

Feb. 23, 1943.

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2,311,802

TUFTING MACHINE AND METHOD

Filed Oct. 6, 1939

4 Sheets-Sheet 1



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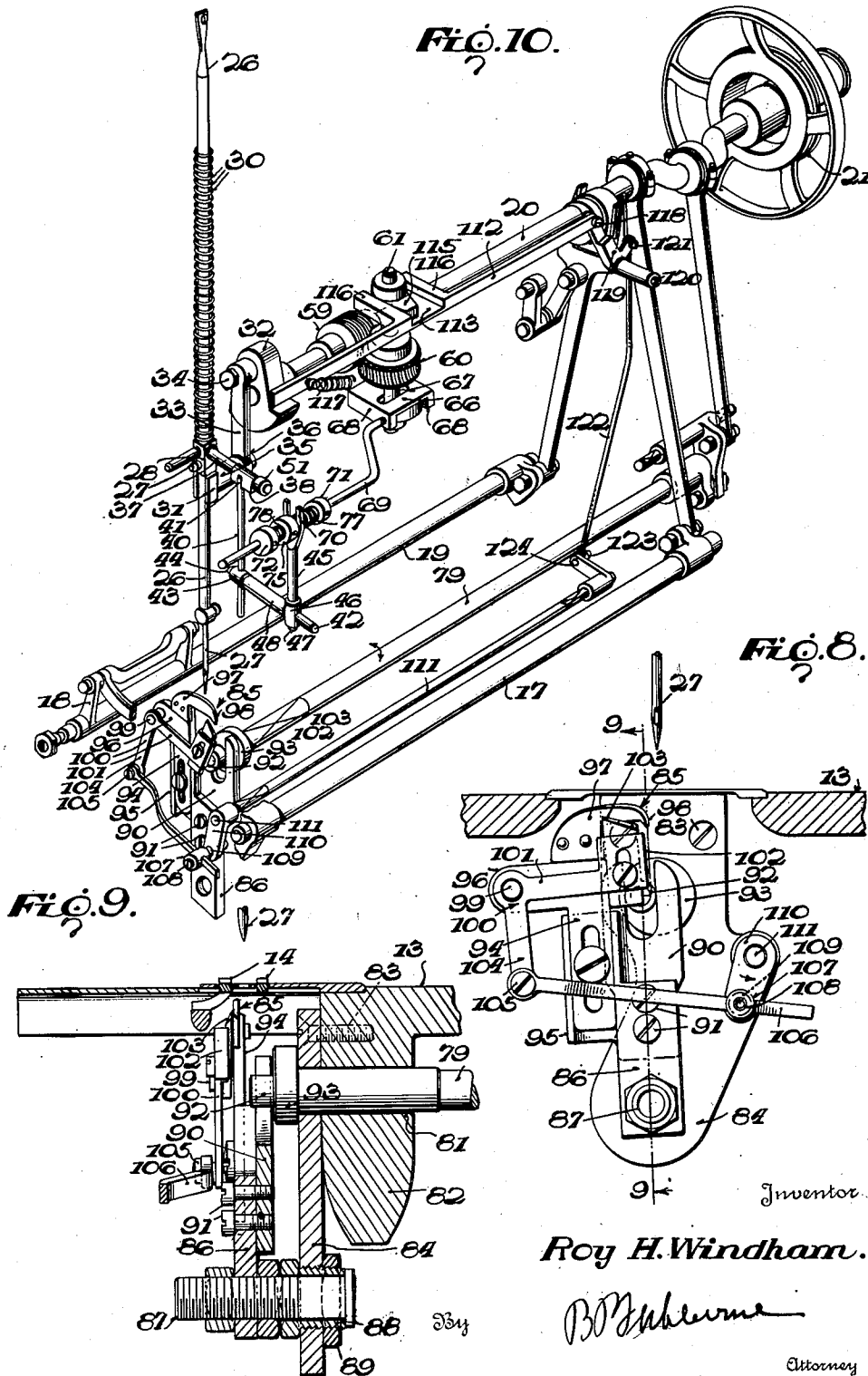
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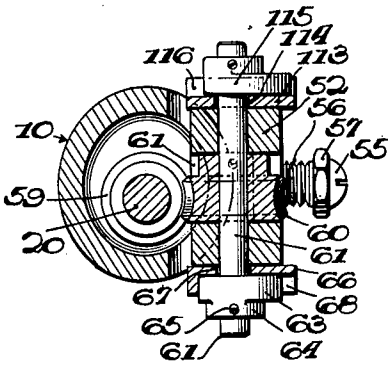


Fig. 11.

