April 26, 1932. C. H. KEENEY 1,855,916

TUFTING ATTACHMENT FOR SEWING MACHINES

Filed July 2, 1930 2 Sheets-Sheet 1

Fig. 1.

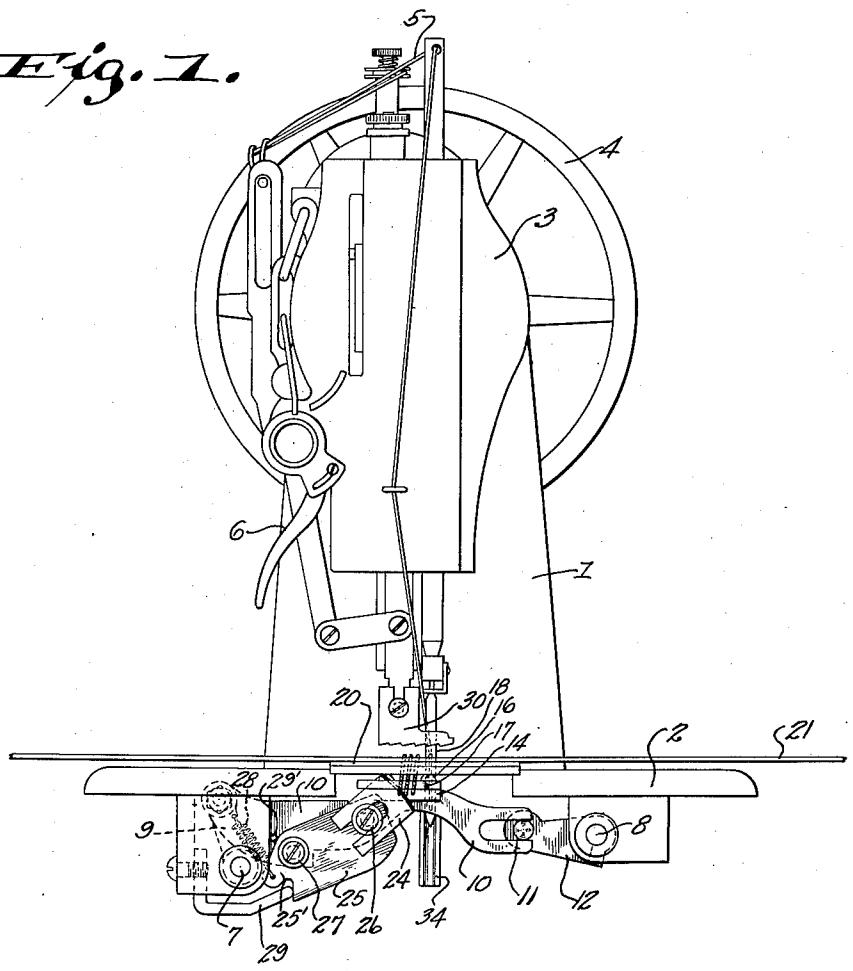
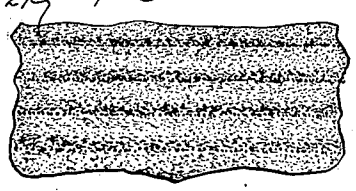


Fig. 6.



Fig. 7.



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Fig. 2.

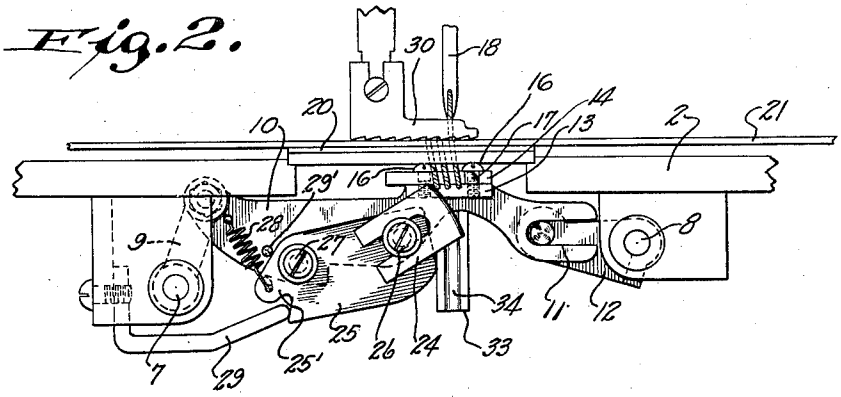


Fig. 3.

