises, in general, a cutter for cutting the buttonhole slit (not shown), a travelling clamp carriage, indicated at 2, which is movable lengthwise and laterally of the buttonhole and a stitch-forming mechanism, which is rotated during the sewing about the eye and about the bar end of the buttonhole and which comprises the upper needle 4, the under needle 6 and the looper 8. The clamp carriage carries the work supporting plates 10 and the vertically movable clamp arms 12, carrying the clamping jaws 14. The parts thus far referred to are, or may be, the same in construction, arrangement and mode of operation as the corresponding parts fully shown and described in the patent above referred to.

In applying the present invention to this machine a work spacer is mounted upon the clamp carriage and is operated, by the endwise travel of the clamp carriage, to intermittently engage and space the work. In the construction shown the spacer comprises an arm 16, the forward end of which is connected to the upper end of a vertical shaft 18 mounted in the clamp carriage and the rear end of which is provided with a laterally projecting finger 20, the end of which is arranged to underlie the rear edge of the work. The end of the finger 20 forms the lower jaw of a gripper, the upper jaw of which is formed by the end of a similarly shaped spring finger 22, which is secured to the rear end of the spacer arm 16 and overlies the finger 20. The work engaging end of the finger 22 may be provided with a conical, or spherical, lug 24 for engaging the work and permitting it to have a slight swinging movement in the jaws of the gripper. The spacer arm is reciprocated during the forward and backward movements of the clamp carriage by the alternate engagement of an arm 26 on the lower end of the shaft 18 with two fixed stop screws 28 and 30. A spring 29 is connected to the arm 26 and normally tends to hold a shoulder 31 on the arm in engagement with a lug 33 on the lower end of the bearing for the shaft 18.

The spring jaw 22 is raised and lowered to open and close the jaws of the spacing gripper by a cam block 32, which underlies the finger and is mounted for limited movement with the finger during the forward and return strokes of the spacer arm 16. As shown the cam block is provided with a vertical rib 34 adapted to slide in a guide-way 36, formed in a bracket 38, which is secured to the clamp carriage. The movement of the cam block in one direction is limited by the fixed stop screw 40 and its movement in the opposite direction is limited by the stop

screw 42, which may be readily adjusted to vary the spacing of the buttonholes as will be further explained.

Assuming that a buttonhole has been completed and the work clamp has moved back into its rearward position to bring the work into register with the buttonhole cutter, the parts will be in the position indicated in the drawings, i. e., in the positions which they occupy after the work has been shifted to bring it into position for the cutting and sewing of the succeeding buttonhole. The cam block 32 will underlie the lug 44 on the spring finger 22 and will hold the finger in its raised position out of engagement with the work. After the work clamp has been closed and the cutter operated to cut the buttonhole slit the clamp carriage will move forward to bring the work into sewing position and then the sewing mechanism will be started. Unless the spring is strong enough to overcome and move the cam block in its guideway, which is undesirable, the block and spacer arm will remain in position during the forward travel of the clamp carriage. As the clamp carriage nears the limit of its forward movement the arm 26 will engage the stop 28 so that during the final forward movement of the clamp carriage the arm 16 will be swung toward the right in Fig. 1. During this movement of the arm the cam block 32 will move with the gripper fingers 20 and 22 until the block engages the screw 40, when its further movement will be arrested. Continued movement of the arm 16 and gripper fingers will carry the lug 44 off of the cam block so that the spring finger or jaw 22 will move downward and engage the work. As the finger rides off the cam block the spring 29 will draw the shoulder 31 snugly against the lug 33 to accurately position the spacing jaws in initial position. The jaw 22 will continue in engagement with the work during the rearward travel of the clamp carriage and until the buttonhole has been completed. During the rearward travel of the clamp carriage from sewing to cutting position, and after the clamp has been opened, the arm 26 will engage the stop 30 and the spacer arm 16 will be swung toward the left in Fig. 1 into the position indicated in this figure. During this movement the cam block 32 will move with the fingers 20 and 22 until the block is arrested by the stop 42, after which the continued movement of the spacer arm and fingers will cause the lug on the finger 22 to ride up onto the cam block, thus raising the finger 22 and disengaging it from the work, preparatory to the next cycle of operation. The work will thus be automatically shifted, after each buttonhole is completed, to properly and accurately position it in the clamp for the succeeding buttonhole. The distance through which the work is shifted by the spacing gripper and the spacing of the buttonholes may be varied by adjustment of the stop 42, which determines the point in the forward stroke of the gripper jaws at which they disengage the work. During the sewing and spacing of the buttonholes the work may be guided by the operator so that during the spacing its rear edge will travel against the gage 46, the working engaging lug 24, on the jaw 22, permitting the work to swing in the spacing jaws to accommodate the curvature of its edge. By applying a continuous pressure to the trip lever of the machine a series of buttonholes may be sewed without interrupting the operation of the machine.

