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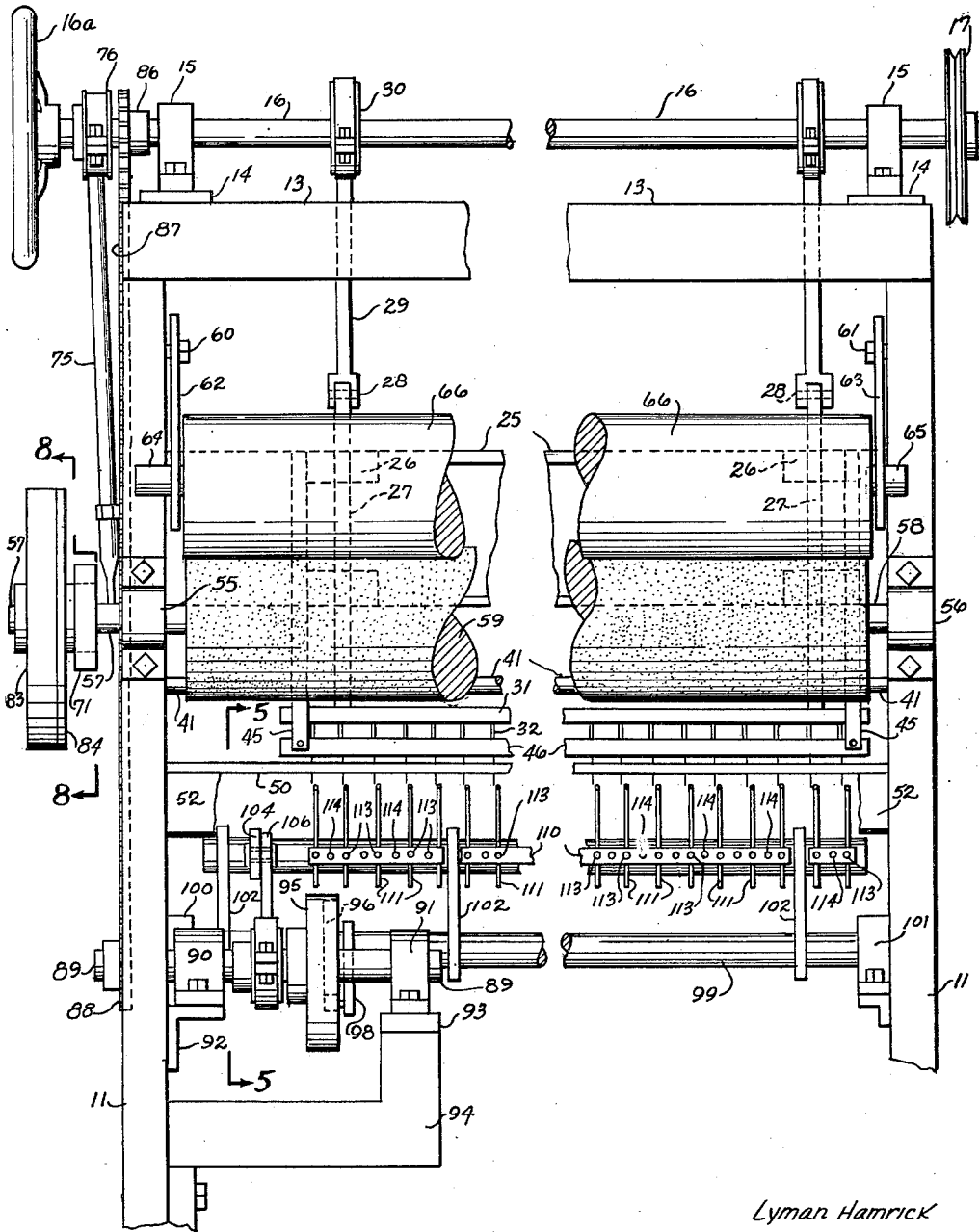
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2,411,268

