

J. G. GREENE & L. F. A. BÜCHNER.

SEWING MACHINE.

APPLICATION FILED MAY 29, 1909.

949,729.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 1.

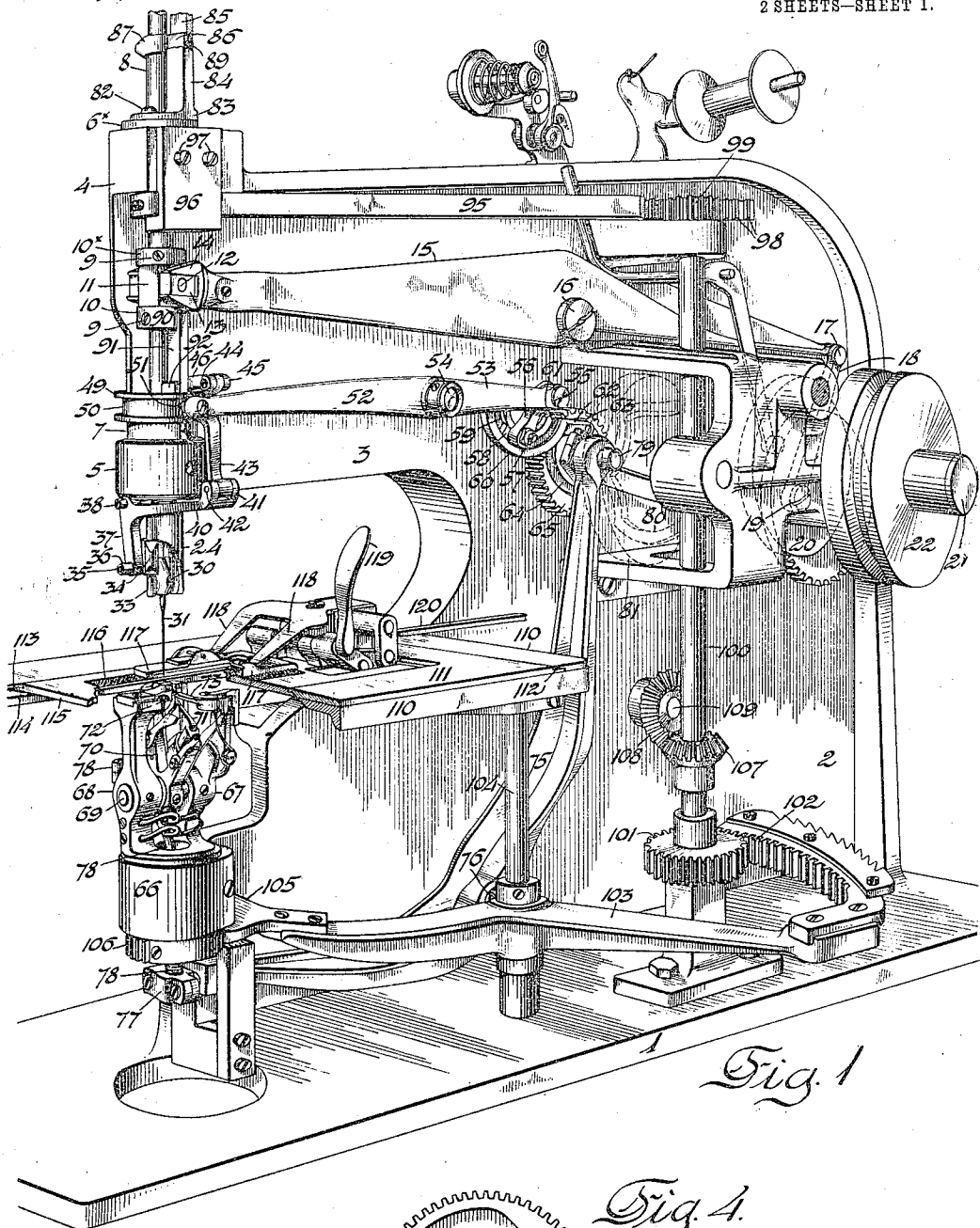


Fig. 1

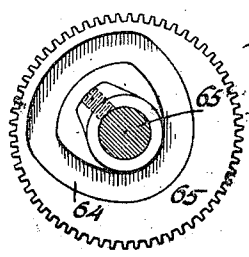


Fig. 4.

