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TUFTING MACHINE

Filed May 17, 1937

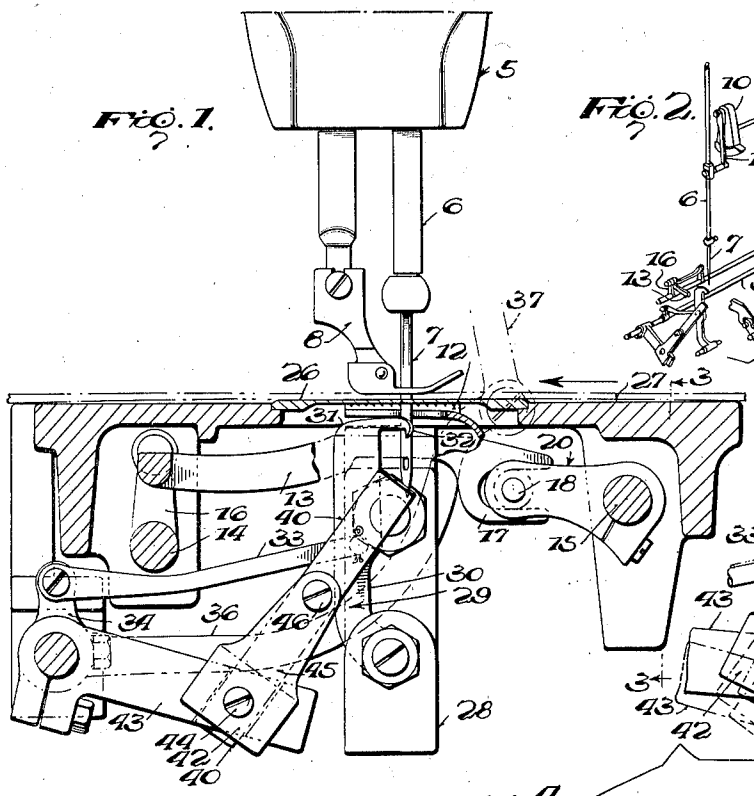


FIG. 1.

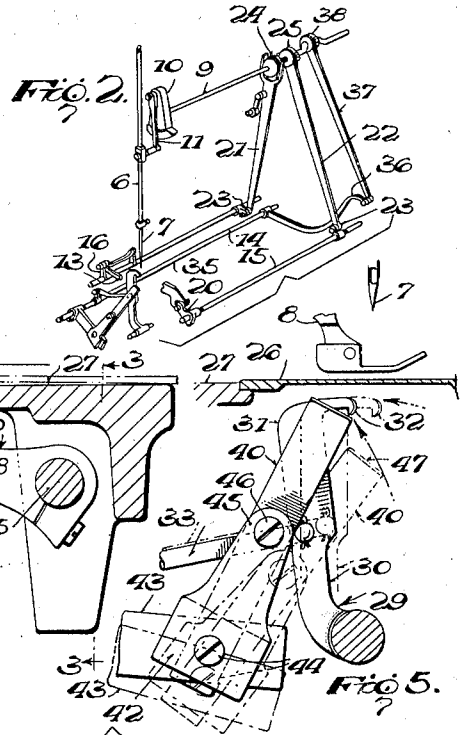


FIG. 2.

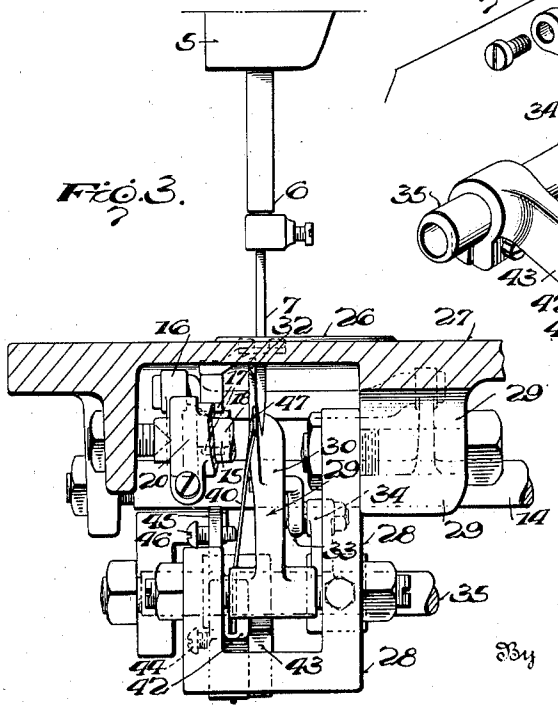


FIG. 3.

