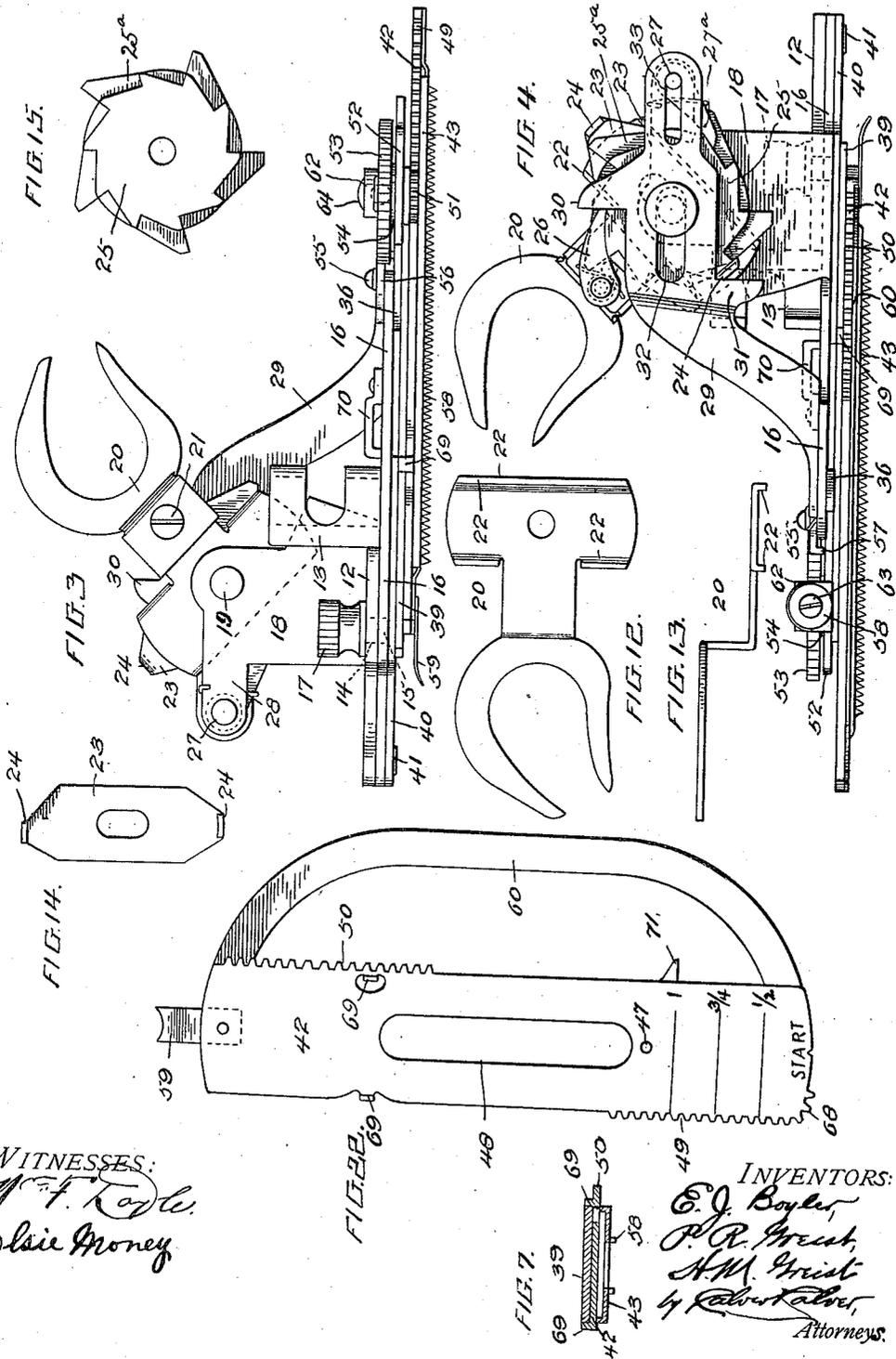


E. J. BOYLER & P. R. & H. M. GREIST.
 BUTTONHOLE ATTACHMENT FOR SEWING MACHINES.
 APPLICATION FILED SEPT. 3, 1910.

1,030,276.

Patented June 25, 1912.