MULTIPLE NEEDLE LOOPING MACHINE

Filed Aug. 4, 1944

5 Sheets-Sheet 1



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Fig-1

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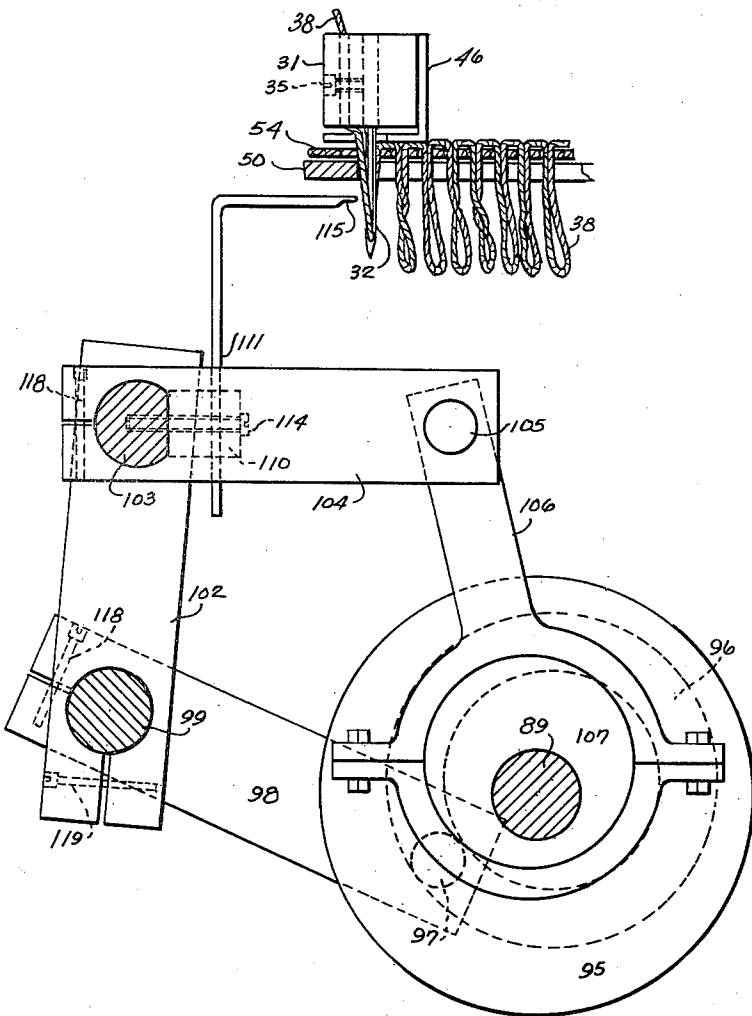


