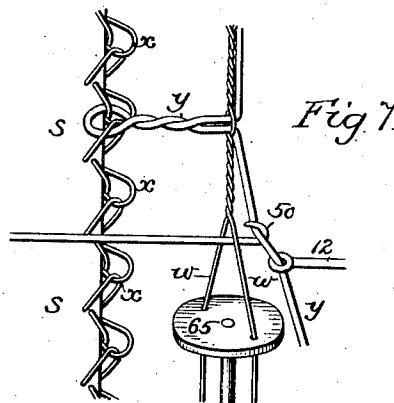
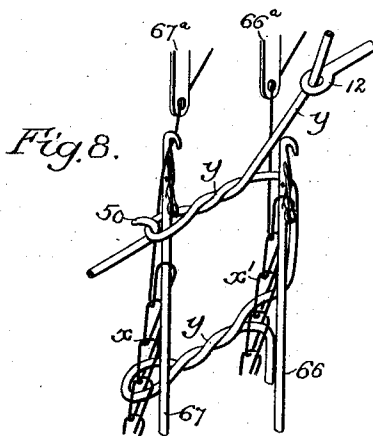
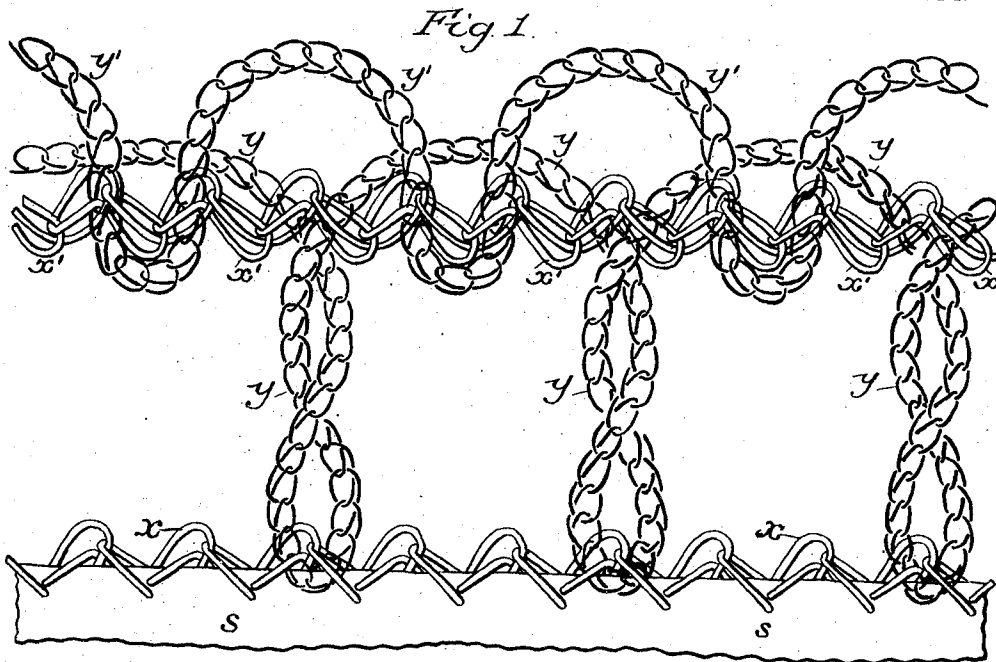


L. N. D. WILLIAMS.
MACHINE FOR BORDERING FABRICS.
APPLICATION FILED AUG. 22, 1908.

1,025,176.

Patented May 7, 1912.