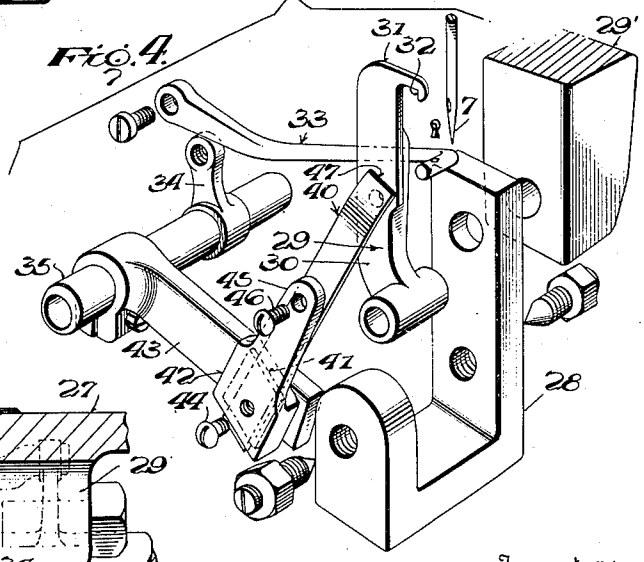


FIG. 4.



FIG. 5.

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## TUFTING MACHINE

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Application May 17, 1937, Serial No. 143,158

5 Claims. (Cl. 112—79)

Our invention relates to tufting machines.

An important object of the invention is to provide a tufting machine which is an improvement upon the tufting machine shown in our co-pending application Serial No. 117,058 filed December 21, 1936.

A further object of the invention is to provide driving means for the looper and cutter, which driving means is separate from or independent of the actuating means for the work feed means, whereby the adjustment of the actuating means to vary the length of the stitches produced by the work feed means, will not alter or interfere with the operation of the looper and cutter.

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

In the accompanying drawing 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 a tufting machine, parts in section, the loop forming mechanism being shown in elevation,

Figure 2 is a perspective view of the operating parts of the machine,

Figure 3 is a vertical section taken on line 3—3 of Figure 1,

Figure 4 is an exploded perspective view of the looper and cutter and associated elements.

Figure 5 is a side elevation of the looper and cutter, the same being in the position to sever the loop.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of our invention, the numeral 5 designates the head of a sewing machine, embodying a needle bar 6, carrying a needle 7. Co-acting with the needle is the usual presser foot 8. The needle bar is reciprocated by the usual drive shaft 9, through the medium of crank disc 10 and link 11.

The work feed means embodies a work feed dog 12, mounted upon a rigid bar or link 13. The work feed means including the bar 13 is actuated by the rock shafts 14 and 15. One end of the bar 13 is pivotally connected with an upstanding crank 16, rigidly attached to the rock shaft 14, while the opposite end of the bar 13 is forked at 17, to receive the roller 18 carried by a horizontal crank 20, rigidly mounted upon the rock shaft 15. The crank 20 serves to raise the feed dog bar 13, while the crank 16 serves to move the feed dog longitudinally. The rock shafts 14 and 15 included in the means to actuate the work feed means are turned by connecting rods 21 and 22 respectively and these connecting rods are connected with the rock shafts 14 and 15 by cranks 23, corresponding to the cranks 20. The connecting rods 21 and 22 are driven by the main drive shaft 9 through the medium of eccentrics 24 and 25. The connecting link 21 is so mounted that its throw may be varied, to regulate the extent of turning movement of the rock shaft 14, which in turn will regulate the extent of movement of the work feed means and control the length of the stitch. The same construction thus far given is that of the ordinary Singer sewing machine and is identical with the disclosure in our said pending application Serial No. 117,058.

The needle 7, in the usual manner, operates through the throat plate 26, carried by the horizontal work support or base 27. Arranged beneath this base 27 is a bracket 28, rigidly secured to a lug 29, depending from the base 27. This bracket is so positioned that the needle will descend into the space of the bracket. Mounted within this bracket is a looper member 29, as a whole, comprising an arm 30, which is pivotally mounted at its lower end within the bracket 28. The looper arm 30 is provided at its upper end with a looper element or bill 31, preferably having a down turned end or hook 32. It is thus seen that the looper member is pivotally mounted to swing in a vertical plane in the direction of the feed of the work, and the free end of the looper element 31 faces in the opposite direction to the direction of travel of the work during its feeding. The looper element 31 moves forwardly toward the needle 7 as the needle descends and enters the loop produced by the needle when it approaches or reaches its lowermost position. The looper member is swung upon its pivot by a link 33, pivotally connected therewith and this link is pivotally connected with an upstanding crank 34, rigidly mounted upon an auxiliary rock shaft 35. This auxiliary rock shaft is arranged near and beneath the rock shaft 14 but is separate therefrom. The rock shaft 35 is turned by a long crank arm 36, pivotally connected with a connecting rod 37, extending upwardly for pivotal connection with a crank 38 formed upon the main drive shaft 39. The rock shaft 35 corresponds to the rock shaft 44 in our said co-pending application Serial No. 117,058, and the driving means for the rock shaft 35 in the present application is substantially identical with the driving means for the rock shaft 44 in said co-pending application. The mechanism thus far described in the present application is

substantially identical with that shown in said co-pending application.

