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CHENILLE STITCHING SEWING MACHINE ATTACHMENT

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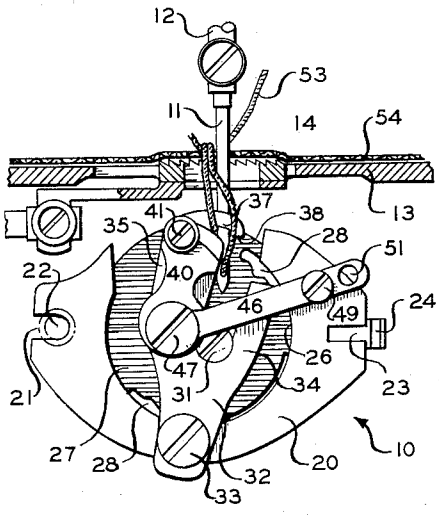


Fig. 1

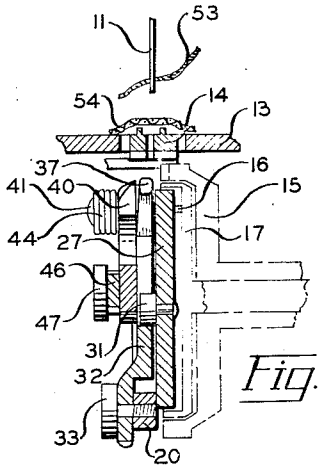


Fig. 3

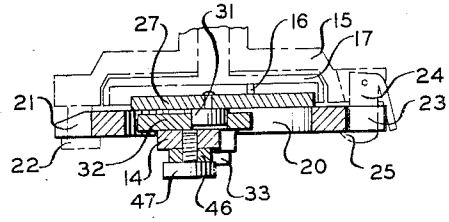


Fig. 4

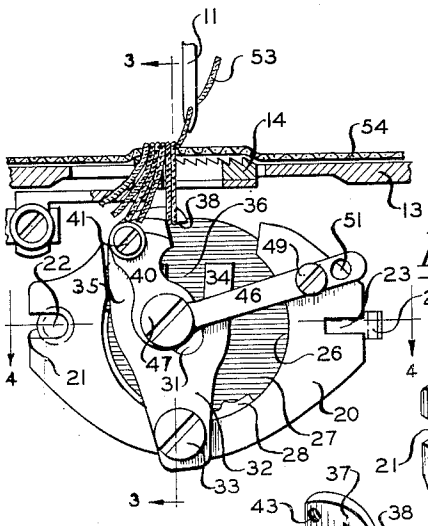


Fig. 2

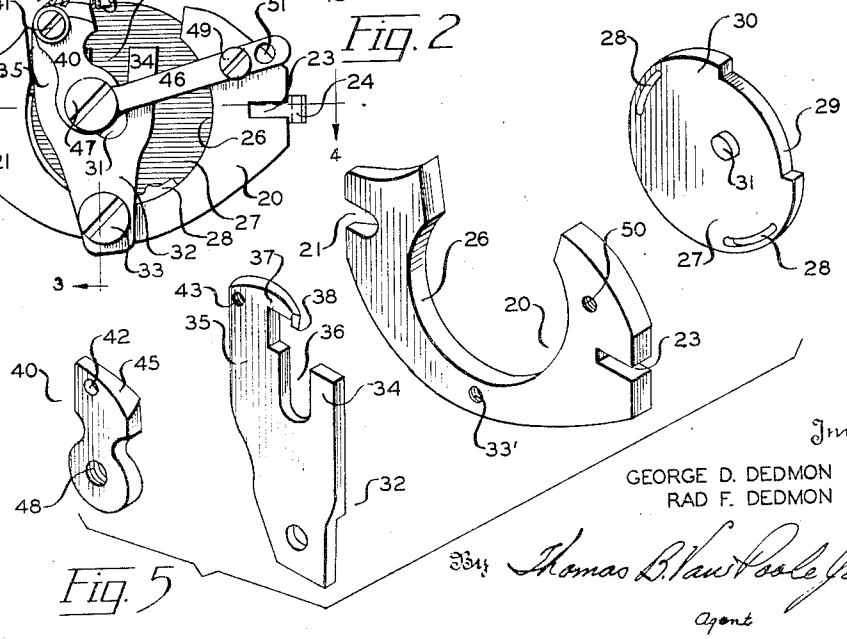


Fig. 5

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CHENILLE STITCHING SEWING MACHINE ATTACHMENT

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The present invention relates in general to chenille stitching sewing machine attachments, and more particularly to sewing machine attachments for forming a chenille type stitch of a strand of yarn or the like through a base fabric in the production of rugs and various decorative effects with a rotary shuttle type domestic sewing machine.