5 SHEETS—SHEET 1.



Witnesses
Harry L. Smith
Kamilton D. Turner

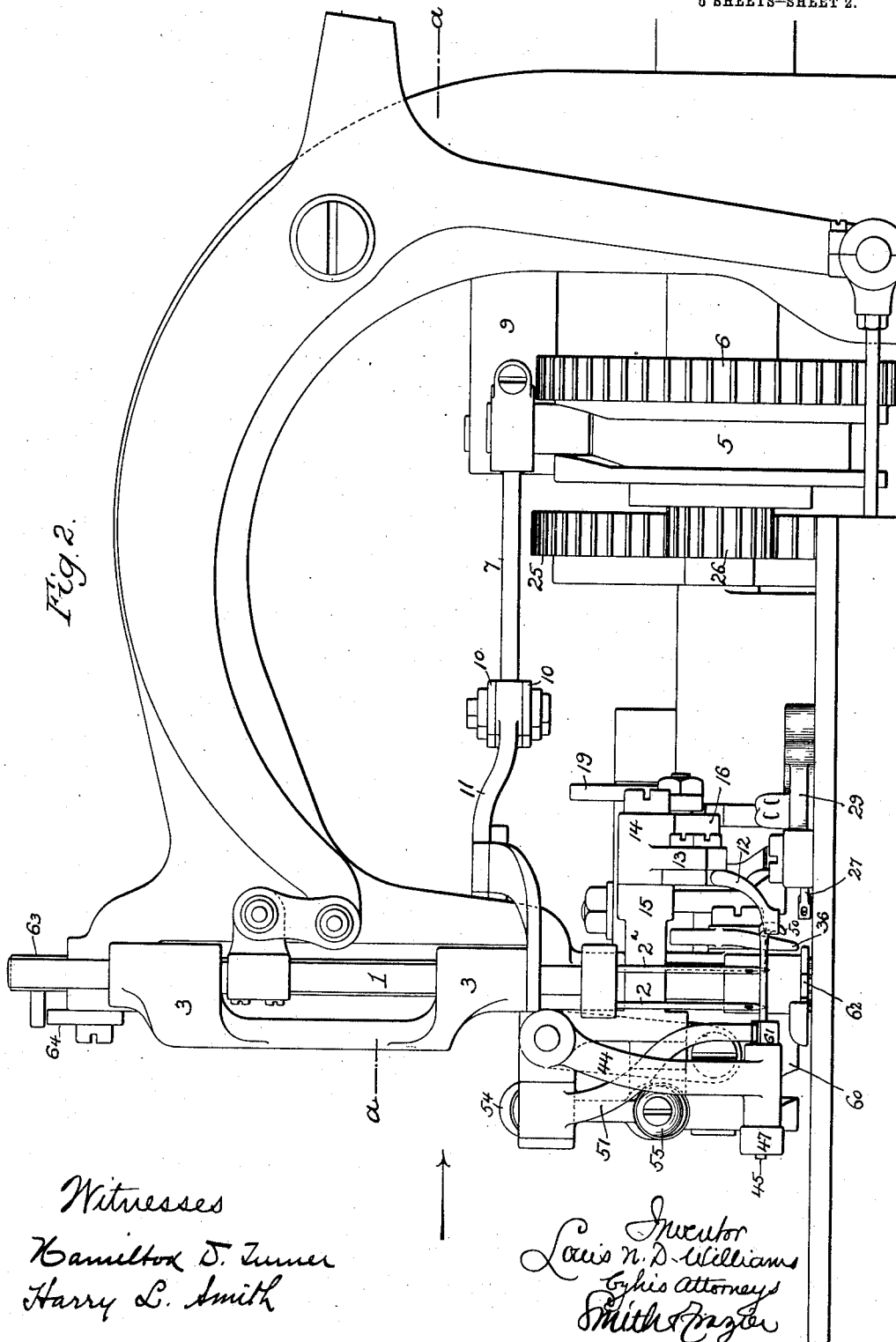
Inventor
Louis N. D. Williams
by his Attorneys
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5 SHEETS-SHEET 2.