3 SHEETS-SHEET 2.



WITNESSES:
H. F. Kayle,
Olivia Money

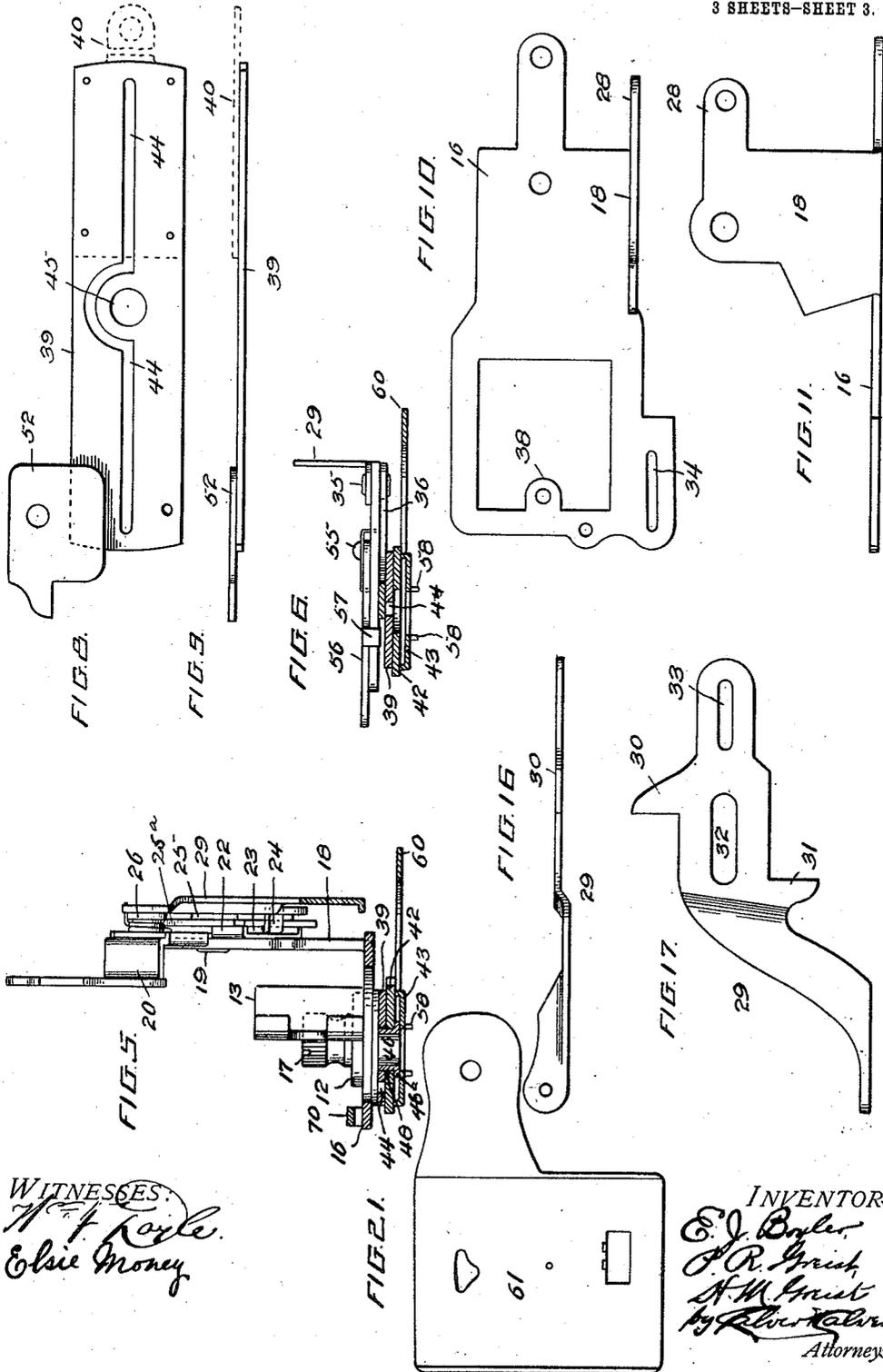
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 Attorneys.

UNITED STATES PATENT OFFICE.

EMANUEL J. BOYLER, PERCY R. GREIST, AND HUBERT M. GREIST, OF NEW HAVEN, CONNECTICUT, ASSIGNORS TO THE GREIST MANUFACTURING COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

BUTTONHOLE ATTACHMENT FOR SEWING-MACHINES.

1,030,276.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed September 3, 1910. Serial No. 580,401.