Heretofore, various attachments have been provided for sewing machines adapted to present progressive loops of a strand of yarn or the like to the needle of a sewing machine such that the needle stitches the looped yarn-strand to a base fabric in the production of rugs and decorative effects for bedspreads, and the like. Cutting devices operated in conjunction with the device forming and presenting the loops have also been provided to sever the looped strands and effect a chenille or cut pile-fabric type of stitch. These attachments, however, operate in conjunction with the reciprocatory needle, driven by the needle holding device, above the base fabric material on the work surface of the sewing machine, and are adapted to effect stitching of the looped yarn-strands to the base fabric by the thread coupled through the needle eye. It is desired, however, to effect a chenille type stitch with available types of domestic sewing machines by forming a stitch of the yarn-strand itself through the base fabric with the cut strands of yarn extending therethrough, particularly for forming ornamental single rows of chenille type stitches for bed spreads and the like. Further, it is desired to provide an attachment to be positioned below the work surface of the sewing machine and the base fabric and adapted for ease of attachment to a shuttle drive mechanism of the commercially marketed rotary shuttle type of sewing machine in which the shuttle is rotated in a vertical plane parallel to the line of feed.

Accordingly, an object of the present invention is the provision of a novel chenille stitching attachment for sewing machines adapted to form stitches of yarn continuously through a base fabric in the form of a chenille type stitch.

Another object of the present invention is the provision of a novel chenille stitching attachment for sewing machines adapted to receive its actuation directly from the shuttle driving mechanism of the sewing machine whereby yarn is stitched through a base fabric continuously in the form of a series of loops and cut to produce a smooth cut-pile or chenille effect.

Another object of the present invention is the

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provision of a novel chenille stitching attachment for sewing machines adapted to be disposed beneath the needle and the work surface of the sewing machine and to receive its actuation from the shuttle driving mechanism of a rotary shuttle type of sewing machine whereby yarn is stitched through a base fabric continuously in the form of a series of loops and periodically severed at a position remote from the fabric to produce a cut-pile or chenille effect.

Another object of the present invention is the provision of a novel chenille stitching attachment for sewing machines adapted to gain certainty and uniformity of operation, improved wearing and operating characteristics, and to enable rows of chenille or cut-pile type stitches of yarn to be stitched in any desired and evenly spaced relationship by an unskilled operator.

Another object of the present invention is to render available a simple and efficient device which readily may be attached to a conventional family sewing machine and which, when so attached, will automatically and rapidly produce a chenille or cut-pile type of stitch through a base fabric in uniform high quality, and without requiring the exercise of any great amount of skill or ingenuity on the part of the operator.

Other objects, advantages and capabilities of the present invention will become apparent from the following description, taken in conjunction with the accompanying drawing showing only a preferred embodiment of the invention, in which:

Figure 1 is a front elevation of a chenille stitching attachment embodying the present invention, with parts of the sewing machine associated therewith shown in section, the looper arm being illustrated at one extreme position of its oscillatory movement adjacent the needle operative to pick up a loop of the yarn;

Figure 2 is a front elevation of the chenille stitching attachment showing the looper arm at its other extreme position;

Figure 3 is a vertical transverse section view of the chenille stitching attachment, taken along the lines 3—3 of Figure 2;

Figure 4 is a horizontal section view of the chenille stitching attachment, taken along the lines 4—4 of Figure 2; and,

Figure 5 is an exploded perspective of the principal components making up the subject stitching attachment.

Referring to the drawing, in which like reference characters designate corresponding parts throughout the several figures, the chenille stitch-

ing attachment, generally indicated at 10, is adapted to be applied to a conventional rotary shuttle type of sewing machine, comprising the reciprocatory needle 11, needle-bar 12, throat plate 13, and feed dog 14. Such conventional types of rotary shuttle sewing machines are provided with the shuttle mechanism disposed below the throat plate such that the shuttle is rotated in a vertical plane parallel to the line of feed, the shuttle being normally disposed in a shuttle race or housing member 15 positioning the shuttle with its outer surface substantially in the plane of movement of the reciprocatory needle 11 and having a pair of shuttle driving pins 16 on a rotary driving plate 17 disposed in the shuttle race 15 adapted to engage corresponding apertures in the shuttle and driven from the master drive mechanism in timed relation with the needle drive.

The chenille stitching attachment 10 is adapted to be detachably mounted on this shuttle race 15 and be driven by the shuttle driving pins 16 on the rotary driving plate 17 disposed in the shuttle race 15, and to this end comprises an assembly mounting plate 20 having a slot 21 in one end thereof positioned to engage a rear retaining pin 22 normally found on the shuttle race 15 to retain the rear end of the mounting plate 20. The other end of the assembly mounting plate 20 has a retaining slot 23 to receive corresponding securing means at the other end of the shuttle race, such as the retaining latch 24 having a clamping head portion 25 adapted to extend inwardly of the retaining slot 23 and engage the outer face of the assembly mounting plate 20, the latch 24 being resiliently urged inwardly toward the center of the mounting plate. The securing means for the shuttle race 15 comprising the fixed retaining pin 22 and the resiliently positioned retaining latch 24 are described by way of illustration only as a type of securing means commonly employed on commercially available sewing machines of the rotary shuttle type to effect ease in removal of the shuttle assembly.

