(No Model.)

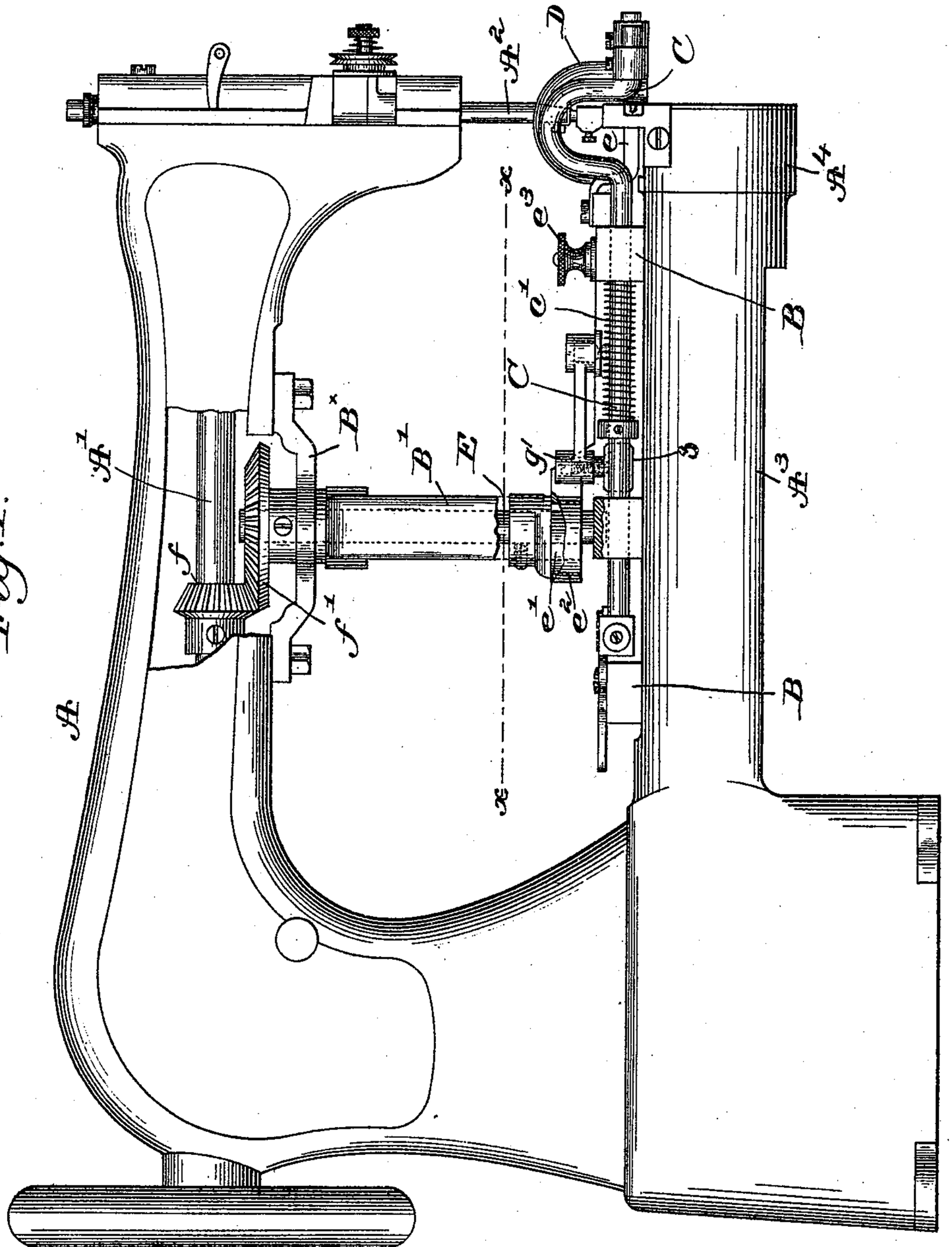
2 Sheets—Sheet 1.

G. S. HILL.

SEWING MACHINE.

No. 494,480. Patented Mar. 28, 1893.

Fig. 1.



Witnesses.
Edward F. Allen.
Louis N. Jarvell

Inventor:
George S. Hill
by Crosby & Gregory
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

G. S. HILL.

SEWING MACHINE.

No. 494,480. Patented Mar. 28, 1893.

Fig: 2.