The spacer arm 16, and the gripper jaws carried thereby, are arranged to overlie one of the work supporting plates 10 and in order that they may be swnug into position to permit the removal of the plate, as occasion requires, the arm is so mounted that it may be swung into position to register with recesses 48 formed in the front ends of the plates and arranged to embrace the shaft 18. When the arm is swung into this position the spring 29 will act to hold a shoulder 49 on the arm 26 in engagement with the lug 33 which determines its position. To reduce the distance through which the arm 16 must be swung to clear the plates it is provided at its forward end with a lateral offset, which will register with the recesses 48, when the rearwardly projecting part of the arm is brought into a position in front of the forward ends of the plates.

While it is preferred to employ the specific construction and arrangement shown and described in applying the invention to 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 or modified as found desirable or best suited to the construction of the machine to which the invention is to be applied.

What is claimed is:

1. A buttonhole sewing machine having in combination a stitch-forming mechanism and a reciprocating work clamp relatively movable to sew about a buttonhole and a work spacer operated by the relative travel of the work clamp and stitch-forming mechanism.

2. A buttonhole sewing machine having in combination a stitch-forming mechanism having a travel clamp carriage, a work clamp on the carriage, a work spacer mounted on the carriage and means for operating the spacer to intermittently engage and space the work.

3. A buttonhole sewing machine having in combination a stitch-forming mechanism and a work clamp relatively movable to sew about a buttonhole, a work spacer on the

clamp and means for reciprocating the spacer and for engaging it with and disengaging it from the work.

4. A buttonhole sewing machine having in combination a stitch-forming mechanism having a travel clamp carriage, a work clamp on the carriage, a work spacing gripper on the carriage, means for reciprocating the gripper by the travel of the carriage and means for opening and closing the gripper.

5. A buttonhole sewing machine having in combination a stitch-forming mechanism having a clamp carriage, removable work supporting plates on the carriage, clamping jaws cooperating with the plates, a work spacer mounted on the carriage to reciprocate over the plates and movable into position to permit the removal of the plates.

6. A buttonhole sewing machine having in combination a stitch-forming mechanism and a work clamp relatively movable to sew about a buttonhole, a reciprocating work spacer provided with a spring jaw, movable toward and away from the work and a jaw operating cam block, mounted for limited movement with the spacing jaw.

7. A buttonhole sewing machine having in combination a stitch-forming mechanism and a work clamp relatively movable to sew about a buttonhole, a reciprocating spacer provided with a spring jaw movable toward and away from the work, a cam block movable with the spacer jaw, onto and off of which the jaw rides, stops for limiting the movement of the block, one of which is adjustable to vary the spacing.

8. A buttonhole sewing machine having, in combination, a stitch forming mechanism and a work clamp relatively movable to sew about a buttonhole, and a work spacer for engaging and spacing the work constructed to permit the work to swing about the point of engagement.

9. A buttonhole sewing machine having, in combination, a stitch forming mechanism and a work clamp relatively movable to sew about a buttonhole, a work spacer for engaging and spacing the work constructed to permit the work to swing about the point of engagement, and an edge gage for guiding the work adjacent the sewing point.

10. A buttonhole sewing machine having, in combination, a stitch forming mechanism and a work clamp relatively movable to sew about a buttonhole, a work spacer provided with work engaging jaws permitting swinging movement of the work about the point of engagement and an edge gage for guiding the work.

BERNARD T. LEVEQUE.