

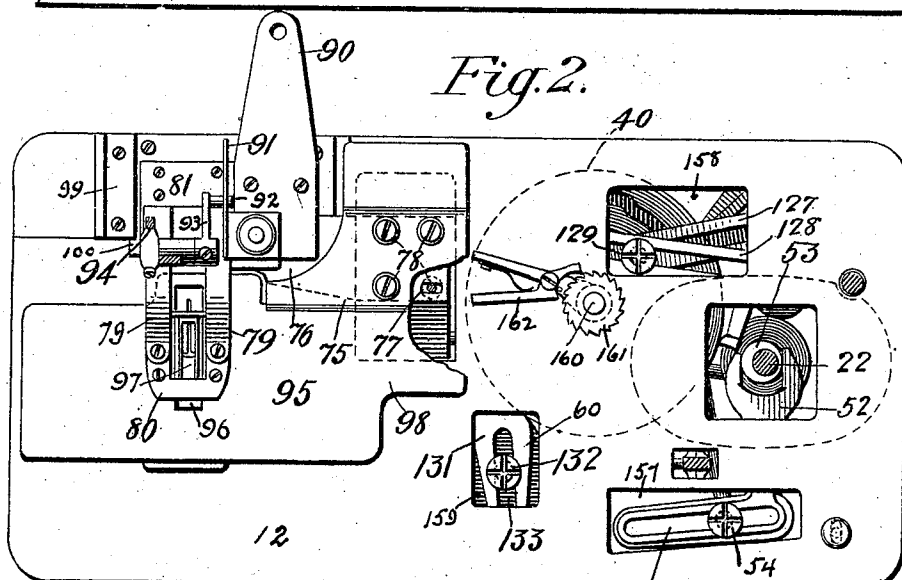
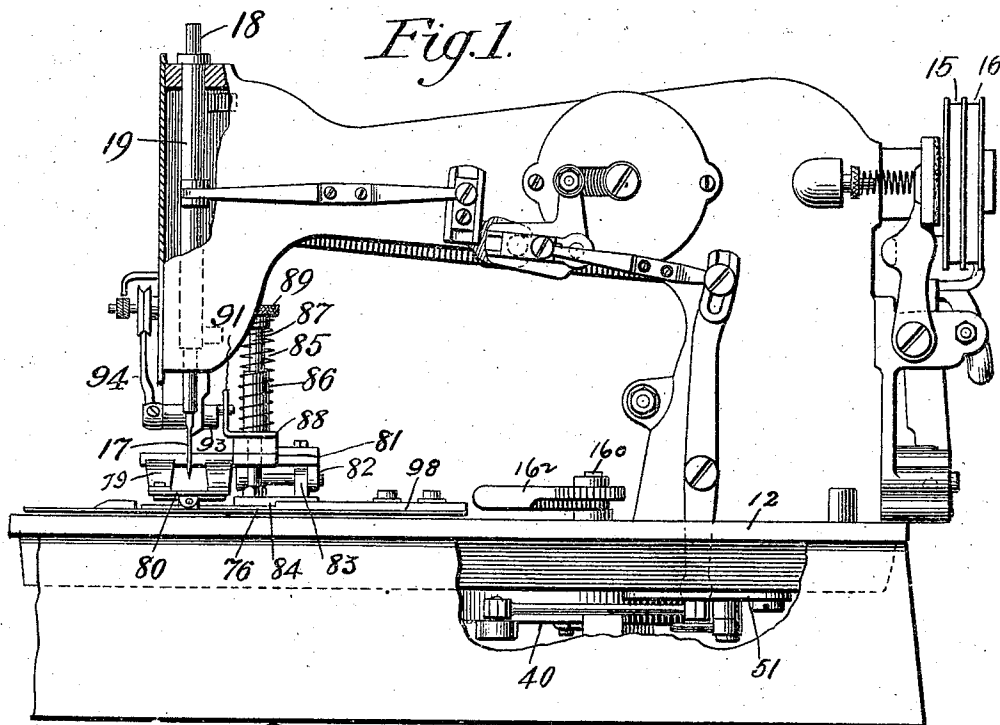
No. 857,145.

