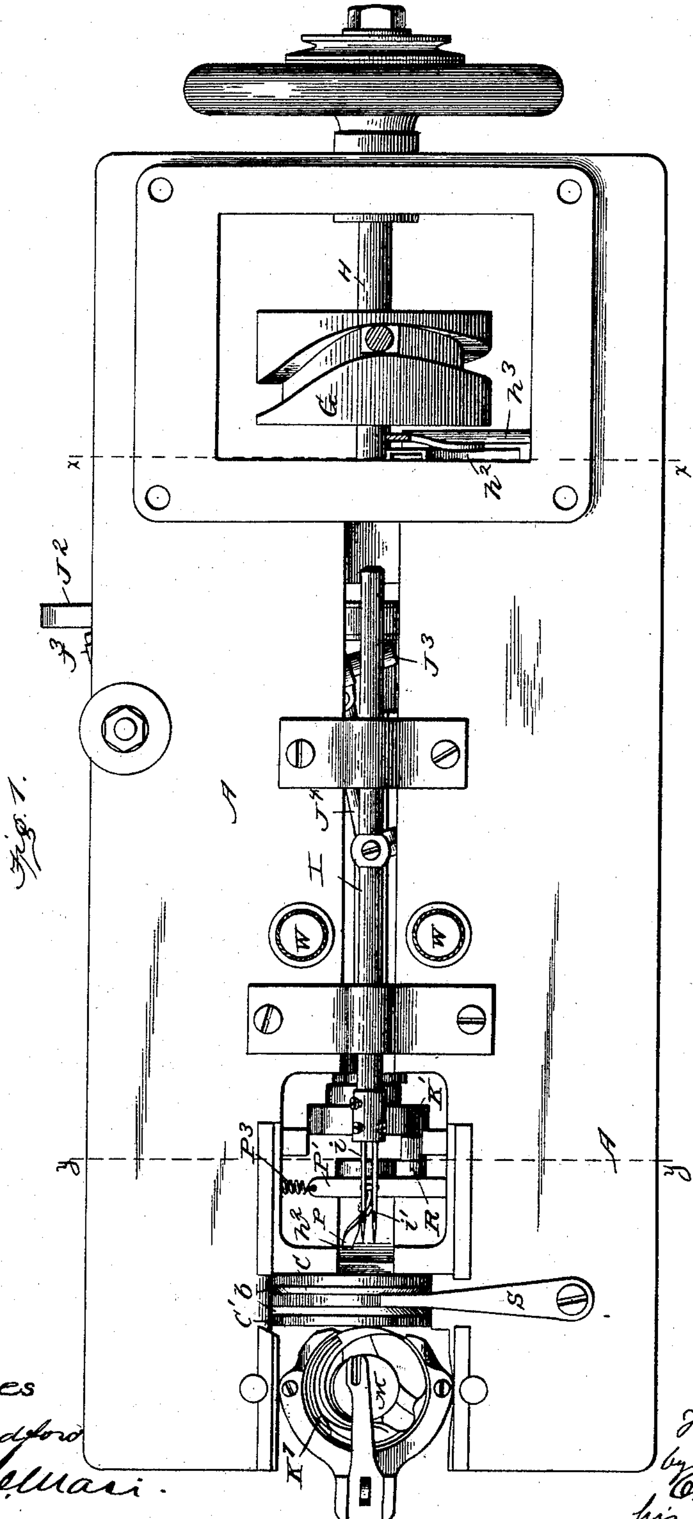
(No Model.)

5 Sheets—Sheet 1.

F. R. AUSTIN.

SEWING MACHINE FOR STITCHING AND BARRING BUTTONHOLES.

No. 522,928. Patented July 10, 1894.



Witnesses
Edwin L. Bradford
Philip C. Masi.

Inventor
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by E. W. Anderson
his Attorney

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

(No Model.) 5 Sheets—Sheet 2.

F. R. AUSTIN.

SEWING MACHINE FOR STITCHING AND BARRING BUTTONHOLES.

No. 522,928. Patented July 10, 1894.