To all whom it may concern:

Be it known that we, EMANUEL J. BOYLER, a subject of the King of Great Britain, and PERCY R. GREIST and HUBERT M. GREIST, both citizens of the United States, and all residing at New Haven, in the county of New Haven and State of Connecticut, have invented or discovered certain new and useful Improvements in Buttonhole Attachments for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a buttonhole attachment adapted for use with ordinary family sewing machines, and the invention has for its object to provide an attachment which is simple in construction, and reliable in operation, and which is of such a character that its efficient use can be readily acquired by any person of fair intelligence familiar with the operation of ordinary family sewing machines. In the operation of the present improved device, in stitching a buttonhole, the work is reciprocated laterally beneath the needle of the machine, for the formation of the buttonhole stitches, and is also fed lengthwise of the buttonhole, these movements being effected automatically by mechanism operated from the needle-bar of the machine; but when the stitching of one side of a buttonhole has been completed the work-holder is turned manually by the operative to stitch around one end of the buttonhole and to reverse the direction of the feed of the work for stitching the other side of the buttonhole.

The improved attachment comprises a work-holder or work mover having a roughened or serrated lower face which is yieldingly pressed downward against the work by the stress of the presser-foot spring, the attachment being secured to the presser-bar of the sewing machine.

In the accompanying drawings Figure 1 is a plan view of the improved attachment with the parts (in full lines) in starting position. Fig. 2 is a bottom view of the same. Figs. 3 and 4 are opposite side views of the same. Fig. 5 is a cross-section of the same on line 5—5, Fig. 1. Fig. 6 is a cross section on line 6—6, Fig. 1. Fig. 7 is a cross section of the vibrating plate and feeding plate, to show the lugs on the latter

embracing the former. Figs. 8 to 22, inclusive, are separate detail views of certain parts of the attachment to be hereinafter more specifically referred to.

Referring to the drawings, 12 denotes a bracket or plate adapted for attachment to a presser-bar of a family sewing machine, said bracket or plate having a portion 13 adapted to engage a sewing machine presser bar and be secured thereto by any well-known clamping device or set screw. The bracket or plate 12, in the form of the invention herein illustrated, is provided with a slot 14 through which extends upwardly a threaded stud 15 rigidly attached to the base-plate or frame 16, the said stud being screw-threaded for the reception of a clamping nut 17 by which the said bracket or plate 12 and the base-plate 16 may be rigidly attached together. The object of the adjustable attachment of the bracket plate 12 and the base-plate 16, by means of the slot 14, is to permit of a lateral adjustment of one of these parts relative to the other for the purpose of varying the distance between the two rows of stitches on opposite sides of a buttonhole; but where such adjustment is not desired it will be understood that the parts 12 and 16 may be rigidly and firmly attached together by a rivet which may be substituted for the threaded stud 15.

Rising from the base-plate 16, and preferably integral therewith, is a standard 18 on which is pivoted, by means of a stud or rivet 19, an operating lever 20 forked at its forward end for engagement with a stud or pin on the needle-bar of a sewing machine. In the form of the attachment herein illustrated in Figs. 1, 3 and 4 the operating lever 20 is shown as being formed in two parts rigidly attached together by a screw 21, but it will be understood that this operating lever may be made in a single piece, as shown in Figs. 12 and 13, as is common with rufflers and other sewing machine attachments. The inner portion of the operating lever 20 is provided with a vertically disposed slideway afforded by small out-turned lips 22 on the transverse inner portion of said lever, said slideway being adapted for the reception of a sliding escapement plate 23 provided with out-turned lugs 24. Mounted for rotation on the stud or rivet 19 is a cam and ratchet wheel comprising the ratchet

wheel portion 25 which, in the form of the invention herein shown, is provided with ten teeth, while the cam wheel portion 25^a of the said wheel is provided with five circumferential cams or teeth. Said cam and ratchet wheel preferably consists of two stamped-out plates riveted or otherwise firmly attached together so that the two parts of said wheel will rotate in unison. The operating lever 20 is provided with a spring-pressed pawl 26 which is arranged to engage the teeth of the ratchet wheel 25 so as to rotate said wheel to the extent of one tooth at each upward movement of the operating lever, and the circumferential toothed portion or arms of the cam wheel, rotating with the ratchet wheel, will thus be caused to alternately engage the laterally projecting lugs 24 on the sliding escapement plate 23 so as to cause the said plate to be raised or lowered at each vibration of the operating lever.

