2 Sheets—Sheet 1.

J. M. MERROW.

MACHINES FOR CROCHETING THE TOPS OF HOSIERY-GOODS.

No. 195,520. Patented Sept. 25, 1877.

Fig: 1.

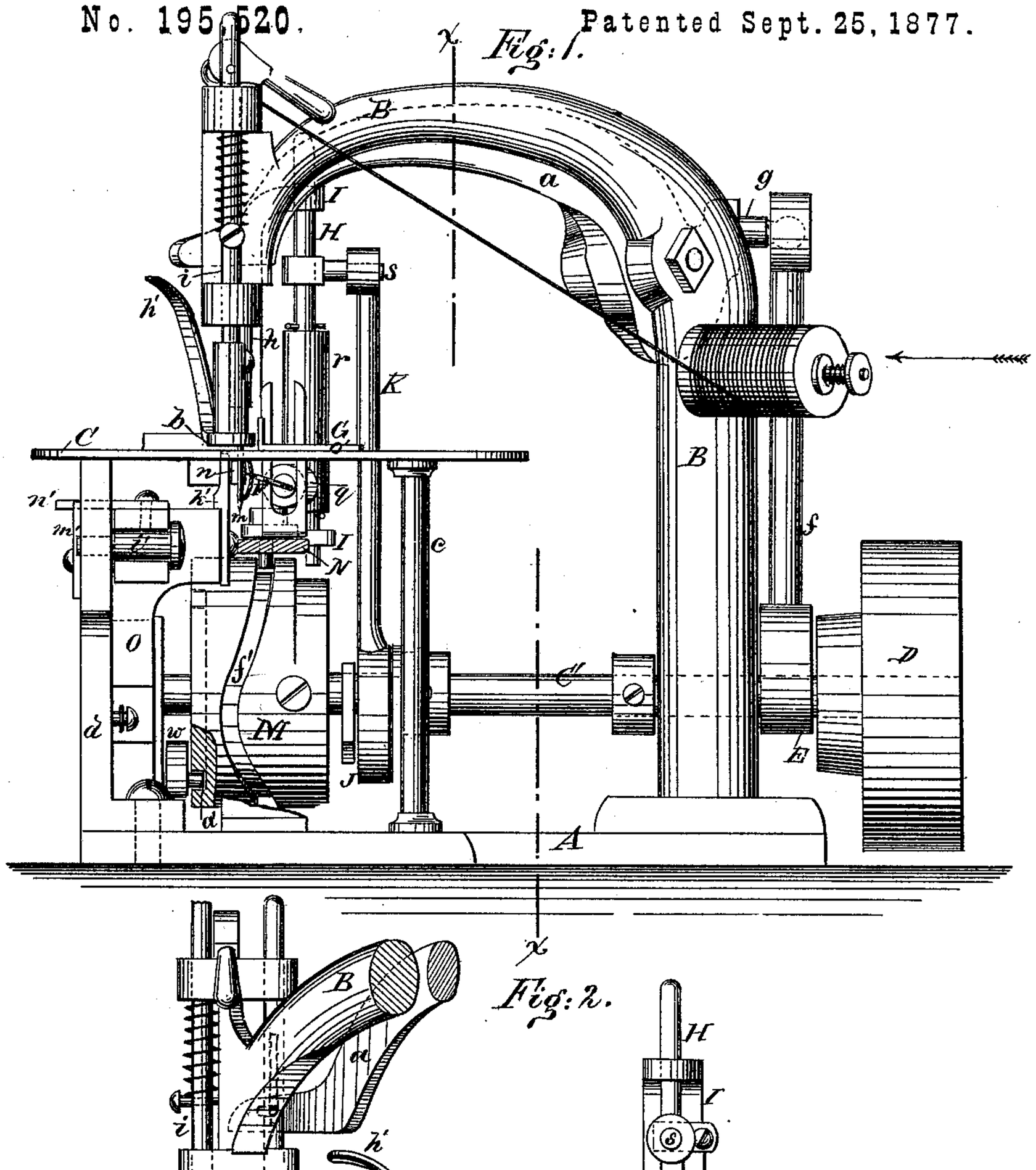

Fig: 2.