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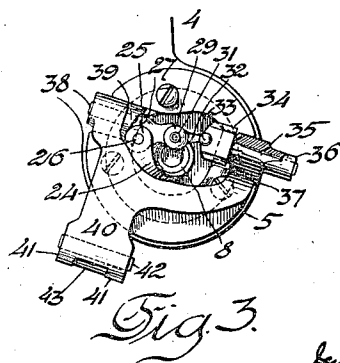
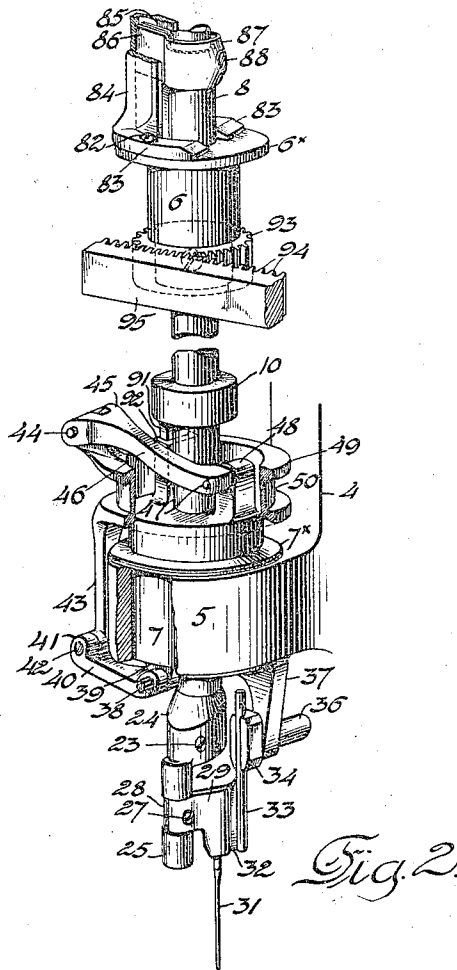
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WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES G. GREENE AND LOUIS F. A. BÜCHNER, OF ELIZABETH, NEW JERSEY, ASSIGNORS TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

949,729.

Specification of Letters Patent.

Patented Feb. 15, 1910.

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To all whom it may concern:

Be it known that we, JAMES G. GREENE and LOUIS F. A. BÜCHNER, citizens of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in that class of overseaming stitch-forming mechanism comprising a laterally moving or jogging needle and complemental stitch-forming mechanism, and it has for its principal object to provide needle-jogging mechanism which shall be simple and effective in operation and capable of accurately controlling the lateral position of the needle to insure uniformity in the alinement of the needle punctures along opposite sides of a buttonhole.

In its preferred form the improvement is embodied in a buttonhole stitching machine of that class comprising stitch-forming mechanism mounted for effecting a semi-rotation in stitching the rounded end of an eyelet buttonhole in conjunction with a traveling non-rotary work-clamp; and it comprises a rectilinearly reciprocating needle-bar journaled in and adapted to partake of the circular movements of an oscillatory bearing sleeve or bushing mounted in the sewing machine frame. The needle-bar is provided with a fulcrum parallel with its direction of reciprocation, upon which is mounted a swinging needle-clamp block carrying a parallel guide-rod embraced by a guide-block pivotally supported upon a depending arm of an elbow jog-lever fulcrumed upon said bearing sleeve and having a lateral arm connected by means of a link with a substantially parallel swinging arm also fulcrumed upon said bearing sleeve. The said link is provided with an externally grooved ring embracing the needle-bar and entered by a roller-stud of an actuating rock-lever deriving its operative movements from connections with the main-shaft of the machine, the to-and-fro movements of the link derived from said rock-lever being communicated to the jog-lever to impart the sidewise movements to the needle. The rock-lever is actuated by a cam serving to maintain the same stationary

excepting while the point of the needle is above the work, when it serves to impart the sidewise movements to the needle alternately in opposite directions.

In the accompanying drawings, Figure 1 is a perspective view of the frame of a buttonhole stitching machine provided with stitch-forming mechanism embodying the present improvements, and omitting certain other parts of the mechanism. Fig. 2 is a perspective view, from another viewpoint, of the needle-bar and its rotating and jogging means, and Fig. 3 a bottom plan view of the same parts. Fig. 4 is a face view of the cam-wheel for imparting the jogging movements to the needle.