Fig-5

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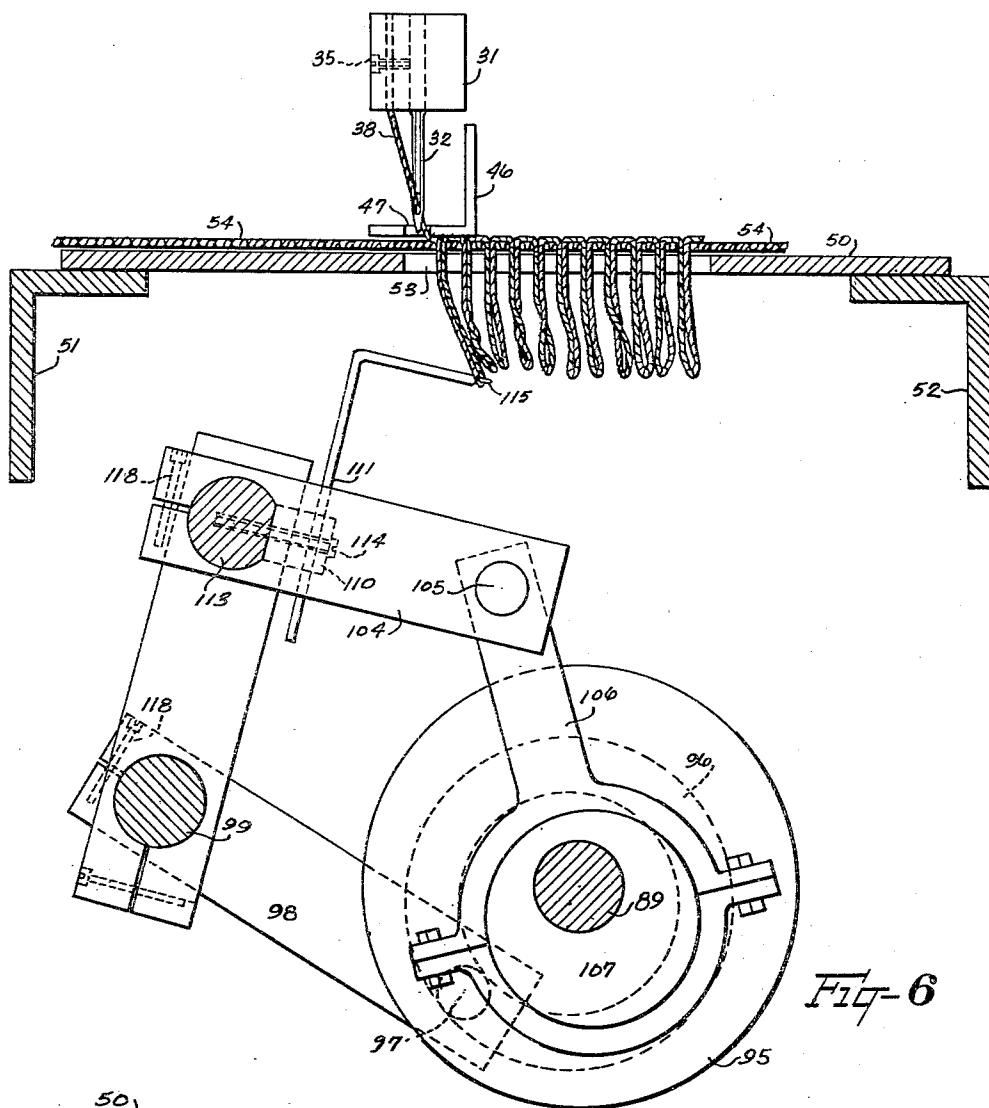


Fig-6

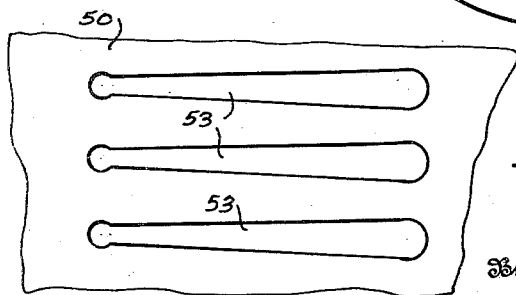


Fig-7

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MULTIPLE NEEDLE LOOPING MACHINE

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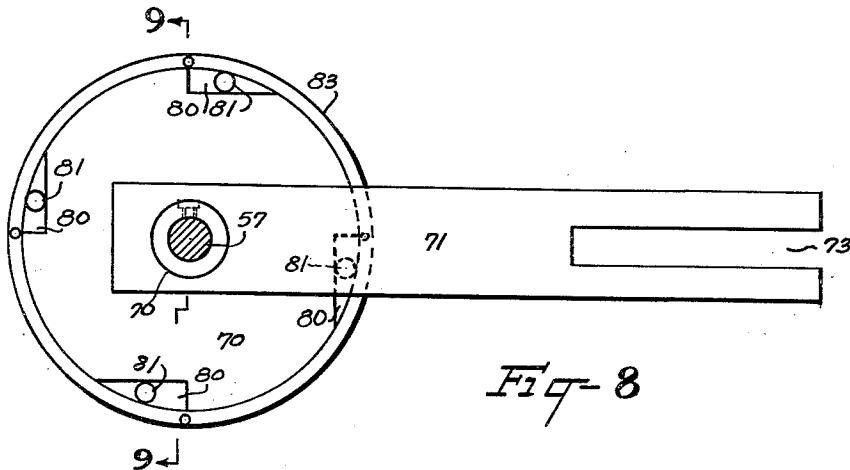


