

976,431.

2 SHEETS--SHEET 1.

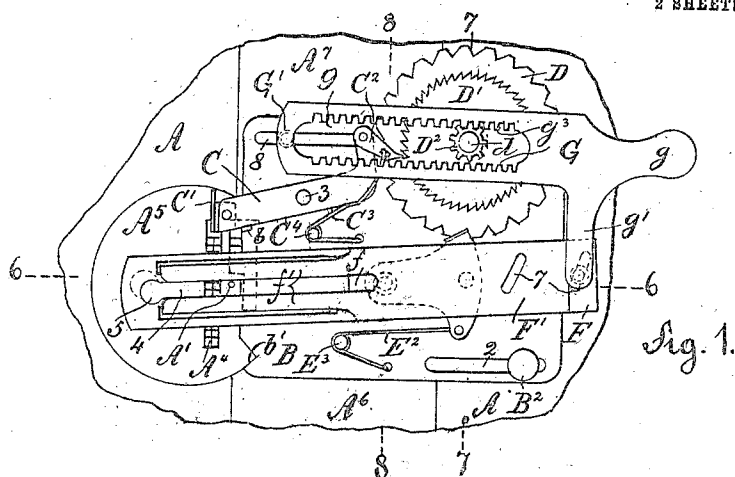


Fig. 1.

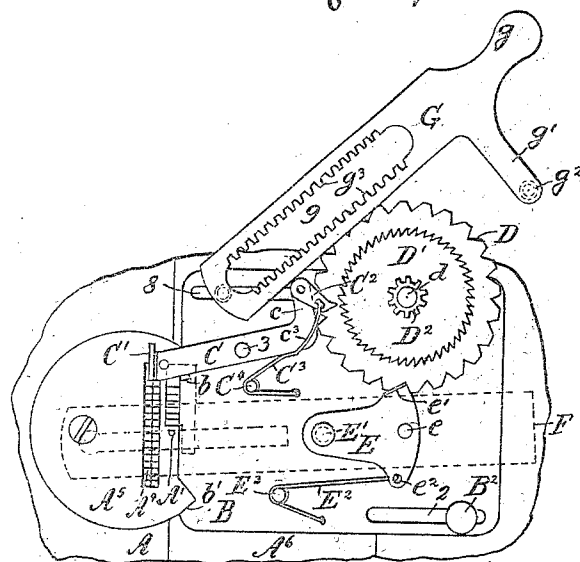


Fig. 2.

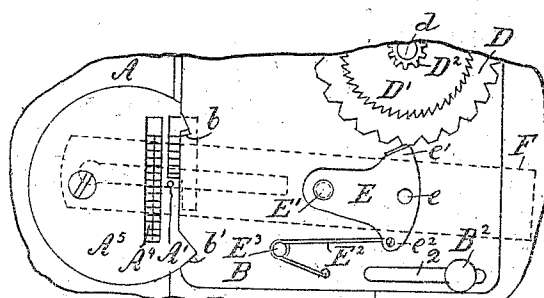


Fig. 3.

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E. J. BOYLER.
 BUTTONHOLE STITCHING ATTACHMENT FOR SEWING MACHINES.
 APPLICATION FILED AUG. 2, 1909.

976,431.

Patented Nov. 22, 1910.

2 SHEETS—SHEET 2.

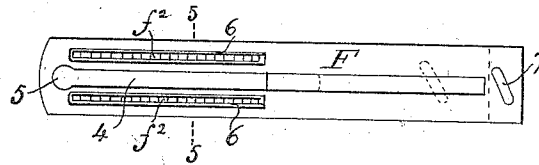


Fig. 4.

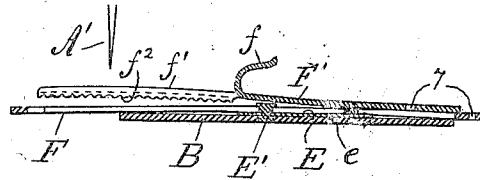


Fig. 6.

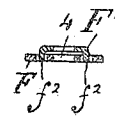


Fig. 5.

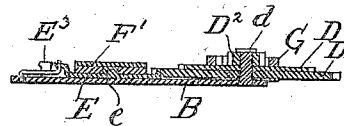


Fig. 7.

