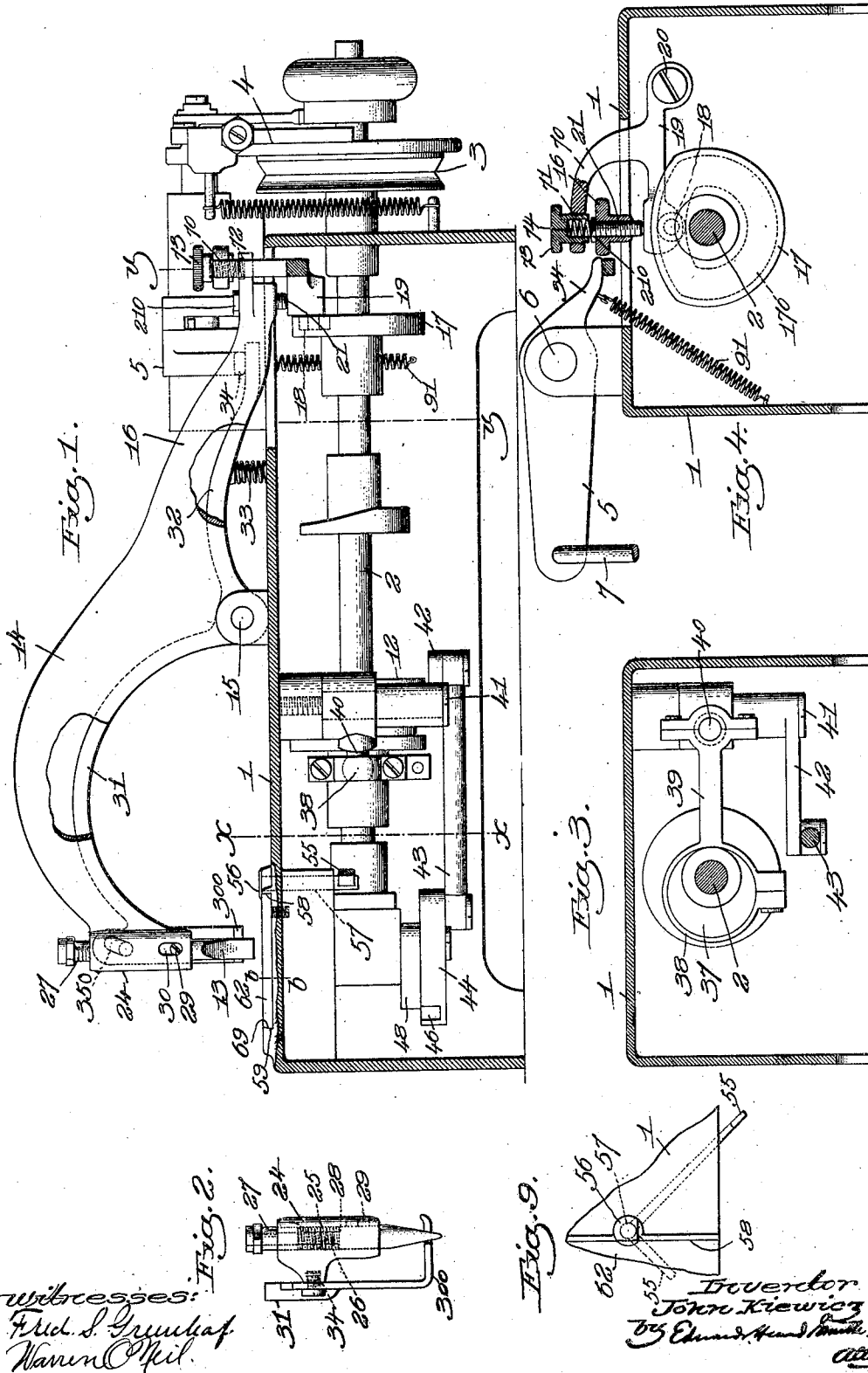


J. KIEWICZ.
SEWING MACHINE FOR FINISHING BUTTONHOLES.
APPLICATION FILED MAY 4, 1912.

1,047,537.

Patented Dec. 17, 1912.

2 SHEETS-SHEET 1.



Witnesses:
F. H. S. Grunke
Namen Phil.