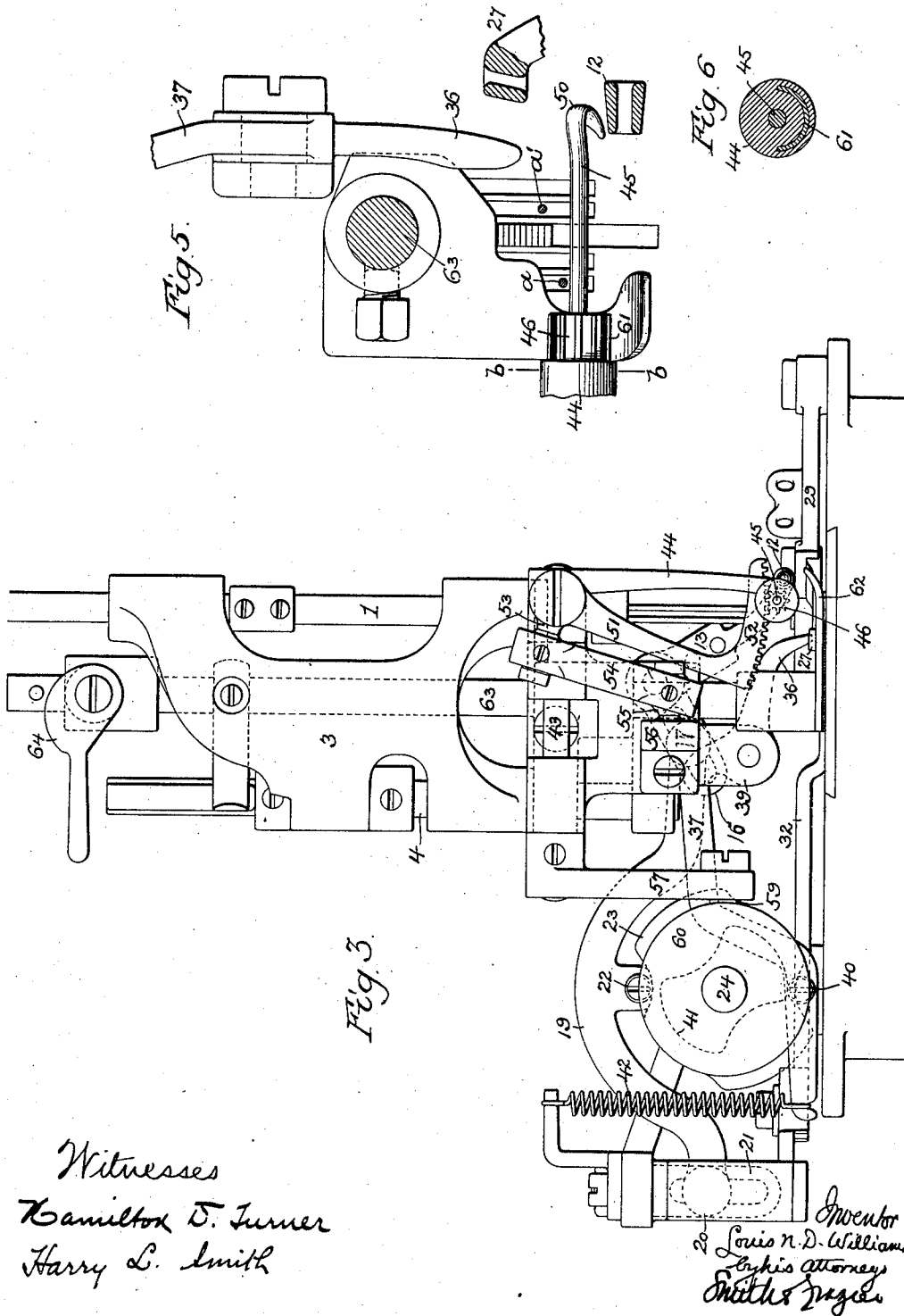


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5 SHEETS—SHEET 3.