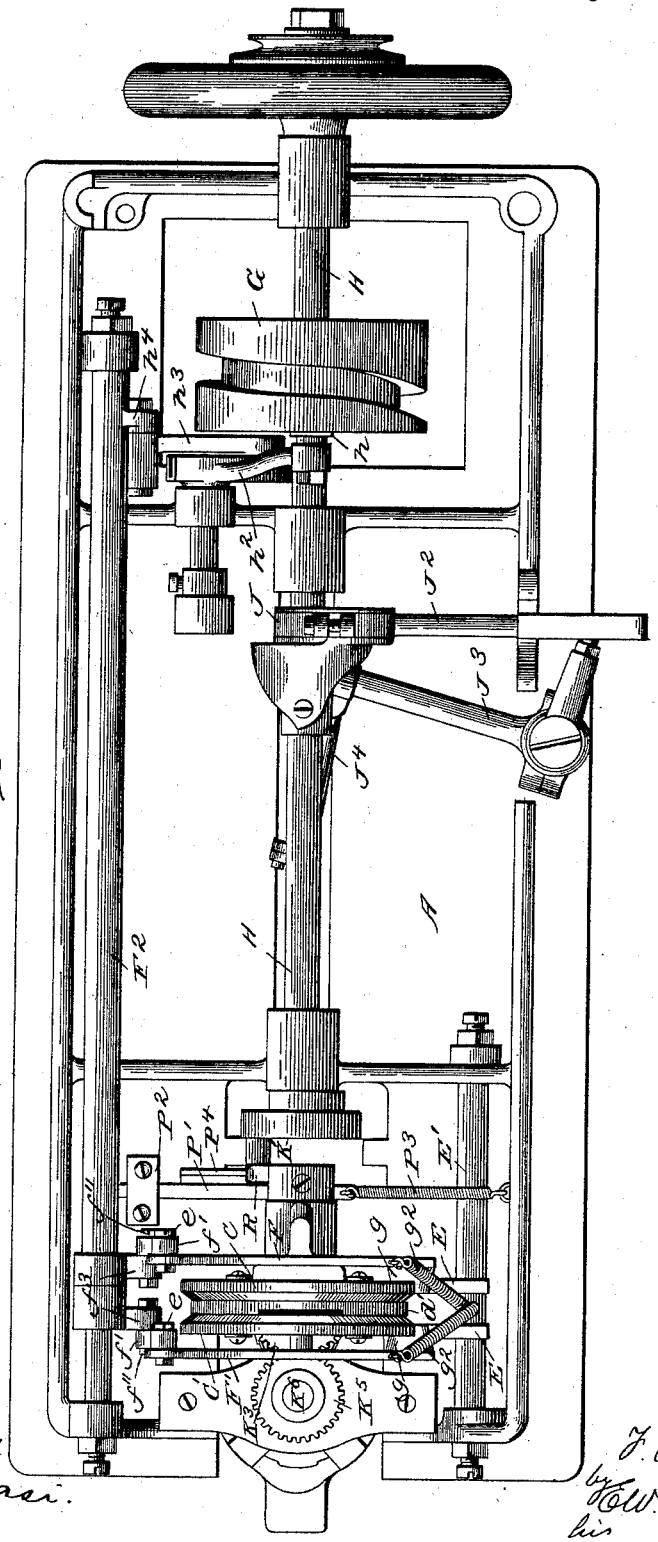

Fig. 2.

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(No Model.) 5 Sheets—Sheet 3.

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SEWING MACHINE FOR STITCHING AND BARRING BUTTONHOLES.