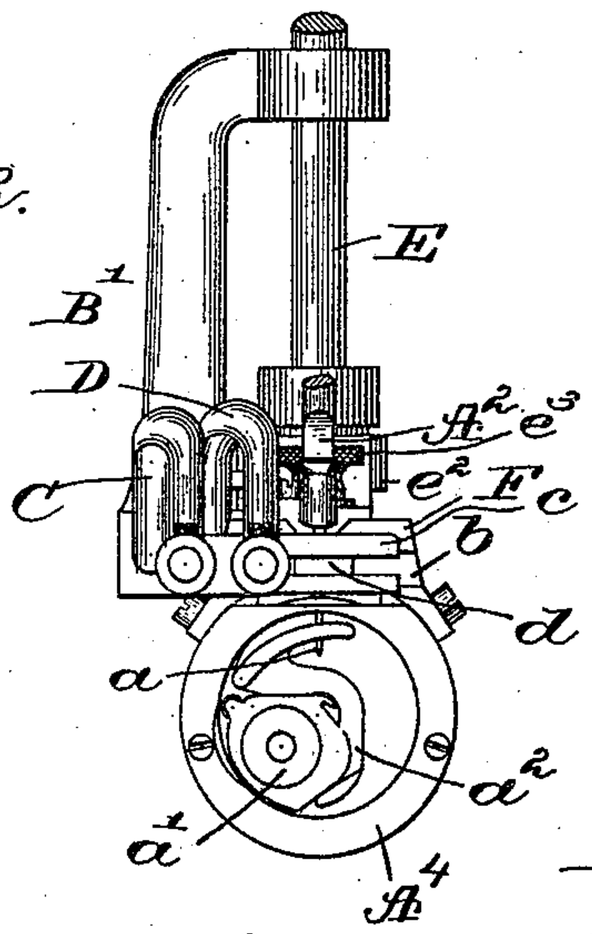


Fig: 3.

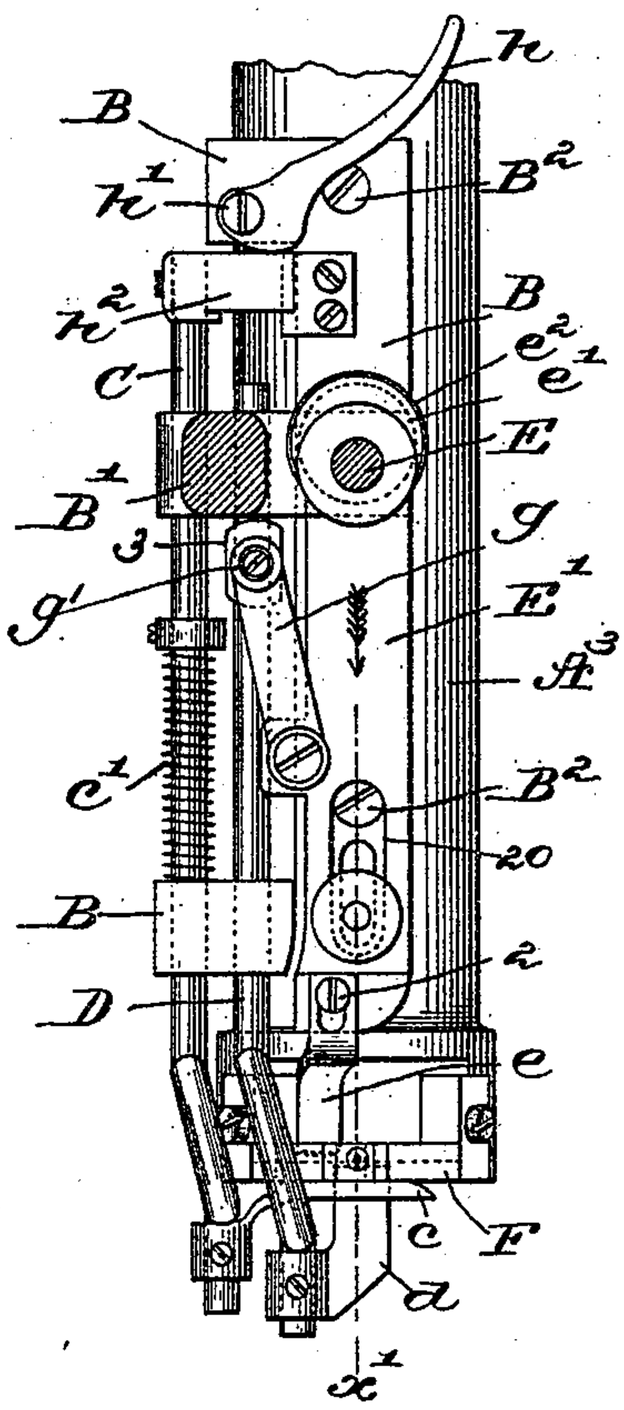
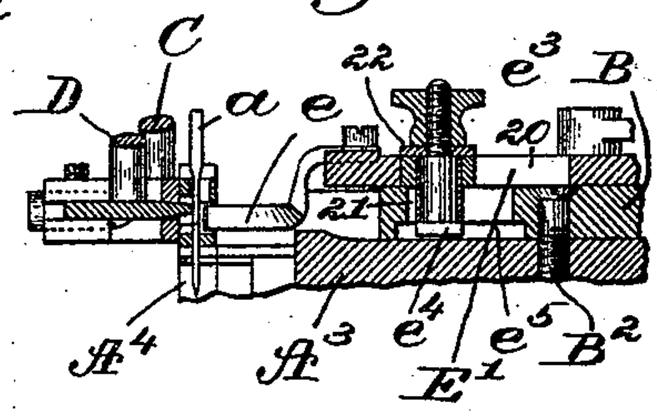


Fig: 4.