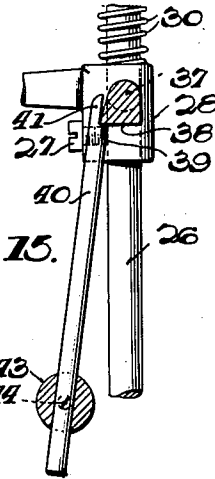


FIG. 15.

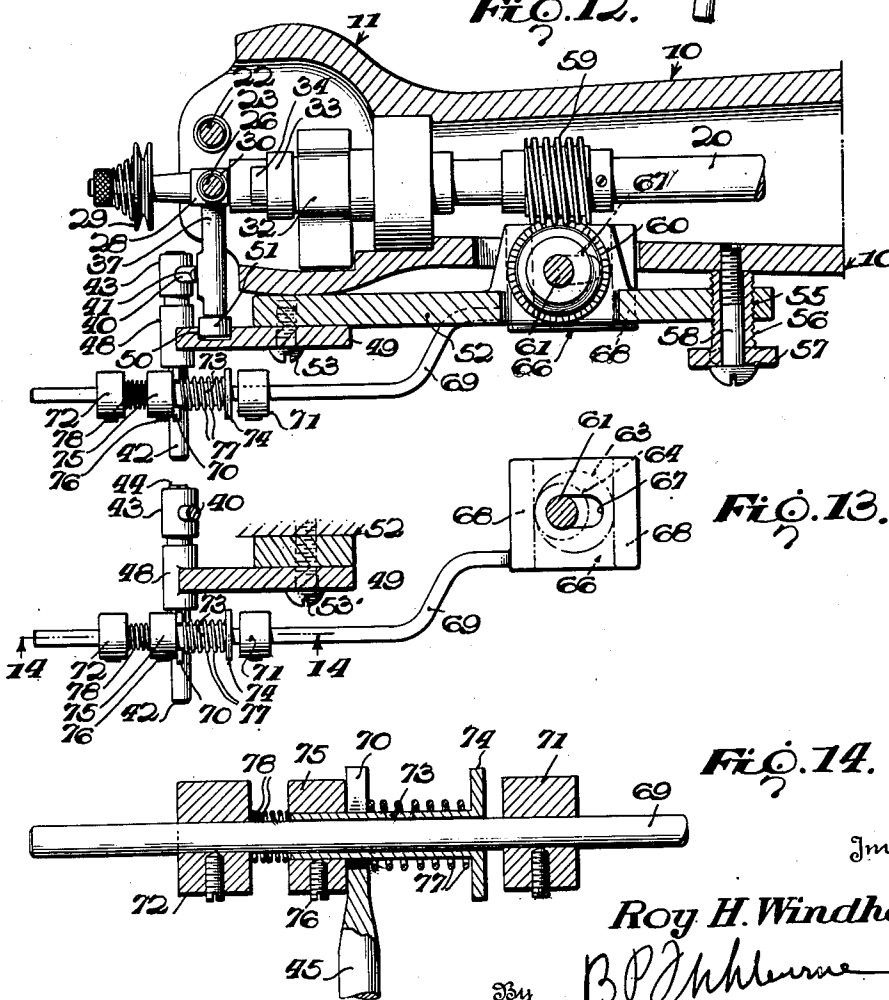


Fig. 13.

FIG. 14.