Fig- 8

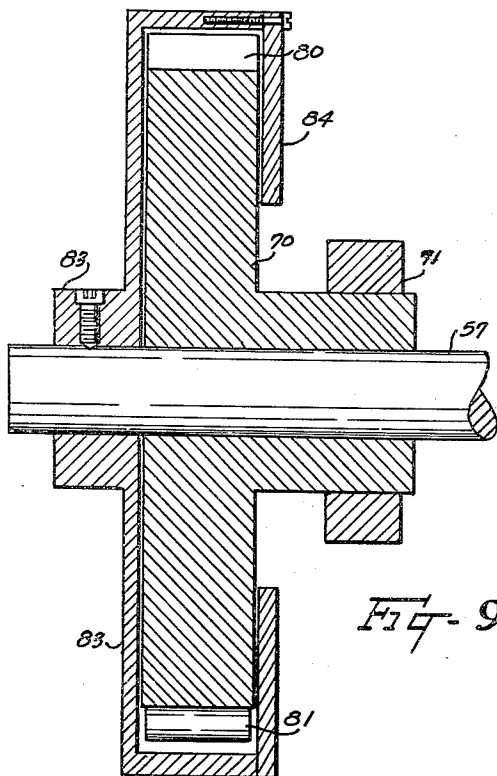


Fig- 9

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UNITED STATES PATENT OFFICE

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MULTIPLE NEEDLE LOOPING MACHINE

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5 Claims. (Cl. 112-79)

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This invention relates to a multiple needle looping machine having means for pulling the fabric through the machine with a needle bar provided with a plurality of needles for piercing the fabric and carrying a strand therethrough and having a plurality of loopers or one looper for each needle adapted to engage the strand after the strand has been carried through the fabric by the needle and having means for not only oscillating the loopers in a back and forth manner, but also giving further oscillation to the loopers when they have engaged the strands to thereby lengthen the loops to a greater degree than if only the first oscillation mentioned were imparted to the looper shaft.

It is an object of this invention to provide a multiple needle looping machine having a needle bar provided with a plurality of needles for piercing a fabric and having a looper shaft provided with a plurality of loopers with means connecting the looper shaft to an oscillating shaft and means for oscillating the second-named shaft to pass the loopers between the strand and the needle when the needle is in lowered position, and also having other means for imparting oscillation to the looper shaft after its loopers have engaged the strands on associated needles to pull the points of the loopers further downwardly away from the fabric to thus form greatly increased lengths of loops on the lower surface of the fabric.

It is another object of this invention to provide a multiple needle looping machine having a unitary needle bar provided with a plurality of needles for piercing the fabric with an intermittently movable feed roll for drawing the fabric past the needles and a plurality of loopers disposed below the fabric and adapted to engage the strands carried by the needles through the fabric for forming loops on the lower surface of the fabric together with means for imparting additional oscillation to the loopers to greatly lengthen the loops being formed on the lower surface of the fabric.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which:

Figure 1 is a rear elevation of the machine with the central portion thereof broken away, and with the bottom portion of the framework broken away;

Figure 2 is an end elevation looking at the left-hand side of Figure 1;

Figure 3 is an enlarged top plan view of a portion of the needle bar;

Figure 4 is a front elevation of a portion of the needle bar;

Figure 5 is a vertical cross-sectional view on

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an enlarged scale, and taken along the line 5-5 in Figure 1;

Figure 6 is a view similar to Figure 5, but showing the looper in a different position;

Figure 7 is a top plan view of a portion of the bed plate;

Figure 8 is an elevation of the clutch arrangement for driving the feed roll with the annular member removed, and taken along the line 8-8 in Figure 1;

Figure 9 is a vertical sectional view through the clutch arrangement shown in Figure 8, and taken along the line 9-9 in Figure 8.

Referring more specifically to the drawings, the numeral 10 indicates front upright frame members while 11 indicates the rear upright frame members. The reference character 12 indicates a transverse upper front frame angle member, while reference character 13 indicates the rear horizontal angle member.

The upper ends of the vertical members 10 and 11 are joined together by means of angle members 9, and on these angle members 9, the horizontal front and rear angle members 12 and 13 are disposed.