WITNESSES:

Chas. Nida.

A. F. Terry

INVENTOR:

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2 Sheets—Sheet 2.

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MACHINES FOR CROCHETING THE TOPS OF HOSIERY-GOODS.

No. 195,520. *Fig: 3.* Patented Sept. 25, 1877.

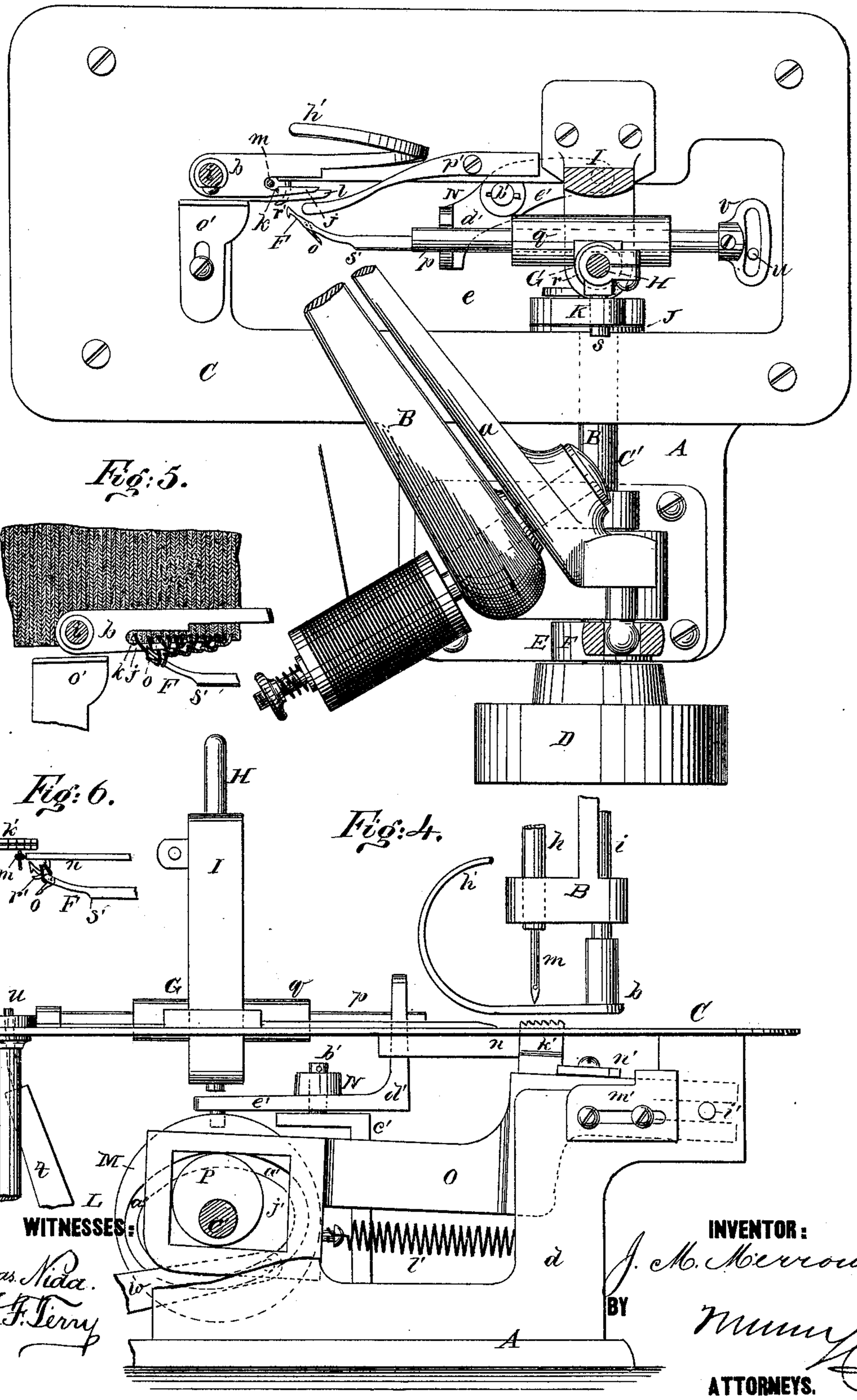

Fig: 5.

