

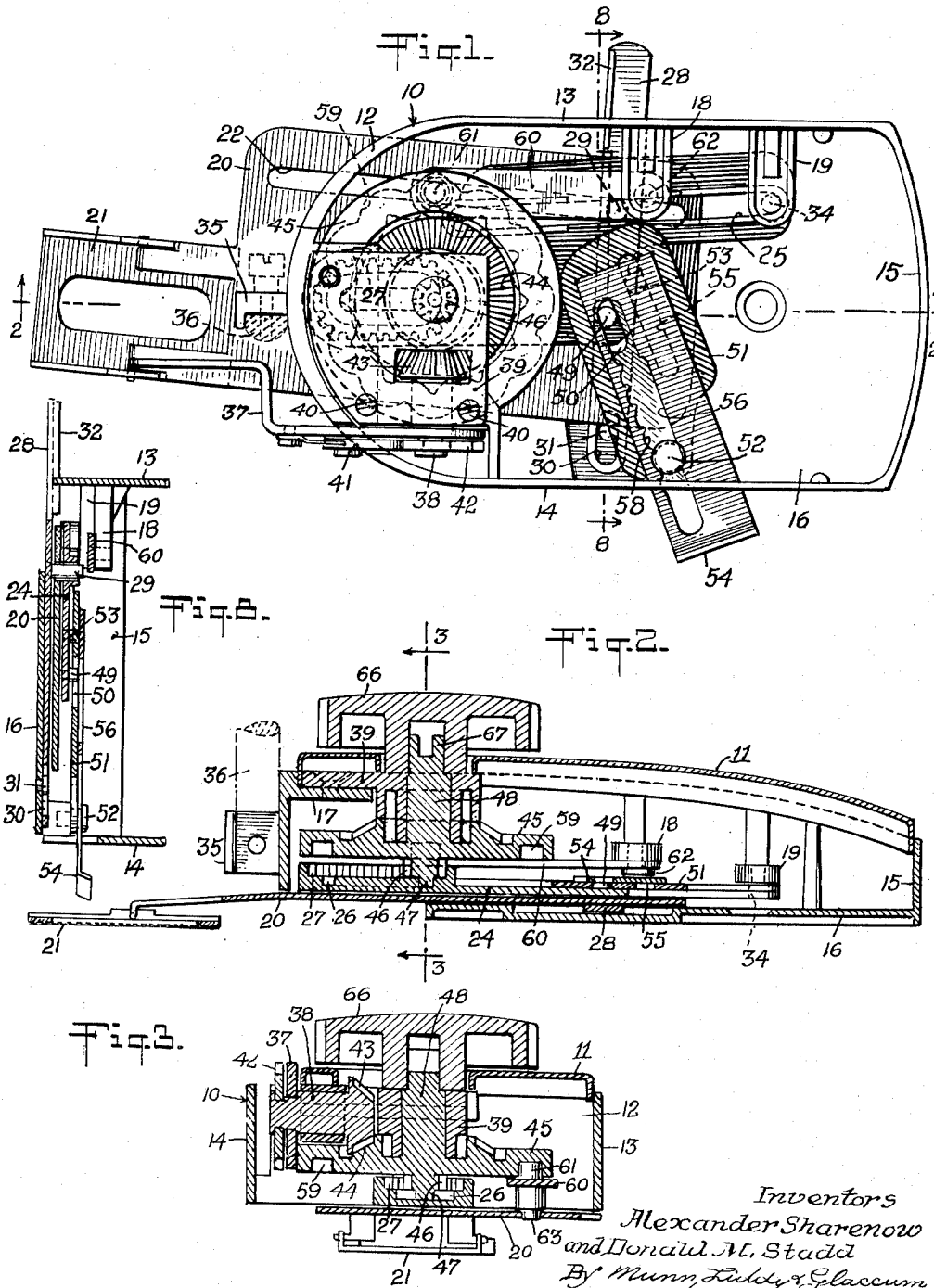
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A. SHARENOW ET AL
BUTTONHOLE ATTACHMENT

