

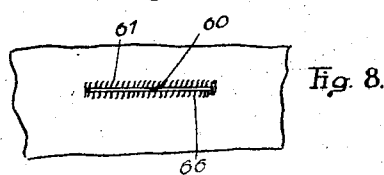
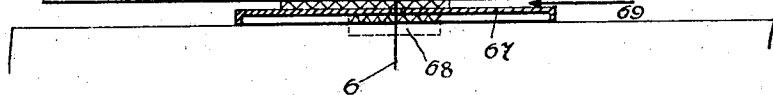
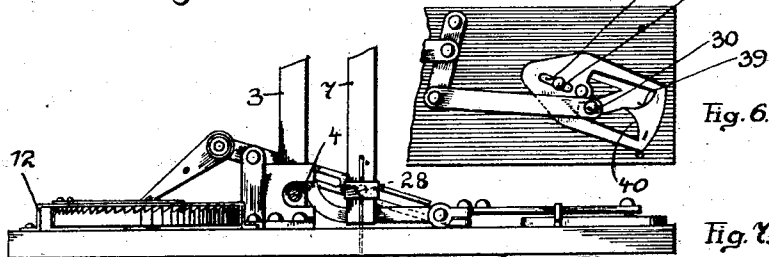
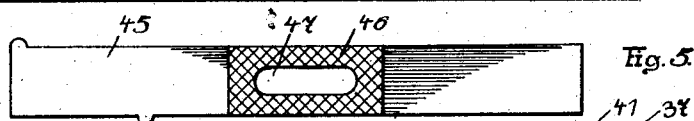
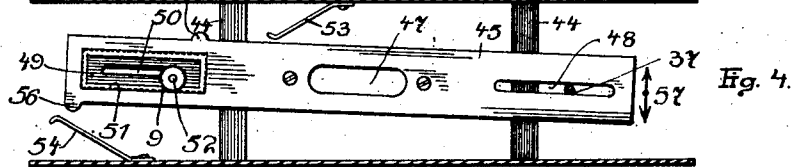
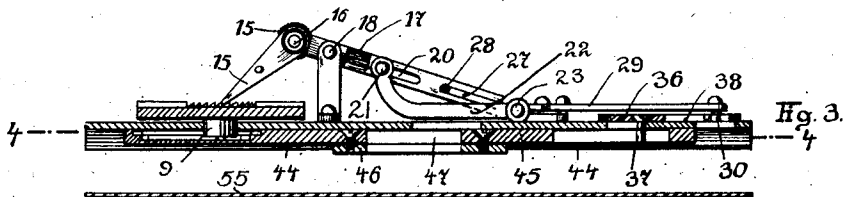
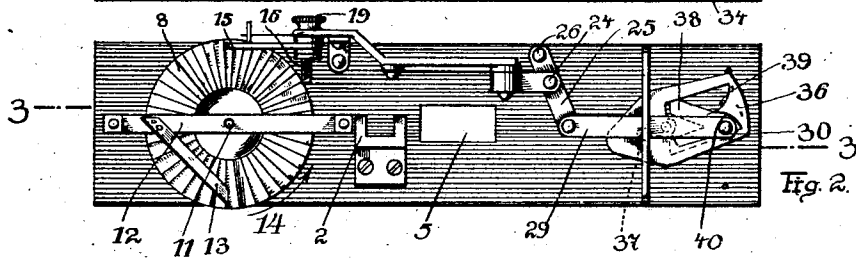
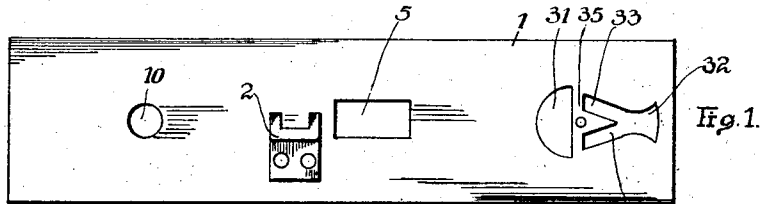
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BUTTONHOLE SEWING APPARATUS

Filed May 24, 1926



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UNITED STATES PATENT OFFICE.

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BUTTONHOLE-SEWING APPARATUS.

Application filed May 24, 1926, Serial No. 111,447, and in Germany June 5, 1925.

This invention relates to a button-hole sewing apparatus.

An embodiment of the invention is shown, by way of example, in the accompanying drawing in which:—

Fig. 1 shows the plate to be fixed on the foot rod of the sewing machine, without the lever- and gear wheel-connection.

Fig. 2 shows the button-hole sewing apparatus in plan view.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 shows the feeding bar in plan view seen from below.

Fig. 6 illustrates a constructional detail.

Fig. 7 shows in side elevation the button-hole sewing apparatus on the foot rod of the sewing machine and in connection with the needle rod of the machine.

Fig. 8 shows a buttonhole sewn on the machine.