Mounted for reciprocation on the rivet or stud 19 and a stud 27 attached to a rearwardly projecting arm 28 on the standard 18 is an operating slide 29 provided with teeth 30 and 31 on its upper and lower sides, the said slide being provided with slots 32 and 33 receiving the said rivets or studs 19 and 27 which will thus steady and guide the said slide properly in its reciprocating movements. The lugs 24 on the sliding escapement plate 23, which is caused by the cams of the cam wheel 25^a to rise or fall at each reciprocation of the operating lever 20, will be caused to alternately engage the shoulders afforded by the teeth 30 and 31 on the operating slide, thereby causing the said slide to be moved backward and forward at alternate reciprocations of the said operating lever. Backward rotation of the cam and ratchet-wheel is prevented by a spring-pressed detent pawl 27^a pivoted on the stud 27.

The frame or base-plate 16 which, it will be understood, will, in practice, be rigid with the presser bar of a sewing machine, is provided with a slot 34 which receives a stud or rivet 35 attached to the forward end of the operating slide 29, said stud or rivet loosely engaging the outwardly extending arm of a bell-crank lever 36 fulcrumed on a stud or rivet 37 attached to a lug 38 on the base-plate 16, so that as the said slide reciprocates said bell-crank lever will be caused to vibrate on said fulcrum stud, for the purpose of vibrating the work laterally in forming overedge and depth stitches for the buttonhole seam, as will presently be explained.

The work moving device by which the work may be vibrated laterally on the work-plate of the machine, for forming the overedge and depth stitches of a buttonhole seam, and by which the work may be fed

longitudinally of a buttonhole, comprises a vibrating plate 39 riveted or otherwise permanently attached to a plate 40, the rearwardly extending portion of which is pivoted on a stud 41, a rack-plate 42 and a feeding plate 43, said rack-plate and feeding plate being rigidly attached together in any suitable manner. The vibrating plate 39 is provided with a slot 44 comprising two straight portions connected by a semi-circular portion, said plate having a circular opening 45 in which is permanently fitted, by riveting or otherwise, a guide ring 46 which extends below the said vibrating plate and which is provided beneath said vibrating plate with a circumferential flange 46^a overlapping the edges of a longitudinal slot 48 formed in the rack-plate 42; so that the said rack-plate will thus be attached to the said vibrating plate, but will be adapted to be fed longitudinally relative to said vibrating plate, and will also be adapted for partial rotation on the said guide ring. The feeding plate 43, being permanently attached to the said rack-plate, will, it will be understood, partake of the vibrating and longitudinal movements thereof; and the said feeding and rack-plates will move together when these parts are turned or partially rotated, as will be presently explained, for the reversal of the feeding movements of the work for the purpose of stitching the second side of a buttonhole after the stitching of the first side thereof has been completed.

The rack-plate 42 is provided at its opposite sides and opposite ends with rack portions 49 and 50, the said rack-ports being adapted for engagement with a pinion 51 mounted in a plate 52 riveted or otherwise permanently attached to the vibrating plate 39, said pinion being connected with a ratchet wheel 53 so as to rotate therewith. Between the said plate 52 and the said ratchet wheel is preferably interposed a spring friction washer 54, to prevent backward rotation of said ratchet wheel. Pivotaly mounted on a stud 55 on a portion of the base-plate 16 is a spring-pressed pawl 56 having a tooth 57 which engages the teeth of the ratchet wheel 53, so that as the said ratchet wheel is vibrated laterally with the vibrating plate 39, on which it is mounted, said tooth, which is relatively stationary, will be caused to effect a partial rotation of said ratchet wheel at each vibrating movement of said plate 39.

The vibrating, longitudinally movable, and partially rotatable feeding plate 43 is provided on its under side with two rows of teeth or serrations 58 for engagement with the work, or it may be otherwise roughened to get a proper hold on the work, and the said feeding plate is also provided at one end with a spring tooth 59 for engagement with the work and serving to assist

in the rotation of the latter when a partial turning of the work is to be effected in reversing the same to stitch the second side of a buttonhole after the stitching of the first side thereof has been completed. Said feeding plate is also preferably provided with a curved guard 60 which will move with the work and hold the work down when the work-holding device is being partially rotated, and is also preferably furnished with an index lug or finger 71 to gage the position of the buttonholes from the edge of the cloth or work.

The pawl 56 will preferably be so arranged as to move the ratchet wheel forward two teeth at each vibration of the plate 39, but if it be desired to space the buttonhole stitches very closely a pivoted keeper 70 may be swung around, as denoted by dotted lines in Fig. 1, so as to engage the tail of the said pawl and limit its action in such a way that the ratchet wheel will be fed forward but one tooth at each vibration of the plate 39.