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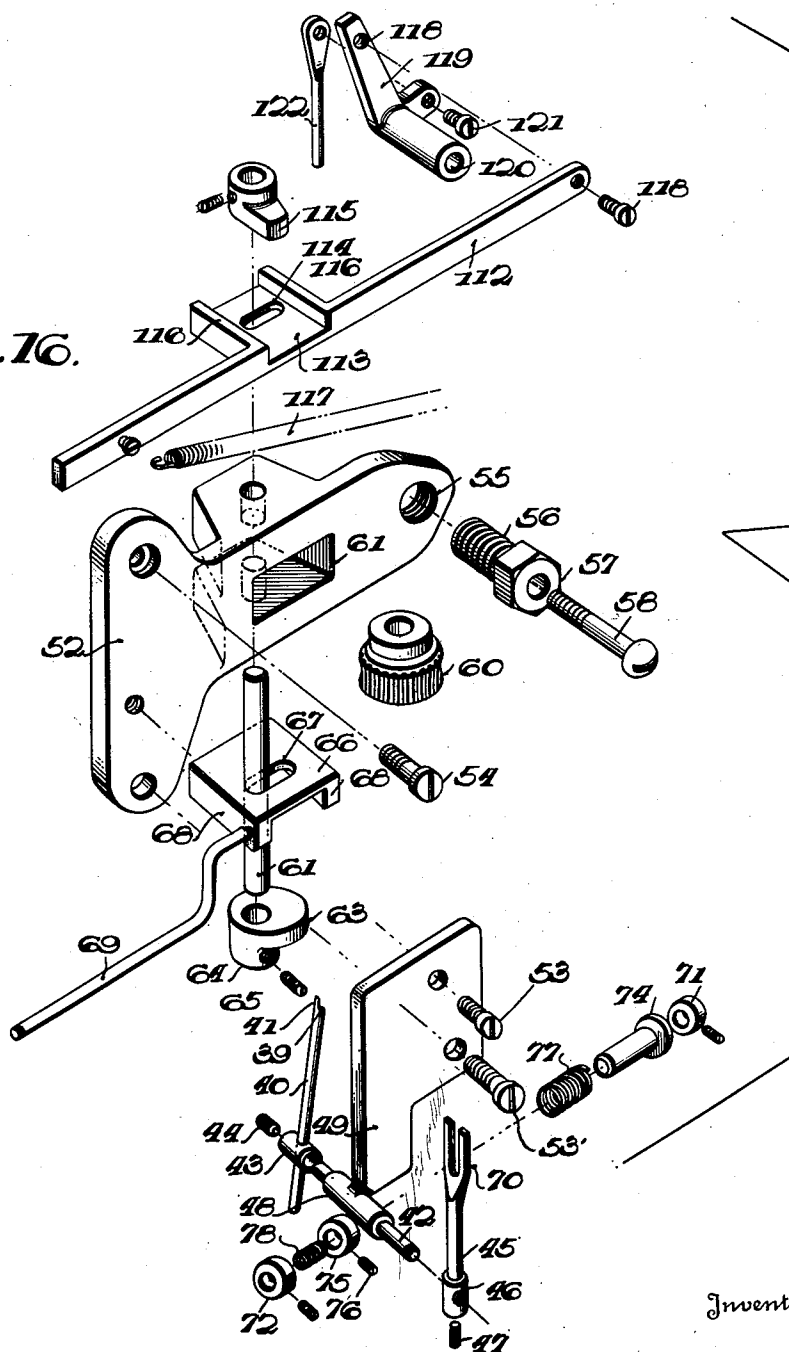
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FIG. 16.



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UNITED STATES PATENT OFFICE

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TUFTING MACHINE AND METHOD

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Application October 6, 1939, Serial No. 298,307

16 Claims. (Cl. 112—79)

My invention relates to tufting machines for making bedspreads, mats, or other tufted articles.

An important object of the invention is to provide a machine of the above mentioned character which will produce spaced tufts or spaced groups of tufts.

A further object of the invention is to provide means to reduce to the minimum the formation of tails upon the tufts or groups of tufts, which tails must be subsequently pulled out or severed.

A further object of the invention is to provide improved means for retaining the needle bar elevated and releasing the same at intervals, and which is exceedingly reliable in operation, relieving the machine of the jars and strains to which it is subjected, due to the improper operation of other similar means.

A further object of the invention is to so operate the looper and the blade, that when the needle is reciprocating to produce the loops, a plurality of unsevered loops will be accumulated upon the looper, subsequent to which all accumulated unsevered loops will be severed during one cycle of operation of the blade.

A further object of the invention is to utilize the presence of a plurality of unsevered loops upon the looper, to aid the blade in severing the tail produced at the trailing loop, eliminating the necessity of using a gripper.

A further object of the invention is to provide automatic means for throwing the blade into shearing action, at the proper time, during the continuous operation of the work feed means.

A further object of the invention is to bring the latch means for the needle bar near the head of the machine, thereby simplifying the construction of the same.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is an end elevation of the head of the tufting machine, parts omitted for the purpose of illustration.

Figure 2 is a side elevation of the machine,

Figure 3 is a diagrammatic view illustrating the first cycle of operation during the sewing period.

Figure 4 is a similar view illustrating the second cycle of operation in the same,

Figure 5 is a similar view illustrating the third cycle of operation in the same,

Figure 6 is a side elevation of the looper and blade, further illustrating the manner in which the blade severs all loops,

Figure 7 is a vertical section through the fabric showing the product,

Figure 8 is a front elevation of the looper and associated elements,

Figure 9 is a vertical section taken on line 9—9 of Figure 8,

Figure 10 is a perspective view of the looper and associated elements,

Figure 11 is a vertical section taken on line 11—11 of Figure 2,

Figure 12 is a horizontal section taken on line 12—12 of Figure 2,

Figure 13 is a horizontal section taken on line 13—13 of Figure 2,

Figure 14 is a longitudinal section taken on line 14—14 of Figure 13,

Figure 15 is a vertical section taken on line 15—15 of Figure 1, and,

Figure 16 is an exploded perspective view of the cam boxes and associated elements.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates the arm of an ordinary sewing machine, such as a Singer sewing machine. This arm is provided with the usual head 11, the forward side of which is covered by a plate which has been removed, for the purpose of illustration. The arm 10 is carried by a stock 12, mounted upon a base 13 which serves as a table or work support.