The plate 1 carries a foot 2 by means of which the apparatus may be fixed on the foot rod 3 (Fig. 7) of the sewing machine by means of the screw 4 of the foot rod. This plate 1 has an aperture 5 through which the needle passes, said aperture being of such size that the stitch in the cloth can be observed. The needle rod 7 (Fig. 7) of the sewing machine carries the needle 6. On the plate 1 a ratchet wheel 8 is rotatably mounted on the lower surface of which a pinion 9 is rigid which extends through an aperture 10 of plate 1. The axle 11 of the ratchet wheel 8 is journaled in a transverse bar 12 fixed on plate 1, (Fig. 2) on which transverse bar a spring 13 is fixed which acts as a locking pawl and permits of a rotation of the ratchet wheel 8 only in the direction of the arrow 14. A ratchet pawl 15 engages further with the ratchet wheel 8, said pawl being oscillatably mounted on a bolt 16. Bolt 16 is threaded and adapted to be rotated by means of a hand wheel 19, whereby the ratchet pawl 15 can be displaced in the longitudinal direction of the bolt 16 so that the point at which the pawl engages with the ratchet wheel is changed and the angle is varied at will through which the ratchet wheel is rotated by said ratchet pawl.

Bolt 16 is fixed in the end of a two-armed lever 17 pivotally mounted on a bolt 18. The lever 17 has a guide slot 20 for a bolt 21 on which a lever 22 is fixed, the other end of which is connected at 23 with a bearing

which at 24 is connected with a lever 25 which is oscillatably mounted on a bolt 26. At the free end of lever 25 a rod 29 is hinged which carries at its end a bolt 30 designed to control, in a manner which will be hereinafter described, the reciprocating movement of the feeding bar. In plate 1 (Fig. 1) apertures 31 and 32 are further arranged, between which a bolt 35 is situated. The aperture 32 has two arms 33 and 34. A plate 36 is pivotally mounted on the bolt 35 and has an aperture 38 presenting inclined faces 39 and 40. On the lower side of plate 36 a bolt 37 is fixed which projects through the aperture 31 of the plate 1. The bolt 30 of rod 29 engages through the aperture 38 of the plate 36 and through the aperture 32 of plate 1.

On the lower surface of plate 1 the feeding bar 45 is arranged, freely movable between said plate 1 and the cross rods 44, 44 (Figs. 3 and 4).

On the feeding bar 45 a feeder 46 is fixed and the feeding bar 45 and the feeder 46 have each an aperture 47 of similar dimension for the passage of the needle. The feeding bar 45 has further a slot 48 with which engages the bolt 37 of plate 36. On the other side of the feeder 46 a box-shaped cavity 49 is arranged in the feeding bar 45 and in the central portion of this cavity a longitudinal bar 50 is fixed. The edges of the box-shaped cavity have teeth 51. The pinion 9 of the ratchet wheel 8 engages with this box-shaped cavity and the axle 52 of the pinion 9 (Fig. 4) is guided between the edges of the box-shaped cavity and the central bar 50. The feeding bar 45 has a nose 55 in the range of the box-shaped cavity 49, said nose cooperating with a spring 53 and it has further a nose 56 on the other side and at the end which cooperates with a spring 54.

The two armed lever 17, pivoted on bolt 18, has a slot 27 engaging over a screw 28 screwed into the needle rod 7 (Fig. 7). A plate 67 corresponds with the stitch-plate of the sewing machine and has an aperture for the passage of the needle 6, said plate 67 being adapted to be easily fixed on the stitch plate of the sewing machine in a suitable manner. This plate 67 covers the feeder 68 of the sewing machine.

The cloth is inserted in the direction of the arrow 69 (Fig. 7) between the buttonhole sewing apparatus and plate 67. As soon

as the sewing machine begins to work the needle rod 7 with the needle 6 descends and ascends in the well known manner. The feeder 68 of the sewing machine does however not act upon the cloth as it is covered by the plate 67. The cloth is fed exclusively by the feeder 46 of the buttonhole sewing apparatus. At the descending and ascending movement of the needle rod 7 the lever 17 is drawn along by the screw 28 and swung up and down. At the upward movement of lever 17 the bolt 21 (Fig. 3) of lever 22 slides at first along the slot 20 so that the lever 17 moves idly with regard to the rod 22 at this portion of the movement. At this movement the ratchet pawl 15 is however advanced and makes the ratchet wheel 8 and consequently the pinion 9 rotate a determined angle, whereby the feeding bar 45 is moved in longitudinal direction. As soon as the bolt 21 of lever 22 has arrived at the end of slot 20 the lever 22 is drawn along whereby, through the intermediary of the lever 25, the bar 29 is moved to the left with regard to Fig. 2, into the position shown in Fig. 6. At this time the bolt 30 slides along in the slot 34 of the aperture 32 of plate 1 (Fig. 1) and strikes at the end of its movement against the shoulder of the aperture 38 of plate 36 so that this plate 36 is brought from the position Fig. 2 into the position Fig. 6. The bolt 37 oscillates consequently in the slot 31 of plate 1 and as the bolt 37 engages with the slot 48 of the feeding plate, this feeding plate is also moved in transverse direction the same amount as the bolt 37. The bolt 37 is adjustable in a slot 41 (Fig. 6) of its plate 36 whereby the lateral oscillation of the feeding bar 45 may be varied at will. If the needle rod descends again the elements return into the position shown in Figs. 2 and 3, but with the difference that the bolt 30 now occupies the opposite corner of the plate 36 adjacent the incline 39, the ratchet pawl 15 moving idly over the teeth of the ratchet wheel 8 and the bolt 30 of rod 29 moving back through the arm 34 of the aperture 32. At the first ascending movement of the needle rod the bolt 30 had been brought, by the action of arm 34, from the position shown in Fig. 2 into the position shown in Fig. 6. If the needle rod 6 ascends again, bolt 30 being thus moved back, it is brought by the inclined face 39 of plate 36 into engagement with the arm 33 of the aperture 32 so that the bolt 30 bears against the other shoulder of the aperture 38 of plate 36 and returns this plate into the position shown in Fig. 2.