PATENTED JUNE 18, 1907.

E. B. ALLEN.
BUTTONHOLE STITCHING MACHINE.

APPLICATION FILED JULY 21, 1906.

3 SHEETS—SHEET 1.



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Fig. 3.

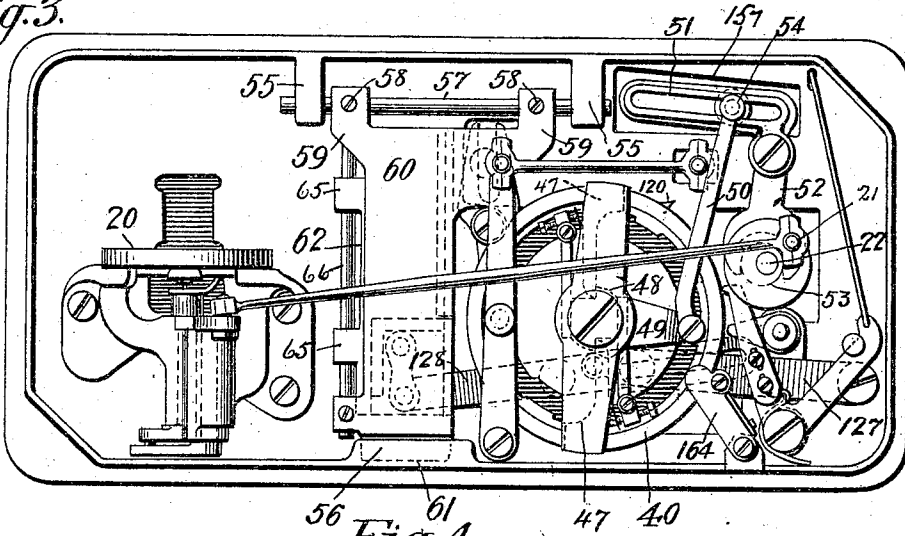
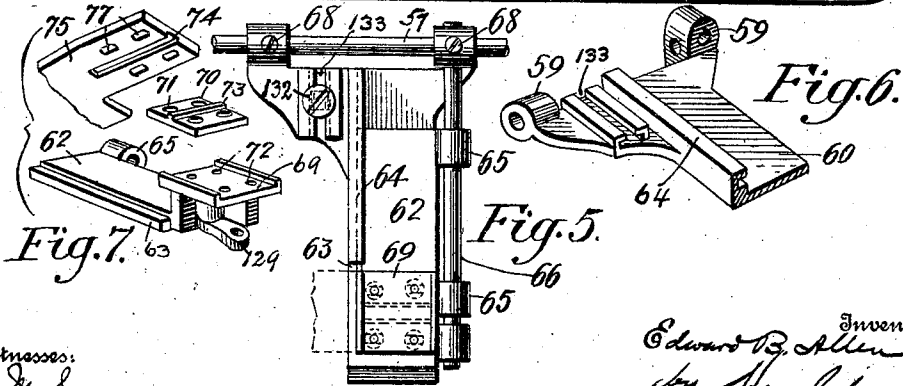
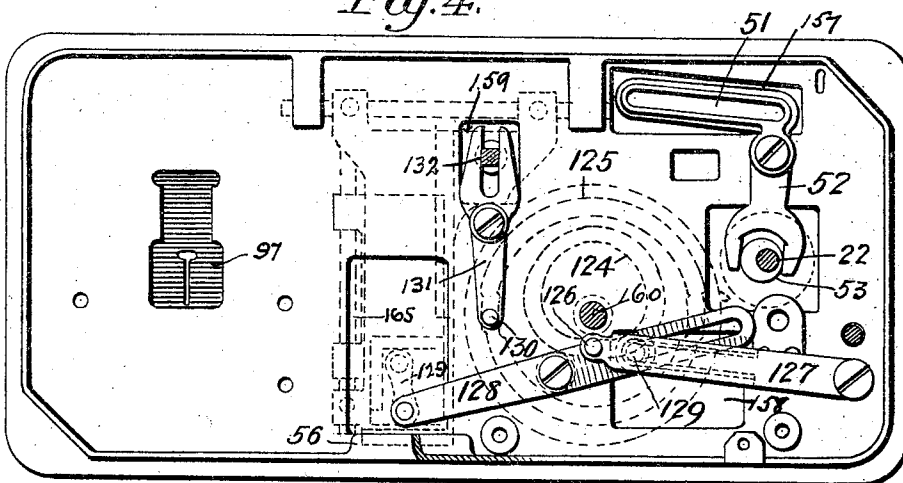