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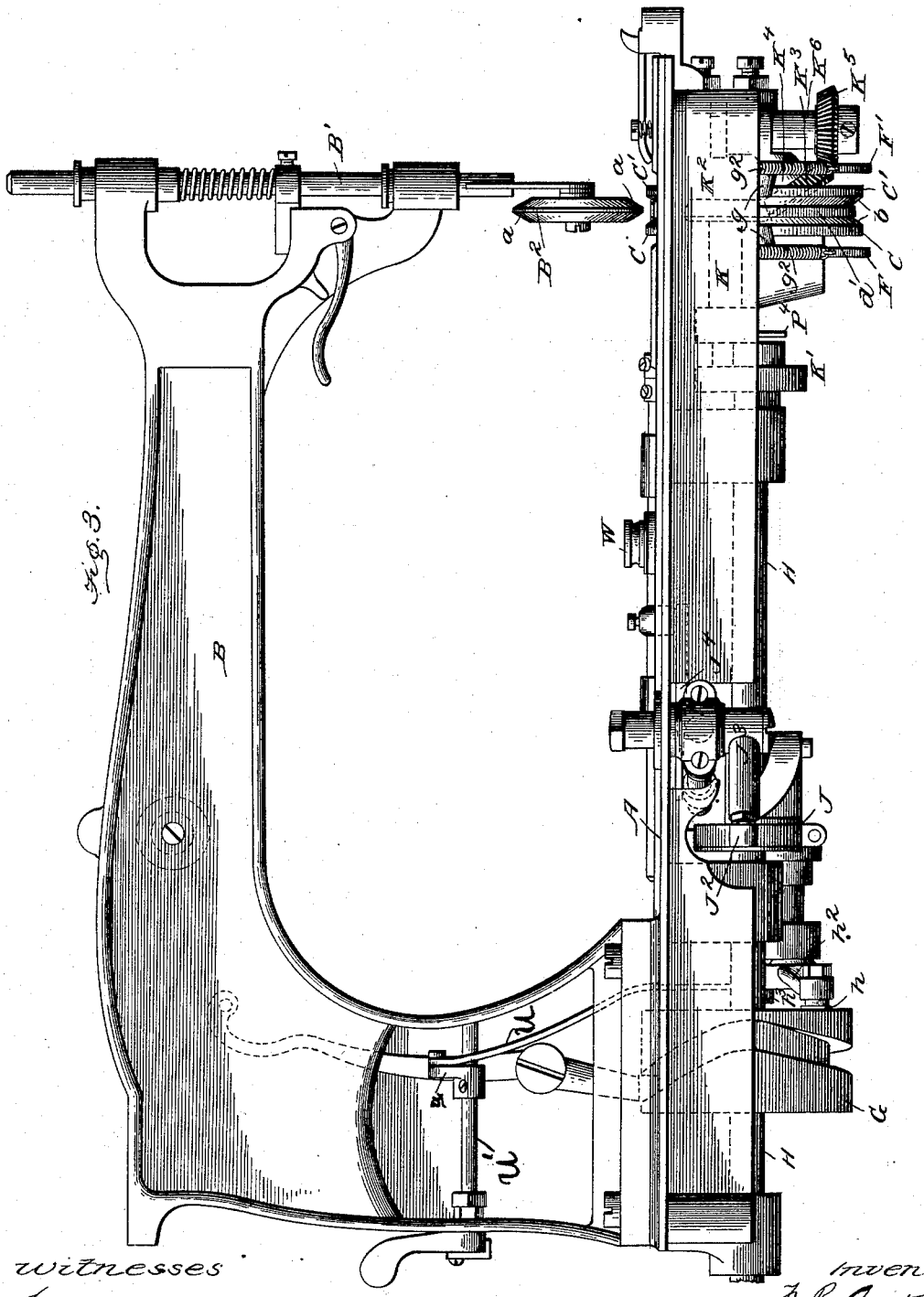

Fig. 3.

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(No Model.) 5 Sheets—Sheet 4.

F. R. AUSTIN.

SEWING MACHINE FOR STITCHING AND BARRING BUTTONHOLES.

No. 522,928. Patented July 10, 1894.

Fig. 4.

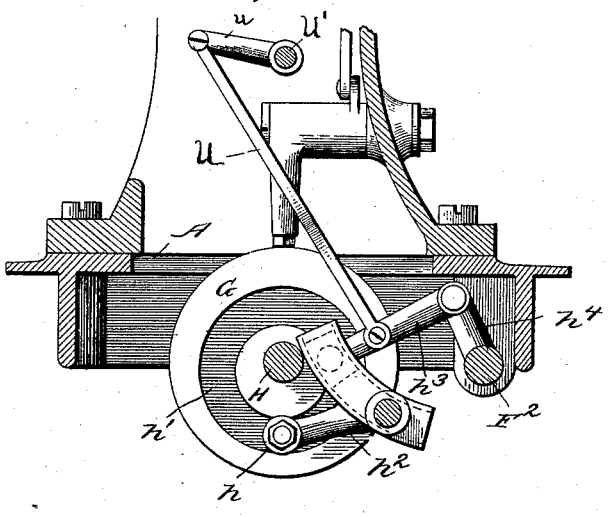


Fig. 5.