At one ascending movement of the needle rod the plate 36 is therefore rotated once to the right and at the next ascending movement once to the left whereby the bolt 37 of this plate 36 is moved to and fro

transversely to the plate 1, feeding bar 45 being consequently moved to and fro in the direction of the arrows 57 (Fig. 4). This to and fro movement corresponds to the width of the stitches 61 and 66 of the buttonhole 60 (Fig. 8). By this to and fro movement the cloth is drawn along the width of one stitch underneath the needle whereby the stitch for the buttonhole is produced. The axle 52 of the pinion 9 slides with regard to Fig. 4 of the drawing at first along the lower portion of the aperture 49 and advances thereby the feeding bar 45 in longitudinal direction parallel to the buttonhole 60 (Fig. 8) so that the seam 66 is produced.

If the axle 52 of the pinion 9 has arrived at the left end (Fig. 4) of the guide in the feeding bar 45 the nose 55 of bar 45 comes in contact with spring 53 so that the axle 52 of the pinion 9 engages with the upper portion of the box-shaped cavity 49 and works now on the other side of the bar 50 engaging with the teeth in this portion of the cavity. The feeding bar is thus moved in lateral direction such a distance that it displaces the cloth underneath the needle in such a manner that the cross stitches produce the seam 61 (Fig. 8). At the same time the feeding bar is moved in opposite direction as before through the action of the axle 52 of the pinion 9 so that now the other side of the buttonhole is sewn in opposite direction as before.

The box-shaped cavity 49 may be extendible in a convenient manner so that the length of the buttonhole can be varied according to requirement. At the other end of the longitudinal movement the nose 56 (Fig. 4) of the feeding bar comes in contact with spring 54 so that the axle 52 of the pinion 9 is again brought to the other side of the central bar 50.

I claim:—

1. A buttonhole sewing apparatus, comprising a horizontal plate having a fork-shaped aperture at the right end and a rectangular aperture for the needle of the sewing machine, a semi-circular aperture close to said fork-shaped aperture and an aperture near the left end, a foot on the upper surface of said plate for fixing said plate on the presser bar of the sewing machine, a ratchet wheel rotatably mounted near the left end on said plate, a feeding bar movably mounted on the lower surface of said plate and having a central aperture, a rectangular cavity near the left end and a longitudinal slot near the right end, a vertical axle of said ratchet wheel, a pinion keyed on the lower end of said axle and extending into said aperture at the left end of said plate, a longitudinal bar extending over said ratchet wheel and fixed on said plate, said axle of said ratchet wheel being journalled

in said bar, a blade spring on said longitudinal bar and having a hook-shaped end engaging with said ratchet wheel, an upright support on said plate, a two-armed lever 5 pivotally mounted in said support and having a longitudinal slot in its front arm and an open slot in the end of its front arm gripping over the guide screw of the needle bar, a pawl hingedly mounted on the rear 10 end of said two-armed lever and engaging with said ratchet wheel, a system of articulated levers upon the front part of said plate, a stud on the rear end of said system of articulated levers and engaging with said longitudinal slot of said two-armed lever, an apertured plate having two inclined surfaces oscillatably mounted on said supporting plate at the front end of the same, a downwardly projecting stud at the front end of said 15 system of articulated levers and engaging with said aperture of said oscillatable plate and with the fork-shaped aperture of said

supporting plate, a downwardly projecting pin on said oscillatable plate projecting through said semi-circular aperture of said supporting plate and through the longitudinal slot of said feeding bar, a feeder on the central portion of said feeding bar on the lower surface of the same and having an aperture corresponding with said central 25 aperture of said feeding bar, and means in the rectangular cavity of said feeding bar at the left end of the same for operatively engaging said pinion on said ratchet wheel. 30

2. In a button hole sewing apparatus as claimed in the preceding claim, in combination with said ratchet wheel, pinion, and feeding bar having a rectangular cavity near the left end, a longitudinal bar in the centre of said cavity, teeth along the edges of said rectangular cavity of said feeding bar and 35 meshing with said pinion. 40

In testimony whereof I affix my signature.

FRITZ FRÖHLICH.