From the foregoing it will be understood that when the attachment is secured in place to the presser-bar of a sewing machine the feed plate will rest on the work placed beneath the same, the ordinary feeding device of the machine being rendered inoperative by a suitable cover plate 61 attached to the work-plate of the machine and between which and the said feeding plate the work will be clamped by virtue of the stress of the sewing machine presser-bar spring. With the attachment thus secured to the sewing machine the forked portion of the operating lever 20 will be engaged by the usual stud or screw on the needle bar of the machine; thereby causing the said operating lever to be vibrated and the operating slide 29 to be reciprocated when the machine is in operation, the needle of the machine passing through the opening 45 in the vibrating plate 39. The reciprocating movement of the operating slide 29 will impart vibrating movements to the bell-crank lever 36, and as the said bell-crank lever is operatively connected with the vibrating plate 39 by the stud 62 fixed to said plate the vibrating plate will be moved laterally for the purpose of forming the depth and overseaming stitches of a buttonhole seam. The "bite" of the buttonhole seam, or the distance of the depth stitches from the edge of the buttonhole slit, may be regulated by the adjusting screw 63 which is tapped to a small upturned lug 64 formed on one arm of the bell-crank lever 36; said adjusting screw being fixed in any desired position of adjustment by the lock nut 65. To provide for this regulation of the distance of the depth stitches from the edge of the buttonhole slit the shank of the said stud 62 is loosely re-

ceived in a slot 66 in one arm of the bell-crank lever, thus providing for more or less lost motion between the said lever and the vibrating plate 39.

The slot 14 in the bracket plate 12 permits of a lateral adjustment of the parts so as to vary the distance between the proximate edges of the two rows of stitches on the opposite sides of the buttonhole, as hereinbefore stated, if this should be desired. This adjustment, however, will not necessarily be provided for, in that an attachment for ordinary family work may be constructed, by omitting the slot 14 and permanently riveting the bracket plate 12 to the base-plate 16, in such a manner that the proximate edges of the two rows of buttonhole stitches will be in the proper position for ordinary buttonhole work, without providing for the adjustment of the distance between the two rows of stitches just above referred to.

In the operation of the invention the work will be placed beneath the attachment with the parts in the position denoted in Fig. 1, and with the rack portion 49 in engagement with the pinion 51. The machine being now set in motion the feeding plate 43, carrying the work with it, will be fed longitudinally as it is vibrated back and forth laterally for the formation of the buttonhole stitches, the said feeding plate being guided longitudinally of the vibrating plate 39 by the guide ring 46 and also by the stud or pin 47 on the rack-plate 42 moving with the said feeding plate and which stud or pin 47 moves in one straight portion of the guide slot 44 in said vibrating plate. When the said guide stud reaches the end of the first straight portion of said slot and enters the curved portion thereof a partial turning of the said feeding plate will be commenced by the engagement of the said pinion with the curvilinearly arranged teeth 68 at the end of the rack section 49, and the semi-circular turning movement of the feeding plate, to stitch around the end of the buttonhole, and to reverse the work, will be completed manually by the operator. When in its partial turning movement the guide stud 47 has passed through the semi-circular portion of the guide slot and again reaches the other straight portion thereof the rack section 50 will be brought into engagement with the pinion 51 and the work will then be fed longitudinally for the stitching of the side of the buttonhole opposite that first stitched; and when the inner end of said rack portion 50 has passed the pinion the stitching of the second side of the buttonhole will have been completed. At this time, should it be desired to form a few barring stitches, the pawl 56 may be pushed back by the finger of the attendant and the work may then be shifted back and

forth a few times manually by side pressure on the attachment, so that the stitched buttonhole may thus be fully completed.

The rack plate 42 is steadied and guided in its longitudinal movements on the vibrating plate 39 not only by the stud 47 working in the guide slot 44 in the said vibrating plate, but also by the guide lugs 69 struck up from the said rack plate and arranged to embrace the opposite edges of said vibrating plate during the longitudinal movements of the rack plate, so as to hold the racks 49 and 50 in engagement with the pinion 51 at the proper times. When, however, in the movements of the rack plate 42 on the vibrating plate 39, the guide stud 47 is in the semi-circular part of the guide slot 44, the said guide lugs 69 will be at one end or the other of the rack plate so as to pass by the curved ends thereof when the said rack-plate and the feeding plate 43 attached thereto are being turned for the rotation of the work, or reversely turned to bring the parts back to starting position for the next buttonhole.