Fig. 4.



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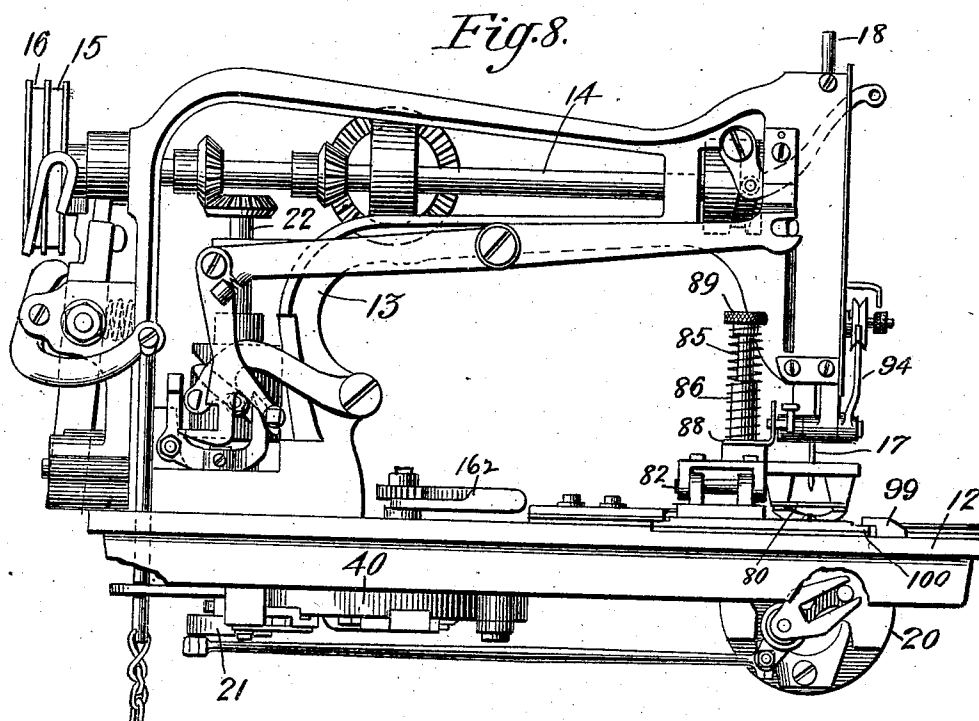
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

BUTTONHOLE-STITCHING MACHINE.

No. 857,145.

Specification of Letters Patent.

Patented June 18, 1907.

Application filed July 21, 1906. Serial No. 327,166.

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, a citizen of the United States, residing at Bridgeport, Fairfield county, Connecticut, formerly at Elizabeth, Union county, New Jersey, have invented or discovered certain new and useful Improvements in Buttonhole-Stitching Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of button-hole stitching machines adapted for working "straight" button-holes, and the invention has for its object to provide improved means for guiding and controlling the work-clamp, such means combining strength and durability with cheapness of construction.

In the accompanying drawings, Figure 1 is a side view of the button-hole stitching machine embodying the invention, and Fig. 2 is a plan view of the work-plate of the same. Fig. 3 is a bottom plan view of the same, and Fig. 4 is a similar view with certain parts shown in Fig. 3 omitted or indicated by dotted lines. Figs. 5, 6 and 7 are detail views of parts of the clamp mechanism. Fig. 8 is a side view opposite to Fig. 1.