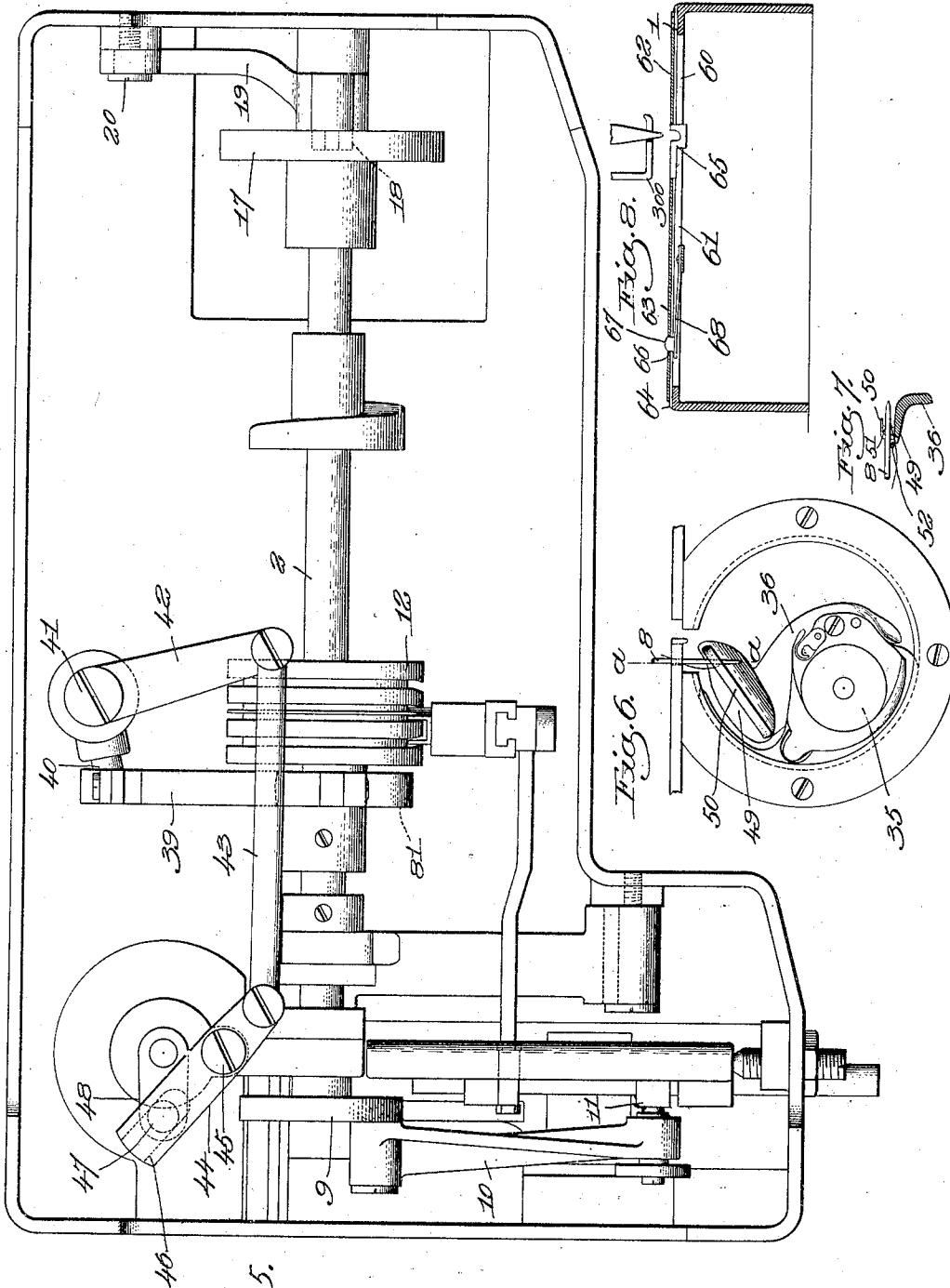
Inventor
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by Edmund H. Smith,
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2 SHEETS—SHEET 2.



Witnesses:
Paul S. Grunbaf.
Warren O. Neil.

Fig. 5.

Inventor,
John Kiewicz,
by Edward, Leonard Smith.

Attest.

UNITED STATES PATENT OFFICE.

JOHN KIEWICZ, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE REECE BUTTON HOLE MACHINE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

SEWING-MACHINE FOR FINISHING BUTTONHOLES.

1,047,537.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed May 4, 1912. Serial No. 695,084.