Fig: 6.

Fig: 4.

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UNITED STATES PATENT OFFICE.

JOSEPH M. MERROW, OF MERROW STATION, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR CROCHETING THE TOPS OF HOSIERY GOODS.

Specification forming part of Letters Patent No. **195,520**, dated September 25, 1877; application filed May 12, 1877.

To all whom it may concern:

Be it known that I, JOSEPH M. MERROW, of Merrow Station, in the county of Tolland and State of Connecticut, have invented a new and Improved Crochet-Machine, of which the following is a specification:

Figure 1 is a side elevation of my improved crochet-machine. Fig. 2 is a vertical section on line *x x* in Fig. 1, looking in the direction of the arrow. Fig. 3 is a plan view with portions broken away on line *y y* in Fig. 2 to show the construction more clearly. Fig. 4 is a front elevation with portions removed to show internal working parts. Fig. 5 represents the presser-foot, the crochet-hook, and the form of the stitch. Fig. 6 is a detail view of the crochet-hook, the feed, and the needle-guard.

Similar letters of reference indicate corresponding parts.

My invention relates to a machine for crocheting or overstitching the top or edge of hosiery or knit goods; and it consists in certain improvements, hereinafter described, and pointed out in the claims, upon that type of machine in which a reciprocating needle carries the yarn or thread through the goods as advanced by a feed, while a hook forms a stitch by looping the thread above and below the work-plate.

Referring to the drawings, A is the bed of the machine, to which the arm B is attached that supports the needle-arm *a*, and also the presser-foot *b*. C is the work-plate, supported above the bed A by the standard *c* and the casting *d*. In this plate an opening, *e*, is formed to permit of the required motion of the crochet-hook. A shaft, C′, which carries the cams and eccentrics for imparting motion to the several parts of the machine, is journaled in boxes formed on the standard B and in the casting *d*. Upon the shaft C′, outside of the standard B, a pulley, D, is placed, between which and the said standard, and upon the shaft, an eccentric, E, is secured, which imparts motion to the short end of the needle-arm by means of the eccentric rod *f*, the upper end of which is bored to receive the end of a stud, *g*, that projects from the needle-arm, and is provided with a spherical head. The arm B and also the needle-arm *a* are arranged diagonally across the bed A and work-plate C, at an angle of about forty-five degrees with the shaft C′. The needle-bar *h* moves vertically in guides formed on the end of the arm B, and is provided with a stud that is received by a slot in the end of the needle-arm. The presser-foot *b* is attached to a spindle, *i*, that is placed in guides on the end of the arm B. The presser-foot is forced down by a spring and raised by an eccentric, in the same manner as the presser-foot of a sewing-machine. The presser-foot is slotted from a point through which the needle descends to the end of the foot, forming a tapering finger, *j*, in which, near its base, a shallow notch, *k*, is formed. The part of the presser-foot at the side of the slot opposite the finger *j* is elongated and curved upward and backward toward the spindle *i*, and is slightly twisted, forming a horn, *h′*, as clearly shown in Figs. 3 and 4. The work-plate is provided with a finger, *l*, that projects from the side of the throat, through which the needle passes in a direction parallel with the plane of the plate and with the finger *j*. The needle *m* is carried by the needle-bar downward through the work-plate, in contact with or near a guard, *n*, whose face is more prominent than the grooved side of the needles, so that the crochet-hook—which of necessity is held loosely—may be deflected past the needle without breaking itself or the needle. This guard consists of a flat imperforate plate, arranged edgewise or at right angles to the work-plate, and in the plane of the needle. It serves, in the relation described, as a guard or fender-plate, to prevent the irregularly-moving crochet-hook from breaking the needle or itself should said hook leave its true path and strike endwise against the center of the needle, or pass behind the same.