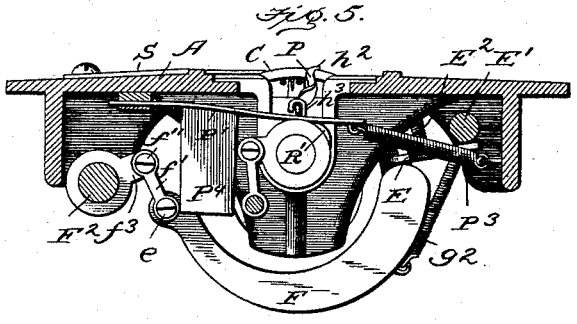
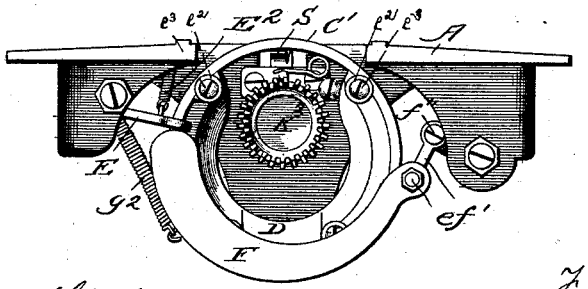


Fig. 6.



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(No Model.) 5 Sheets—Sheet 5.

F. R. AUSTIN.

SEWING MACHINE FOR STITCHING AND BARRING BUTTONHOLES.

No. 522,928. Patented July 10, 1894.

Fig. 7.

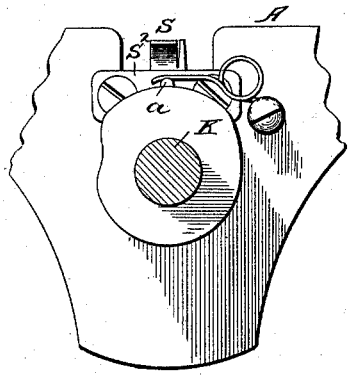


Fig. 8.

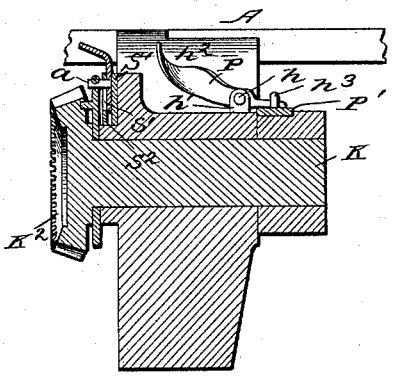


Fig. 9.

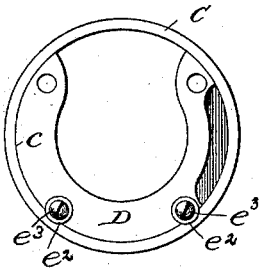


Fig. 10.

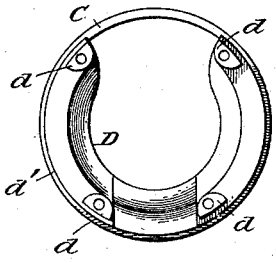


Fig. 11.

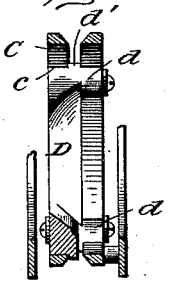


Fig. 12.

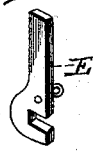


Fig. 13.

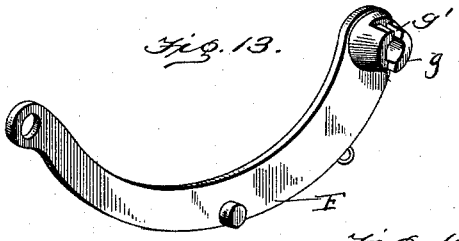
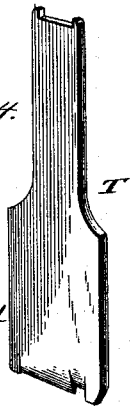


Fig. 15.

Fig. 14.



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UNITED STATES PATENT OFFICE.

FRANK R. AUSTIN, OF LYNN, MASSACHUSETTS.

SEWING-MACHINE FOR STITCHING AND BARRING BUTTONHOLES.

SPECIFICATION forming part of Letters Patent No. 522,928, dated July 10, 1894.

