July 8, 1947. J. K. McCUTCHEN 2,423,608

LOOPING MACHINE

Filed Nov. 24, 1944 4 Sheets-Sheet 1

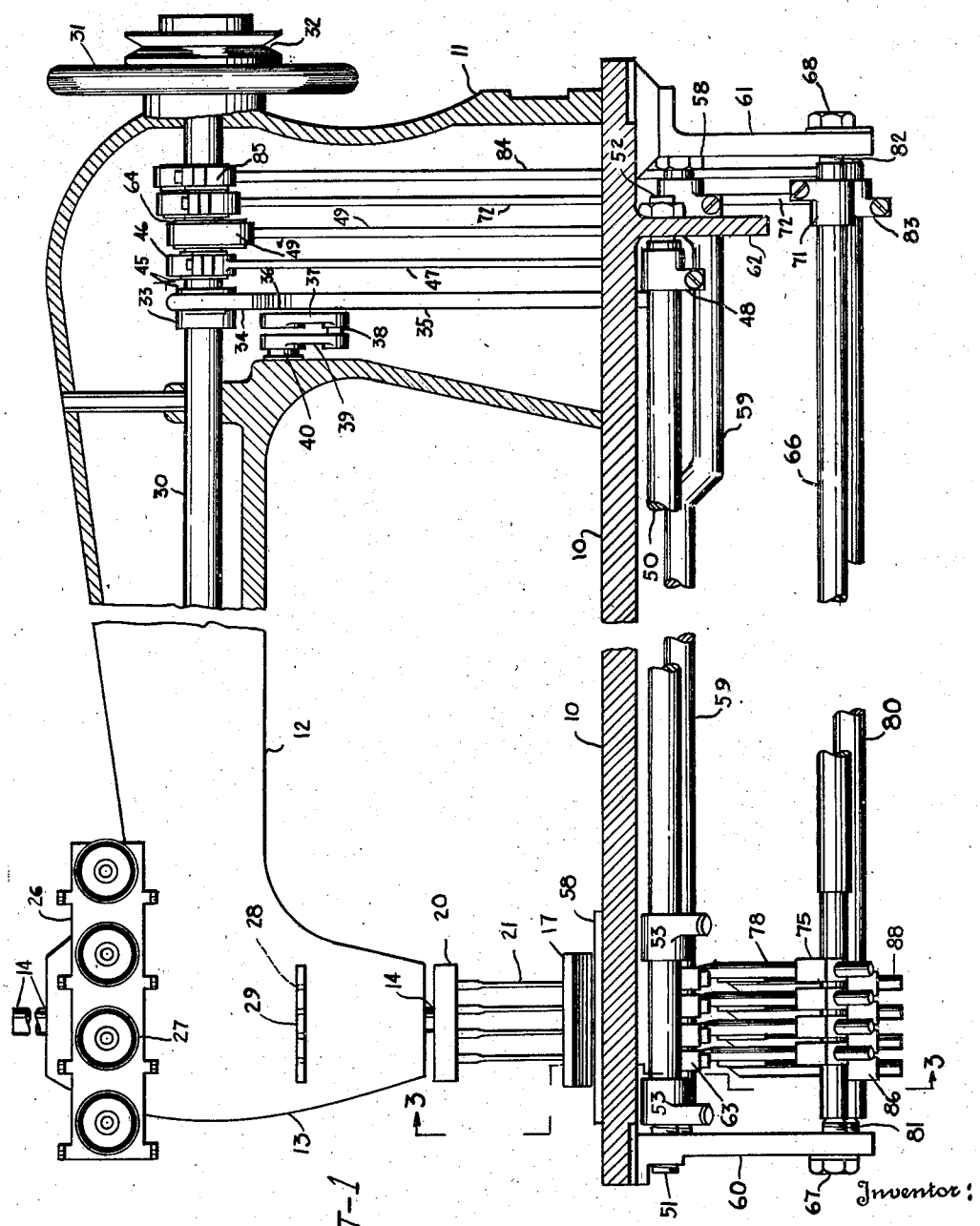


Fig-1

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