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Filed Jan. 18, 1951

2 SHEETS—SHEET 1



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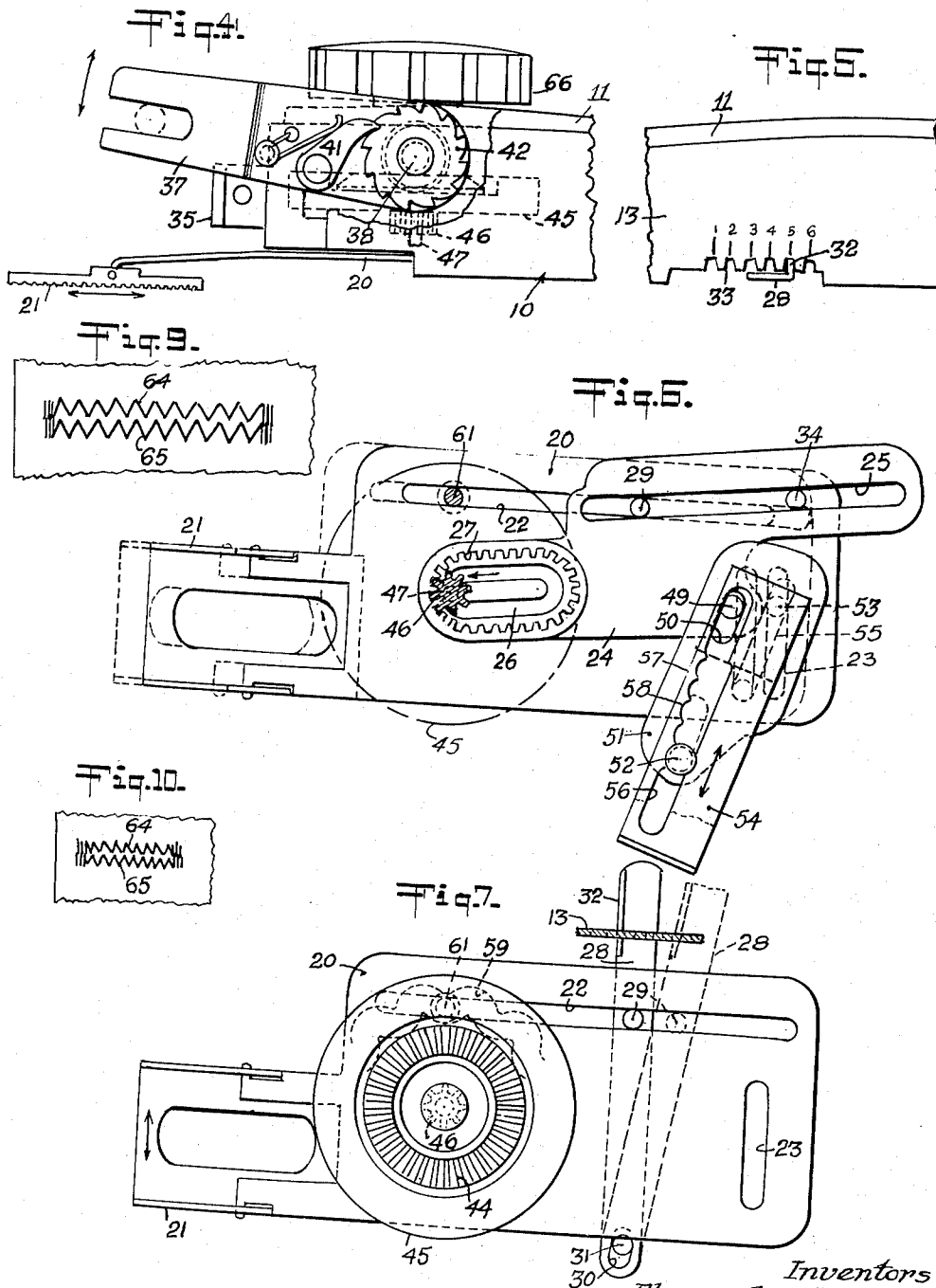
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BUTTONHOLE ATTACHMENT

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5 Claims. (Cl. 112-77)

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This invention relates to a buttonhole attachment adapted for use in conjunction with conventional sewing machines.

More particularly, the attachment of the present invention is designed and adapted for feeding or moving the work so that a buttonhole in the work may be stitched in such manner that the stitching completely borders the buttonhole, and wherein the width and spacing of the lines of stitching may be performed to suit buttonholes differing as to the length thereof.