Referring to the drawings, 12 denotes the work-plate, 13 the arm of the machine and 14 the main shaft journaled in the upper part of said arm, and provided at its rear end with the fast and loose pulleys 15, 16. The stitch-forming mechanism of the machine is of an old and well-known character and comprises the needle 17 carried by the needle-bar 18 having a crank and pitman connection (not shown) with the forward end of the main shaft 14 so as to reciprocate vertically in a horizontally swinging frame or gate 19; said needle co-operating in the usual manner with an oscillating shuttle working in the shuttle race 20 and operated from a crank 21 at the lower end of the vertical shaft 22 geared to the main shaft (see Fig. 8) so as to rotate coincidentally therewith.

The feed-wheel 40 is intermittently rotated by clutch-dogs 47 gripping the flange of said wheel in a well-known manner and operated by a rocking hub 48 having an arm 49 connected by a link 50 with the slotted arm 51 of a bell-crank lever the other arm 52 of which is forked to embrace an eccentric 53 on the vertical shaft 22. The long slotted arm

51 of the bell-crank lever, to which the outer end of the link 50 is adjustably attached by a clamping screw or nut 54, provides for a wide adjustment of the feed, so that very fine or very coarse stitches, as well as stitches of all intermediate grades, may be made; thus adapting the machine for a very wide range of work. Backward movement of the feed-wheel is prevented by the clutch device back-stop 164.

To provide for cheapness of construction, combined with strength and durability, the guiding or sliding parts for the button-hole clamp are located bodily beneath the work-plate of the machine. The guiding or sliding parts referred to are those which permit longitudinal movements of the clamp for the lengthwise feed of the buttonholes, and lateral movements of the clamp to bring the two opposite sides of the button-holes beneath the needle to work the two parallel rows of buttonhole or overseaming stitches; and the location of these parts beneath the work-plate brings them in such position as will afford plenty of room for novel forms of these parts which, while they may be made at little cost, are strong and durable. To this end the work-plate or bed-plate of the machine is provided, beneath, at one side, with lugs or ears 55, and at its opposite side with a grooved lip 56. The ears 55 are drilled for the reception of a sliding-rod 57 attached by screws 58 to ears 59 on the main guide-plate 60 having at its end, opposite said ears 59, a steadying tongue 61 entering the said grooved lip 56. Mounted on the main guide plate 60 is the secondary guide-plate 62 having at one side a steadying tongue 63 entering a groove 64 in the main plate 60. The said secondary plate 62 is provided, on its side opposite said tongue 63, with ears 65 through which passes a rod 66 which is rigidly fixed with relation to the said main guide plate in any suitable manner, as by one or more set-screws 68 entering one or more ears on the said main plate. From this construction it results that the main guide-plate 60 will be movably mounted on the bed-plate of the machine by virtue of the sliding rod 57 and steadying tongue 61 movable in parts on said bed-plate, while the secondary guide-plate will be movably mounted on the main guide-plate by virtue of the guides afforded by the steadying

groove 64 entered by the steadying tongue 63 on the said secondary plate and the ears 65 on the said secondary plate sliding on the rod 66 fixed to the said main plate.

5 The secondary guide-plate 62 is provided at one end with a platform or raised part 69 which is slightly recessed for the reception of an intermediate plate 70 provided with holes 71 which are a little larger than the screw
10 holes 72 tapped in the said platform, said plate 70 having also a small rib 73 extending at a right angle to the length of the said secondary plate 62. The platform or raised part 69 projects upward through an opening
15 165 in the bed-plate or work-plate 13. The rib 73 fits a small groove 74 in the lower face of an arm 75 extending laterally from the clamp base-plate 76, the said arm 75 having slots or elongated holes 77 through which
20 loosely pass the screws 78 which rigidly attach the clamp to the platform 69 of the secondary guide-plate 62. The construction just described permits of a slight adjustment of the work-clamp, lengthwise of a button-
25 hole, relative to the guide-plate 62, by virtue of the adjustment of the intermediate plate 70 on the platform 69; and the said construction also permits of a considerable lateral adjustment of the clamp transverse to the
30 length of a button-hole, to center the same beneath the needle, by virtue of the adjustable rib-and-groove connection between the said intermediate plate 70 and the arm 75 of the clamp base-plate.