These angle members 12 and 13 have spanning the distance therebetween a plurality of bars 14 on which a plurality of bearings 15 are mounted and in which bearings an upper drive shaft 16 is mounted for rotation. Shaft 16 has a hand wheel 16a thereon on one end thereof so that the machine can be turned over slowly by hand for adjustment purposes. The shaft 16 is driven by any suitable means such as a pulley 17 having a belt 18 mounted thereon which is also mounted on a pulley 19 fixed on a motor shaft 20 of an electric motor 21 suitably supported in a manner not shown.

Spanning the distance between the rear upright frame members 11 is a channel member 25 having fixed thereon a plurality of sets of bearings 26 in which are mounted for vertical reciprocation a plurality of rods 27 whose upper ends are pivotally connected as at 28 to an eccentric arm 29 which encircles an eccentric portion 30 fixed on the shaft 16.

To the lower ends of the bars 27, there is secured a needle bar 31 having a plurality of spaced needles 32 projecting from the lower surface thereof. These needles 32 are mounted in vertically disposed holes 34 and are fixed in position by means of set screws 35. The needle bar also has a plurality of vertically disposed holes 37, there being a hole 37 for each needle, through which the strands of yarn 38 are led from suitable packages, not shown.

For guiding the strands of yarn, there is an angle bar 40 fixed to the front surface of upper horizontal angle bar 12 and having a plurality of holes therethrough, through which the strands

of yarn 38 are passed for guiding the same and keeping the strands of yarn separated from each other.

Disposed between the front vertical frame members 10 is a horizontally disposed rod 41 beneath which the strands of yarn 38 are guided on their way to the vertically disposed holes 37 in the needle bar 31.

The channel member 25 has fixed thereto downwardly projecting strap members 45 to the lower end of which is fixed an angle bar 46 having a plurality of holes 47 therethrough for passage of the needles and the yarn carried thereby. This angle bar 46 is adapted to serve as a presser foot or presser bar for pressing a fabric 54 against a bedplate 50 which is mounted on two horizontally disposed intermediate angle bars 51 and 52. This bed plate 50 has a plurality of elongated slots 53 therein, the front end of which is adapted to allow passage of the needles through the fabric 54 resting on the bed plate 50, and these slots 53 increase in width as they progress rearwardly to allow room for the passage of the loops formed by the loopers rearwardly and out over the rear ends of these slots as the fabric 54 progresses through the machine.

Mounted in suitable bearings 55 and 56 are stub shafts 57 and 58 respectively, which are fixed in the ends of a take-up sand roll 59 which has a roughened or abrasive surface thereon, which may be a covering of perforated material, or any suitable friction covering such as is present on sand rolls in looms.

Pivotally mounted as at 60 and 61 on the rear frame members 11 are links 62 and 63 in the free ends of which are mounted stub shafts 64 and 65 which are embedded in and fixed to a weight roll 66 which is adapted to rest on the roughened roll 59, and between which the cloth 54 is adapted to pass as shown in Figure 2.

Intermittent motion is given to the take-up roll 59 by means of a free wheeling clutch arrangement fixed on the stub shaft 57. This comprises a member 70 rotatably mounted on stub shaft 57 and having a lever arm 71 fixed thereto which projects forwardly of the machine and is slotted as at 73 in which is adjustably mounted by means of a bolt 74 the lower end of a link 75, the upper end of which has a bearing which encircles an eccentric 76 fixedly mounted on shaft 16. This imparts up and down motion to the free end of lever 71 and thus oscillates the member 70 back and forth on the stub shaft 57.

The periphery of member 70 has a plurality of tapering notches 80 therein in which rollers 81 are mounted. Fixedly mounted on stub shaft 57 is a cup-shaped member 83 whose periphery is adapted to encircle the member 70. An annular member 84 is fixed over the open end of the cup-shaped member 83 to confine the member 70 against endwise movement on the stub shaft 57 and to confine the rollers 81 in the notches 80.