The cutting means for co-action with the looper member comprises a blade **40**, which is preferably resilient. This blade has its lower end inserted within the opening **41** of a socket **42**, which is rigidly secured to a relatively long crank **43**, by welding, soldering, or the like, or the socket may be formed integral with the crank **43**, if desired. The socket **42** has a screw-threaded opening for receiving a set screw **44**, for clamping engagement with the lower end of the blade **40**. The socket **42** carries an upstanding arm **45**, extending longitudinally of the blade **40** and carrying an adjusting screw **46**, to engage the blade or cutter **40**, and press the same against the side of the looper element **31**, for producing a shearing action with the looper element. The blade or cutter is preferably slightly twisted at its cutting edge **47**, to produce a proper shearing action. The crank **43** is clamped to the auxiliary rock shaft **37**, as shown. Attention is called to the fact that the crank **43** is much longer than the crank **34**. The cutter or blade **40** is disposed substantially at a right angle to the crank **43**. Since both cranks **34** and **43** are mounted upon the common rock shaft **35** they both turn clockwise when the rock shaft **35** is turning clockwise and they both turn counter-clockwise when the rock shaft is turning counter-clockwise. The looper member **29** is swung by the crank **34** while the cutter or blade **40** is swung by the crank **43**, and since the crank **43** is materially longer than the crank **34**, the looper element or blade **40** will move faster than the looper element **31** and will swing clockwise when the looper element swings clockwise and counter-clockwise when the looper element swings counter-clockwise and will also partake of a movement generally longitudinally of the looper member whereby the cutting edge **47**, which is inclined, will have a shearing action with the lower edge of the looper element **31**, throughout the major portion of such lower edge **31'**, but not throughout the entire length of the edge **31**, as it is desired to leave one or more loops uncut, adjacent to the down turned end or hook **32**, at each cutting stroke of the cutter or blade **40**.

The operation of the machine is as follows:

When the needle **7** moves downwardly it passes through the fabric and forms a loop beneath the same, and as the needle moves downwardly the looper element **31** moves toward the needle and enters the loop as the needle approaches or reaches its lowermost position. While the looper element is moving toward the needle the cutter or blade **40** is moving from the looper element. As the needle rises, the looper element **31** moves rearwardly from the needle, while the feed dog **12** moves in the direction of the movement of the looper, to feed the work, and the cutter or blade **40** is now moving toward the looper. As the looper approaches or reaches its outermost position from the needle the loop on the looper is severed, leaving one or more loops unsevered upon the looper. The looper element **31** has a greater horizontal travel than vertical travel, while the cutter or blade **40** has a greater vertical travel than horizontal travel. This results in the cutter or blade **40** moving generally longitudinally of the looper.

The word "reciprocatory" is used in its broad sense and covers an element moving back and forth in a straight path or in a curved path.

It is to be understood that the form of our 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 our invention or the scope of the subjoined claims.

Having thus described our invention, what we claim is:

1. In a tufting machine, a reciprocatory needle, means to operate the needle, work feed means, means to actuate the work feed means including rock shafts, an auxiliary rock shaft separate from the first named rock shaft, means to turn the auxiliary rock shaft, a reciprocatory looper to enter the loop formed by the needle, means to move the looper driven by the auxiliary rock shaft, and a cutter mounted upon the auxiliary rock shaft to be moved thereby and independently mounted with respect to the looper and slidably engaging the looper to produce a shearing action therewith.

2. In a tufting machine, a reciprocatory needle, work feeding means, means to actuate the work feeding means, an auxiliary rock shaft separate from the work feed actuating means, a reciprocatory looper to enter the loop formed by the needle, a crank carried by the auxiliary rock shaft, a link connecting the crank and looper, a second crank carried by the auxiliary rock shaft, and a cutter mounted upon the second crank and separately mounted from the looper and having slidable engagement with the looper to produce a shearing action with the looper.

3. In a tufting machine, a reciprocatory needle, work feeding means, means to actuate the work feeding means including rock shafts, an auxiliary rock shaft independently driven with respect to said rock shafts, a crank carried by the auxiliary rock shaft, a reciprocatory looper to coact with the needle, a link connecting the looper and crank, a second crank mounted upon the auxiliary rock shaft and longer than the first crank, and a cutter mounted upon the second crank and separately mounted from the looper and having slidable engagement with the looper for producing a shearing action with the looper.

4. A tufting attachment for use in connection with a reciprocatory needle, and work feeding means of a sewing machine, said attachment comprising, a pivoted looper, a pivoted cutter mounted separately from the pivoted looper and slidably engaging the looper to have a shearing action therewith, and means separate from the work feeding means to simultaneously swing the looper and cutter counter-clockwise when viewed from one side and then simultaneously swing the looper and cutter clockwise when viewed from one side for effecting a relative movement between the same.

5. In a tufting machine, a reciprocatory needle, work feeding means, a pivoted looper, a pivoted cutter mounted separately from the looper and permanently slidably engaging one side of the looper to effect a shearing action with the looper, and means separate from the work feeding means to swing the looper and cutter counter-clockwise when viewed from one side and then swing the looper and cutter clockwise when viewed from one side.

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