It will be understood that this attachment is more particularly adapted for the stitching of buttonholes in the work before the work is cut, as is common in stitching straight buttonholes. In the partial rotation of the work by the operator the work will be turned somewhat quickly so that the radiating stitches at one end of the buttonhole will not be too closely crowded, some seven or eight radiating stitches being the number which will preferably be made at the end portion of the buttonhole referred to.

Having thus described our invention we claim and desire to secure by Letters Patent:

1. In a sewing machine buttonhole attachment, the combination with a work-holder comprising a vibrating plate provided with a guide slot having two straight portions and a connecting semi-circular portion, of a longitudinally movable rack plate having a stud engaging said guide slot, said rack plate being pivotally connected to said vibrating plate and being provided at its opposite outer edges and at its opposite ends with toothed portions, a pinion arranged to engage the toothed portions of said rack plate, and means, adapted to be operated from the needle-bar of a sewing machine, for intermittingly rotating said pinion and for operating said vibrating plate.

2. In a sewing machine button-hole attachment, the combination with a base plate, of a work-holder comprising a vibrating plate pivotally connected with said base plate, a feeding plate provided on its lower side with teeth or serrations for engagement with the work, said feeding plate being connected with said vibrating plate so as to partake of the lateral movements thereof but be-

ing longitudinally movable relative thereto by having a guiding connection therewith, and means, operated from the needle-bar of a sewing machine, for actuating said vibrating plate and for moving said feeding plate longitudinally thereof, said feeding plate having a central pivotal connection with said vibrating plate so that it may be turned thereon for 180° or thereabout, to reverse it endwise or bring it end for end, so as to stitch the second side of a buttonhole after the stitching of the first side thereof has been completed.

3. A sewing machine buttonhole attachment provided with means for securing the same to the presser-bar of a sewing machine, and comprising a pivotally mounted work-holder movable back and forth laterally, for the formation of buttonhole stitches, and one portion of which work-holder is adapted to be fed longitudinally, the said longitudinally movable portion of said work-holder being pivotally connected with the laterally movable portion thereof so that when the stitching of one side of the buttonhole has been completed said longitudinally movable portion of work-holder may be partially rotated to stitch around the end of the buttonhole and to reverse the direction of the feed of the work, for stitching the other side of the buttonhole, combined with means for operating the said work-holder from the needle-bar of a sewing machine, said operating means comprising an intermittingly rotating pinion, for the longitudinal feed of the work, and a bell-crank lever for effecting the lateral movements of the work-holder.

4. A sewing machine buttonhole attachment provided with means for securing the same to the presser-bar of a sewing machine, and comprising a pivotally mounted work-holder movable back and forth laterally, for the formation of buttonhole stitches, and one portion of which work-holder is adapted to be fed longitudinally, the said longitudinally movable portion of said work-holder being pivotally connected with the laterally movable portion thereof so that when the stitching of one side of the buttonhole has been completed said longitudinally movable portion of said work-holder may be partially rotated to stitch around the end of the buttonhole and to reverse the direction of the feed of the work, for stitching the other side of the buttonhole, combined with means for operating the said work-holder from the needle-bar of a sewing machine, said operating means comprising an intermittingly rotating pinion, for the longitudinal feed of the work, a bell-crank lever for effecting the lateral movements of the work-holder, and means for regulating the vibrating movements of said laterally movable part of said work-holder imparted thereto from said bell-crank lever.

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5. A sewing machine buttonhole attachment adapted to be secured to the presser bar of the machine and comprising a pivotally mounted work-holder roughened or serrated on its lower face for engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is pivotally connected with the said laterally movable part, so as to be capable of a semi-circular rotation, and is also longitudinally movable relative to said laterally movable part, so as to feed the work lengthwise of the buttonhole, combined with means for operating said work-holder from the needle-bar of the sewing machine.

6. A sewing machine buttonhole attachment adapted to be secured to the presser bar of the machine and comprising a pivotally mounted work-holder roughened or serrated on its lower face for engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is pivotally connected with the said laterally movable part, so as to be capable of a semi-circular rotation, and is also longitudinally movable relative to said laterally movable part, so as to feed the work lengthwise of the buttonhole, combined with means for operating said work-holder from the needle bar of the sewing machine, said operating means comprising a horizontally vibrating bell-crank lever and an operating slide for effecting the lateral movements of the work-holder, and an intermittingly rotating pinion and two separate racks for actuating the longitudinally movable part of said work-holder.