Application filed July 13, 1893. Serial No. 480,363. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. AUSTIN, a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines for Stitching and Barring Buttonholes; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1, is a top plan view of a machine embodying my invention, with the overhanging arm removed. Fig. 2, is a bottom plan view of the same. Fig. 3, is a side elevation. Fig. 4, is a transverse section on the line *x*—*x*, Fig. 1. Fig. 5, is a similar section on the line *y*—*y*, Fig. 1. Fig. 6, is an end-view, with the shuttle and shuttle-carrying frame and mechanism removed. Fig. 7, is a detail sectional view of the mechanism for supporting the needle. Fig. 8, is a similar view showing the looper and adjacent parts. Figs. 9 and 10, are detail views of the casting D, from different sides, and showing the rings thereon. Fig. 11, is a sectional view of the casting D and the rings. Fig. 12, is a detail view of one of the grips E. Fig. 13, is a detail view of one of the grips F. Fig. 14, is a detail view of a modified form of presser foot. Fig. 15, is a diagrammatic view showing the stitch.

This invention has relation to certain new and useful improvements in sewing machines, and more particularly to that class of sewing machines as are designed for use in stitching and barring buttonholes, or other over edge work; and the invention consists in the novel construction and combination of parts, all as hereinafter described and pointed out in the appended claims.

The improvements constituting this invention are designed to be applied to sewing machines of the Wheeler & Wilson type, having a rotating hook or shuttle, and consist more particularly in the arrangement of the needle bar and needles, the devices for holding and feeding the work while being stitched, the means for effecting the desired stitch, and the necessary operating devices, and minor features.

Referring to the accompanying drawings, the letter A designates the bed plate of the machine, and B the overhanging arm of the frame, the vertical portion of said arm having a presser rod or plunger B′ of the usual form. Loosely mounted at the lower portion of said arm is a presser wheel B^2, the peripheral edge of which is beveled from the center toward each edge, as seen at *a*. Situated immediately under said wheel B^2 in the bed of the machine, are two parallel rings C, C′, placed in edgewise vertical position, with their upper portions projecting through a cut-away portion of the bed plate, slightly above the surface of the latter. Said rings are spaced a short distance from each other, and their inner faces are beveled off toward the outer edge, as seen at *b*, to correspond to the bevel of the presser wheel B^2.

The ring C is fitted upon and free to turn on the edge portion *c* of a partially circular, rigid casting D, and the ring C′ is fitted and arranged to turn upon lugs or projections *d* of said casting. Said casting has a flanged portion *d*′ which extends between said rings, and holds them at the proper distance from each other.

A grip E engages each of the rings C, C′ at its upper rear portion, the upper portion of the grips bearing against a bar E′, against which they are drawn by means of springs E^2, attached thereto, and to the under side of the bed plate or table. The ring C is further held against lateral movement away from the ring C′ by means of washers e^2, which are held by screws e^3 inserted in the casting D. The said rings C, C′, are actuated to form the feed by means of the grips F, F′, one for each ring. Said grips consist each of a curved arm, which is placed substantially parallel with its respective ring, along the lower half of its circumference. The upper forward end portion of each grip has a pin *e*, which is connected by a link or arm *f*′ with a pin *f*″ of a crank arm f^3, of a rock shaft F^2, journaled longitudinally underneath the forward portion of the bed plate. The upper rear end portion of each grip has an inward and lateral lug *g*, formed with a recess *g*′ which engages the respective ring C or C′, in such a

manner as to enable it to move thereon to a slight extent. Connected to each of said grips at its upper rear portion is a spring g^2, the other end of which is attached to the frame or to the bar E'.

The rock shaft F^2 is actuated by a connection with the main cam wheel G on the main driving shaft H. Said connection comprises a cam block h, running in a groove h' in the end portion of said cam wheel, the bell crank lever h^2, an arm of which carries said block, and a link or lever h^3 connected at one end to the other arm of said bell-crank, and at the other end to an arm h^4 of the rock shaft F^2. The rear portion of the main shaft H, through said connections, causes a rocking movement of the shaft F^2, and a consequent oscillation of the grips F, F', which take such a hold upon the rings as to give them a step-by-step movement.

I designates a needle bar, which is placed in a horizontal position in the bed of the machine, and carries two needles i, i', placed side-by-side in the same horizontal plane. The needle bar and needles are so placed, that upon the reciprocation of the said bar, the needles will pass through the rings C, C', just inside thereof.