35 The clamping arms 79, carrying the clamp foot 80, are attached to a rocking plate 81 having ears 82 by which it is pivoted to ears 83 on a plate or raised part 84 on the clamp base-plate 76; the clamp-foot being yield-
40 ingly pressed against the work by a spring 85 encircling a sleeve 86 which in turn surrounds a post 87; said spring being confined between a follower 88, from which said sleeve rises, and a regulating nut 89 on the thread-
45 ed upper end of said post. The rocking plate 81 is provided with a clamp-opening arm 90 to be connected with a suitable treadle; and the follower 88 is provided with a slotted arm 91 engaging a pin 92 on
50 an arm 93 of a small rock-shaft to which is attached the tension releasing arm 94, so that when the clamp is opened the tension of the needle-thread is relaxed. Beneath the
55 clamp-foot 80, and resting on the work-plate of the machine, is the lower clamp plate 95 having an elongated opening 96 above the throat-plate 97; said lower clamp-plate 95 having an extension or portion 98
60 overlying the arm 75 of the clamp base-plate, and through which extension or portion the screw 78, by which the said clamp base-plate is secured to the platform 69 of the second-
65 ary guide-plate, pass, so that the upper and lower clamp parts are rigidly attached to said secondary guide-plate.

The pressure of the clamp-foot on the work lying on the throat-plate has a tendency to lift the outer end of the clamp base-plate 76 and which outer end is considerably removed from the point of attachment of the said
70 base-plate with the platform 69 of the secondary guide-plate 62; and to counteract this lifting tendency, which might otherwise strain the screws 78 and cause more or less
75 cramping or binding of the guiding parts, the work-plate of the machine is provided with an undercut guide or holder 99 beneath which extends a lip or portion 100 at the outer end of the said clamp base-plate, so that said
80 outer end is thus held down on the work-plate of the machine.

The feed-wheel 40 is provided in its upper face with two cam-grooves 124 and 125 from which longitudinal feeding movements and side shifting movements are imparted to the
85 work-clamp. The cam-groove 124 is entered by a pin or roller-stud 126 on a lever 127 connected with a second lever 128 by an adjustable stud or screw 129 entering slots or
90 grooves in said levers, and by virtue of this adjustable connection the throw of the lever 128 may be widely varied to provide for working button-holes of greatly differing
95 lengths. The lever 128 is connected with the secondary guide-plate 62 by a link 129 so that the said secondary guide-plate, to which the work-clamp is attached, may be reciprocated lengthwise of the button-hole on the
100 main guide-plate 60. The cam-groove 125 is entered by a pin or roller-stud 130 on a shifting lever 131 engaging a stud or screw 132 adjustable in a slot in said lever and in a
105 groove 133 with which the main guide-plate 60 is provided, and thus by adjusting said stud toward or from the fulcrum of the said
110 shifting lever 131 the lateral throw of the work-clamp, in shifting the work from one side of the needle to the other side thereof, may be varied, as is required with different widths of overseams, or longer or shorter
115 edge-covering stitches.

In the practical use of button-hole machines in factories considerable black oil is liable to accumulate in the heads of the machines where it will generally remain without
120 making trouble by running down on the work unless it be disturbed by turning the machines over on their hinges for access to parts beneath the work-plates, but when this is done the oil becomes displaced from the pock-
125 ets or recesses in which it accumulates, and when work is again resumed it will frequently cause trouble, sometimes for hours, and particularly when working on white goods, by
130 getting down the needle-bars, or otherwise, on to the work. It is therefore desirable that the machines should be of such construction that all of the different adjustments of the feed, or of the movements of the button-hole clamp, and which have to be made in
135

changing to different sizes of button-holes, or for different kinds of work, may be effected from above the work-plates or bed-plates so that it will not be necessary to turn the machines over on their hinges; and particularly so when, as in the present machine, the clamp guides are located beneath the bed-plate, so that they are not so readily accessible as they otherwise might be.