7. A sewing machine buttonhole attachment adapted to be secured to the presser bar of the machine and comprising a pivotally mounted work-holder roughened or serrated on its lower face for engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is pivotally connected with the said laterally movable part, so as to be capable of a semi-circular rotation, and is also longitudinally movable relative to said laterally movable part, so as to feed the work lengthwise of the buttonhole, combined with means for operating said work-holder from the needle bar of the sewing machine, said operating means comprising a horizontally vibrating bell-crank lever and an operating slide, for effecting the lateral movements of the work-holder, an intermittingly rotating pinion and two separated racks for actuating the longitudinally movable portion of said work-holder, and means for regulating the

vibrating movements of said laterally movable part of said work-holder imparted thereto from said bell-crank lever.

8. A sewing machine buttonhole attachment adapted to be secured to the presser bar of the machine and comprising a work-holder roughened or serrated on its lower face for engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is pivotally connected with the said laterally movable part, so as to be capable of a semi-circular rotation, and is also longitudinally movable to said laterally movable part, so as to feed the work lengthwise of the buttonhole, combined with means for operating said work-holders from the needle bar of the sewing machine, said operating means comprising an operating slide having oppositely arranged teeth affording opposing shoulders, racks on said work-holder, an intermittingly rotating pinion for engagement with said racks, a bell-crank lever connected with said slide and said work-holder, for vibrating the latter, an escapement slide having lugs for alternate engagement with the said shoulders on said operating slide, an intermittingly rotating cam and ratchet wheel for operating said escapement slide, and an actuating lever adapted to be operated from the needle-bar of the sewing machine and having a pawl to intermittingly rotate the said cam and ratchet wheel.

9. A sewing machine buttonhole attachment adapted to be secured to the presser bar of the machine and comprising a work-holder roughened or serrated on its lower face for engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is pivotally connected with the said laterally movable part, so as to be capable of a semi-circular rotation, and is also longitudinally movable relative to said laterally movable part, so as to feed the work lengthwise of the buttonhole, combined with means for operating said work-holder from the needle-bar of the sewing machine, said operating means comprising an operating slide having oppositely arranged teeth affording opposing shoulders, racks on said work-holder, an intermittingly rotating pinion for engagement with said racks, a bell-crank lever connected with said slide and said work-holder, for vibrating the latter, an escapement slide having lugs for alternate engagement with the said shoulders on said operating slide, an intermittingly rotating cam and ratchet wheel for operating said escapement slide, an actuating lever adapted to be operated from the needle-bar of the sewing machine and

having a pawl to intermittingly rotate the said cam and ratchet wheel, and means for regulating the vibrating movements of said laterally movable part of said work-holder
5 imparted thereto from said bell-crank lever.

10. A sewing machine buttonhole attachment adapted to be secured to the presser-bar of the machine and comprising a work-holder having a roughened lower face for
10 engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is longitudinally
15 movable relative thereto and is also pivotally connected therewith, so as to be capable of a semi-circular rotation, the said longitudinally movable part being provided with oppositely arranged racks at its opposite
20 ends, a pinion arranged to engage said racks, a ratchet wheel connected with and serving to operate said pinion, said ratchet wheel and pinion being mounted on the said laterally movable part of said work-holder,
25 a pawl mounted on a stationary part of the attachment and having a tooth to engage said ratchet wheel, and means, operated from the needle-bar of the sewing machine, for vibrating said laterally movable part
30 laterally.

11. A sewing machine buttonhole attachment adapted to be secured to the presser-bar of the machine and comprising a work-holder having a roughened lower face for
35 engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is longitudinally
40 movable relative thereto and is also pivotally connected therewith, so as to be capable of a semi-circular rotation the said longitudinally movable part being provided with oppositely arranged racks at its opposite
45 ends, a pinion arranged to engage said racks, a ratchet wheel connected with and serving to operate said pinion, said ratchet wheel and pinion being mounted on the said laterally movable part of said work-holder, a
50 pawl mounted on a stationary part of the attachment and having a tooth to engage said ratchet wheel, and means, operated from the needle-bar of the sewing machine, for vibrating said laterally movable part
55 laterally, said means comprising a bell-crank lever.

12. A sewing machine buttonhole attachment adapted to be secured to the presser-bar of the machine and comprising a work-holder having a roughened lower face for
60 engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of buttonhole stitches,
65 and the other of which is longitudinally

movable relative thereto and is also pivotally connected therewith, so as to be capable of a semi-circular rotation, the said longitudinally movable part being provided with
70 oppositely arranged racks at its opposite ends, a pinion arranged to engage said racks, a ratchet wheel connected with and serving to operate said pinion, said ratchet wheel and pinion being mounted on the said laterally movable part of said work-holder,
75 a pawl mounted on a stationary part of the attachment and having a tooth to engage said ratchet wheel, means, operated from the needle-bar of the sewing machine, for vibrating said laterally movable part laterally, said means comprising a bell-crank
80 lever, and means for regulating the throw of said laterally movable part.