Witnesses
Hamilton D. Turner
Harry L. Smith

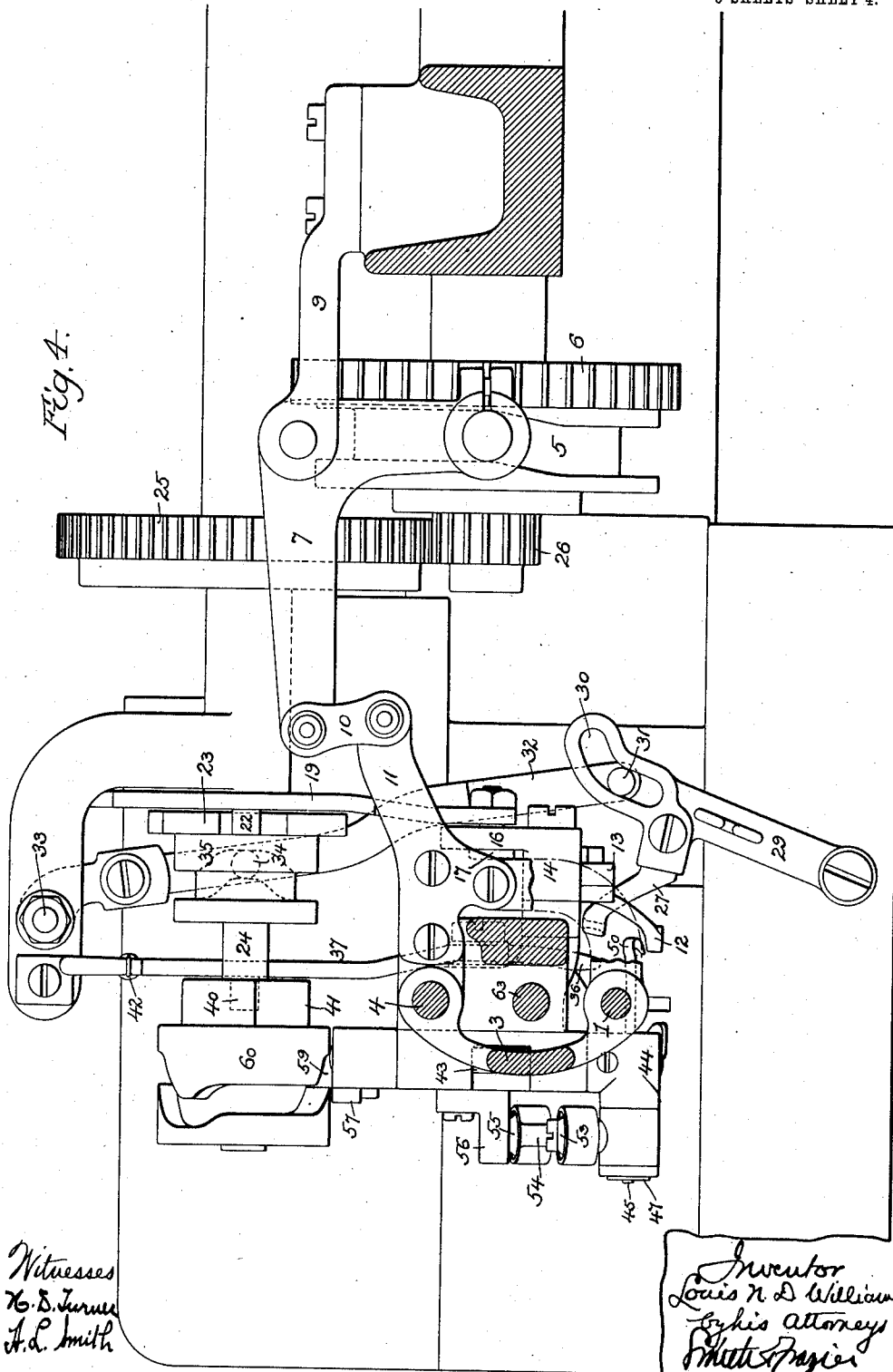
Inventor
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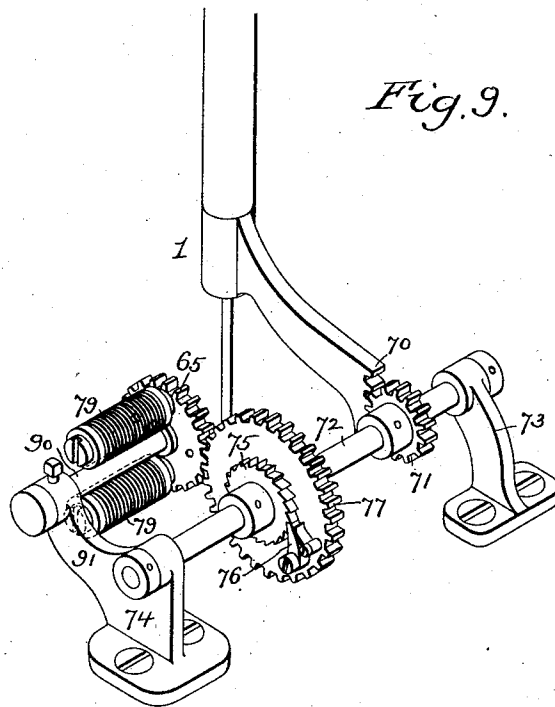
6 SHEETS-SHEET 4.