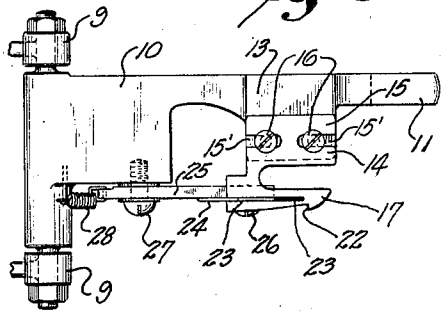


Fig. 4.

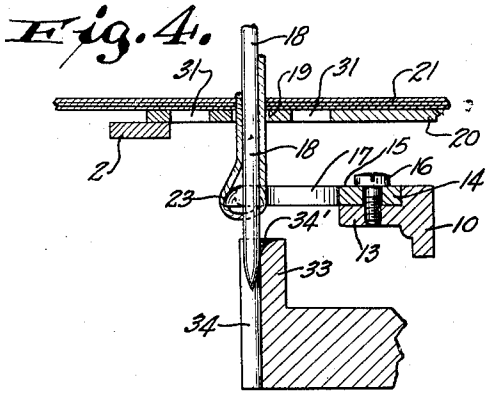
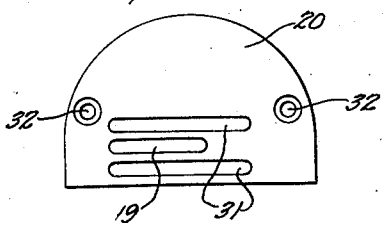


Fig. 5.



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UNITED STATES PATENT OFFICE

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TUFTING ATTACHMENT FOR SEWING MACHINES

Application filed July 2, 1930. Serial No. 465,385.

This invention relates to improvements in tufting attachment for sewing machines.

It is one of the objects of the present invention to provide a tufting attachment for sewing machines in which the cutting means for severing the strand loops is carried by the strand looping member.

A further object of the invention is to provide a tufting attachment for sewing machines in which the strand loop severing means is arranged to sever the loops with a comparatively long drawing cutting movement to form a more efficient cut and to eliminate the wear at one point on the cutter.

A further object of the invention is to provide a tufting attachment for sewing machines in which a number of strand loops are held on the looper member at one time and are moved towards the oscillatory cutter carried by the looper member and the innermost loop is severed at each reciprocation of the looper member in one direction.

A further object of the invention is to provide a tufting attachment for sewing machines in which a newly formed strand loop is engaged and held by the looper member while the innermost loop is severed to form pile members during the reciprocations of the looper member.

A further object of the invention is to provide a tufting attachment for sewing machines in which the fabric supporting plate is formed with an elongated opening on each side of the needle opening to accommodate the completed pile members and permit forming lines of pile members to the right or left of the completed pile members.

A further object of the invention is to provide a tufting attachment for sewing machines in which the cutting angle of the cutter member with relation to the strand loops may be easily varied as desired.

A further object of the invention is to provide a tufting attachment for sewing machines which is of simple construction, is strong and durable and is well adapted for the purpose described.

A further object of the invention is to provide a tufting attachment for sewing machines which while easily forming loops through a single thickness of material is more particularly adapted for forming loops through a plurality of thicknesses of material.

A further object of the invention is to provide a tufting attachment for sewing machines which is more particularly adapted for forming tufted rugs with plain solid pile portions or in multi-colored designs as desired.

With the above and other objects in view the invention consists of the improved tufting attachment for sewing machines and its parts and combinations as set forth in the claims and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is an end elevation of a sewing machine showing the improved tufting mechanism incorporated therein and the looper member in its rearward position;

Fig. 2 is a fragmentary end view on a larger scale showing the looper member in its forward position;

Fig. 3 is a top view of the reciprocating bar and the looper member connected thereto;

Fig. 4 is a vertical sectional detail view of the looper member and connected parts;

Fig. 5 is a top detail view of the removable work supporting plate showing the elongated pile openings on each side of the needle opening;

Fig. 6 is a vertical sectional detail view of a piece of material illustrating the manner of forming the pile members, some of the strand loops being shown before they are severed; and

Fig. 7 is a top view of a fragmentary portion of a completed rug.