Witnesses.
Edward F. Allen
Louis N. Goodell

Inventor:
George S. Hill,
by Crosby & Gregory
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE S. HILL, OF BRADFORD, ASSIGNOR TO JOHN REECE, OF BOSTON, MASSACHUSETTS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 494,480, dated March 28, 1893.

Application filed November 28, 1892. Serial No. 453,371. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. HILL, of Bradford, county of Essex, State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object the production of a simple and efficient sewing machine for making what is known as a blind stitch, the machine, among other purposes, being very useful for securing thrum ends and stay cord at the inner side of button-hole pieces used in boots or shoes. Prior to this invention this work has been done by bending the material at the small end of the button-hole at right angles to the length of the button-hole, and the thrum ends and stay cord having been brought together nearly parallel, the needle at one descent enters the convexed side of the bend in the material, and in its descent emerges from the same side just behind the collected thrum ends and stay cord, and the loop of needle thread is caught by a suitable device complemental to the needle, but at the next descent of the needle the material having been fed the length of a stitch, the needle passes outside the stay cord and thrum ends and does not penetrate the material. In this way the stay cord and thrum ends are bound together in the stitches and connected to the inner side of the button-hole piece, but without the stitches used for this purpose showing at the face of the button-hole piece. I have devised very simple apparatus for this purpose, which apparatus I have constructed in such manner that it may be readily applied to what is called a tubular arm machine, the particular machine on which I have shown my invention as applied being of the class known as the "Singer," but it will be understood that I may apply the same to any other usual tubular arm machine.

Figure 1, is a left-hand side elevation of a machine of the class referred to with my improvements added, portions of frame-work being broken away to represent moving parts. Fig. 2, is a partial front end view of the machine shown in Fig. 1; Fig. 3, a section below the line x, Fig. 1; and Fig. 4 is a partial section in the line x', Fig. 3.

The overhanging arm A containing the needle-bar actuating or main shaft A′; the needle-bar A^2 having an eye-pointed thread-carrying perforating needle a; the tubular arm A^3, containing a device complemental to the needle in the formation of stitches, said device being herein illustrated as a shuttle a' actuated by a suitable driver a^2 in a circular race A^4, are and may be of usual construction.

The frame B, B′ located between the tubular arm A^3 and the overhanging arm A, and connected to the arm A^3, as shown, by suitable screws B^2 forms bearings for the several working parts to be described, such as the presser-bar C, the bender-bar D, and the actuating shaft E.

The arm A^3 near its outer end has secured to it a block F having in its outer vertical face a suitable groove b, so shaped as to aid in gathering the thrum ends together substantially parallel to the usual stay cord as the button-hole piece with its rear side laid against the grooved face of said block is fed along, as will be described, said block having the said groove for a portion of its length cut through to the back of the block in order that the forward or acting end of the feed bar e may pass through said slot and engage the inner side of the button piece opposite the presser-foot c, and feed the material. The presser-foot is slotted for part of its length, as best shown in Fig. 2, for the passage of the bender d through it to contact with the outer side of the material in the line of the inner ends of the button-hole and bend such material preparatory to making, say every other stitch, into the groove b in order that the convexed portion of the material presented by the bender may be entered by the needle a to make a blind stitch as stated.

The horizontally arranged presser-bar has co-operating with it a spring c' which acts normally to keep the presser-foot on the button-hole piece to keep it pressed against the face of the block F, which is the work support, when the stitch is made in the material, the foot also resisting the pressure of the feed e when acting to feed the material, and also co-operating with the feed when the lat-

ter is moved horizontally to the right, viewing Fig. 1, to carry the material held between it and the presser-foot laterally out of the path of the descending needle, as for instance, at every other stitch, as when the needle is to descend and leave its thread across the outer side of the collected thrum ends and stay cord.

The main shaft A′ has been provided with a bevel gear *f* which engages a bevel gear *f′* of twice the number of teeth fast on the shaft E having its bearings in frame B, B′, and also in a plate B×, shown as secured to arm A. The shaft E has an eccentric *e′* which is embraced by an eccentric strap e^2 at the inner end of the carrier E′ for the feed dog *e*. The carrier E′ is represented as provided with a slot 20, and the frame B has a slot e^5. The slot e^5 receives the head of a screw e^4 which is surrounded by a roll 21, which in turn is surrounded by a block 22 fitted into the slot 20. When the thumb nut e^3 on the screw e^4 is loosened, the said screw which constitutes a fulcrum for the feed carrier E′ may be adjusted to vary the length of the stitch.