To the end that all of the adjustments necessary in the present machine, in changing the feed of the work-clamp, or in changing the longitudinal and lateral throws thereof for different lengths of button-holes or for different side-shifting movements, may be made from above the bed-plate of the machine, the said bed-plate is provided with openings 157, 158 and 159 beneath which are located the screws or nuts which have to be loosened and moved in effecting these adjustments. Thus the screw or nut 54, by which the speed of rotation of the feed-wheel 40 may be regulated, is accessible through the opening 157, and the screws or nuts 129 and 132 by which, respectively, the longitudinal and lateral throws of the work-clamp may be regulated, are accessible through the openings 158 and 159 respectively.

For the purpose of rotating the feed-wheel manually, as is sometimes necessary in re-stitching imperfect button-holes, or for other purposes, the shaft 160 of said feed-wheel is provided with a ratchet-wheel 161 conveniently located to be rotated by a hand pawl-lever 162.

Having thus described my invention I claim and desire to secure by Letters Patent:

1. In a button-hole stitching machine, the combination with stitch-forming mechanism and a work-clamp, of a feed-wheel operatively connected with said clamp, one or more feed clutch-dogs for intermittingly rotating said feed-wheel, a rotating eccentric, a bell-crank lever one arm of which is forked to embrace said eccentric and the other arm of which extends at a right angle to said forked arm, or approximately so, and is slotted practically for its entire length to afford a wide variation of adjustment of the feed, and a link or pitman one end of which is operatively connected with said clutch feed dog or dogs and the other end of which is adjustably attached to the said slotted arm of said bell-crank lever.

2. In a button-hole stitching machine, the combination with a bed-plate provided with an opening, of a stitch-forming mechanism, a work-clamp located above the said bed-plate, and main and secondary guide-plates or guiding devices for said work-clamp both bodily located beneath said bed-plate and to one of which said work-clamp is rigidly connected through said opening.

3. In a button-hole stitching machine, the combination with a bed-plate provided with

an opening, of a stitch-forming mechanism, a work-clamp located above the bed-plate of the machine, and main and secondary guide-plates or guiding devices for said work-clamp both bodily located beneath said bed-plate and to one of which said work-clamp is rigidly connected through said opening, said main guide-plate being movable, transversely of the button-holes to be made, in suitable supports beneath said bed-plate, and the said secondary guide-plate being movable, lengthwise of the button-holes to be made, on the said main guide-plate.

4. In a button-hole stitching machine, the combination with a bed-plate provided with an opening, of a stitch-forming mechanism, a work-clamp located above the bed-plate of the machine, main and secondary guide-plates or guiding devices for said work-clamp both located bodily beneath said bed-plate and to one of which said work-clamp is rigidly connected through said opening, said main guide-plate being movable, transversely of the button-holes to be made, in suitable supports beneath said bed-plate, and the said secondary guide-plate being movable, lengthwise of the button-holes to be made, on the said main guide-plate, a feed-wheel provided with two cam-grooves, a shifting lever operated from one of said cam-grooves and adjustably connected with said main guide-plate, and a feed-lever operated from the other of said cam-grooves and connected with the said secondary guide-plate.

5. In a button-hole stitching machine, the combination with a bed-plate provided with an opening, of a stitch-forming mechanism, a work-clamp, a main guide-plate, a sliding rod attached to one end of and movable with said guide-plate, means for guiding and steadying the other end of said guide-plate, a secondary guide-plate having ears at one side and with which secondary guide-plate said work-clamp is connected, through said opening, a rod fixed relative to said main guide-plate and on which said ears can slide, and means for steadying and guiding the other side of said secondary guide-plate on said main guide-plate.