To all whom it may concern:

Be it known that I, JOHN KIEWICZ, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Sewing-Machines for Finishing Buttonholes, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to sewing machines of that type which are used for finishing buttonholes, and particularly to sewing machines which are provided with a vibrating bender to engage the work and make a bend therein and with a needle operating in a plane parallel to the general plane of the work and adapted to penetrate the bent portion of the work thereby to enter and leave the work on the same side thereof. A machine of this general type is shown in the Reece Patent, No. 404,863, June 11, 1889, and an improved machine of this same type is illustrated in Patent No. 987,966, March 28, 1911.

The object of the present invention is to improve generally machines of the type above referred to so as to make them capable of operating at an increased speed; to simplify the construction, and otherwise to provide the improvements which will be more fully hereinafter described and then pointed out in the appended claims.

Referring to the drawings which illustrate an embodiment of my invention, Figure 1 is a side elevation of the machine with the base shown in section to better illustrate some of the operative parts; Fig. 2 is an end view of the bender carrier and presser-foot carrier; Fig. 3 is a section on the line *x-x*, Fig. 1; Fig. 4 is a section on the line *y-y*, Fig. 1; Fig. 5 is an under side plan view of the machine; Fig. 6 is an enlarged plan view of the shuttle-carrier with the shuttle therein; Fig. 7 is a section on the line *a-a*, Fig. 6; Fig. 8 is a section on a small scale through the bed frame on substantially the line *b-b*, Fig. 1; Fig. 9 is a detail view showing the locking means for the movable plate 62.

1 designates the bed plate of the machine beneath which is journaled the driving shaft 2 by which the shuttle and needle are operated. This shaft 2 is operated from a driving pulley 3 which is loosely mounted

thereon, but which is adapted to be clutched thereto by a clutch mechanism 4 of some suitable type, that herein shown being similar to the general construction of the clutch mechanism illustrated in Patent No. 987,966. Inasmuch as the clutch mechanism forms no part of the present invention I have not deemed it necessary to further describe it herein, except to say that the clutch is rendered operative to clutch the driving pulley 3 to the shaft by means of a starting lever 5 which is pivoted to the base 1 at 6 and which is connected by a link 7 to a suitable treadle, not shown, so that when the treadle is depressed and the left-hand end of the starting lever 5 in Fig. 4 is depressed, the clutch will be thrown in operation. The needle 8 reciprocates in a horizontal plane directly beneath the bed plate 1, and it may be operated from the driving shaft 2 by any suitable mechanism, such as illustrated in either of the above-mentioned patents. As the needle-operating mechanism does not form part of the present invention, it will not be necessary to describe it except to say that 9 is a crank disk on the shaft 2, which crank disk is connected by the link 10 with a block 11 secured to a horizontally and longitudinally-reciprocating needle bar to which the needle 8 is secured.

12 designates the switch cam on the main shaft 2 by which the needle bar and needle are vibrated laterally, all as described in said Patents No. 404,863, and No. 987,966.

In the present improvement the bender by which the material is bent into the throat-plate while the needle makes its thrust through the bend thereof, is carried by a bender-carrier 14 which is pivoted intermediate of its ends at 15 upon the base plate 1. This bender-carrier receives its vibrating movement from the shaft 2 by a novel mechanism which is particularly designed to admit of a very high speed of operation without producing any appreciable vibration. As shown in Fig. 4 the shaft 2 has thereon a cam member 17 provided with a cam groove 170 which receives a roll 18 on an intermediate member 19 that is pivotally sustained at one end, as at 20. The end of the bender-carrier is provided with an adjustable bearing member 21 preferably in the form of a screw screw-threaded into the part 16 and provided with a lock nut 210 for locking it in position. Yielding means

are provided for holding the bearing projection 21 against the intermediate member 19, and in the present embodiment this yielding means is in the form of an arm 70 which is formed as part of the intermediate member 19 and is shaped to overlie the end 16 of the bender-carrier. A comparatively stiff spring 71 is interposed between the portion 16 of the bender-carrier and the arm 70 and means are preferably provided for adjusting the tension of said spring. As herein shown the part 16 is provided with a recess 72 in which one end of the spring 71 is received and the arm 70 carries an adjusting nut 73 provided with a recess 74 in which the other end of said spring is received. The intermediate member 19 is given a positive vibration by means of the cam groove 170, and this positive movement is transferred to the bender-carrier through the projection 21 and spring 71. The projection 21 allows for an adjustment of the bender-carrier to suit the character of the work being operated on, and the spring 71 holds the projection 21 in contact with the intermediate member 19. Since this spring is carried by the vibrating member 19, the spring is not compressed and expanded at each vibration of the bender-carrier, but merely constitutes a yielding connection between the bender-carrier and the arm 70 and insures that the bender-carrier will be held in engagement with the member 19 at all times.