As important object of the present invention is the provision of an attachment of the indicated character which embodies improvements for performing the stitching of buttonholes as set forth hereinabove.

The invention also resides in the simplicity of the attachment, the economy with which it may be manufactured, and the utility and efficiency derived therefrom.

The nature of the invention and its distinguishing features and advantages will appear when the following specification is read in conjunction with the accompanying drawings, in which—

Fig. 1 is a top plan view of the attachment with the cover of the casing removed.

Fig. 2 is a longitudinal sectional view taken on the line 2-2 of Fig. 1, including the cover and knob used for manual operation.

Fig. 3 is a vertical transverse section taken on the line 3-3 of Fig. 2.

Fig. 4 is an enlarged fragmentary side view showing certain features at the front end of the attachment, a portion of the casing being broken away.

Fig. 5 is a side view showing details of the stitch width adjusting means.

Fig. 6 is a top plan view of the work feed plate, buttonhole plate and parts for effecting changes in the feed of the work for stitching buttonholes differing in length.

Fig. 7 is a top plan view of the work feed plate, driven rotor and parts for effecting changes in the degree of oscillatory movement of the feed plate.

Fig. 8 is a detail sectional view taken on the line 8-8 of Fig. 1.

Figs. 9 and 10 are diagrammatic views showing type of stitching on both relatively large and small buttonholes.

In accordance with the invention and as shown in the drawings, the attachment includes a casing 10 having a removable top cover 11 which conforms in outline to the front, side and rear walls 12, 13, 14 and 15 respectively. The casing also

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has a recessed bottom wall 16 which serves as a support for certain parts. A bearing bracket 17 is formed integral with the front wall 12 and side wall 14 on the inside thereof. Brackets 18 and 19 are formed integral with the side wall 13 on the inside thereof. The mentioned walls and brackets are die cast in one piece and the cover 11 is stamped from a single piece of material.

A work feed plate 20 which is oblong has a hinged or pivoted presser foot 21 on its front end at one side. The foot contacts the work to move it in response to the movement of the plate 20. The plate 20 has a longitudinal slot 22 and a transverse slot 23 at a right angle to the slot 22. The plate 20 is disposed directly over the bottom wall 16 and it projects through an opening formed in the front and bottom walls with the foot 21 disposed exteriorly of the casing as shown in Fig. 2.

A motion transmission slide plate 24 which is substantially S shape has a longitudinal slot 25 bordered in part by flanges at the ends thereof on the top of the plate. A continuous groove 26 of closed loop or oblong shape is formed on the top of the plate 24 at the front end. A continuous gear rack 27 extends about the groove 26 in parallel relation thereto. The plate 24 is disposed directly over the plate 20.

In order to enable the plates 20 and 24 to have both lengthwise movement and oscillatory movement with respect to the longitudinal axis of the attachment, and also to vary the degree of oscillatory movement of both plates, there is provided a straight hand lever arm 28 having a pivot pin 29 intermediate the ends thereof. One end of the arm has a longitudinal slot 30 therein which receives a fulcrum or pivot pin 31 fixed on the bottom wall 16. The arm 28 underlies the plate 20 in a depression or recess in the bottom and the pin 29 projects upwardly in the slots 22 and 25 which enables the lengthwise and pivotal movement of both plates 20 and 24. The slot 30 enables the arm 28 to have lengthwise movement as well as pivotal movement when adjusting the arm 28 for the purpose of adjusting the pin 29 so as to vary the amount of oscillatory movement of the plates 20 and 24. The arm 28 is inherently resilient or flexible and has an upturned flange 32 engageable between any two of a series of teeth 33 on the side wall 13 of the casing, said wall having an opening to accommodate the arm which projects exteriorly of the casing so that the arm may be flexed out from between two teeth and then be moved to a different position between two other teeth 33 for the purposes

stated. The teeth 33 are enumerated or indexed to indicate different positions of adjustment to attain corresponding oscillatory movements of the plates 20 and 24. The plate 24 has a fixed pivot 34 carried by the bracket 19 and projecting

downwardly in the slot 25.