Referring to the drawings the numeral 1 indicates generally the sewing machine head comprising a base portion 2 from one portion of which extends the arm 3 having the usual drive shaft and pulley 4 journaled thereon. The thread or strand feeding means 5 and the fabric feed mechanism 6 are of usual construction and it is not necessary to further describe the same. The driving mechanism below the base portion is also of ordi-

nary construction and includes a rock shaft 7 and a fixed shaft 8. The end portion of the shaft 7 has mounted thereon upwardly extending spaced arms 9 which are pivotally connected to the looper supporting bar 10. Said bar 10 extends transversely of the base 2 and its free end portion is bifurcated as indicated by the numeral 11 to slidably embrace the cranked portion of an arm 12 adjustably mounted on the shaft 8. A medial portion of the looper bar is formed with a horizontally extending flange 13 upon which is mounted a looper member 14 as clearly indicated in Fig. 3 of the drawings. Said looper member comprises a body portion 15 having elongated slots 15′ to receive screws 16 which adjustably and detachably attach the looper member to the bar flange 13.

One end part of the body portion of the looper member is provided with a right angularly extending arm 17, the outer portion of which is approximately parallel to the body portion and the looper bar.

As shown in Fig. 3 the inner edge of the arm 17 is substantially straight and flat for its horizontal reciprocation alongside of the needle 18 which reciprocates vertically through a needle slot 19 provided in the work supporting plate 20 forming part of the base portion 2. The needle slot 19 extends parallel to the reciprocal movement of the looper arm 17 and is positioned thereabove.

The piece or pieces of fabric 21 of a predetermined size to form the rug are positioned on the base member and the strand of yarn or other material to be used is threaded through the needle and when sewed through the material forms the pile of the rug made.

The outer free end of the looper arm is beveled to permit easy entrance between the needle side and the strand in forming the loops, and to prevent the loops from slipping off the end of the looper arm when said arm is reciprocated rearwardly, a shoulder 22 is formed on said outer side adjacent the beveled portion, as shown in Fig. 3. The outer opposite end portion of the looper arm is provided with a longitudinally extending elongated slot or opening 23 into which extends the cutting edge of an oscillatory cutter 24. Said cutter is of slotted formation and is adjustably connected to a bell crank lever 25 by a screw 26, and the bell crank lever is in turn pivotally connected to the looper supporting bar 10 by a pivot screw 27. A coiled spring 28 connected to the short arm 25′ of the bell crank lever is connected at its other end to the looper bar 10 to yieldingly hold the short arm bearing against a stop member 29 projecting from a frame portion so that as the looper bar 10 reciprocates the stop member will cause the cutter to oscillate vertically in the slot 23 and successively sever the strand loops moving into its path of movement. The cutter is placed at such an angle that the edge thereof will cut with a drawing movement to extend the cutting stroke to approximately the length of the cutting edge and thus prolong the life of the cutter. A stop pin 29′ limits the upper movement of the bell crank lever 25.

The numeral 30 indicates the conventional fabric feeding foot which yieldingly presses downwardly on the fabric and intermittently advances the fabric as the sewing progresses in the usual manner. Any desirable form of feed may be used.

The work supporting plate 20 is also provided with elongated slots or openings 31 positioned on opposite sides of the needle slot 19 and parallel thereto to accommodate rows of tufting or pile members on either side of the line being stitched, thus permitting the lines of tufting to be formed close together. The plate is provided with openings 32 for the reception of screws or other means for securing the plate on the base portion 2.

To brace the lower end of the needle when in its lower position a fixed guide member 33 is positioned below the looper arm and is provided with a vertically extending groove 34 in its outer face, the three side walls of which closely engage three sides of the needle and hold the needle firmly in position. The upper portions of the walls forming the slot are tapered outwardly as indicated by the numeral 34′ to easily guide the needle into the groove.

In operation, the needle 18 having the strand threaded therethrough reciprocates downwardly through the pieces of fabric and the needle slot of the plate 20 and at the lower end of its reciprocation it will enter the groove of the guide member 33 to prevent any lateral flexure of the needle. The upward reciprocation of the needle will cause th needle strand to slacken and at the same time the looper bar will move forwardly and its looper arm 17 will move between the strand and the needle to a point where the looper arm shoulder has passed beyond the strand so that on the return reciprocation of the looper bar the strand loop will be held by the looper arm and withdrawn from the path of movement of the needle. The foregoing is repeated until a sufficient number of loops are threaded on the looper arm, usually three or more, to prevent formed loops from being withdrawn from the fabric by the sewing tension of the strand.