The construction wherein the spring which holds the bender-carrier against the intermediate member 19 is sustained by said member and moves therewith is one which permits of a high speed of operation without danger of the bender-carrier jumping or separating from the intermediate member, for the spring 71 is not constantly expanded and contracted, as is the case where the spring is secured to a fixed support, but instead bears on the bender-carrier with a uniform pressure during every position thereof.

By pivoting the bender-carrier at its central portion, as illustrated, said carrier is substantially balanced so far as distribution of the weight relative to the pivot is concerned, and this feature is advantageous in that it readily lends itself to a rapid operation of the parts. The bender is yieldingly sustained in the bender-carrier, and for this purpose the head 24 of the bender-carrier is provided with an opening in which the bender is received, and the bender is provided with a stem 25 which is encircled by a spring 26, one end of which engages an adjustable nut 27, and the other end of which engages a shoulder 28 formed on the bender. The bender has extending laterally therefrom a pin 29 operating in a slot 30 in the head 24. The slot permits a slight move-

ment of the bender relative to the bender-carrier, thus providing for operating on work of different thicknesses, and the pin in the slot also holds the bender from turning in the head 24 about its vertical axis.

300 designates the presser foot of usual construction, and this is sustained by a presser-foot carrier 31 which is also pivoted to the bed 1 at 15. The presser-foot carrier 31 is formed with the extension 32 which is acted upon by a spring 33 that tends to elevate the extension and thereby depress the presser foot, and said extension is also engaged by a finger 34 formed integral with the starting lever 5. When the machine is at rest and the starting lever occupies the position shown in Figs. 1 and 4 the finger 34 on the starting lever holds the presser foot in elevated position. When, however, the starting lever is depressed, to set the clutch in operation, then the finger 34 is elevated, thus allowing the spring 33 to depress the presser foot into engagement with the work. The presser foot remains in such engagement during the entire operation of the machine, it being yieldingly held in position by the spring 33. Whenever the treadle is released thereby to disengage the clutch, the finger 34 is brought against the extension 32 of the presser foot carrier by the spring 91 thereby elevating the presser foot, and the presser foot will be held elevated while the machine is at rest and until it is again started up. Since the presser foot is yieldingly held in constant engagement with the work while the machine is in operation, it is desirable to provide means to prevent lateral movement of the presser foot due to the frictional engagement of the work therewith, as said work is fed forward. I have provided for this herein by making a slot 350 in the presser foot and providing a bender-carrier with a laterally-extending headed stud 34 which operates in said slot, said slot being formed substantially on an arc struck from the axis 15 as a center. The head of the stud 34 prevents any lateral movement of the presser foot and holds it in proper position.

The shuttle 35 is of the oscillatory type and it is sustained by an oscillating shuttle carrier 26. In order to produce a machine capable of operating at a high rate of speed, it is essential that the means for operating the shuttle carrier should be of such a construction that the shuttle can be operated in time with the rapidly-operating bender without subjecting the machine to any undue vibration, and my invention, therefore, involves a shuttle-operating mechanism, especially designed to admit of an extremely rapid operation which coöperates with the rapidly-operating bender to produce a high speed machine.

The shaft 2 has mounted thereon an ec-

centric 37, the eccentric strap 38 of which is connected by a link 39 with one arm 40 of a bell-crank lever pivoted to turn about a vertical stud 41, and the other arm 42 of which is pivotally connected to a link 43 that is connected to an oscillating member 44 pivoted at 45. The member 44 is provided with a slot 46 in its end in which is received a roll 47 on the end of an arm 48 extending from the spindle of the shuttle-carrier whereby oscillating movement of the member 44 will oscillate the shuttle carrier. It will be noted that the arm 40 of the bell-crank is much shorter than the arm 42 and that the pivotal axis 45 of the oscillating member 44 is so positioned that the link 43 connects with the shorter arm of said oscillating member. With this arrangement an eccentric 37 having a comparatively small throw will provide the necessary movement to give the shuttle the required oscillation. This eccentric, bell-crank lever and link mechanism, however, can be operated rapidly without any appreciable jar or vibration, and this construction when operated with the means herein described for operating the bender and presser foot provides a machine which can be run at a high rate of speed.