The needle bar is reciprocated by means of the following mechanism: On the main shaft H is a ball eccentric J, to which is attached a pitman J^2, the other end of which is loosely connected by a ball joint to an arm of a bell-crank lever J^3. To the other arm of said bell-crank lever is connected the needle bar, by means of a connecting rod J^4. By means of said pitman, the bell-crank, and connecting rod, the rotary motion of the eccentric is converted into a reciprocating movement, which is imparted to the needle bar. The main shaft H is coupled to the short shaft K by the usual crank and eccentric devices K', and on said shaft K is a beveled gear wheel K^2, meshing with a second wheel K^3, carried by an oblique shaft K^4. The wheel K^3 drives a gear wheel K^5 on the lower end of a vertical shaft K^6, which carries the rotary hook K^7, which is similar in form to those heretofore in use, and is designed to catch both threads from the needles i, i'. The gear wheels K^2, K^3, are within the rings C, C', and their gripping and holding devices. The presser roll or wheel presses the work down between the rings far enough for the rearward of the two needles to penetrate the edge portion to be stitched, but not sufficiently to be penetrated by the forward needle i', which comes forward just outside of the thrums and stay cord, or edge to be overstitched. Both needles, and the shuttle M, are threaded, and the rotary hook K^7 catches the threads of both needles, carrying them over the shuttle thread. The thread of the forward needle forms the over-edge thread, while the thread of the rear needle i passes through the fabric and is connected to the thread of the other needle, by the shuttle thread. The needles then retreat to their farthest point from the shuttle, and a looper P, (hereinafter fully described) catches the thread of one needle, carries it over the other needle, and holds it while said needle and its thread advance toward the shuttle through the loop thus formed. The looper is then depressed, carrying with it the thread so that it will be below the point of the needle as said needle approaches and penetrates the fabric, thus locking the two threads at this side.

The form of stitch is shown in the diagram, Fig. 15, wherein 1 designates the stay cord, 2 the shuttle thread, 3 the thread which penetrates the fabric, and 4 the over-edge thread.

The looper P consists of an arm hung loosely on a horizontal pivot h, of a rotary or swivel pin h', the forward end of said arm being bent upwardly, as seen at h^2, to form the hook or catch for the thread. The other end of said arm is engaged loosely by a loop h^3 on a slide bar P'. Said bar P' works in a guide P^2 at one end portion, and at its other end portion it is connected by a spring P^3 with the frame of the machine. Depending from said bar is an arm or projection P^4, which upon the revolution of the shaft K, is engaged by a cam projection R on said shaft, this engagement causing the bar an endwise movement in one direction, the return movement being effected by the spring P^3. A second cam R' on said shaft K gives said bar a slight vertical movement. The effect of these movements upon the looper P is as follows: As the needles recede, the looper arm is given a rotary rearward movement through an arc of ninety degrees or thereabout, its hook p^2 catching the thread from the forward needle i'. At this time, the cam R' acts to depress the bar P', which raises the hook p^2, and the latter commencing its return movement, carries the thread over the needle i and its thread, to lock the stitch. The hook is then again depressed, and recedes to its original position.

In order to keep the work above the needle i', a flat spring S is secured to the bed plate at the front side of the machine, with a narrow end portion lying between the rings. Underneath the other needle i', in order to support it while entering the work, is a finger S, working in a guide S', and having a pin a, engaging a slot s' in the guide plate. S^2 is a cam on the shaft K, which engages the end of said finger, and causes it an upward movement, as the needle recedes. Said finger by this movement, also raises the thread of the needle i', and assists the looper to catch it and carry it over the other needle.

In barring, the same mechanism is used, and the machine is operated in the same manner, with the exception that in place of the presser roll B^2, a plunger T, shown in Fig. 14, is substituted, said plunger consisting of a metal plate working in edgewise position and adapted to force the work down where the rear needle can catch it, and the feed is stopped.

The mechanism provided for stopping the feed is as follows: The link h^3 has a movable connection with the bell-crank lever h^2, as seen in Fig. 4; and connected to said link h^3 is a link U, the other end of which is connected to an arm u of a rock-lever U′ (Figs. 3 and 4). By operating this lever U′, the connection between the link h^3 and the bell-crank h^2, may be moved to such a point that the rock-shaft F^2 will not be caused a sufficient movement to actuate the feed.

W. W. are two tension devices for the two needle threads.

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

1. In a sewing machine, the parallel rings having the beveled faces, the beveled presser roll or wheel, and the horizontally reciprocating needle bar carrying two needles, arranged to work through said rings, in combination with the mechanism for securing the stitch, and feed mechanism, substantially as specified.