The machine comprises the usual work feed, including feed dogs 14, carried by a feed bar 15. One end of this feed bar 15 is raised and lowered by a crank 16 operated by a rock shaft 17. The forward end of the feed dog bar 15 is moved longitudinally by a crank 18, operated by a rock shaft 19. The rock shafts 17 and 19 are connected with the drive shaft 20 of the machine, in the conventional manner, whereby the feed dog is moved to feed the work in proper timed relation with respect to the needle, as is well known. The main drive shaft 20 is arranged within the arm 10 and receives its rotation from a grooved pulley 21, ordinarily power driven.

The machine comprises the usual presser bar 22, moved downwardly by a spring 23 and elevated by the finger 24. This presser bar carries a presser foot 25 to hold the fabric in proper engagement with the feed dog.

The machine further comprises a vertical reciprocatory needle bar 26, suitably guided within the head 11 and carrying a needle 27 at its lower end.

The machine thus far described is of the conventional type of sewing machine.

Clamped to the needle bar 26 by means of a set screw 27 or the like is a block 28, having a thread device 29 mounted thereon. This block is rigidly attached to the needle bar and reciprocates therewith and the block is engaged at its top by a compressible coil spring 30, surrounding the needle bar, and engaging against the top of the head

11. This spring forces the needle bar downwardly when it is released. Arranged beneath the block 28 is a sleeve or grooved element or block 31, receiving the needle bar therein and contacting with the bottom end of the block 28. Rigidly mounted upon the forward end of the main drive shaft 20 is a crank-disc 32, having a connecting rod 33 pivotally connected therewith, as shown at 34. At its lower end, the connecting rod 33 has a sleeve 35 integral therewith and this sleeve receives a pivot element 36, rigidly secured to the sleeve or grooved block 31, whereby the sleeve or grooved block 31 is pivotally connected with the lower end of the connecting rod. The sleeve 31 elevates the needle bar while spring 30 lowers it.

Means are provided to hold the needle bar 26 elevated, at intervals, while the work feed continues to operate. This means comprises a horizontal rod 37, which is rigidly secured to the block 28, and this rod has a horizontal jaw 38 for receiving therebeneath a horizontal jaw 39 formed upon a generally vertical latch-rod 40, having an extension 41 projecting above the jaw 39, as shown. The latch-rod 40 is rigidly mounted upon a horizontal rock shaft 42. The rock shaft 42 has a collar 43 rigidly secured to one end thereof and this collar receives the latch-rod 40, and the latch-rod is clamped in the collar at a selected adjusted position by a set screw 44. The numeral 45 designates a substantially vertical crank-arm having a collar 46 rigidly secured to its lower end, and this collar has an opening to receive the rock shaft 42, and the collar 46 is clamped to the rock shaft by a set screw 47. The rock shaft 42 is supported by a stationary bearing sleeve 48, arranged between the collars 43 and 46, and held in place by a stationary bracket 49. This stationary bracket has a vertical groove 50 to receive and guide a roller 51, mounted upon the outer end of the horizontal rod 37. The bracket 49 is rigidly mounted upon a support plate 52, by means of screws 53 and 53' or the like. The forward end of the support plate 52 is attached to the head 11 by means of a screw 54 and the screw 53'. The rear end of the support plate 52 has a screw-threaded opening 55, receiving a screw-threaded bushing 56, the inner end of which contacts with the arm 10 but has no connection therewith. The outer end of this bushing has a head 57 for turning by a wrench or the like. The bushing 56 receives a screw 58, the inner end of which has screw-threaded engagement with the arm 10. By manipulating the bushing 56 and the screw 58 the support plate may be slightly adjusted angularly in a horizontal plane and then clamped in the selected adjusted position, for a purpose to be described.

Rigidly mounted upon the main drive shaft 20 is a worm 59, engaging a worm wheel 60, rigidly mounted upon a vertical shaft 61. This vertical shaft operates within bearings carried by the support plate 52 and the horizontal worm wheel 60 operates within a horizontal opening 62, formed in the support plate 52. By manipulating the bushing 56 and the screw 58 as explained, the worm wheel 60 may be brought into proper engagement with the worm 59.