The feed carrier has pivoted on it a link *g* shown as jointed at *g′* to a block 3 on the bender-bar D, the bender-bar and feed-carrier moving substantially in unison in the direction of the length of the feed carrier so that the space between the bender-bar D and feed bar *e* is always the same during the stitching operation, and this space may be adjusted to suit the particular button-hole piece being acted upon, by adjusting the block 3 on the bar D, the stud screw used to pivot the link *g* to the said block also serving by its inner end to confine the block in adjusted position on the bar. The presser-foot may be entirely removed from the button-hole piece by the lifter *h* pivoted at *h′* and adapted to act against the block h^2 on the presser-bar.

To adapt the bender-bar and presser-bar to a horizontal or tubular arm machine, I had to form both said bars with a bend or arch, as shown, to embrace the block F, such construction enabling me to produce a compact and very simple structure.

Referring to Figs. 1 and 3, it will be supposed that a stitch has just been made in the convexed part of the material, and that the bender-bar has its end thrust fully into the groove *b* of the throat or work support F. Now, in the further movement of the machine, the feed carrier is moved in the direction of the arrow upon it, and at the same time the bender-bar through the connection *g* is moved in unison with it until the material, held between the feeding device and bender-bar, is carried out of the groove *b*, and then the eccentric *e′* referred to, in its continued operation, vibrates the feed carrier, causing the feed device *e*, in engagement with the material, to move it the length of one stitch, and this done, the needle again descends, this time outside the stay-cord and thrum ends, and its loop is caught for another stitch. During the feeding operation the presser-foot *c* is held against the button-hole piece in a suitable manner to enable the feeding device *e* to engage and move the work as in ordinary sewing.

In this my invention, it will be readily understood that by mounting the throat or work support *b* at the end of the tubular arm, using the vertical side of the support to sustain the material, the folding of the work, as practiced in other machines, is obviated, the only manipulation of the work during the operation of securing the thrum ends and stay cord being the temporary bending of the same by the bender, the main body of the button-piece hanging vertically at the end of the tubular arm.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A grooved throat or work support; a bender-bar provided with a bender; a feed carrier provided with a feeding device; a frame to support said bender-bar and feed carrier; and connections between the said feed carrier and bender-bar, combined with actuating means for the feed carrier, the combination being and operating, substantially as described.

2. A grooved throat or work support; a slotted feed carrier; a feed device attached thereto; an adjustable fulcrum for the feed carrier; a bender bar; an attached bender; a connecting device between the bender-bar and the feed carrier, whereby the feed carrier in its reciprocations moves the bender-bar substantially in unison with it, combined with means for both reciprocating and vibrating the feed carrier, to operate, substantially as described.

3. In a sewing machine, the following instrumentalities, viz:—stitch-forming mechanism, a tubular arm, a work support mounted upon the end of said arm and presenting a vertical face containing a groove, said support being provided with a needle hole, combined with a bender-bar, a bender, a feeding device, and means for actuating the feeding device and bender-bar, to operate, substantially as described.

4. A work support having its acting face grooved and being provided with a needle hole, a bender-bar bent to embrace the work-support, and a bender attached to said bender bar, combined with actuating devices to reciprocate the said bender-bar, and with work feeding mechanism, to operate, substantially as described.

5. A grooved throat or work support; a bender-bar provided with a bender; a feed carrier provided with a feeding device; a frame to support said bender-bar and feed carrier; and connections between the said feed carrier and bender-bar, combined with actuating means for the feed carrier, and with a presser-bar and an attached slotted presser, the combination being and operating, substantially as described.

6. A grooved throat or work support; a bender-bar provided with a bender; a feed carrier provided with a feeding device; a frame to support said bender-bar and feed carrier; and connections between the said feed carrier and bender-bar, combined with actuating means for the feed carrier, a presser-bar bent as described to embrace the work-support, and a slotted presser-foot attached to said presser-bar, the combination being and operating, substantially as described.

7. A tubular arm; a work-support mounted upon the end of said arm and provided with a groove, as *b*, and with a needle hole; stitch-forming mechanism; a bender-bar bent to embrace the work-support; a bender attached to the said bender-bar; a presser-bar provided with a presser-foot, a frame having bearings for said bender-bar and presser-bar and for an upright shaft; combined with an upright shaft, as E, an eccentric carried by said shaft, means to rotate the shaft, a feed carrier provided with a feed device and actuated by said eccentric, and a jointed connection between said feed carrier and said bender-bar, to operate, substantially as described.

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

GEORGE S. HILL.

Witnesses:
JOHN C. EDWARDS,
FREDERICK L. EMERY.