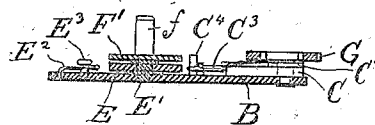


Fig. 8.

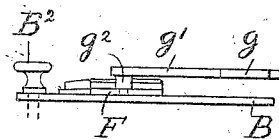


Fig. 9.

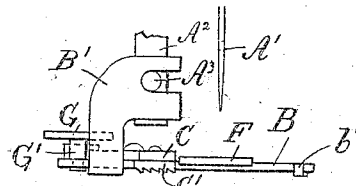


Fig. 10.

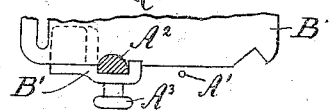


Fig. 11.

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UNITED STATES PATENT OFFICE.

EMANUEL JOHN BOYLER, OF OTTAWA, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF TO
JOHN HAROLD ALFORD, OF OTTAWA, ONTARIO, CANADA.

BUTTONHOLE-STITCHING ATTACHMENT FOR SEWING-MACHINES.

976,431.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed August 2, 1909. Serial No. 510,910.

To all whom it may concern:

Be it known that I, EMANUEL JOHN BOYLER, residing at Ottawa, in the county of Carleton, Province of Ontario, and Dominion of Canada, have invented new and useful Improvements in Buttonhole-Stitching Attachments for Sewing-Machines, of which the following is a specification.

My invention which will be hereinafter fully set forth and claimed relates to attachments to sewing machines for stitching button holes.

The object of my invention is an attachment for sewing machines by means of which button holes can be stitched, an attachment of simple construction and that can be readily attached, adjusted and removed.

Figure 1 is a plan of my improved button hole attachment, shown attached to the plate of a sewing machine. Fig. 2 is a similar plan, showing the rack bar thrown out of gear and the work holder removed but shown dotted, exposing the parts below the latter. Fig. 3 is a partial view of the same, with the ratchet wheel moved one tooth and the workholder (shown dotted) thrown in the reverse position. Fig. 4 is a bottom view of the workholder. Fig. 5 is a transverse section of the same, on line 5-5, Fig. 4. Fig. 6 is a section on line 6-6, Fig. 1, showing a longitudinal section of the workholder, the top leaf of the same lifted for the insertion of work. Figs. 7 and 8 are transverse sections on lines 7-7 and 8-8, Fig. 1 respectively. Fig. 9 is an end view, showing the connection of the rack with the workholder. Fig. 10 is an elevation of the end opposite to the one shown in Fig. 9 and showing a method of carrying the device on the presser rod, and Fig. 11 is a plan view of the same.

B is a base plate which may be attached to the plate (A) of a sewing machine by means of a thumb screw, B², passing through a slot, 2, in said plate, Figs. 1, 2, 3 and 9, when the plate A has a hole for the same in the proper position, or it may be provided with a bracket such as B¹, Figs. 10 and 11, and secured to the presser rod, A², of the machine, in the same well known manner as the presser foot or other attachments now in general use. The bracket B¹ may be formed integrally with the plate B or it may be riveted or otherwise secured to it; the screw A² holding it on the presser rod.

A¹, Figs. 1, 2, 3, 6, 10 and 11 denotes the needle, shown for the sake of indicating the relative position of the parts. A⁴ denotes the positive feed, A⁵ A⁶ and A⁷ are respectively insertion plate and slides in the machine plate.

A feed lever, C, Figs. 1, 2, 8 and 10, is pivoted, as at 3, upon the base plate B and furnishes the operating movements of the device, itself receiving motion from the machine feed A⁴. For this purpose the operated end projects beyond the base plate and has a claw, C¹, pivoted to it, which is adapted to be engaged by the feed A⁴, operating against the pressure of a spring, C², held on a post C⁴ and pressing it against a stop, b, nicked out of and raised on the plate. The operating end is cranked rearward (as at c, Fig. 2) and carries a pallet, C², which is pivoted to it and held by an extension, c³, of the spring C² which presses the point into engagement with a ratchet wheel, D¹, when the feed A⁴ moves the lever C backward and causes the operating end c to swing forward.