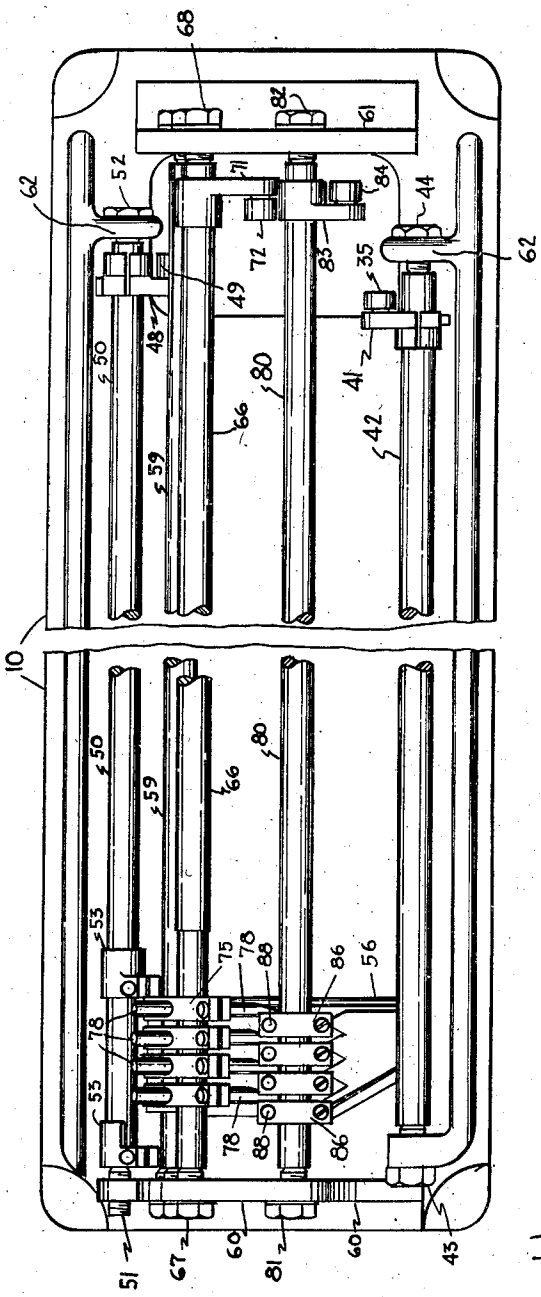


Fig-2

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LOOPING MACHINE

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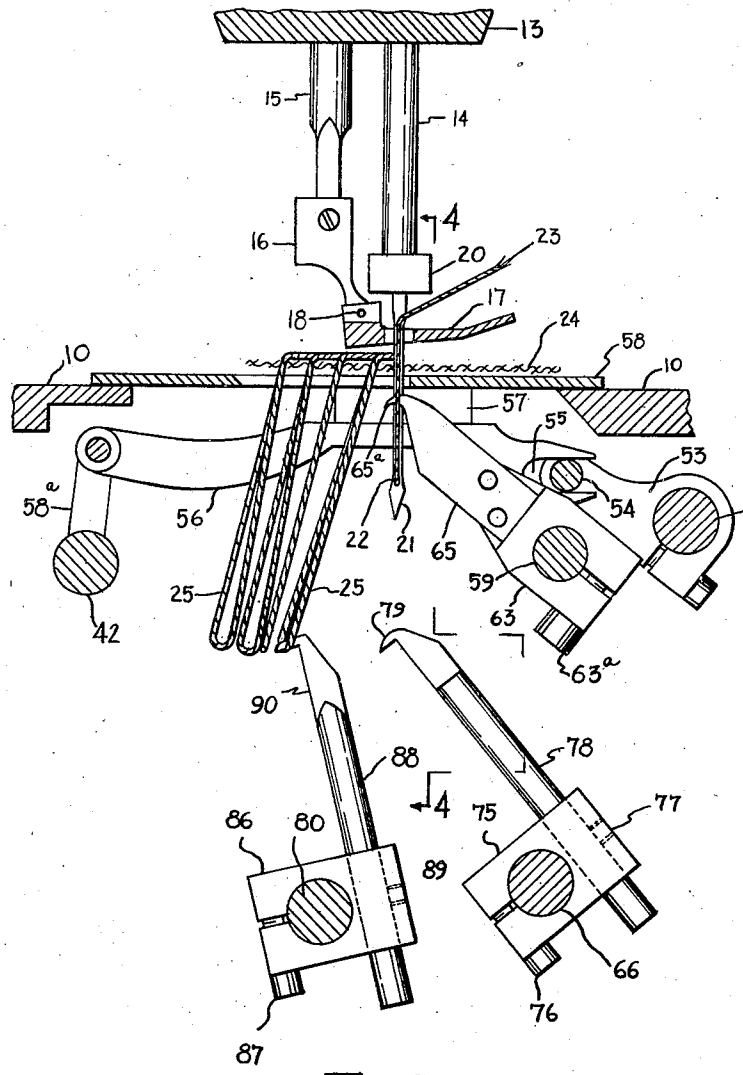