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Patented May 7, 1912.
5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

LOUIS N. D. WILLIAMS, OF OGONTZ, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO SCOTT & WILLIAMS, INCORPORATED, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR BORDERING FABRICS.

1,025,176.

Specification of Letters Patent.

Patented May 7, 1912.

Application filed August 22, 1908. Serial No. 449,781.

To all whom it may concern:

Be it known that I, LOUIS N. D. WILLIAMS, a citizen of the United States, residing in Ogontz, Montgomery county, Pennsylvania, have invented certain Improvements in Machines for Bordering Fabrics, of which the following is a specification.

My invention consists of a machine for producing a trimming in imitation of a hand crocheted trimming either directly upon or for subsequent application to the edge of a piece of fabric such, for instance, as the knitted fabric of which underwear is composed. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is an exaggerated view of a piece of fabric with trimming such as that for whose production my machine has been designed; Fig. 2 is a side elevation of sufficient of the machine to illustrate those parts of the same to which my invention refers; Fig. 3 is an end view of the machine, looking in the direction of the arrow, Fig. 2; Fig. 4 is a horizontal section of the machine on the line *a—*a**, Fig. 2, but omitting the needle arm; Fig. 5 is an enlarged view of certain parts of the machine, partly in top or plan view and partly in horizontal section; Fig. 6 is an enlarged transverse section of part of the machine on the line *b—*b**, Fig. 5, and Figs. 7, 8 and 9 are views illustrating certain modified forms of the trimming and the essential elements of the machines for producing the same.

The machine shown in Figs. 1 to 5 is one of that type in which the vertically reciprocating needle bar 1 is provided with spaced needles 2 and 2^a for producing two parallel lines of stitches. The needles cooperate with looper or shuttle mechanism beneath the bed of the machine in the usual manner, but, as the latter mechanism forms no part of my invention and may be of any ordinary type, it has not been considered necessary to illustrate it.

My invention is shown in connection with a machine in which the needle bar 1 is reciprocated vertically in a laterally swinging frame 3, the rocking of said frame between the formation of successive stitches causing said stitches to follow a zigzag line, although my invention is not limited to a

machine of this type but may be applied as well to a machine constructed for the production of straight lines of stitches.

The rocking frame 3 is pivotally mounted upon a vertical stud or pin 4 (Figs. 3 and 4) and is rocked by mechanism of the usual character, such mechanism, in the machine shown in the drawing, consisting of a cam 5, free to rotate on a suitable horizontal pin or stud on the frame of the machine, and driven by means of a spur wheel 6 from a small spur pinion (not shown) on the shaft of the machine, the cam serving to actuate a bell crank lever 7 which is pivotally mounted upon a bracket 9 on the main frame and is connected by links 10 to a bracket 11 secured to the rocking frame 3, as shown in Fig. 4.

The fabric is so fed in respect to the needles 2 and 2^a of the machine that the needle 2 forms a row of stitches upon or adjacent to the edge of the fabric, while the other needle 2^a forms its row of stitches beyond said edge, the machine shown in the drawing being designed to produce a line of zigzag or over-edge stitches *x* on the fabric *s*, and an outer line of stitches *x'* beyond the edge of said fabric, the two lines of stitches being connected by a thread *y*, preferably consisting of enchainé stitches, which is laid back and forth between the two lines of stitches *x* *x'*, is engaged by each of said lines of stitches, and is twisted in its passage from one to the other, so as to form a twisted bar between them, as shown in Fig. 1, the outer line of stitches *x'* being also engaged by a thread *y'* which forms loops or festoons beyond said outer line of stitches, as also shown in Fig. 1.