The machine is constructed with the bed-plate 1 from which rises the standard 2 with overhanging bracket-arm 3 formed at its forward end with the vertically alined bearing bosses 4 and 5 in which are mounted the oscillatory bearing sleeves 6 and 7 each affording journals for the rectilinearly reciprocating needle-bar 8. Secured upon the needle-bar intermediate the sleeves 6 and 7 by means of the set-screws 9 are the spaced thrust-collars 10 and 10* with intermediate block 11 loosely mounted upon the needle-bar and having oppositely extending studs 12 upon which are mounted slide-blocks 13 entering the parallel slotted members 14 of the bifurcated needle-actuating lever 15 fulcrumed intermediate its ends upon the stud-screw 16 carried by the machine frame and pivotally connected at its opposite end by means of the screw-pin 17 with the upper end of a link 18 whose opposite end is connected by means of the stud-screw 19 with the circular crank-plate 20 which is mounted upon the transversely disposed main-shaft 21 journaled in the machine frame and carrying the belt-wheel 22. The needle-bar thus derives a complete reciprocation for each rotation of the main-shaft.

The needle-bar has secured upon its lower end by means of a set-screw 23 the collar 24 having the forked bearing boss 25 for the fulcrum-pin 26 arranged parallel with the path of reciprocation of the needle-bar but laterally offset therefrom. Fixed to the fulcrum-pin 26 by means of the set-screw 27 is a lateral lug 28 of the swinging needle clamp block 29 formed with the usual socket in which is secured by means of the set-screw 30 the shank of the eye-pointed needle

31. The side of the needle-clamp block opposite the fulcrum-pin 26 is formed with a longitudinal web or fin 32 to which is attached one side of the lower portion of the guide-rod 33 fitted within and partially embraced by a transverse slideway in the guide-block 34 forming the head of a fulcrum-pin 35 which is journaled in a transverse bearing boss 36 upon the lower end of a depending arm 37 of the needle-jogging elbow lever which is fulcrumed upon the stud-screw 38 carried by the depending lug 39 of the bearing sleeve 7 and having a lateral arm 40 with forked extremity 41 between the spaced members of which is pivoted by means of the pin 42 the lower end of the link 43 whose opposite end is similarly embraced by and pivoted by means of the screw-pin 44 within the forked extremity 45 of a swinging arm or lever 46 fulcrumed at its opposite end by means of the pin 47 to an upwardly extending lug 48 upon the top of the sleeve 7. As the needle-jogging lever has in practice only a slight rocking motion, it will be observed that the parts 40, 43, 46 constitute practically a parallel-motion device in which the connecting link 43 has a substantially rectilinear to-and-fro motion.

The link 43 is provided near its upper end with the preferably integral laterally extending ring or yoke 49 loosely embracing the upper portion of the sleeve 7 and the needle-bar and provided with the external annular groove 50 which is entered by a roller-stud 51 carried by the forwardly extending arm 52 of a rock-lever fulcrumed upon the bracket-arm at 54 and having a rearwardly extending arm 53 carrying at its extremity a stud 55 embraced by the upper end of a link 56 which is provided at its opposite end with a stud 57 carrying a swiveled block 58 fitted adjustably within the under-cut segmental groove or slot 59 in a segment-lever 60 which is fulcrumed upon the machine frame at 61 and has a rearwardly extending arm 62 carrying a roller-stud 63 which enters the cam-slot 64 in the cam-wheel 65, which has in practice the usual two-to-one connection with the main-shaft. Thus the ring 49 with groove 50 and the stud 51 of the rock-lever 52 which enters said groove, together constitute, with the link 43, a universal-joint connection between the vibratory actuating member 52 mounted upon the fixed stud 54 and the jog-lever 37 fulcrumed upon and partaking of the turning movements of the sleeve or support 7 for the needle-bar 8.

As will be observed by reference to Fig. 4, the cam-groove 64 is formed at opposite sides concentric with the supporting stud 65* of the cam-wheel 65, the inner and outer concentric portions being active while the needle-bar is in its lower position and

the point of the needle is in the work, while the connecting eccentric portions act upon the stud 63 of the grooved segment-lever when the needle-bar is in its upper position and the point of the needle is withdrawn from the work.

As will be observed by reference to Fig. 3, the fulcrum-pin 26, needle 31 and slide-rod 33 are in substantial alinement, the needle being between, and it is thus evident that the lateral movement imparted to the slide-rod 63 is substantially double that communicated to the needle. Thus, any lost motion between the component members of the jogging mechanism produced by wear of the parts will be so reduced in transmission to the needle as to be inappreciable in the stitching. As the slide-block 34 so embraces the cylindrical slide-rod 33 that it partakes of the latter's movements in a circular arc about the fulcrum-pin 26, it will be observed that the pivotal pin 35 forming the shank of the slide-block will have a slight endwise motion in the movement of the needle from one to the other of its extreme positions.