Fig 3

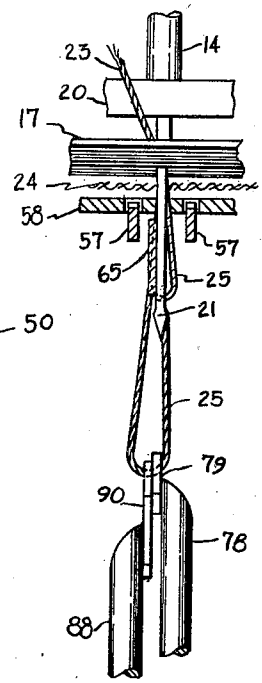


Fig 4

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LOOPING MACHINE

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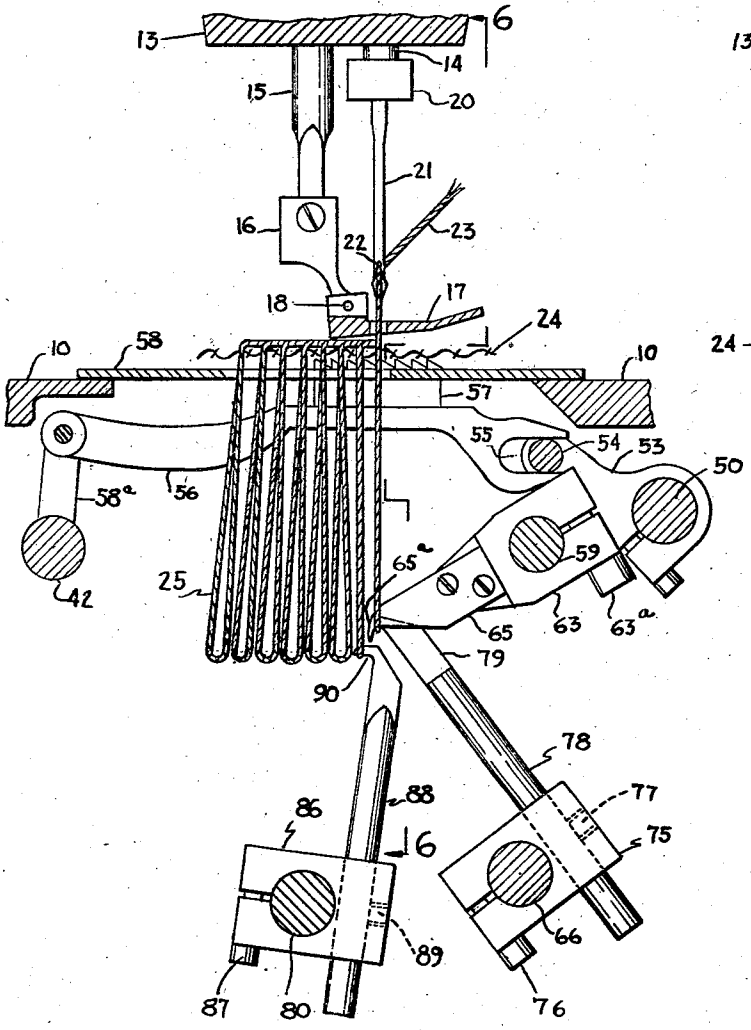