The main object of my invention is to provide the machine with devices for applying to the sewing or stitch-forming mechanism of the machine the barring and festooning threads *y* and *y'*. The guide eye for the barring thread is formed in an arm 12 which is secured to one arm 13 of a lever 14 pivotally mounted upon a stud 15 on the fixed frame but having another arm 16 which is engaged by a pin or stud 17 projecting from the forward end of an arm 19, the latter being pivotally mounted at its rear end by means of a stud 20 in a slotted bracket 21 (Fig. 3) at the back of the machine. The

arm 19 carries an anti-friction roller 22, which is engaged by a cam disk 23 on a shaft 24 mounted in suitable bearings at the back of the bed plate and rotated by means of a spur wheel 25, which meshes with a spur pinion 26 secured to the face of the cam 5, as shown in Figs. 2 and 4, whereby, as the cam disk 23 is rotated, rocking movement will be imparted to the arm 19 and thence to the lever 14 to cause the guide eye for the barring thread to travel in an arc of a circle about the axis of said lever 14.

The guide eye for the festooning thread is formed in an arm 27 projecting from a lever 29, which is pivoted to the front of the bed plate, as shown in Fig. 4, and has a cam slot 30 for the reception of a pin or stud 31 on a lever 32, the latter being pivotally mounted upon a stud 33 at the back end of the machine and having a pin or stud 34, which enters a groove in a cam disk 35 upon the shaft 24, whereby rocking movement is imparted to the levers 32 and 29, and the thread-guiding arm 27 is caused to lay the festooning thread alternately in the path of the needle 2^a and beyond the path of the same. When in the latter position the festooning thread is engaged by a loop-forming finger 36, which forms part of a lever 37 pivotally mounted upon the bracket 39 on the fixed frame and having a stud, pin or roller 40, which is acted upon by a cam 41 upon the shaft 24 and is maintained in contact therewith by means of a coiled spring 42 acting upon the rear end of the lever 37, as shown in Fig. 3. When the thread-guiding arm 27 is in position to lay its festooning thread in the path of the needle 2^a, the finger 36 is raised, but when the arm 27 is moved outward, after engagement of the festooning thread by the needle, the finger 36 is permitted to descend in front of said thread and retains the same when the arm 27 again moves inward to engage its thread with the needle, thereby forming a loop or festoon of said thread outwardly beyond the line of stitches produced by the needle.

Mounted so as to be free to rock in bearings on the fixed frame of the machine is a rock shaft 43, which is provided, at its forward end with a depending arm 44, this arm having at its lower end a bearing for a spindle 45 which is provided with a spur pinion 46 and is confined longitudinally to its bearing by means of a collar 47, the forward end of the spindle projecting beyond the pinion 46 and being bent at the outer end so as to form a hook 50, as shown in Figs. 2, 4 and 5.

Pivotally mounted upon the hub of the arm 44 so as to swing in a plane transverse to the plane of movement of said arm is a lever 51, whose depending arm terminates in a toothed sector 52, which is in mesh with the pinion 46 of the hook spindle, as