In the initial lateral position of the needle for the edge thrust, the lateral arm 40 of the jog-lever is raised and the depending arm is in position to bring the guideway of the block 34 nearly in alinement with but slightly eccentric to the axis of the needle-bar and the fulcrum-pin 26, while in the opposite extreme position of the needle, as represented in Fig. 3, the eccentricity of the latter to the needle-bar is increased by the width of the overseam to be stitched. It will be seen, however, that when making either its edge or depth thrust the needle is never removed far from axial relation with the needle-bar, the side pressure upon the journal of the needle-bar in the bearing sleeve 7 being inappreciable; and the durability of these parts of the mechanism is thus practically the same as that of the ordinary straight-way stitching mechanism in which the needle is arranged permanently substantially in the axial line of the needle-bar.

It will be observed that, by adjusting the block 58 in the segmental groove 59 of the lever 60 toward and from the fulcrum of said lever, the range of vibration of the rock-lever 52 53 may be varied in the required degree to change the amplitude of lateral movement of the needle 31 proportionally.

The frame of the machine is provided above the bed-plate 1 and in alinement with the sleeve 6 and 7 with a bearing boss in which is journaled a third oscillatory sleeve or support having spaced upright arms 67 68, in which is journaled the transverse looper rock-shaft 69. Upon the rock-shaft 69 is fixed the plural armed looper-

carrier 70 upon one member of which is mounted the thread-carrying looper 71 and upon the other member of which is mounted the non-thread carrying looper 72, cooperating spreaders 73 and 74 being pivotally mounted upon extensions of the arms 67 and 68 to cooperate with said loopers and the needle in the formation of overseam stitches, substantially as shown and described in the United States patent to J. G. Greene No. 304,638, of Sept. 2, 1884, and the patent to E. B. Allen No. 734,794, of July 28, 1903. The oscillatory movement of the looper rock-shaft 69 from which the operative movements of the loopers and spreaders are derived, is communicated through an angular actuating lever 75 fulcrumed upon the machine frame at 76 and formed with a lateral arm having a universal-joint connection at 77 with one end of a vertically reciprocating connecting rod 78 whose opposite end is attached to a lateral arm of the looper-carrier 70; while an upwardly extending arm of the actuating rock-lever 75 carries a roller-stud 79 entering a cam-groove 80 in a rotary cam-wheel 81 (represented in dotted lines only in Fig. 1) turning at one-half the speed of rotation of the driving shaft 21 to which it is in practice connected by any usual or suitable gearing. The looper mechanism is so actuated that the thread-carrying looper 71 takes a thread-loop from the needle in each reciprocation of the latter in one of its lateral positions, and the non-threaded looper takes a thread-loop from the needle in each reciprocation of the same in the other extreme lateral position thereof. The thread-carrying looper passes through its respective needle-thread loop and the loop of its own thread is distended for subsequent passage of the needle, while the non-threaded looper seizes its respective needle-thread loop which is distended by the respective spreader for passage of the needle in its succeeding descent, whereby a three-thread overseam is produced similar to that of the well-known Singer I. B. H. machine as described in the United States patents to J. G. Greene No. 304,638, of September 2, 1884, No. 360,434 and No. 360,435, of April 5, 1887.

The upper end of the bearing sleeve 6 is formed with a flange 6* upon which is secured by means of screws 82 the bifurcated foot 83 of an upright post 84, formed with a vertical channel or guideway 85 which is entered by the split stud 86 extending laterally from a collar 87 fixed upon the upper end of the needle-bar by means of the set-screw 88. By this means, the needle-bar is permitted to reciprocate freely within its journal in the sleeve 6 but is caused to turn therewith by engagement of the lug 86 with the slideway in the post 84. The

split lug 86 is formed with a screw-socket entered by a tapering screw 89 by which the same may be expanded to take up wear when required.

The collar 10 is provided with a lateral lug 90 from which depends a guide-pin 91 parallel with the needle-bar and adapted to enter a slideway formed in the upwardly extending post 92 upon the top of the sleeve 7 and within the body of said sleeve; whereby the needle-bar is caused to partake of the circular movements of the oscillatory bearing sleeve 7.