Fig-5

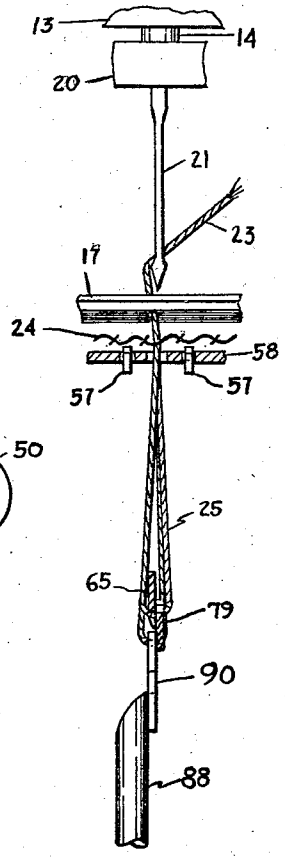


Fig-6

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UNITED STATES PATENT OFFICE

2,423,608

LOOPING MACHINE

Joseph K. McCutchen, Ellijay, Ga.

Application November 24, 1944, Serial No. 564,940

4 Claims. (Cl. 112—79)

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This invention relates to a sewing or embroidering machine, and more especially to a standard commercial sewing machine redesigned and equipped with means whereby not only loops can be formed, but said loops can be elongated and then freed to form very elongated uncut loops to produce what is known at shag rugs, bedspreads and the like.

It is an object of this invention to provide a sewing machine having a plurality of needles and a plurality of loopers for passing between the needles and the strands carried thereby and above the eyes of the needles for engaging the strands carried by the needles and forming loops as the needles move upwardly, said loopers moving downwardly an appreciable distance to elongate the loops and having additional loopers for passing into the loops and transferring them from the first loopers and having additional release means adapted to pass into the loops while they are held on the second set of loopers and to remove the loops from the second set of loopers and to free the same so that they can be carried along by the fabric as it advances through the machine.

It is another object of this invention to provide a sewing machine having means for forming loops, means for elongating the loops, and means for freeing the elongated loops from the elongating means.

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

Figure 1 is a front elevation of my improved sewing machine showing portions cut away for sake of clearness;

Figure 2 is a bottom plan view of the machine;

Figure 3 is a vertical sectional view taken substantially along a line 3—3 in Figure 1;

Figure 4 is a vertical sectional view taken transversely across the throat plate substantially along the line 4—4 in Figure 3;

Figure 5 is a view similar to Figure 3, but showing the needle and loopers in a different position from that shown in Figure 3;

Figure 6 is a view similar to Figure 4, but showing the parts in the position which they occupy in Figure 5.

Referring more specifically to the drawings, the numeral 10 indicates the conventional bed plate of a sewing machine having an upstanding portion 11 and a horizontal portion 12 terminating in a head 13 which houses a vertically reciprocating needle bar 14 and a presser bar 15 having a presser member 16 secured on its lower end with a

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presser foot 17 pivotally secured as at 18 to the lower end of the member 16. The presser foot is shown in raised position in all of the drawings.

The needle bar 14 has secured on its lower end a transversely disposed bar 20 having a plurality of needles 21 therein, and near the lower end of each of these needles, there is an eye 22 through which a strand of yarn 23 is led, the needles being adapted to pierce a base fabric 24 to form loops 25 on the lower side thereof.

The head 13 has a bar 26 on which a plurality of tension devices 27 are provided through which the strands of yarn pass on their way to the needles. The strands also pass through suitable holes 28 in a transversely disposed bar 29 secured on the front side of the head 13.

Mounted in the upper portion of the upstanding portion 11 and extending all the way through the horizontal portion 12 for operating the needle bar 14 and the presser bar 15 in a conventional manner, is a main drive shaft 30 which has a hand wheel 31 fixed thereon and also has a pulley 32 thereon adapted to receive a belt, not shown, which belt is also mounted on a suitable belt pulley, not shown, on a suitable motor, not shown, for driving the sewing machine.