It is thus seen that as the lever 71 moves downwardly, the rollers 81 will roll back into the larger portion of the notches 80 and will have no tendency to move the cup-shaped member 83; whereas, upon upward movement of the free end of lever 71, the rollers 81 will move into the narrow or converging end of the notches 80 and will be wedged between the wall of the notches and the peripheral portion of the member 83 and will therefore impart a step by step rotation to the take-up roll 59. This movement of the shaft 57 and the take-up roll 59 occurs while the needle is moving upwardly out of the fabric and downwardly to

pierce the fabric so as to move the fabric a sufficient amount to allow the needles to penetrate the fabric again to form new loops from the yarn carried by the needles. The distance apart of the loops is regulated by the point of adjustment of bolt 74 in slot 73.

Fixed on shaft 16 is a sprocket wheel 86 on which is mounted a sprocket chain 87 which extends downwardly and is mounted on a sprocket wheel 88 fixed on shaft 89. This shaft 89 is mounted in bearings 90 and 91 disposed on angle bar 92 and bar 93 respectively supported at their ends by suitable brackets 94 secured to the front and rear upright frame members 10 and 11.

Mounted on the shaft 89 is a closed cam wheel 95 having a closed cam track 96 therein in which a pin 97 fixed on one end of arm 98 is adapted to be confined to impart oscillation to lever arm 98. This lever arm 98 is fixedly secured on an oscillating shaft 99 which is mounted in suitable bearings 100 and 101 at its ends.

Fixed on shaft 99 is a plurality of upright members 102 in the upper ends of which is mounted for oscillation a looper shaft 103. Members 102 are split at their lower ends and are adapted to clampingly engage shaft 99 by means of a bolt 109 so as to angularly and longitudinally adjust these members relative to shaft 99. This looper shaft 103 has fixed thereon a lever arm 104 which is pivotally connected as at 105 to an eccentric arm 106 which encircles an eccentric 107 fixed on shaft 89.

To the rear surface of looper shaft 103 as viewed from standing in front of the machine, there is fixed in sections a looper carrying bar 110 having adjustably mounted therein a plurality of loopers 111, these loopers being vertically adjustable by means of suitable set screws 113 and the sections of the looper bar 110 being secured to the looper shaft 103 by means of a plurality of bolts 114. It is to be noted that the front or pointed portion of each looper has a shoulder 115 which is adapted to engage the strand as the extreme pointed portion of the looper passes between the strand and the needle as it moves to lowered position, and this shoulder prevents the loops from travelling further back on the looper as shown in Figure 6.

With the parts in the position shown in Figure 5, as the needle starts its upward movement, the closed channel 96 in cam wheel 95 oscillates arm 98, which oscillates the shaft 99 to move the looper point in between the yarn carried by the needle and the needle itself, and immediately above the needle eye, and thus prevents the yarn from being withdrawn from the fabric on the upward travel of the needle. At the same time, after the looper has passed in between the needle and the yarn to cause the yarn to impinge against its shoulder 115, the eccentric 107 causes downward movement of arm 104 to also oscillate shaft 103 to the position shown in Figure 6 to thus draw out the loops to a much greater length than would be the case were not this double oscillation given to the shafts 99 and 103 respectively.

The vertical posts 10 and 11 rest on a base member 120, which with frame members 121, 122, and 123, form a support for a shaft 124 on which a roll of the cloth 54 is adapted to be supported. This cloth on its way to the upper surface of the bed plate passes over a roller 125 rotatably mounted in bearings 126 supported on blocks 127 secured to the front surface of the front vertical posts 10.

It is to be noted that the lever arms 98 and

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104 are split at the end where they encircle the shafts 99 and 103, respectively, and are penetrated by a suitable bolt 118 which allows angular adjustment of the lever arms 98 and 104 relative to their respective shafts and also permits longitudinal adjustment of same to align them with the respective eccentrics with which they are adapted to operate.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for the purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. A looping machine comprising a framework having a needle bar provided with a plurality of needles and means for imparting vertical reciprocation to the needle bar and needles to pierce a fabric being passed through the machine, an oscillating shaft disposed below the fabric and having a pair of upwardly projecting arms thereon, a looper shaft mounted for oscillation in the upper ends of said arms, means for imparting oscillation to the first-named shaft to pass the loopers between the needles and the strands carried thereby to engage the strands when the needles are in lowered position so as to form loops on the lower surface of the fabric as the needles are withdrawn from the fabric, means for also imparting oscillation to the looper shaft for moving the points of the loopers further downwardly away from the fabric to lengthen the loops already formed by the loopers from the yarn passed through the fabric by the needles.