13. A sewing machine buttonhole attachment adapted to be secured to the presser-bar of the machine and comprising a work-holder having a roughened lower face for
85 engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and is provided with a guide slot having two straight portions and a connecting semi-circular portion, and the other of which is longitudinally movable relative thereto and is also pivotally connected therewith, so as to be capable of a semi-circular rotation, the said longitudinally movable part being provided with a stud engaging said slot and with oppositely arranged racks at its opposite
90 ends, a pinion arranged to engage said racks, a ratchet wheel connected with and serving to operate said pinion, said ratchet wheel and pinion being mounted on the said laterally movable part of said work-holder, a
95 pawl mounted on a stationary part of the attachment and having a tooth to engage said ratchet wheel, and means, operated from the needle-bar of the sewing machine, for vibrating said laterally movable part laterally.
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14. A sewing machine buttonhole attachment adapted to be secured to the presser-bar of the machine and comprising a work-holder having a roughened lower face for
115 engagement with the work, said work-holder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and is provided with a guide slot having
120 two straight portions and a connecting semi-circular portion, and the other of which is longitudinally movable relative thereto and is also pivotally connected therewith, so as to be capable of a semi-circular rotation, the said longitudinally
125 movable part being provided with a stud engaging said slot and with oppositely arranged racks at its opposite ends, a pinion arranged to engage said racks, a ratchet
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5 wheel connected with and serving to operate said pinion, said ratchet wheel and pinion being mounted on the said laterally movable part of said workholder, a pawl
 10 mounted on a stationary part of the attachment and having a tooth to engage said ratchet wheel, and means, operated from the needle-bar of the sewing machine, for vibrating said laterally movable part laterally, said means comprising a bell-crank lever.

15 15. A sewing machine buttonhole attachment adapted to be secured to the presser-bar of the machine and comprising a workholder having a roughened lower face for engagement with the work, said workholder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and is provided with a guide slot having
 20 two straight portions and a connecting semi-circular portion, and the other of which is longitudinally movable relative thereto and is also pivotally connected therewith, so as to be capable of a semi-circular rotation, the said longitudinally movable part being provided with a stud engaging said slot and with oppositely arranged racks at its opposite ends, a pinion arranged to engage said
 25 racks, a ratchet wheel connected with and serving to operate said pinion, said ratchet wheel and pinion being mounted on the said laterally movable part of said workholder, a pawl mounted on a stationary part of the attachment and having a tooth to engage
 30 said ratchet wheel, means, operated from the needle-bar of the sewing machine, for vibrating said movable part laterally, said means comprising a bell-crank lever, and means for regulating the throw of said laterally movable part.

40 16. A sewing machine buttonhole attachment adapted to be secured to the presser-

bar of the machine and comprising a workholder roughened or serrated on its lower
 45 face for engagement with the work, said workholder consisting of two portions one of which is movable back and forth laterally, for the formation of the buttonhole stitches, and the other of which is pivotally
 50 connected with the said laterally movable part, so as to be capable of a semi-circular rotation, and is also longitudinally movable relative to said laterally movable part, so as to feed the work lengthwise of the buttonhole, said last-named part having the
 55 roughened or serrated portion, and being also provided at one end with a spring tooth, combined with means for operating said workholder from the needle-bar of the
 60 sewing machine.

17. In a sewing machine buttonhole attachment, the combination with the base plate thereof, of a workholder comprising
 65 a vibrating plate pivotally connected with said base-plate and having a guiding slot comprising two straight portions and a semi-circular connecting portion, a feeding plate toothed or serrated on its lower side to engage the work and having a longitudinal
 70 guiding connection with said vibrating plate and adapted for partial rotation thereon by virtue of said guiding slot, and means, adapted to be operated from the needle-bar of a sewing machine, for operating said vibrating plate and causing said feeding plate
 75 to travel lengthwise relative thereto.

In testimony whereof we affix our signatures, in presence of two witnesses.

EMANUEL J. BOYLER.
 PERCY R. GREIST.
 HUBERT M. GREIST.

Witnesses:

GEO. H. BEEBE,
 W. C. GREIST.