The main drive shaft 30 has an eccentric 33 fixed thereon which fits into the forked upper end 34 of a connecting rod 35. This connecting rod has pivotally secured thereto as at 36 one end of a link 37 whose other end is pivotally secured as at 38 to the free end of an arm 39 which is pivoted on a stud 40 on the interior of the uprising portion 11 and this arrangement not only gives an up and down motion to the connecting rod 35, but also a lateral swinging motion. The lower end of connecting rod 35 is pivotally connected to the lower end of an arm 41 adjustably secured on rear feed shaft 42 which is mounted for oscillation at its ends on pivot screws 43 and 44.

Also fixed on the drive shaft 30 is an eccentric 45 which is surrounded by a circular portion 46 on the upper end of a connecting rod 47 whose lower end is pivotally connected to the outer free end of a lever 48 adjustably secured on front feed dog shaft 50 mounted for oscillation at its ends in pivot screws 51 and 52. This front feed dog shaft 50 has arms 53 adjustably secured thereon, each of which has a pin 54 in its free end adapted to have sliding movement in a fork 55 on the front end of the feed dog frame 56.

The frame 56 has a plurality of upwardly projecting portions 57 which are notched on their upper surfaces in a conventional manner for penetrating slots in a throat plate 58 mounted on the

bed plate of the machine, said throat plate also having openings through which the needles 21 pass on their downward movement after penetrating the fabric 24 passing therethrough.

The rear feed dog shaft 42 has a pair of upstanding arms 58a thereon which are pivotally secured at their upper ends to the rear ends of the feed dog frame 56. The above described mechanism is largely conventional, and it is with this conventional mechanism that my improved mechanism is designed to cooperate.

Also fixed on shaft 30 is an eccentric 64 which has a circular portion 49a of a connecting rod 49 surrounding same and the lower end of this connecting rod is pivotally secured to the free end of a lever not shown. This lever which is not shown is adjustably connected in the same manner as shown for the other levers on a looper shaft 59 mounted at its end in suitable pivot screws, not shown, but which are the same as other pivot screws described, said pivot screws being disposed in downwardly projecting brackets 60 and 61 extending downwardly from the bed plate of the machine while the pivot screws for the front and rear feed dog shafts 42 and 50 are mounted in one end of the bracket 60 while at the other end they are mounted in the downwardly projecting portion 62 extending from the bed plate of the machine. The looper shaft 59 has a plurality of blocks 63 which are split and which are clampingly held on the looper shaft 59 by means of a suitable screw 63a. Fixed on these blocks 63 are looper bills 65 which are adapted, upon oscillation of shaft 59, to pass between the needle and the strand carried thereby and above the eye of the needle for forming a loop when the needle moves upwardly.

Also mounted immediately below the first looper shaft 59 and some distance therebelow is a second looper shaft 66 which is mounted on pivot screws 67 and 68 in downwardly extending brackets 60 and 61, and this second looper shaft has an arm 71 thereon to the free end of which is pivoted downwardly extending connecting rod 72 which projects upwardly and has a rounded portion at its upper end mounted on an eccentric on the main drive shaft 30 to give proper oscillation to the second looper shaft 66. This second looper shaft has a plurality of members 75 adjustably secured thereon by means of a set screw 76 and adjustably mounted in the members 75 by means of a set screw 77 is a looper member 78 having a hook 79 on its free end which is adapted to pass into the loops 25 when the looper bills 65 are in lowermost position.

Also mounted in the machine is a loop shedding shaft 80 which is mounted on pivot screws 81 and 82 in the downwardly projecting portions 60 and 61, and this shaft 80 has a lever 83 adjustably secured thereon, the free end of which is pivotally connected to connecting rod 84 which extends upwardly and has a circular portion 85 at the top which surrounds a suitable eccentric on the main drive shaft 30 for imparting reciprocatory motion to the connecting rod 84 which in turn, imparts oscillatory motion to the loop shedding shaft 80. This loop shedding shaft 80 has a plurality of plate members 86 thereon which are clampingly secured on the shaft 80 by means of a set screw 87 and in these plate members is adjustably mounted a plurality of transfer rods 88 by means of a set screw 89, and the upper ends of these rods have welded, or otherwise secured thereto, a transfer bill 90 for taking the loops off the looper members 79 and as the shaft 80 oscillates in a clockwise manner in Figures 3 and 5, these hook members 90 move out of the loops 25 and release them to be carried along with the base fabric 24 during operation of the machine.