2. A looping machine comprising a framework having a needle bar provided with a plurality of needles and means for imparting vertical reciprocation to the needle bar and needles to pierce a fabric being passed through the machine, an oscillating shaft disposed below the fabric and having a pair of upwardly projecting arms thereon, a looper shaft mounted for oscillation in the upper ends of said arms, means for imparting oscillation to the first-named shaft to pass the loopers between the needles and the strands carried thereby to engage the strands when the needles are in lowered position so as to form loops on the lower surface of the fabric as the needles are withdrawn from the fabric, means for also imparting oscillation to the looper shaft for moving the points of the loopers further downwardly away from the fabric to lengthen the loops already formed by the loopers from the yarn passed through the fabric by the needles, a feed roll for pulling the fabric past the needles in step by step movement, and means driven in timed relation to the needles for moving the fabric upon each up and down movement of the needles.

3. In a looping machine comprising a framework having a vertically reciprocable needle bar provided with a plurality of needles, a bed plate having a plurality of elongated slots therein, through which the needles are adapted to project, means for feeding a fabric across the bed plate, a presser bar adapted to press on the upper side of the fabric, said presser bar having a plurality of holes therethrough through which the needles with a strand carried thereby are adapted to project to penetrate the fabric and penetrate

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the slots in the bed plate, an oscillatable shaft disposed below the bed plate, a main shaft having cam means thereon and a connection between the cam means and the oscillatable shaft for imparting oscillation to the oscillatable shaft, said oscillatable shaft having a plurality of uprising arms fixed thereto and a looper shaft mounted for oscillation in the upper ends of said arms, a lever carried by the looper shaft and having a connection at its outer end extending downwardly, a cam member disposed on the main shaft and a connection between the cam member and said connection on the outer end of said lever for imparting oscillation to the looper shaft, the looper shaft having affixed thereto a plurality of looper members, each looper member having a pointed end and a shoulder disposed on the lower surface thereof immediately below the pointed end and against which the yarn is adapted to impinge when the looper is passed between the yarn and the needle carrying same upon oscillation of the first-named shaft, the looper shaft being adapted to be oscillated in the upper ends of said uprising arms to impart further downward movement to the free ends of the looper members after they have been passed into engagement with the strands carried by the needles to form loops thereon, whereby the loops formed by the loopers will be pulled downwardly further as the needles move upwardly to thereby form more elongated loops on the lower surface of the fabric being passed through the machine.

4. A looper mechanism comprising an oscillatable shaft, means for imparting oscillation to the shaft, a plurality of uprising arms affixed on said shaft, a looper shaft mounted for oscillation in the upper ends of said arms, a looper member fixed on said shaft, an arm extending from said looper shaft, an eccentric mechanism having a connection with said arm for imparting oscillation to the looper shaft, a bed plate for supporting a fabric adapted to be pierced by a needle, the looper having a shoulder thereon adapted to pass between the yarn and the needle carrying the yarn for forming loops upon oscillation of the first-named shaft, the means for imparting oscillation to the looper shaft being timed to impart oscillation to the looper shaft after the first shaft has oscillated so that upon oscillation of the looper shaft, the loop is moved downwardly and lengthened as the needle moves upwardly through the fabric.

5. In a looping machine having a plurality of needles and an oscillatable shaft having fixed thereon a plurality of loopers, a second oscillatable shaft having arms fixed thereon and in the free ends of which the first oscillatable shaft is mounted, means for imparting oscillation to the second shaft for producing loops on the lower sides of a fabric being passed through the machine, a feed roll driven in timed relation to the needles for pulling the fabric through the machine, each of the loopers having a shoulder near its free end adapted to engage a strand of yarn and to hold the yarn while the needle is withdrawn from the fabric to form loops on the lower side thereof and means for imparting oscillation to the first oscillatable shaft to draw the strands of yarn farther downwardly than the point to which they were drawn by oscillation of the second shaft.

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