Arranged beneath the support plate 52 is a cam 63, having a boss 64, which is clamped to the vertical shaft 61 by a set screw 65 or the like. Arranged above the horizontal cam 63 and between it and the support plate 52 is a cam box 66, having an elongated slot 67, to receive the vertical shaft 61. This cam box has end flanges 68, engaging the cam 63. It is thus seen that the cam

box is supported and guided and that it will move longitudinally of the main drive shaft 20. Rigidly attached to the forward end of the cam box 66 is a substantially horizontal rod 69, passing through a fork 70 carried by the arm 45 and extending forwardly beyond this fork. Clamped to the rod 69 by a set screw or the like is a stop collar 71, upon the rear side of the crank-arm 45, while a stop collar 72 is clamped to the rod 69 upon the forward side of the crank-arm 45. Slidably mounted upon the rod 69 between the stop collars 71 and 72 is a sleeve 73, having a radial flange 74 at one end, preferably integral therewith. A collar 75 is adjustably mounted upon the forward end of the sleeve 73 and is clamped thereto by a set screw 76. A compressible coil spring 77 is arranged between the collar 75 and flange 74, while the fork 70 of the crank-arm 45 is arranged between the forward end of the spring 77 and the collar 75. The collar therefore serves to limit the forward movement of the fork and the fork bears against the spring 77. The forward end of the sleeve 73 bears against a spring 78 surrounding the rod 69 and engaging the stop collar 72. The spring 78 serves to shift the sleeve 73 rearwardly upon the rod. This spring 78 also swings the crank-arm 45 rearwardly so that latch-rod 40 may engage the surface or jaw 38 of the rod 37.

Extending longitudinally beneath the base 13 between the rock shafts 17 and 19 is a center longitudinal rock shaft 79, journaled at its rear end in a stationary bearing 80 and at its forward end in a stationary bearing 81, formed in the depending lug 82. The center rock shaft is turned or rocked from the main drive shaft 20 through the usual means as employed in a sewing machine to rock a center bobbin shaft. Rigidly attached to the lug 82 by screws 83 or the like is a vertical depending bracket 84, upon which the looper 85 is pivotally mounted. This looper swings in a vertical plane longitudinally of the line of work and comprises a lower arm 86, clamped to a horizontal shaft 87, rotatably mounted in a bushing 88, having screw-threaded engagement with the bracket 84 and carrying a lock nut 89. The lower arm 86 has an upstanding fork 90 secured thereto by screws 91 or the like and this fork receives an eccentric pin 92, carried by a disc 93, rigidly mounted upon the forward end of the center rock shaft 79. The looper comprises an upper generally vertical arm 94, adjustably secured to a laterally off-set portion 95 of the arm 86. The arm 94 is provided with a lateral extension 96 and has the looper element 97 secured to its upper end and this looper element is provided with the usual down-turned bill 98.

Pivotally mounted upon the lateral extension 96, as shown at 99, is a bell-crank lever 100, including an upper horizontal arm 101 carrying at its free end a socket 102, for receiving and holding a generally vertical blade 103, arranged to have shearing action with the looper element 97, and to sever all of the plurality of unsevered loops accumulated thereon at one operation, as will be more fully explained. The bell-crank lever 100 includes a depending vertical arm 104, having pivotal connection at 105 with a rod 106. This rod extends through an opening in a head 107 and is adjustable with relation to the head and is clamped to the head by a set screw 108. This head is carried by a shaft 109 which is pivotally connected with the lower end of a crank 110, rigidly mounted upon an auxiliary rock shaft 111. The looper swings in a vertical plane longitudinally of the line of work and the looper

element 97 faces in an opposite direction to the work movement, and when the rock shaft 111 is held against turning movement, the shaft 109 will serve as a stationary pivot against which the rod 106 acts, whereby the reciprocatory movement of the looper will impart a reciprocatory movement to the blade 103 toward and from the loops accumulated upon the looper element 97. When the rock shaft 111 and the shaft or pivot 109 are in the adjusted position which they occupy during the sewing action of the needle, the blade 103 will reciprocate, but the extent of movement is not sufficient to cause this blade to sever any of the accumulated loop or loops upon the looper. At the end of the sewing operation of the needle, the rock shaft 111 is turned so that the shaft or pivot 109 is shifted to the right, Figure 8, whereby when the looper is again swung toward the shaft 111, the shaft or pivot 109 in its adjusted position, acting upon the rod 106, due to the movement of the looper, will cause the blade 103 to move toward the looper element 97 for an increased distance so that this blade will then simultaneously sever all of the accumulated loops upon the looper.