F is a crochet-hook, which is curved toward the needle *m*, and provided with a latch, *o*, that is pivoted to the hook, and is capable of moving freely on its pivot.

The crochet-hook F is carried by a bar, *p*, that slides through the horizontal part *q* of the cross-shaped guide G, the vertical portion *r* of which is placed between collars on the rod H, that slides in a guide, I, attached to the work-plate C.

Vertical motion is imparted to the rod H by the eccentric J through the eccentric rod K, the upper end of which is pivoted to a stud, *s*, that projects from the said rod. The crochet-needle receives its vertical motion by means of this arrangement, and it is moved longitudinally by the angled lever L, whose upright arm *t* is provided with a finger, *u*, that extends upward through an arc-shaped slot in the casting *v*, that is attached to the end of the bar *p*.

The arm *w* of the lever L extends along the face of a cylinder, M, on the shaft C′, in which cylinder is cut a cam-groove, *a′*, into which a stud projects from the said arm *w*. The cam-groove *a′* is of such form as to give the bar *p* two longitudinal thrusts at every revolution of the shaft C′, one at the upper portion of the vertical stroke of the said bar and the other at the lower portion of the stroke.

An oscillating motion is imparted to the bar *p* by a lever, N, that is pivoted at *b′* to a standard, *c′*, that is attached to the bed A. The arm *d′* of this lever is bent upward at right angles, and is slotted to receive the bar *p*. The arm *e′* of the said lever is provided with a stud that is engaged by a cam-slot, *f′*, cut in the periphery of the cylinder M. This cam-slot is arranged to move the bar *p* laterally twice at every revolution of the shaft C′, and is provided with an adjustable section, *g′*, which may be moved when the cam becomes worn.

The feed is similar to the four-motion feed of sewing-machines. It consists of a bar, O, having a slot formed in one of its ends for receiving a screw, *i′*, that projects from the casting *d*, and acts as a guide for the bar. The opposite end of the bar O is provided with an opening, *j′*, for receiving the eccentric P, that is secured to the shaft C′, and gives motion to the bar. A serrated piece, *k′*, is secured to the bar O, and extends upward through a slot in the work-plate under the presser-foot *b*.

A spring, *l′*, draws the bar back after it is moved forward by the eccentric P, and the length of the stitch is governed by a gage, *m′*, that is slotted, and secured to the casting *d* by screws. A finger, *n′*, is fastened to the bar O, which strikes the gage *m′* when the said bar is retracted by the spring *l′*. A gage, *o′*, is attached to the work-plate by means of a screw, and regulates the distance of the stitches from the edge of the work.

A curved finger, *p′*, is attached to the work-plate C, and extends over the edge of the plate into the opening *e*, for the purpose of causing the crochet-hook to "knock over" with certainty.

A short horn or projection, *r′*, is placed on the face of the guard *n* over the path of the crochet-hook, for the purpose of holding back the stitches upon the crochet-hook as it is moved forward, thus insuring the opening of the latch *o*, so that it cannot pass through the loop closed and prevent the hook from taking the thread from the needle.