2. In a sewing machine, the combination of the parallel rings, having the beveled adjacent faces, and spaced from each other, the devices for supporting said rings and for giving them a step-by-step feed movement, the horizontally reciprocating needle bar, the two needles, arranged to work through said rings, the presser device for forcing the work between said rings, the rotary shuttle, and the looper, substantially as specified.

3. In a sewing machine, the rings C, C′, the casting D on which said rings are fitted, and on which they may turn, means for holding said rings to their seats, the grips F, F′, and the actuating mechanism for said grips, substantially as specified.

4. In a sewing machine, the rings C, C′, having the beveled adjacent faces, the casting D on which said rings are fitted, and on which they are arranged to turn, the spring-actuated grips E, E, engaging said rings, the feed grips F, F′, one for each of said rings, the springs therefor and the actuating devices for said grips, substantially as specified.

5. In a sewing machine, the combination with a horizontally reciprocating needle bar, and its two needles, in the same horizontal plane, of the parallel rings C, C′, the device for pressing the work between the rings, the revolving hook, the shuttle and the looper, substantially as specified.

6. In a sewing machine, the combination with the horizontally reciprocating needle bar and its two needles, of the parallel rings C, C′, through which said needles work, the presser for forcing the work between said rings, the spring for keeping the work away from one of said needles, the rotary hook, the shuttle, and the looper, substantially as specified.

7. In a sewing machine, the looper P having the hook at one end, the slotted swivel pin m, in which said looper is pivoted, the reciprocating bar with which said looper has a loose connection, the spring for said bar, a rotary cam for giving a horizontal movement to said bar, and a second cam for giving a vertical movement to said bar, all in combination with a needle-bar for reciprocating in proximity to said looper, and a pair of needles carried by said bar substantially as specified.

8. In a sewing machine, the combination with the main shaft, and the shaft K driven by said main shaft, of the looper P hung on a horizontal pivot, a swiveled pin carrying said pivot, a movable bar with which said looper has a loose connection, a spring for said bar, a cam on the shaft K for giving a vertical movement to said bar, and a needle bar reciprocating through the plane of movement of said looper during a portion of its travel substantially as specified.

9. In a sewing machine, the combination with a horizontally reciprocating needle bar, and a pair of needles carried thereby, of the shaft K which actuates the rotary hook, the cam thereon, the finger acted upon by said cam, and having a vertical movement toward and away from the plane of movement of the said needle bar and needles, and a spring for acting upon said finger reversely to said cam, substantially as specified.

10. In a sewing machine, the combination of a horizontally reciprocating needle bar, and the two needles carried thereby, of a looper arm P, loosely hung on a horizontal pivot below the plane of movement of said needle bar and needles, a rotary pin carrying said pivot, a slide bar P′ which loosely engages said looper, the rotary cams R R for imparting an endwise and a vertical movement to said slide bar, and a retracting spring for said slide bar, substantially as specified.

11. In a sewing machine, the combination with a horizontally reciprocating needle bar, and its two needles, of a looper devices for actuating said looper, whereby, as the needles reach their farthest point from the shuttle, said looper rises and catches the thread of one needle, carries it over the other, and holds it while the needles advance through the loop so formed, when it is again depressed, and a cam operated finger having a vertical, reciprocating movement toward and away from the plane of movement of said needle bar and needles, and adapted to raise the thread into position for it to be grasped by said looper and also to support the needle, substantially as specified.

12. In a sewing machine, the combination of the horizontally reciprocating needle bar, its two needles, mechanism for reciprocating said bar, the grip and feed rings, the actuating devices therefor, means for preventing but one of said needles from penetrating the fabric, the rotary shuttle and hook, the looper, and devices for imparting a rotary and a rising and falling movement to said looper, substantially as specified.

13. In a sewing machine, the combination with the annular parallel rings C, C′, the mech-

anism for imparting a feed motion to said rings, the presser adapted to force the work between said rings, the horizontally reciprocating needle bar, its two needles, means whereby only one of said needles is caused to penetrate the work, the revolving hook the stitch, and the looper arranged to secure the stitch at the opposite side of the fabric from the shuttle thread, substantially as specified.

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

FRANK R. AUSTIN.

Witnesses:
DANIEL W. STRATTON,
FRED O. WELSH.