I will now describe the means which turns the rock shaft 111 to cause the blade 103 to sever all of the loops at one time. This means comprises a reciprocatory bar 112, which is horizontally disposed above the support plate 52 and slidably engages with the top edge thereof. The reciprocatory bar is provided with a cam box 113, having an elongated slot 114 to receive the shaft 61. The shaft 61 carries a cam 115 rigidly secured to its upper end and this cam operates within the cam box 113 and engages the flanges 116 thereof. The cam 115 serves to move the cam bar 112 forwardly and this cam bar is moved rearwardly by a retractile coil spring 117. The rear end of the cam bar 112 is pivotally connected at 118 with a bell-crank lever 119, pivotally supported at 120. This bell crank lever has pivotal connection at 121 with a depending rod 122, which is pivotally connected at 123, with a crank 124 which is rigidly secured to the rear end of the auxiliary rock shaft 111.

The operation of the machine is as follows:

The main drive shaft 20 turns seven complete revolutions while the vertical shaft 61 turns one complete revolution. The main drive shaft 20 makes three complete revolutions during the sewing period and four complete revolutions during the spacing period, the reciprocatory needle bar 26 making three cycles of operation during the sewing period and held elevated during the four cycles of operation of the shaft 20 during the spacing period. Assuming that the needle bar 26 has moved to the uppermost position and is held elevated by the latch-bar 40, at the beginning of the spacing period, then the cam 115 assumes a position whereby its high portion disengages the front flange 116 and the spring 117 has shifted the bar 112 rearwardly. This turns the crank 110 counter-clockwise, Figure 8, shifting the pivot 109 to the right. Upon the first cycle of operation, during the spacing period, when the needle is held elevated, when the crank-disc 32 moves down the looper moves toward the path of travel of the needle and the blade is opened and when the crank-disc moves upwardly the looper moves from the path of travel of the needle and the blade moves to the completely closed position to sever all accumulated loops on the looper. Upon the second, third, and fourth cycles of operation, the same

operation of the blade occurs, but there are no loops upon the looper. At the end of the fourth cycle of operation of the crank-disc 32, during the spacing period, when this crank-disc reaches the uppermost position, the sleeve 31 will lift the bar 37 from the shoulder 39 of the latch-bar 40, and the latch-bar 40 will now move forwardly so that its shoulder 39 releases the shoulder 38. The latch-bar 40 moves forwardly at this time since the cam 63 has shifted the rod 69 forwardly, this rod swinging the arm 45 forwardly through the medium of the spring 17. This cam now holds the rod 69 in the forward position during the three cycles of operation of the crank-disc 32, during the sewing period. When the crank-disc 32 reaches the uppermost point at the end of the third cycle of the operation of the crank-disc during the sewing period, the cam 63 has shifted the rod 69 rearwardly and the spring 78 will now swing the arm 45 rearwardly and the latch-rod 40 will again have its shoulder 39 positioned beneath the shoulder 38 of the bar 37. During the sewing period, the machine has made three cycles of operation and three unsevered loops have been accumulated upon the looper. During this sewing period, the blade reciprocates, but cannot move sufficiently to the closed position to sever any of the loops on the looper. At about the end of these three cycles of operation, the trailing side of the trailing loop has been gradually pulled out of the fabric due to the work feed and when the spacing period occurs, all unsevered loops upon the looper will be simultaneously severed by the blade when the crank-disc 32 rises at the end of the first cycle of operation. By accumulating a plurality of unsevered loops upon the looper and severing them all at one operation of the blade, the unsevered loops serve as a support for the tail from the trailing loop and thereby aid the blade in severing such tail, thus dispensing with the use of a gripper. The loops are thus all severed and a short tail is cut from the trailing loop, and as the feeding operation of the machine continues, the work being fed a step during each cycle of operation of the crank disc 32, the yarn from the needle which has been severed from the leading loop is pulled out of the fabric. This leaves two U-shaped strands of yarn in the fabric forming two tufts in each group and the groups are spaced. When the end of the spacing period is reached, the sewing operation again starts, as explained. In the operation of the machine the thread tension device is properly adjusted to exert the proper tension upon the yarn so that the tail from the trailing loop extends beyond the top of the fabric for a suitable distance so that such tail will gradually pull out from the fabric during the feeding operation and be completely pulled from its hole in the fabric at about the time that the blade severs all of the accumulated loops at the same time. If the tension device is adjusted to exert too much tension on the yarn, the tail will pull out too much in advance of the severing operation, and if the tension device is adjusted so that it does not exert sufficient tension on the yarn, the tail will not pull out and will remain extending upon the upper side of the fabric. If the tail pulls out too soon and is not severed by the blade, it must be manually cut after the work is finished and if it does not pull out of the fabric but is severed by the blade and remains projecting upon the top of the fabric, it must be subsequently pulled out by hand. By the proper adjustment of the

tension device relatively few of the tails are not properly severed.