The arm 40 of the bell-crank works on the arc of a circle and in order that there may be no binding between said arm and the link 39, or between the eccentric strap and the eccentric due to the curved direction of movement of the arm 40, I preferably will use a ball-and-socket connection between the arm 40 and the link 39 and will make the face of the eccentric rounded slightly, as shown at 81. This permits a sufficient rocking motion of the eccentric and link 39 to conform to the curved motion of the arm 40.

The shuttle carrier 36 is formed with a rest or support 49 over which the point of the needle 8 passes during the penetrating movement thereof, and I have herein shown said shuttle-carrier as having the guard or bridge piece 50 which extends over that portion of the rest 49 with which the needle has contact during the operation of the machine. This guard 50 forms with the rest 49 a loop or opening 51 through which the needle point passes, and it provides a guard for the needle point which will prevent the shuttle thread from becoming entangled therewith.

In machines of this type it is customary to provide the bed plate with openings 60 and 61 above the shuttle and the needle-operating mechanism, respectively, and to close said openings with removable plates 62, 63, respectively. The plate 63 is usually beveled at its edges and slips into undercut guiding lips 64 formed on the bed of the machine, it being held in place by the frictional engagement between the plate

and the guiding lips 64. The vibrations due to rapid operation of a machine of this type is often sufficient to overcome this friction so that the plate 63 will gradually slide away from the feeding mechanism and throat plate 65. To prevent this from occurring I form the plate 63 with an aperture 66 and provide a locking button 67 which is adapted to enter said aperture and is provided with a rounded upper surface, said button being yieldingly sustained in some suitable way, as by means of a spring 68. The button 67 normally locks the plate 63 from movement, but whenever the operator wishes to remove said plate for any purpose he places his thumb or finger on the button 67, thus depressing it until the cylindrical portion thereof is forced out from the aperture 66 when by pushing longitudinally of the plate 63 with the thumb which is at this time in contact with the plate 63 and partially filling the aperture 66, said plate can be withdrawn. When the plate is put in position again the button 67 will automatically snap into the aperture 66, thus locking the plate.

The plate 62 is usually provided with the beveled edge 69 to engage the undercut guiding lip 59, the opposite edge 58 being straight so that the plate can be dropped into position by first bringing the edge 69 against the lip 59 and then swinging the edge 58 down into position. It has been customary heretofore to lock the plate 62 in place by means of a flat headed screw which is cut away at one edge. In order to lock the plate 62 in position I provide the locking stud 57 which is provided with the locking head 56 and is provided with an arm 55 that extends out through a slot in the side of the bed plate frame 1. This head 56 is eccentrically mounted on the stud so that when the parts are in the position shown in Figs. 1 and 9 the head overlies the edge of the plate 62 and locks it in place, but when the stud is turned through approximately 90°, the head 56 is carried off from the edge of the plate thereby unlocking it. This turning movement of the stud is accomplished by swinging the arm 55 from the full to the dotted line position Fig. 9. This arrangement is very advantageous, as it does not require the use of a screw-driver or any other implement for unlocking the plate 62 and enables the operator to more quickly remove the plate when it is necessary to secure access to the shuttle.

While I have illustrated herein one embodiment of my invention which is sufficient to illustrate the principle thereof, I do not wish to be limited to the constructional details shown, as many of them may be varied without departing from the spirit of the invention.

Having fully described my invention, I

what I claim as new and desire to secure by Letters Patent is:—

1. In a high speed buttonhole finishing machine, the combination with a bed plate, of means to make bends in the work supported on said bed plate, high speed stitch-forming mechanism comprising a needle, an oscillatory shuttle carrier situated beneath the bed plate, a shuttle carried thereby, a driving shaft, an elbow lever, an oscillating pivoted member operatively connected to the shuttle carrier, a link connecting one arm of said elbow lever to said oscillating member, an eccentric on the driving shaft, and an eccentric strap encircling said eccentric and provided with an arm having a ball-and-socket connection with the other arm of said elbow lever.

2. In a high speed buttonhole finishing machine, the combination with a bed plate, of a driving shaft, a bender to make bends in the work, bender-operating mechanism capable of operating at high speed without producing undue jar or vibration, a shuttle, an oscillatory shuttle carrier therefor, and a high speed shuttle carrier operating mechanism comprising an elbow lever pivotally sustained by the bed plate beneath the latter and having a long and a short arm, an oscillating member operatively connected to the shuttle carrier, a link connecting the long arm of said elbow lever to said oscillating member, an eccentric on the driving shaft, and an eccentric strap therefor having a ball-and-socket connection with the short arm of said elbow lever.