In order to effect the lengthwise and oscillatory movement of the plate 24 in an oblong path in cooperation with the rack 27 and in response to the operation of the needle-bar of the sewing machine there is provided mechanism as follows: the casing 10 on its front wall 12 has an apertured lug 35 to which is secured the lower end of the usual foot pressure bar 36 of the machine. A bifurcated Z-shaped arm 37 is adapted to be connected with and to be operated by the usual needle-bar. The arm 37 projects through an opening in the wall 12 and is fulcrumed on one end of a shaft 38 supported for rotational movement by bearing means embodied by the bracket 17 and a block 39 removably secured to the bracket 17 by screws 40. A spring pressed pawl 41 on the arm 37 cooperates with a ratchet wheel 42 fastened on the shaft 38, causing step-by-step rotatory movement of the shaft 38 in response to the up and down movement of the needle-bar. A bevel pinion gear 43 meshes with a bevel gear 44 formed integral with a rotor 45. A pinion gear 46 is formed integral with the rotor 45 coaxially thereof, and said gear has an arbor 47 formed thereon which projects downwardly into the groove 26. An upstanding arbor 48 coaxial with the arbor 47 is received in a hole in the block 39 to operatively support the rotor. It will now be understood that movement of the plate 24 in an oblong path will be transmitted to said plate through the intervention of the parts 37, 41, 42, 38, 43, 44, 45, 46 and 27.

The plate 24 oscillates in order to produce the lines or runs of stitching at opposite sides of the buttonhole. Such oscillation is transmitted to the feed plate 20 as will appear hereinafter.

In order that lengthwise movement will be transmitted to the feed plate 20 in response to the lengthwise movement of the plate 24, there is provided means as follows: an upstanding pivot pin 49 on the plate 24 is disposed in a longitudinal slot 50 in an arm 51 pivotally connected with a headed pivot pin 52 fixed on bottom 16. A pivot pin 53 on the inner end of a lever arm 54 depends into a longitudinal slot 55 in the arm 51, said slot 55 paralleling the slot 50. The pin 53 also projects into the transverse slot 23 in the plate 20. The arm 54 has a longitudinal slot 56 therein, and the pin 52 projects upwardly into the slot 56. This slot 56 occurs near one side of the arm 54 which provides a resilient portion 57 having a series of notches 58 communicating with the slot 56. The arm 54 is thus mounted upon the arm 51 for inward and outward sliding movement into different positions of adjustment for the purpose of shifting the pin 53 with respect to the feed plate 20. By reason of the pin 52 and notches 58 and the resiliency of the portion 57, the arm 54 and its pin 53 may be held in different positions of adjustment. This enables a change in the radius between the pivot pins 52 and 53. Consequently, the amount of lengthwise movement of the feed plate 20 may be varied to suit buttonholes of different length. The arm 54 projects through an opening in the wall 15 exteriorly of the casing 10, so that it may be manipulated conveniently.

It is to be understood that the plate 24 always

slides back and forth the same distance; that the amount of back and forth movement of the feed plate 20 is governed by the radius between the pivot pins 52 and 53; and that such radius may be varied by manipulating the arm 54.

The maximum length buttonhole stitched is more than the length of the closed loop formed by the rack 27. Buttonholes shorter in length than the maximum length may be stitched by making adjustments with the arm 54 in the manner described. The arm 54 pulled out to the fullest extent is for stitching the shortest buttonholes and vice versa.

Zig-zag type stitching is produced about the buttonhole in the work. To produce such stitching there is provided in the rotor 45 at the under side a continuous or circular zig-zag or undulated cam track or groove 59. An arm 60 has a follower 61 on one end and the opposite end of said arm is connected with the bracket 18 by a pivot 62. The arm 60 also has a shouldered stud 63 coaxial with the follower 61. The follower 61 projects upwardly into the cam groove 59, and the stud 63 projects downwardly into the slot 22. It will now be understood that as the rotor 45 moves step-by-step, the cam groove 59 acting on the follower 61 will cause the feed plate 20 to oscillate through the intervention of the stud 63 on the pivoted arm 60. This produces a single stitch. The operation is repeated until the buttonhole has been completely stitched entirely about the same as shown in Figs. 9 and 10.