Method of operation

The method of operation of the machine is as follows:

As the needles move downwardly and slightly before they have reached lowermost position, the loopers 65 on the first looper shaft 59 are disposed above and in front of the needle eyes and as the needles move farther downwardly, the loopers 65 begin moving toward the needles and just before the needles start their upward movement, the hooks 65a on the loopers 65 pass above the eyes of the needles and between the needles and the strands carried thereby and move downwardly and rearwardly as the needles move upwardly until the hooks 65a on the ends of the first loopers 65 are slightly below and rearwardly of the hooks 79 on the second loopers 78 which at that time occupy a position forwardly of the hooks 65a on the first loopers 65, and just before the needles reach uppermost position, the first loopers start moving upwardly and the second looper hooks 79 start moving downwardly and rearwardly which transfers the loops from the first loopers to the second loopers. As the first loopers move upwardly and the second loopers move downwardly, the loop transfer members 90, which at this time are disposed forwardly of the hooks on the second loopers, begin to move rearwardly just as the first loopers reach uppermost position and at the same time the second loopers start moving forwardly which transfers the loops on the second loopers onto the loop transfer members 90 which move rearwardly as the needles descend again while the first loopers start moving downwardly, and such cycle is repeated upon each up and down movement of the needles.

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 purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a sewing machine having a vertically reciprocating needle for carrying a strand through a fabric, a swingable means for entering between the needle and a strand carried thereby for forming a loop and for moving the strand further downwardly to elongate the loop, a second swingable means for entering the loop while it is held by the first swingable means for transferring the loop from the first swingable means to the second swingable means and further moving the yarn downwardly to further elongate the loop, and a third swingable means for entering the loop while it is held on the second swingable means for transferring the loop from the second swingable means to the third swingable means and moving it rearwardly, the last swingable means, upon its forward movement, being adapted to pass out of the loop to free the same to be carried along by the fabric.

2. In a sewing machine having a vertically reciprocating needle for carrying a strand through a fabric, means for entering between the needle and a strand carried thereby for forming a loop and for moving the strand further downwardly to elongate the loop, a second means for entering the loop while it is held by the first means for

transferring the loop from the first means to the second means and further moving the yarn downwardly to further elongate the loop, and a third means for entering the loop while it is held on the second means for transferring the loop from the second means to the third means and moving it rearwardly, the last means, upon its forward movement, being adapted to pass out of the loop to free the same to be carried along by the fabric.

3. In a sewing machine having a vertically reciprocating needle for piercing a fabric to carry a strand through the fabric, a swingable arm having a hook on its end adapted to be passed between the needle and the strand carried thereby and to form a loop as the needle moves upwardly and to move further downwardly to elongate the loop, a second swingable arm adapted to pass into the loop while it is held on the first swingable member and to further elongate the loop while moving its lowermost portion downwardly while the first swingable arm moves upwardly out of the loop, a third swingable arm adapted to enter the loop while it is held on the second swingable member and to hold the loop while the second swingable member moves out of the loop.

4. In a sewing machine having a vertically reciprocating needle provided with a plurality of needles for penetrating a fabric and carrying a strand through the fabric, an oscillatable shaft having a plurality of hook members thereon for

passing between the needles and the strands carried thereby for forming loops and moving the loops further downwardly to elongate the same, a second oscillatable shaft having a plurality of hooks thereon for engaging the loops while they are held in lowermost position by the first named hooks and allowing the first named hooks to move out of the loops, a third oscillatable shaft having a plurality of hook members thereon for passing into the loops while they are held in elongated position by the second hook members to hold the loops while the second hook members move out of the loops to normal position, the last named hook members being adapted to move forwardly out of the loops to release the same to be carried along by the fabric.

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