The bearing sleeve 6 has secured at its lower end beneath the bearing boss 4 the pinion 93 meshing with the rack 94 at the forward end of a reciprocating bar 95 which is held in contact therewith by means of the guard-plate 96 secured by screws 97 to the side of the bearing boss 4. The rearward end of the bar 95 is provided upon the opposite side with rack-teeth 98 meshing with a pinion 99 at the upper end of the vertical oscillatory shaft 100 journaled upon the standard 2 of the machine frame and carrying at its lower end the pinion 101 which meshes with the segmental rack 102 upon the rearwardly extending arm of a rock-lever 103 fulcrumed upon the vertical stud or shaft 104 and provided upon its opposite end with a similar rack member 105, the teeth of which are hidden by the bearing boss 66 in Fig. 1, meshing with the segmental gear 106 fixed upon the lower end of the oscillatory sleeve carrying the looper shaft-support 67 68. The actuating means for imparting oscillatory movements to the shaft 100 comprise the bevel-pinion 107 fixed upon said shaft which meshes with a similar pinion 108 upon a transverse shaft 109 journaled in the standard 2 and driven alternately in opposite directions in a suitable or well-known manner by means not shown in the drawings. As is common in the class of machines referred to, the stitch-forming mechanism performs its overseaming stitch-forming operation for the stitching of the first side of the buttonhole without circular movement, but at the beginning of the eye stitching operation the shaft 100 receives a step-by-step semi-rotation and through the described connections imparts corresponding movements to the stitch-forming members in order to lay the overseam stitches substantially radial to the rounded end of the buttonhole eye, after which the stitching of the second side of the buttonhole progresses without further return movement of the stitch-forming devices which are, however, returned to initial position at the completion of the stitching operation.

As herein shown, the machine is provided with the usual work-plate 110 formed with undercut transverse ways to which are fitted the ends of the slide-plate 111 having tongues

112 fitted to said ways; and the slide-plate 111 is formed with a central opening having longitudinal undercut ways 113 in which are fitted the tongues 114 along the edges of the sliding clamp carrying plate 115 formed with roughened or serrated portions 116 affording the lower jaws of the work-clamp whose upper jaws are provided by clamping feet 117 pivotally mounted upon the spring-arms 118 of a clamp-lever operated by means of the finger-lever 119, substantially as shown and described in the patent to J. G. Greene No. 319,700, of June 9, 1885.

The traveling work-clamp receives its step-by-step longitudinal feeding movements by connection of the slide-plate 115 with an endwise moving bar 120 actuated by means not shown, and it has imparted to it also the usual sidewise movements for spacing the parallel lines of side stitches by laterally shifting the transversely movable slide-plate 111.

While the needle-jogging mechanism of the present improvement is herein shown and described in connection with a button-hole stitching machine of a particular type, it is to be understood that in certain of its features it is adapted for embodiment in other classes of overseaming machines, while its details of construction are susceptible of material modification, without departure from the scope of the present invention.

Having thus set forth the nature of the invention, what we claim herein is:—

1. In a sewing machine, the combination with the work-plate, circularly movable supports disposed respectively above and below the same, and means for imparting to said supports circular movements in unison, of stitch-forming mechanism comprising a rectilinearly reciprocating needle-bar journaled in one of said supports, a needle-clamp mounted for transverse movement thereon, a guide-rod fixed to said clamp and disposed parallel with the needle-bar, needle-jogging means including a jog-lever fulcrumed upon said support and having a slide-block pivotally mounted thereon and embracing said guide-rod, a rock-lever mounted upon a fixed fulcrum, and a link-connection intermediate said jog-lever and rock-bar, a needle carried by said needle-clamp, a loop-taker mounted upon the other of said supports and cooperating with said needle in the production of stitches, and means for imparting reciprocating movements to said needle-bar and operative movements to said loop-taker.

2. In a sewing machine, the combination with the work-plate, circularly movable supports disposed respectively above and below the same, and means for imparting to said supports circular movements in unison, of

stitch-forming mechanism comprising a rectilinearly reciprocating needle-bar, a needle-clamp pivotally mounted upon and at one side of the axial line of said needle-bar and movable transversely thereof, a guide-rod fixed to said clamp at the opposite side of the axial line of the needle-bar and disposed parallel therewith, a jog-lever fulcrumed upon said support independently of said needle-bar and having one arm provided with a slide-block pivotally mounted thereon to embrace said guide-rod and a laterally extending arm, a reciprocating member supported independently of the said support and pivotally connected to the lateral arm of said jog-lever, a needle carried by said needle-clamp, a loop-taker mounted upon the other of said supports and cooperating with said needle in the production of stitches, and means for imparting reciprocating movements to said needle and operative movements to said loop-taker.