By adjusting the arm 28 to the left as viewed in Figs. 1 and 7, the width of the stitching is increased, and by moving the arm to the right the width of the stitching is decreased. The extreme position of the arm 28 to the left produces stitching of maximum width and vice versa.

Adjustment of the arm 28 shifts the position of the pivot pin 29 with a corresponding change in the throw or oscillation of both plates 20 and 24. The throw of the plate 20 and its foot 21 governs the width of the stitching, while the throw of the plate 24 governs distance between the lines or runs 64 and 65 of the stitching. The throw of the plate 24 is transmitted to the feed plate 20 through the intervention of the pivot pin 29 because the plate 24 acting on the pin 29 causes the latter to move with the arm 28 by reason of the slot 30, and the pin 29 in turn causes the plate 20 to move laterally. Therefore, the adjustment of the arm 28 controls the lateral movement of the work for changes in the width of the stitching and also changes in the spacing of the runs of the stitching at the same time to suit buttonholes differing in length. Adjustment of the arm 54 controls the amount of lengthwise movement of the work to correspond to the length of the buttonhole to be stitched.

If desired a knurled knob 66 may be applied to the upstanding arbor 48 on the rotor 45 for the manual operation of the attachment so that the parts may be brought to starting relationship prior to making the desired adjustments. The arbor 48 has a cross-sectionally square upper end 67 which projects upwardly through an opening in the cover 11. The knob 66 fits on the end 67 and may be manipulated to operate the rotor 45 and parts operatively responsive thereto.

It is to be understood that the invention is not restricted to the embodiment thereof illustrated and described, and that details of construction

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may be modified and rearranged in accordance with the scope of the invention as defined in the appended claims.

We claim:

1. In a buttonhole attachment for sewing machines, a work feed plate having a longitudinal slot and a transverse slot, a motion transmission slide plate having a longitudinal slot, means which slides said slide plate in an oblong path, a pivoted arm having a pin and slot connection with said slide plate, said arm having a second slot therein, a manual control member, coacting means on the control member and said arm to retain the control member in different positions of adjustment, a fixed pivot extending into the longitudinal slot in the slide plate, means operated by said slide plate operating means to oscillate said feed plate, a pin on said control member extending into the second slot in said arm and into the transverse slot in said feed plate, said feed plate being adapted to slide back and forth through the intervention of the pin and slot connection of the arm with the slide plate and the pin on the control member, the adjustment of said control member determining amount of back and forth movement of the feed plate.

2. In a buttonhole attachment for sewing machines, a work feed plate having a longitudinal slot therein, a motion transmission slide plate having a longitudinal slot therein, a manually operable lever arm having a pivot intermediate the ends thereof, said arm also having a longitudinal slot in one end thereof, said pivot projecting into the slot in both of said plates and by reason of which said feed plate has pivotal movement as well as lengthwise movement, a fixed pivot projecting into the slot in said arm enabling pivotal and endwise movement of the arm, a second fixed pivot projecting into the slot in said slide plate by reason of which the plate has pivotal movement as well as lengthwise movement, the pivotal adjustment of said arm enabling transposition of the pivot thereon to alter the degree of pivotal movement of said feed plate.

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3. In a buttonhole attachment for sewing machines as set forth in claim 2, needle-bar operated mechanism which causes the pivotal and lengthwise movement of the slide plate in an oblong path, and means which causes the feed plate to move lengthwise in response to the lengthwise movement of the slide plate.

4. In a buttonhole attachment for sewing machines as set forth in claim 3, wherein the intermediate pivot of the arm causes pivotal movement of the feed plate in response to the pivotal movement of the slide plate.

5. In a buttonhole attachment for sewing machines, a motion transmission slide plate, means which slides said plate in an oblong path, a pivoted arm having a pin and slot connection with said plate, said arm having a second slot therein, a manual control member having a longitudinal slot therein, one wall of said longitudinal slot having notches therein, a stud on said arm which selectively cooperates with said notches to retain the control member in different positions of adjustment, a work feed plate, and said control member having a pin and slot connection with the feed plate, the pin on said control member projecting into the second slot in said pivoted arm, so as to govern the amount of lengthwise movement of the feed plate in accordance with the adjustment of the control member.

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