When a sufficient number of loops have been formed around the looper arm 17 the innermost or the first loop formed of the loops on the arm has been moved inwardly or rearwardly by the rearward feed of the fabric to a position around the slotted portion of the looper arm, and the cutter in its oscillation in the arm slot will successively sever

each innermost loop with a drawing cut. The pile members thus formed move rearwardly in the needle slot and when they reach the end of the slot they are withdrawn therefrom by the rearward movement of the fabric.

When the cutting operation is completed the looper arm, which is at its rearmost position, will then start its forward reciprocation and the operations described will be repeated.

In forming the loops on the looper arm the shoulder 22 thereof will prevent the loops from accidently slipping off said arm during the reciprocations of the arm.

The screw and slotted connection between the cutter and the bell crank lever permits adjusting the angle of the cutter to increase or diminish the depth of the cut and also the drawing angle of the cut.

The length of the loop can be regulated by substituting a looper bar having the looper arm on a lower plane for the one illustrated or adjusting the arm 12 to swing the looper arm to a higher or lower plane.

It will be further understood that a number of tufting attachments may be mounted on the same machine to permit sewing a plurality of lines or rows of stitches at the same time.

From the foregoing description it will be seen that the tufting attachment is of very simple construction and is well adapted for the purpose described.

What I claim as my invention is:

1. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating a fabric and carrying a strand which is passed through the fabric by the needle, a transversely reciprocal member positioned below the fabric and having a shouldered arm which engages the strand to form loops below the fabric, the shoulder of the arm preventing rearward movement of the loops while being cut, a cutter carried by the reciprocal member and operable to sever some but not all of the loops on the shouldered arm at any one time to form pile members, and means for reciprocating the needle and the transverse member.

2. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating a fabric and carrying a strand which is passed through the fabric by the needle, a transversely reciprocal member positioned below the fabric and having a shouldered arm which engages the strand to form loops below the fabric, the shoulder of the arm preventing rearward movement of the loops while being cut, a cutter carried by the reciprocal member and operable by engagement with a fixed means for severing some but not all of the loops on the shouldered arm at any one time to form pile members, and means for reciprocating the needle and the transverse member.

3. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating and carrying a strand through a fabric, transversely reciprocal shouldered means below the fabric for forming the strand into loops, the shoulder of the reciprocal means preventing rearward movement of the loops while being cut, a cutter carried by the reciprocal means for severing some but not all of the loops on the reciprocal means at any one time to form pile members, a fixed means momentarily engaged by the lower end portion of the needle for laterally reinforcing said needle, and means for reciprocating the needle.

4. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating and carrying a strand through a fabric, a transversely extending reciprocal shouldered member positioned below the fabric and having a shouldered arm which engages the strand to form loops below the fabric, the shoulder of the reciprocal member preventing rearward movement of the loops while being cut, a pivoted cutter carried by the reciprocal member for severing some but not all of the loops on the shouldered arm at any one time to form pile members, and means for reciprocating the needle and the transverse member.

5. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating and carrying a strand through a fabric, a member below the fabric and reciprocal transversely with relation to the path of movement of the needle and having a shouldered arm which enters strand loops formed by upward reciprocations of the needle, the shoulder of the arm preventing rearward movement of the loops while being cut, a cutter pivotally carried by the reciprocal member for severing some but not all of the loops on the shouldered arm at any one time, means engaged by the cutter for causing its cutting oscillation, and means for reciprocating the needle and the transverse member.

6. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating and carrying a strand successively through a fabric, a looper member below the fabric and movable transversely of the path of movement of the needle for engaging the strand and holding the same while loops are being formed by the upward reciprocations of the needle, and means carried by the looper member for severing other than the last formed loops to form pile members, and means for reciprocating the needle and the looper member.

7. A tufting attachment mechanism for sewing machine having a reciprocating needle for penetrating and carrying a strand suc-

cessively through a fabric, a looper member below the fabric and having an arm provided with a shoulder adjacent its outer end for successively engaging the strand loops formed by the upward reciprocations of the needle and for holding a plurality of the loops at the same time, and means carried by the looper member for successively severing the innermost loop on the arm to form pile members.

8. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating and carrying a strand successively through a fabric, a looper member below the fabric and having a slotted arm provided with a shoulder adjacent its outer end for successively engaging and holding the strand loops formed by the upward reciprocations of the needle, said loops working inwardly to extend around the slotted portion of the arm, means carried by the looper member for oscillating in the slot of the arm for successively severing the innermost loop which extends across the slotted portion of the arm to form pile members, and means for reciprocating the needle and the looper member.

9. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating and carrying a strand successively through a fabric, a looper member below the fabric and having a slotted arm provided with a shoulder adjacent its outer end for successively engaging and holding the strand loops formed by the upward reciprocations of the needle, said loops working inwardly to extend around the slotted portion of the arm, an oscillatory cutter pivotally mounted on the looper member and entering the slotted portion of the arm for successively severing the innermost loops which extend across the slotted portion of the arm to form pile members, means engaged by the cutter for causing it to oscillate, and means for reciprocating the needle and the looper member.

10. A sewing machine having the usual needle and means for guiding a strand to the needle, a fabric supporting plate having a needle opening and an elongated opening on each side of the needle opening for receiving an adjacent line of completed pile members on either side of the needle opening, the needle reciprocating to successively carry the strand through the frabric and the plate needle opening, the upward reciprocation of the needle causing the strand to slacken on one side of the needle, a looper member having a shouldered means below the plate openings movable to successively pass between the slacked portions of the strand and the needle to form and hold successive loops, means carried by the looper member adjacent the shouldered means for successively severing the innermost loop on the shouldered means to form pile members, and means for reciprocating the needle and the looper member.

11. A sewing machine having the usual needle and means for guiding a strand to the needle, a fabric supporting plate having a needle opening and an elongated opening on each side of the needle opening for receiving an adjacent line of completed pile members on either side of the needle opening, the needle reciprocating to successively carry the strand through the fabric and the plate needle opening, the upward reciprocation of the needle causing the strand to slacken on one side of the needle, a transversely extending reciprocal bar positioned below the plate and having a projecting slotted arm provided with a shoulder adjacent its free end, said arm during its forward reciprocation successively passing between the slacked portions of the strand and the needle to form and hold successive strand loops, the inner ones of which extend transversely of the arm slot, a cutter pivotally connected to the reciprocal bar and oscillating through the arm slot to sever the innermost strand loop on the arm and form pile members when the needle is in an upper position, a stop member coacting with and causing said cutter to oscillate, and means for reciprocating the needle and the reciprocal bar.

12. A sewing machine having the usual needle and means for guiding a strand to the needle, a fabric supporting plate having a needle opening and an elongated opening on each side of the needle opening for receiving an adjacent line of completed pile members ing, the upward reciprocation of the needle reciprocating to successively carry the strand through the fabric and the plate needle opening, the upward reciprocation of the needle causing the strand to slacken on one side of the needle, a transversely extending reciprocal bar positioned below the plate and having a projecting slotted arm provided with a shoulder adjacent its free end, said arm during its forward reciprocation successively passing between the slacked portions of the strand and the needle to form and hold successive strand loops, the inner ones of which extend transversely of the arm slot, a cutter pivotally connected to the reciprocal bar and oscillating through the arm slot to sever the innermost strand loop on the arm and form pile members when the needle is in an upper position, a stop member coacting with and causing said cutter to oscillate, a grooved means momentarily engaged by the lower end portion of the needle for laterally reinforcing the needle, and means for reciprocating the needle and the reciprocal bar.

13. A tufting attachment mechanism for sewing machines having a reciprocating needle for penetrating a fabric and carrying a strand which is passed through the fabric by the needle, a transversely reciprocal member positioned below the fabric and having an

outwardly extending angular arm, the arm having a vertical longitudinally extending slot opening rearwardly and a shoulder adjacent its forward end, a bell crank lever fulcrumed on the reciprocal member, a stop member engaging one arm of the bell crank lever, means for yieldingly holding the bell crank lever bearing against the stop member, a cutter carried by the ball crank lever and having its cutting edge extending for oscillation within the slot of the bar, and means for reciprocating the needle and the reciprocal member.

14. A tufting machine attachment mechanism for sewing machines, comprising a transverse reciprocal member having an angularly extending arm provided with an elongated slot in its rear portion and a loop holding shoulder adjacent its free end portion, and a cutter fulcrumed on and carried by the reciprocal member and oscillating in the slot to sever loops formed therearound.

15. A tufting machine attachment mechanism for sewing machines, comprising a transverse horizontally reciprocal member having an outwardly and forwardly extending arm provided with an elongated longitudinally extending slot in its rear end portion of its outer part and an outwardly projecting shoulder adjacent its forward end, said forward end portion being tapered on its free end, a bell crank lever fulcrumed on the reciprocal member and having a cutter which reciprocates in the arm slot, and a spring for yieldingly holding the bell crank lever in a predetermined position.

In testimony whereof I affix my signature.

CHARLES H. KEENEY.