3. In a sewing machine, the combination with the frame comprising a bracket-arm formed with a bearing boss for the needle-bar, of a reciprocating needle-bar embraced by said bearing boss, a needle-clamp mounted upon said needle-bar and carrying a laterally moving needle, an angular jog-lever fulcrumed below said bearing boss and independently of the needle and comprising a lateral arm and a depending arm having a sliding connection with said needle-clamp, a swinging lever disposed substantially parallel with the lateral arm of said jog-lever and having a fulcrum above said bearing boss and substantially parallel with the fulcrum of said jog-lever, a link connecting said swinging lever with the lateral arm of said jog-lever, actuating means applied to said link for jogging the needle, and means for reciprocating said needle-bar.

4. In a sewing machine, the combination with the frame comprising a bracket-arm formed with a bearing boss, and a circularly movable sleeve journaled within said bearing boss, of a reciprocating needle-bar embraced by said sleeve and connected therewith to partake of its circular movements, a needle-clamp mounted upon said needle-bar and carrying a laterally moving needle, an angular jog-lever having a fulcrum mounted upon and depending from said sleeve transversely of said needle-bar and comprising a lateral arm and a depending arm having a sliding connection with said needle-clamp, a swinging lever disposed substantially parallel with the lateral arm of said jog-lever and having a fulcrum mounted upon and disposed above said sleeve and substantially parallel with that of said jog-lever, a link connecting said swinging lever with the lateral arm of said jog-lever, actuating means applied to said link for jogging

the needle, means for imparting circular movements to said sleeve, and means for reciprocating said needle-bar.

5 5. In a sewing machine, the combination with the frame comprising a bracket-arm formed with a bearing boss, and a circularly movable sleeve journaled within said bearing boss, of a reciprocating needle-bar journaled within said sleeve and connected there-
10 with to partake of its circular movements, a needle-clamp mounted upon said needle-bar and carrying a laterally moving needle, an angular jog-lever having a fulcrum mounted upon and depending from said sleeve trans-
15 versely of said needle-bar and comprising a lateral arm and a depending arm having a sliding connection with said needle-clamp, a swinging lever disposed substantially parallel with the lateral arm of said jog-
20 lever and having a fulcrum mounted upon and disposed above said sleeve and substantially parallel with that of said jog-lever, a laterally extending ring carried by said link and adapted to embrace the needle-
25 bar and provided with an external annular groove, a rock-lever mounted upon a fixed fulcrum and having an arm carrying a stud entering the external groove in said ring, means for actuating said rock-lever, means
30 for imparting circular movements to said sleeve, and means for reciprocating said needle-bar.

6. In a sewing-machine, a stitch-forming mechanism comprising a rectilinearly reciprocating needle-bar, a circularly moving support in which the same is journaled to reciprocate and with which it is adapted to turn, means for imparting circular move-
35 ments to said support, a needle-clamp pivotally mounted upon and at one side of the axial line of said needle-bar and movable transversely thereof, means upon the opposite side of said axial line for imparting transverse jogging movements to said needle-
40 clamp, and means for reciprocating said needle-bar.

7. In a sewing machine, the combination

with the frame, of stitch-forming mechanism comprising a rectilinearly reciprocating needle-bar, a circularly moving support in
50 which the same is journaled to reciprocate and with which it is adapted to turn, means for imparting circular movements to said support, a needle-clamp pivotally mounted upon and at one side of the axial line of said
55 needle-bar and movable transversely thereof, a jogging member mounted upon said support and connected with said needle-clamp upon the opposite side of said axial line for imparting transverse movements to the
60 needle, an actuating member mounted upon said frame independently of said circularly moving support, a universal joint connection intermediate said actuating member and jog-
65 ging member, and means for reciprocating said needle-bar.

8. In a sewing machine, the combination with the work-plate, circularly movable supports disposed respectively above and below the same, and means for imparting to
70 said supports circular movements in unison, of stitch-forming mechanism comprising a rectilinearly reciprocating needle-bar journaled in one of said supports, a needle-clamp pivotally mounted upon said needle-bar and
75 movable transversely thereof, means including a vibratory member pivotally mounted upon said support for imparting jogging movements to said needle-clamp, a needle
80 mounted upon the other of said supports and cooperating with said needle in the production of stitches, and means for imparting reciprocating movements to said needle-bar and operative movements to said loop-
85 taker.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

JAMES G. GREENE.

LOUIS F. A. BÜCHNER.

Witnesses:

HENRY J. MILLER,

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