The ratchet wheel D¹ is concentric with 80 and fast upon another larger one, D, resembling a ratchet wheel but acting as a cam wheel and having only half the number of teeth, the back of each of which leaves intact a part of the periphery of the disk forming it, i. e., the back slope does not extend from the bottom of the one tooth to the point of the next, but runs out into the periphery, as shown in Figs. 1, 2 and 3. A pinion, D², is fast upon the ratchet wheel, all three being integral or connected to turn in unison upon the same stud, d, which is fast upon the base plate.

A follower in the shape of a pawl, E, Figs. 1, 2, 3, 6 and 8, is pivoted by a stud, E¹, upon the base plate B in longitudinal line with the needle A¹, which pawl carries near its free broad end a stud, e, also in line with needle and pivot center. The rear corner, adjacent to the cam wheel, is formed with an angular point, e¹, to fit the teeth of the cam wheel, the opposite or front corner is turned up to form an ear, e², with eye, which is engaged by a spring, E², held by a post E³; said spring pressing the pawl into engagement with the cam wheel. As the ratchet wheel D¹ has double the number of teeth of the cam wheel D, the latter is only turned half a tooth for each tooth of the ratchet wheel and consequently the pawl 112

point e^1 goes alternately to the bottom of the teeth and against the periphery of the wheel. In this manner the stud e is oscillated or thrown alternately to either side of the center line of the workholder coincident with a line passing through the needle A^1 and the stud E^1 , for the purpose to be presently described.

The workholder is composed of two thin bars F and F^1 , one on top of the other, the upper one secured upon the lower at the operated end and acting as a spring, as shown particularly in Figs. 4, 5, 6, 7 and 8. The lower bar F is provided with a longitudinal slot, 4, extending nearly to the ends. At the operating end this slot terminates with a larger eye, 5, adapted to pass the enlarged flat head of the stud E^1 which acts as pivot to the pawl E . The free neck of the stud E^1 and the stud e carried by the pawl are of the same diameter and fit the slot 4, so that the bar F may slide freely upon the two studs and be held down upon the pawl E by the head of the stud E^1 which projects over the edges of the slot. It will be noted that when thus assembled the bar F must participate in the oscillating movements of the pawl E , as caused by the cam wheel D , turning in its limited movements upon the stud E^1 . The pawl E is of sufficient width at its free end that the points e^1 and e^2 project at each side and are free of the bar. The slot 4 at the same time is of such a width that the needle A^1 may pass through when the bar is thrown on one side or the other and clear the edges of the slot and also make the necessary length of stitch transversely across the slot. The top bar F^1 acts as a spring clamp, being attached to the lower bar at the operated end and slotted or forked at the operating end to register with the slot 4. A thumb piece f is provided for lifting the free end and inserting the work between the two bars, as shown in Fig. 6. The forked operating ends, f^1 , of the spring bar F^1 have their outer edges, f^2 , serrated and turned down to pass into slots, 6, in the bar F , as shown in Figs. 4 and 5. The operated end of the workholder is provided with a couple of transverse slots, 7, as shown in Figs. 1, 4 and 6; these will be referred to again.

The traverse of the workholder is effected as follows: G , Figs. 1, 2, 7 and 8, is a double rack bar having at its forward end a central downward projecting stud, G^1 (Fig. 1) engaging a slot, 8, in and near the rear edge of the base plate, in line with the center of the pinion D^2 , said stud adapted to slide in said slot. At the rear end is formed a handle, g , and an arm, g^1 , extends across to the workholder $F F^1$, the end of said bar being provided with a stud, g^2 (Figs. 2 and 9) which is adapted to engage either one of the slots 7 in said workholder. The rack

bar is provided with a longitudinal slot, 9, the edges of which are formed with teeth, g^3 , which gear into the pinion D^2 . The width of the slot 9 is such that when one side is in gear with the pinion D^2 , the opposite rack clears the latter. It will be observed that as the ratchet wheel D^1 turns tooth for tooth, the rack will be moved by the pinion in one direction or the other, according to which side of the rack is in gear and the workholder will move in unison with the rack.