shown in Fig. 3. The lever 51 has another arm 53, connected, by means of a ball-and-socket joint, with the upper end of a link 54, whose lower end is likewise connected, by means of a ball-and-socket joint, to a stud 55 projecting from a bracket 56 on the fixed frame, as shown in Fig. 3, the result of this construction being that, as the arm 44 swings in order to advance and retract the hook spindle 45, the lever 51 will also be caused to swing in a plane transverse to that of the arm 44, and rotating movement, first in one direction and then in the opposite direction, will be imparted to the hooked spindle 45 because of the engagement of the spur pinion 46 thereon with the toothed sector 52. The rock shaft 43 has, at its rear end, an arm 57 with projecting stud, pin or roller 59, the latter engaging a groove in a cam disk 60 secured to the shaft 24, as shown in Fig. 4, whereby, as said shaft 24 is rotated, rocking movement will be imparted to the shaft 43 and to the parts carried thereby. When the hooked spindle 45 is projected, the thread-guiding eye at the end of the arm 12 will be raised so that the barring thread, in its passage from the needle 2^a to said guide eye, will be caused to engage with the hook 50, the guide eye remaining in this position until the hook has been retracted so as to draw a loop of the barring thread over into position for engagement with the opposite needle 2, the loop, by reason of the rotation of the hooked spindle 45, being twisted as it is drawn forward and the outward movement of the spindle terminating at such point that the bight at the outer end of this loop will be laid in position for engagement by the needle 2. The hook 50 remains in the retracted position until the barring thread has been again engaged by a stitch formed by the needle 2^a, the guide arm 12 having meantime been moved downward and inward in order to lay its thread in position for such engagement, after which the guide arm 12 is moved to carry the thread *y* outwardly beyond the line of stitches formed by the needle 2^a, where it remains during the formation of any desired number of stitches by the latter needle, whereupon the operations are repeated, and another twisted barring thread is formed and engaged by stitches of the needle 2.

In order to prevent the spur wheel 46 on the hook spindle from engaging and entangling any of the threads the underside of said spur wheel is preferably guarded by a segmental shield 61, which is preferably driven into an opening in the end of the spindle bearing on the arm 44, and is retained in position by frictional contact with the wall of said opening, (see Fig. 6). The presser foot 62 is carried by a presser bar 63, guided vertically in the fixed frame of the

machine and raised by means of a cam lever 64 pivotally mounted upon a member of said fixed frame, as shown in Fig. 3.

Although I prefer to embody my invention in a machine of the character described, many modifications of the invention are possible and in Figs. 7 and 8 I have illustrated two modifications as examples.

In the device shown in Fig. 7, twisted threads or cords *w* take the place of the outer row of stitches *x'*, these threads being controlled by a disk 65 to which rotative movement may be imparted from the arm 44 or in any other convenient manner.

In Fig. 9 I have illustrated one combination of mechanism whereby the disk 65 may be rotated from the reciprocating needle bar 1, which in this case will reciprocate in fixed bearings. The needle bar carries a rack 70 which meshes with a pinion 71 secured to a shaft 72, the latter being free to turn in bearings 73 and 74 on the bed plate. Secured to this shaft 72 is a ratchet wheel 75 with which engages a spring-actuated pawl 76 on a spur wheel 77 mounted so as to turn on the shaft 72 and meshing with teeth on the periphery of the disk 65. The latter carries the thread supplying bobbins 79 and is free to turn on a shaft 90 which is secured to a support 91 projecting from the bearing 74. When the shaft 72 turns in one direction its movement will be transmitted through the ratchet wheel 75 and pawl 76 to the spur wheel 77 and thence to the disk 65, no movement in the opposite direction being transmitted, owing to the slipping of the ratchet wheel under the pawl so that the disk 65 will always be turned in the same direction.

The term "stitches" as used in my claims in connection with the retention of the outer portions of the barring threads *y* is therefore to be construed broadly enough to cover this modification.

While I prefer in all cases to attach the trimming to the fabric at the same time that said trimming is being produced, the machine shown in Figs. 1 to 4 is equally applicable for the production of a trimming to be afterward secured to the fabric, and some features of my invention may also be used in machines of a different type, for instance in Fig. 8, I have shown the essential parts of a knitting machine for making fabric trimming in accordance with my invention, 66 and 67 representing two reciprocating knitting needles, and 66^a and 67^a yarn guides coöperating therewith to effect the production of two separated chains of stitches *x* and *x'*, with which the barring thread *y* is engaged by means of a hook 50, which may be similar to and operated in the same manner as its counterpart in the machine shown in Figs. 1 to 4, so as to twist the loop of barring thread at the same time that it is

drawing the same from one row of stitches to the other, the final position of the hook being such that the needle 67 can pass through the loop of barring thread when said needle is being projected to slip its stitch back of the latch and engage the knitting yarn for a fresh stitch.

As illustrating the general type of machine shown in Fig. 8, I may refer to Letters Patent No. 21,396, dated Aug. 31, 1858, and No. 209,786, dated Nov. 12, 1878, which are examples of machines of the transverse warp type.