The looper is timed in operation with the needle, and when the needle moves to the lowered position, the looper moves toward the needle and enters the loop. As the needle rises, the looper moves from the needle, and the blade moves toward the closed position. The movement of the blade toward the closed position, will be sufficient during the spacing period to sever all loops during one cycle of operation of the blade, but this movement will be insufficient to sever any of the loops during the sewing period.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, what I claim is:

1. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, means to operate the needle during sewing periods to produce a plurality of groups of loops and to render the needle idle during spacing periods to provide spaces between the groups, means to drive the work feed means during the sewing period and spacing period, a movable looper to receive thereon the group of loops formed by the needle during the sewing period, a cutter, and timed means to operate the cutter after the sewing period for severing all of the loops in the group upon the looper by a single cycle of operation of the cutter.

2. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, means to drive the needle during sewing periods to produce groups containing a plurality of loops and to subsequently render the needle idle during spacing periods to space the groups, means to drive the work feed means during the sewing and spacing periods, a movable looper to receive the group of loops from the needle during the sewing period, a cutter, and automatic means operated during the spacing period to cause the cutter to sever all of the loops in the group upon the looper upon a single cycle of operation of the cutter.

3. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, means to operate the needle during sewing periods to produce a plurality of loops in groups and to subsequently render the needle idle during spacing periods to provide spaces between the groups, means to drive the work feed means during the sewing and spacing periods, a movable looper to receive thereon the group of loops from the needle during the sewing period, a cutter, and automatic means to operate the cutter only during the spacing period to cause the cutter to sever all or the loops in the group upon the looper.

4. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, means to operate the needle during sewing periods to pro-

duce a plurality of groups of loops and to render the needle idle during spacing periods to provide spaces between the groups, means to drive the work feed means during the sewing and spacing periods, a movable looper to receive thereon the group of loops from the needle during the sewing period, a cutter, and automatic timed means to impart to the cutter a limited movement during the sewing period so that the cutter is incapable of severing the group of loops during the sewing period and imparting to the cutter an increased movement during the spacing period to cause the cutter to sever all of the loops in the group upon the looper.

5. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, means to operate the needle during sewing periods to produce spaced groups of loops and to render the needle idle during spacing periods to provide spaces between the groups, means to drive the work feed means during the sewing and spacing periods, a reciprocatory looper to receive thereon the group of loops from the needle during the sewing period, a cutter pivotally connected with the looper, a supporting element, means connecting the cutter and supporting element so that the movement of the looper moves the cutter, and timed automatic means to move the supporting element to vary the extent of movement of the cutter.

6. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, a drive shaft, means operated by the drive shaft to operate the needle during a sewing period to produce a plurality of loops in a group and to subsequently render the needle idle during a spacing period to provide spaces between the groups, means operated by the drive shaft to drive the work feed means during the sewing and spacing periods, a reciprocatory looper to receive thereon the plurality of loops from the needle during the sewing period, a cutter pivotally connected with the looper, a supporting member, a link pivotally connecting the cutter and supporting member so that the movement of the looper effects the cutting movement of the cutter, and means driven from the drive shaft to shift the supporting element for increasing the extent of cutting movement of the cutter.

7. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, means to operate the needle during a sewing period to produce a plurality of loops in a group and to subsequently render the needle idle during a spacing period to produce spaces between the groups, means to drive the work feed means during the sewing and spacing periods, a reciprocatory looper to receive thereon the plurality of loops from the needle during the sewing period, a cutter pivotally connected with the looper, a rock shaft, a supporting element carried by the rock shaft, a link pivotally connecting the cutter and supporting element, a reciprocatory bar, means connecting the reciprocatory bar and the rock shaft, a cam for controlling the movement of the reciprocatory bar, and means to drive the cam.

8. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a main drive shaft, a reciprocatory needle

to carry the yarn through the work and produce loops, means operated from the main drive shaft to operate the needle during a sewing period to produce a plurality of loops in a group and to subsequently render the needle idle during a spacing period to provide spaces between the groups, means to drive the work feed means during the spacing and sewing periods, a reciprocatory looper to receive thereon the plurality of loops from the needle during the sewing period, a cutter pivotally connected with the looper, a rock shaft, a supporting element carried by the rock shaft, a link connecting the cutter and supporting element, a reciprocatory bar, means connecting the reciprocatory bar and rock shaft, a cam controlling the movement of the reciprocatory bar, and gearing connecting the cam and main drive shaft.

9. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle bar having a stop element, a spring to move the needle bar downwardly, an element movable longitudinally of the needle bar and arranged beneath the stop element and engaging the stop element to raise the needle bar, a bar secured to the needle bar, a movable latch-bar to engage beneath the last named bar to hold the needle bar elevated, operating means including a resilient element to move the latch-bar out of engagement with said bar, and means to move the operating means.

10. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle bar having a needle and provided with a stop element, a spring to move the needle bar downwardly, an element arranged beneath the stop element and movable longitudinally of the needle bar and adapted to engage the stop element to elevate the needle bar, a holding bar secured to the needle bar, a pivoted latch-bar having a part to engage beneath the holding bar to retain the needle elevated, means to reciprocate said element and to cause the same to raise the needle bar so that the pressure from the holding bar is taken off of the latch-bar, a swinging arm connected with the latch-bar, a reciprocatory rod, a spring carried by the reciprocatory rod and engaging the swinging arm to shift it in one direction, and a cam controlling the movement of the reciprocatory rod.

11. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle bar carrying a needle and having a stop element, a main drive shaft, a crank-disc carried by the main drive shaft, an element arranged beneath the stop element and movable longitudinally of the needle bar and engaging the stop element to raise the needle bar, a link connecting the crank-disc and element, a spring to move the needle bar downwardly, a holding bar carried by the needle bar, a horizontal rock shaft, an upstanding latch-bar mounted upon the rock shaft and having a part to engage with the holding bar to retain the needle bar elevated, the crank-disc raising the holding bar from the latch-bar when the crank-disc moves the needle bar to the uppermost position, an upstanding arm secured to the rock shaft and having a fork, a reciprocatory rod, a spool slidably mounted upon the reciprocatory rod and having its sleeve held within the fork, a spring carried by the sleeve and engaging the fork, a spring carried by the rod to shift the spool in one direction, and means driven by the

main drive shaft to control the movement of the reciprocatory rod.

12. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle bar to carry a needle, a spring to move the needle bar downwardly, a main drive shaft, means operated by the main drive shaft to raise the needle, a latch device to hold the needle elevated, an auxiliary shaft driven by the main drive shaft, means to operate the latch device including a cam connected with the auxiliary shaft, a reciprocatory looper to receive the loops from the needle, a cutter to sever the loops upon the looper, means to render the cutter effective and ineffective with respect to severing the loops, and means to operate the last named means including a cam connected with the auxiliary shaft.

13. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work-feed means, an arm extending over the work support and having a head, a reciprocatory needle bar carried by the head, a spring to move the needle bar downwardly, a main drive shaft within the arm, means operated by the main drive shaft to raise the needle, a latch device within the head to hold the needle bar elevated, a rod to operate the latch device to release the needle bar, a cam arranged near the head to move the rod, and gearing arranged near the head and connecting the cam and main drive shaft.

14. In a machine for producing spaced tufts or spaced groups of tufts, a work support, work feed means, a reciprocatory needle to carry the yarn through the work and produce loops, means to drive the work feed means, means to operate the needle during sewing periods to produce groups of loops and to subsequently render the needle idle during spacing periods while the work feed means is operating to feed the work to space the groups, a looper to receive thereon the loops of the group, a cutter, and means timed in operation with respect to the needle operating means to operate the cutter during the spacing period to sever all of the loops of the group accumulated upon the looper during the sewing period.

15. In a machine for producing spaced groups of tufts, a support, work feed means, a reciprocatory needle to carry the yarn through the fabric and produce loops, means to drive the needle through a plurality of cycles of operation for forming a plurality of unsevered loops and then retain the needle idle for producing a space, a looper disposed in cooperative relation to the needle, means to drive the looper so that it enters the plurality of unsevered loops formed by the needle, means to drive the work feed means while the needle is operating to produce the loops and while the needle is retained idle, a cutter arranged in cooperative relation with the looper, and means to operate the cutter only after the needle has produced the plurality of unsevered loops for severing all of the plurality of loops.

16. The method of producing spaced groups of tufts upon fabric, comprising feeding the fabric while sewing a plurality of loops therein for producing a group and then discontinuing the sewing action and maintaining the loops unsevered until the group is completed, continuing the feeding of the fabric after the group of loops has been completed for providing a space, and after the group has been completed severing all of the loops in the group before the formation of the succeeding group of loops.

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