The nick b^1 , Figs. 1, 2, 3 and 10, is made in the base plate and the metal turned down to form an abutment meeting the joint of the circular plate A^5 where such exists; when the joint does not exist the abutment will not be so effective, but not objectionable.

The operation of the device will be readily understood. The work is placed in the holder $F F^1$, the cut in the material close to one of the edges of the slot 4 and the holder placed ready for the start. The rack G , the stud g^2 of the arm g^1 engaging one of the slots 7, is held in engagement on the required side of the pinion D^2 by the handle g . For each movement of the feed A^4 the workholder makes an oscillation to one side while also sliding upon the studs E^1 . When the end of the cut in the material is reached, the rack G is reversed, i. e., pressed into engagement on the opposite side and the workholder is now ready to return in the same manner as it advanced. Before proceeding, however, the material must be shifted so that the other side of the button hole comes within the slot 4. For extra long button holes, the stud g^2 is moved from one slot 7 into the other. The rack G has a certain flexibility which enables it to be readily lifted out of engagement.

I claim as my invention;—

1. In a buttonhole stitching attachment, the combination of a base plate, means of holding the same in position on the plate of a sewing machine, a feed lever pivotally secured upon the said base and having one end in engagement with the positive feed of the machine, a pallet pivotally secured at the other end of said lever, a spring returning said feed lever at the end of the movement imparted by the positive feed, a ratchet wheel in gear with the said pallet, a larger cam wheel journaled upon said base plate and upon which said ratchet wheel is fast and having only half the number of ratchet-like teeth as the ratchet wheel, a pinion fast upon said ratchet wheel, a slotted bar having the edges of the slot serrated with teeth gearing into said pinion one end of said bar having a handle and an arm projecting laterally and provided with a stud, a stud at the other end of said bar sliding in a slot in said base, a flat pawl like follower piv-

oted upon the base plate and carrying a stud and having a point at one side which is in engagement with the cam wheel, a spring engaging said pawl and pressing said point into engagement, a headed stud upon which said pawl is pivoted, a bar having a longitudinal slot engaging the headed pivot and the stud on the pawl and sliding thereon and extending with its slot under the needle and provided with a transverse slot at the rear end for engagement with the stud of the rack arm, a spring bar secured at one end upon the end of the aforesaid bar and having its forward end slotted to register with the slot in the bar below, means on said spring bar for holding the material for stitching under the forward end thereof and a thumb piece for lifting the forward end of said spring bar, substantially as set forth.

2. In a buttonhole stitching attachment, the combination of a base plate, means of holding the same in position on the plate of a sewing machine, a cam wheel journaled upon a stud secured to said base plate, a ratchet wheel smaller than and concentric with and fast to said cam wheel and having double the number of teeth of said cam wheel, a pinion upon and fast to said ratchet wheel, means for turning said ratchet wheel one tooth for each descent of the needle bar, a slotted bar having the edge of the slot serrated with teeth gearing with said pinion said bar terminating in a handle and having a laterally extending arm carrying a stud, means for holding said rack bar slidingly on the base plate a flat pawl-like

follower pivoted to said base plate on a stud and carrying a stud and having a point engaging said cam wheel, a spring holding said follower in engagement with said cam wheel and a slotted workholder held slidingly on the studs of said follower and engaged by the arm of the rack bar, substantially as set forth.

3. In a buttonhole stitching attachment for sewing machines, the combination of a base plate, means of holding the same on the plate of a sewing machine, a flat pawl like follower pivoted upon said base plate carrying a stud, a stud forming the pivot of said pawl having a neck of the same diameter as the stud on the pawl with an overlapping flat head, means of giving an oscillating motion to said pawl, a bar having a slot engaging the pivot stud and the pawl stud slidingly and through which the needle may pass, a spring bar secured at one end upon the end of the aforesaid bar and having its other end slotted to register with the slot in the lower bar and its outer edges turned down and pass into slots in the lower bar, a suitable thumb piece for lifting said spring bar which latter acts as a clamp upon the material placed between the two bars and means of giving a sliding motion to said bar and clamp, substantially as set forth.

In testimony whereof I have affixed my signature, in presence of two subscribing witnesses.

EMANUEL JOHN BOYLER.

Witnesses:

A. HARVEY,
B. HARVEY.