3. In a buttonhole-finishing machine, the combination with means to make bends in the work, of a needle and operating mechanism therefor, an oscillatory shuttle carrier provided with a laterally-extending arm having a roll, an oscillating member pivoted intermediate of its ends and forked at one end to engage said roll, an elbow lever having a long and a short arm, means connecting the long arm with said oscillatory member, a driving shaft, and an eccentric on the driving shaft connected to said short arm.

4. In a buttonhole-finishing machine, the combination with means to form bends in the work, of a horizontal reciprocable needle, an oscillatory shuttle carrier and a shuttle sustained thereby, said shuttle carrier having an elongated rest 49 to sustain the needle, and a guard member 50 extending parallel to said rest and forming therewith an elongated needle-receiving opening.

5. In a buttonhole-finishing machine, the combination with a bed plate, of stitch-forming mechanism, a bender-carrier centrally pivoted directly to the bed plate, a bender sustained by said carrier at one end thereof, a driving shaft, a cam on said shaft, and an adjustable connection between said cam and the opposite end of the carrier by

which said carrier is vibrated and the throw thereof is regulated.

6. In a machine of the class described, the combination with a bed plate, of stitch-forming mechanism, a bender carrier pivoted centrally directly to the bed plate, a bender sustained by one end of said carrier, a driving shaft provided with a cam, an intermediate member operated by said cam and having engagement with the opposite end of said carrier, and a spring to hold the end of the carrier in engagement with the intermediate member.

7. In a machine of the class described, the combination with a bed plate, of stitch-forming mechanism, a bender carrier pivoted centrally directly to the bed plate, a bender sustained by one end of said carrier, a driving shaft provided with a cam, an intermediate member operated by said cam and having engagement with the opposite end of said carrier, and a spring sustained by the intermediate member and operating to hold the end of the carrier in engagement with said member.

8. In a device of the class described, the combination with a bed plate, of stitch-forming mechanism, a bender carrier pivoted centrally directly to the bed plate, a bender sustained by said carrier at one end thereof, a driving shaft, a cam on said shaft, an intermediate member operated by said cam and having a forked portion between the arms of which the end of the carrier is situated, said end of the carrier having engagement with one of said arms, and a spring interposed between said end of the carrier and the other arm.

9. In a device of the class described, the combination with a bed plate, of stitch-forming mechanism, a bender carrier pivoted centrally directly to the bed plate, a bender sustained by said carrier at one end thereof, a driving shaft, a cam on said shaft, a pivoted intermediate member operated by said cam, said member having a forked portion between the arms of which the bender carrier is situated, said end of the carrier having an adjustable bearing which engages one arm of said fork, and a spring carried by the other arm of said fork and engaging said carrier.

10. In a buttonhole-finishing machine, the combination with a bed plate, of stitch-forming mechanism, a bender carrier centrally pivoted directly to the bed plate, a bender sustained thereby, a driving shaft, a cam on the shaft, an adjustable connection between said cam and one end of the carrier by which said bender carrier is vibrated, a presser-foot carrier also pivoted directly to the bed plate, a spring for yieldingly holding the presser foot against the work, and a connection between said two carriers which permits the bender carrier to vibrate relative

to the presser-foot carrier but prevents lateral movement of one relative to the other.

11. In a device of the class described, the combination with a bed plate, of a bender-carrier centrally pivoted thereto, means to vibrate said carrier, a presser-foot carrier also pivoted directly to the bed plate, a presser foot sustained by said carrier and provided with a slot, and a headed stud on the bender carrier operating in said slot and preventing lateral movement of the presser-foot carrier relative to the bender carrier.

12. In a high speed buttonhole finishing machine, the combination with a driving shaft, of a shuttle, an oscillating shuttle carrier, a high speed shuttle carrier operating mechanism actuated by the driving

shaft, a bender carrier, a bender sustained thereby, and a high speed bender-carrier-operating mechanism comprising an oscillatory intermediate member having two arms between which the bender carrier is received, a spring sustained by one of said arms and acting to yieldingly hold said carrier against the other arm, and a cam on the driving shaft for giving the intermediate member a positive motion in both directions.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN KIEWICZ.

Witnesses:

CHRISTIAN H. T. HAGELSTEIN,
LOUIS C. SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."