The operation of my invention is as follows: The fabric is placed under the presser-foot *b*, with its edge against the gage *o′*, and, the needle *m* being threaded, the machine is turned, forcing the needle through the work, carrying the thread or yarn with it. After the needle has passed the lower portion of its stroke and begins to rise, the crochet-hook F moves forward, and the latch *o* being opened, the hook passes through the slack thread or loop formed at the side of the needle, and moves laterally to tighten the thread and to bring it into position for rising. It then rises nearly simultaneously with the needle, and is moved laterally sufficiently to carry the thread around the fingers *j l*. At the same time it is drawn back away from the needle, and when the needle has reached the highest part of its stroke the crochet-hook advances, moving over the presser-foot and behind the thread, running out of the needle, which movement has the effect to force back the loop, taken below the work-plate, past the latch *o*, and to hook the thread above the work-plate. The hook then moves laterally and retreats, at the same time descending and drawing the thread through the loop which it brought up from below, said loop "knocking over" and then deflecting the latch, which, in closing upon the hook, retains the drawn-through thread to form a loop for the stitch proper, the first stitch being only a half-stitch or imperfectly-formed one. When the needle and crochet-hook reach the lower portion of the stroke, the hook advances to seize the thread below the work-plate, as before, and in so doing the latch is opened, to receive the said thread, by the projection *r′*, which forces back the loop already in the hook, and opens, but does not pass over, the latch. The hook then rises with the two loops, and moves above the work-plate. As it advances above the work-plate the two loops are forced back and over the latch *o*, deflecting the latter and passing to shoulder *s′*. The hook then takes the thread behind the needle, as before, and in retreating draws it through the two loops, which, in knocking over, close the latch upon the thread for a second stitch, the knocking over of the two loops being facilitated by the finger *p′*. This completes one perfect stitch, and the hook then, with its loop retained by the closed latch, descends to get a second loop below the work-plate preparatory to rising and seizing the thread above, and knocking over the two loops in forming the second stitch, after the manner before described. The fabric is moved forward by the feed as the needle rises and the crochet-hook retreats. The operation of forming the stitches around the fingers *j l* and over the edge of the fabric is continuously carried on as the shaft of the machine is rotated by any convenient power.

The gage *o′* guides the fabric so that the stitches are made equally distant from the edge of the work, and the horn *h′* prevents the work from coming into contact with the nee-

dle, and is more particularly designed for use in finishing small tubular goods.

The stitch, consisting of a loop from above the fabric and a loop from below the fabric, of two adjacent stitches having drawn through them a loop from the next stitch in order, is peculiar to this machine, and forms an elastic and ornamental finish for the edge of the work. This stitch is also adapted to joining or over-seaming the edges of work, forming a strong seam, which is fully as elastic as the goods in which it is made.

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

1. The bar *p*, arranged in guides permitting a longitudinal movement, and having a crochet-hook and a transversely-slotted head, *v*, in combination with the lever L, having an arm arranged in the slotted head *v*, and the lever N, arranged to oscillate the crochet-hook in a plane at right angles to the plane of oscillation of lever L, together with the actuating cam-cylinder M, substantially as and for the purpose described.

2. The combination, with the bar *p*, bearing the crochet-hook, of the bearing or guide G, having the right-angular tubular parts *q* and *r*, the bar H, and guide I, for supporting and controlling the movement of the crochet-hook, substantially as and for the purpose described.

3. The bearing or guide G, consisting of the right-angular portions *q* and *r*, combined with the bar *p*, carrying crochet-hook, the bar H, the guide I, levers L N, cam-cylinder M, eccentric J, and connecting-rod K, substantially as and for the purpose described.

4. The combination of the angled and slotted lever N, the rod *p*, bearing crochet-hook, and the cam-cylinder having cam-slot *f'*, substantially as and for the purpose described.

5. The presser-foot provided with the curved horn *h'*, for the purpose herein described.

6. The work-plate C, provided with finger *l* in the same plane, in combination with the presser-foot having finger *j* arranged in its plane, for the purpose of clamping the work and yet permitting the stitches formed around said finger to be fed out from the looping-point, as described.

7. The guard *n*, provided with projection *r'*, in combination with the crochet-hook, for the purpose described.

8. The plate C, having finger *p'*, combined with the crochet-hook, to facilitate the knocking over, as described.

9. The guard *n*, consisting of an imperforate plate arranged below the work-plate in the plane of the needle, and with its edge adjacent to the same, in combination with the said needle and the irregularly-moving crochet-hook, for the purpose described.

JOSEPH M. MERROW.

Witnesses:

C. SEDGWICK,

ALEX. F. ROBERTS.