I claim:

1. The combination, in a machine for the production of trimming for fabrics, of means for producing two separated rows of stitches, means for engaging a barring thread with one of said rows of stitches and means for forming and twisting a loop of said barring thread and engaging it with the other row of stitches.

2. The combination, in a machine for the production of trimming for fabrics, of means for producing two separated rows of stitches, and for engaging one of said rows of stitches with the fabric, means for engaging a barring thread with the row of stitches which is beyond the fabric, and means for forming and twisting a loop of said barring thread, and engaging it with the row of stitches which engages the fabric.

3. The combination of mechanism for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a hook for drawing a loop of said thread into position for engagement with the other row of stitches, and means for rotating said hook so as to twist the loop between its points of connection with the two rows of stitches.

4. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a hook for engaging said barring thread, and means for simultaneously retracting and rotating said hook to produce a twisted loop extending from one row of stitches to the other.

5. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a hook for engaging said barring thread and drawing a loop of the same to the other row of stitches, means for rotating said hook so as to twist said loop, and means for vibrating the barring thread guide so as to cause it to lay its thread in the path of the hook.

6. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a rotatable hook for engaging said barring thread and drawing a loop of the same between the two rows of

stitches, and means for rotating said hook, said means comprising a spur pinion on the hook spindle and a toothed sector engaging said spur wheel and swinging in a plane 5 transverse to the direction of movement of the hook.

7. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of 10 said rows of stitches, a rotatable hook for engaging said thread and drawing a loop of the same from one row of stitches to the other, a swinging carrier for said hook, and rotating mechanism for the hook mounted 15 on said swinging carrier.

8. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a rotatable hook for 20 engaging said thread and drawing a loop of the same from one row of stitches to the other, a hook spindle, a swinging carrier therefor, a lever mounted on said carrier, to swing in a plane transverse to the plane 25 of movement of the carrier, connections between said lever and the hook spindle, and a connection between the lever and a fixed point, whereby swinging movement of the carrier will cause the lever to swing thereon.

9. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a rotatable hook for engaging said thread and drawing a loop 35 of the same from one row of stitches to the other, a hook spindle having a spur pinion thereon, a swinging carrier for said hook spindle, a lever mounted on said carrier so as to swing in a plane transverse to the plane 40 of movement of the carrier, a toothed sector on said lever engaging the spur wheel on the hook spindle, and a connection between said lever and a fixed point, whereby the swinging of the hook carrier will cause swinging 45 movement of the lever on said carrier.

10. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a rotatable hook for 50 engaging said thread and drawing a loop

of the same from one row of stitches to the other, a hook spindle, a swinging carrier therefor, a lever mounted on said carrier to swing in a plane transverse to the plane of movement of the carrier, connections between said lever and the hook spindle, and a connection between the lever and a fixed point, said connection having universal joints.

11. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a rotatable hook for engaging said thread and drawing a loop of the same from one row of stitches to the 65 other, a hook spindle having a spur wheel thereon, a swinging carrier for said hook spindle, a lever mounted on said carrier so as to swing in a plane transverse to the plane of movement of the carrier, a toothed 70 sector on said lever engaging the spur wheel on the hook spindle, and a connection between said lever and a fixed point, said connection having universal joints.

12. The combination of means for producing two separated rows of stitches, a guide for engaging a barring thread with one of said rows of stitches, a hook for engaging said thread and drawing a loop of the same 80 between the two rows of stitches, a lever having one arm carrying said guide, and another arm having a slot therein, an arm having a projection for entering said slot, and means for vibrating the latter arm.

13. The combination of means for producing two separated rows of stitches, a feeder for engaging a barring thread with one of said rows of stitches, a hook for drawing a loop of said thread between the two rows of stitches, rotating mechanism for said hook 90 having as an element a spur pinion on the hook spindle, and a segmental guard for said pinion secured to the hook carrier.

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

LOUIS N. D. WILLIAMS.

Witnesses:

HAMILTON D. TURNER,
KATE A. BEADLE.