6. In a button-hole stitching machine, the combination with a bed-plate provided with an opening, of a stitch-forming mechanism, a work-clamp which is located above the said bed-plate, a main guide-plate located beneath said bed-plate and connected with said work-clamp through said opening, a sliding rod attached to one end of and movable with said guide-plate, means for guiding and steadying the other end of said guide-plate, a secondary guide-plate having ears at one side, a rod fixed relative to said main guide-plate and on which said ears can slide, and means for steadying and guiding the other side of said secondary guide-plate on said main guide-plate.

7. In a button-hole stitching machine, the combination with a bed-plate provided with an opening, of a stitch-forming mechanism, a work-clamp, a main guide-plate, a rod connected with one end of said guide-plate and fitted to slide in supports on the bed-plate of the machine, a guiding and steadying tongue, at the opposite end of said guide-plate, movable in a guide-way beneath said bed-plate, a secondary guide-plate mounted on said main guide-plate and having ears at one side and with which secondary guide-plate said work-clamp is connected, through said opening, a rod fixed relative to said main guide-plate and on which rod said ears are fitted to slide, and a steadying and guiding tongue-and-groove connection between said main and secondary guide-plates at the other side of said secondary guide-plate.

8. In a button-hole stitching machine, the combination with a bed-plate provided with an opening; of a stitch-forming mechanism, a work-clamp which is located above the bed-plate of the machine, a main guide-plate located beneath said bed-plate, a rod connected with one end of said guide-plate and fitted to slide in supports beneath said bed-plate, a guiding and steadying tongue, at the opposite end of said guide-plate, movable in a guide-way formed beneath said bed-plate, a secondary guide-plate mounted on said main guide-plate and having ears at one side and with which secondary guide-plate said work-clamp is connected through said opening, a rod fixed relative to said main guide-plate and on which rod said ears are fitted to slide, and a steadying and guiding tongue-and-groove connection between said main and secondary guide-plates at the other side of said secondary guide-plate.

9. In a button-hole stitching-machine, the combination with a stitch-forming mechanism, of a work-clamp, a bed-plate provided with openings, means, located beneath said bed-plate, for feeding said clamp relative to the needle of the machine, means also located beneath the said bed-plate and accessible from above the latter through said openings, for regulating or adjusting the said feeding means in changing to different sizes of button-holes or different kinds of work.

10. In a button-hole stitching machine, the combination with a stitch-forming mechanism, of a work-clamp, a bed-plate provided with openings, and means, located beneath said bed-plate, for feeding and shifting said clamp relative to the needle of the machine, means also located beneath the said bed-plate and accessible from above the latter through said openings, for regulating or adjusting the said feeding and shifting means in changing to different sizes of button-holes or different kinds of work.

11. In a button-hole stitching-machine, the combination with a stitching machine, of a work-clamp, a bed-plate provided with openings, main and secondary guide-plates for said work-clamp located beneath said bed-plate, said work-clamp being connected with said secondary guide-plate through one of said openings, means, also located beneath said bed-plate, for feeding said clamp relative to the needle of the machine, and means, also located beneath said bed-plate and accessible from above the latter, through others of said openings, for regulating or adjusting said feeding means in changing to different sizes of button-holes or different kinds of work.

12. In a button-hole stitching machine, the combination with a stitching-mechanism, of a work-clamp, a bed-plate provided with openings, main and secondary guide-plates for said work-clamp located beneath said bed-plate, said work-clamp being connected with said secondary guide-plate through one of said openings, means, also located beneath said bed-plate, for feeding and shifting said clamp relative to the needle of the machine, and means, also located beneath said bed-plate and accessible from above the latter, through others of said openings, for regulating or adjusting said feeding and shifting means in changing to different sizes of button-holes or different kinds of work.

In testimony whereof I affix my signature, in presence of two witnesses.

EDWARD B. ALLEN.

Witnesses:

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