The assembly mounting plate 20 is provided with a cylindrical opening 26 extending through the plate 20 at substantially the center thereof, the mounting plate 20 being cut away along the upper portion of the opening 26 to permit the reciprocatory needle 11 to extend downwardly into the opening 26. The opening 26 is of somewhat smaller diameter than that of the shuttle race 15 and shuttle driving plate 17 so that the edges of the mounting plate 20 along the opening 26 serve as a cover plate for the shuttle race 15. An eccentric driving disk 27 of a diameter to fit into the shuttle race 15 is disposed in the shuttle race and retained therein by the edges of the opening 26 in the assembly mounting plate 20, and is provided with a pair of diametrically opposed slots 28 disposed near the periphery thereof to receive the shuttle driving pins 16 on the shuttle driving plate 17 for imparting rotary motion to the eccentric driving disk 27 timed in accordance with the movement of the reciprocatory needle 11.

A segment of the periphery of the eccentric driving disk 27 is cut away as indicated at 29 to permit an outwardly extending lip normally found on the driving plate 17 in the shuttle race 15 to extend therethrough, and the outer face of the disk 27 along the portion of the edge thereof that is presented upwardly when the needle 11 is in its lowermost position is inclined inwardly at 30 to permit the lower portion of the needle 11 to

extend downwardly below the upper edge of the disk 27.

An eccentrically positioned driving lug 31 is disposed on the outer surface of the driving disk 27 extending outwardly therefrom to drive a looper arm member 32 in oscillatory manner on an arcuate path about a mounting screw 33 extending through the looper arm member 32 and threaded into a threaded aperture 33' in the assembly mounting plate 20 to form a pivot for the looper arm 32. The looper arm member 32 is bent inwardly at a point slightly above the pivot formed by the mounting screw 33 to extend into the opening 26 in the mounting plate 20 and along the outer surface of the eccentric driving disk 27, and is formed of two bifurcated arms 34 and 35 defining a substantially vertically extending slot 36 into which the eccentric driving lug 31 is disposed to cam the looper arm 32 back and forth within the cylindrical opening 26 of the assembly mounting plate 20 along an arcuate path about the pivot forming mounting screw 33. The rearmost arm 35 of the looper arm member 32 is shaped to define a forwardly extending hook portion 37 at the upper end thereof disposed so as to advance into juxtaposed relation with the needle 11 along the side thereof as to looper arm 32 is cammed forwardly by the inter-action of the eccentric driving lug 31 and the slot 36 in the looper arm 32. The hook 37 on the looper arm member 32 is provided at its forward edge with a downward projection 38 and the outer end of the hook 37 is tapered to a sharp point so that the hook when moved forwardly into juxtaposed relation with the needle 11 may move between the needle 11 and the yarn threaded into the eye of the needle 11 on the forward stroke of the looper arm 32, and the portion of the yarn thus extending around the hook portion 37 of the looper arm 32 be retained around the hook 37 by the projection 38 on the return stroke of the looper arm 32 to form a downwardly extending loop of the yarn below the throat plate 13, in a manner to be more completely described hereafter.

A shearing arm member 40 is mounted for reciprocatory movement on the arm 35 of the looper arm member 32 about a pivot formed by a mounting screw 41 extending through an aperture 42 in the shearing arm 40 and threaded into a threaded aperture 43 in the looper arm member 32, the mounting screw 41 being surrounded by a coil spring 44 or other resilient means bearing against the shearing arm member 40 to resiliently urge the upper edge of the shearing arm, provided with a surface inclining inwardly to define a sharp edge as indicated at 45, in juxtaposed relation with the lower edge of the hook forming portion 37 of the looper arm 32 to form shearing edges for cutting the looped yarn retained around the hook forming portion 37 of the looper arm. The lower or free end of the shearing arm member 40 is retained in fixed relation with the assembly mounting plate 20 by means of a coupling link 46 secured to the shearing arm member 40 by a screw 47 extending through the coupling link 46 and threaded into threaded aperture 48 in the shearing arm. The other end of the coupling link 46 is adjustibly secured to the mounting plate 20 by means of a screw member 49 threaded into the mounting plate at threaded aperture 50 and adapted to selectively extend through any of a plurality of openings 51 provided axially along the coupling link 46. In this manner, as the looper arm member 32 is oscillated back and forth

within the opening 26 in the assembly mounting plate 20 by the eccentric driving lug 31, the shearing arm 40 is likewise oscillated about the pivot screw 41 such that the shearing edge 45 of the shearing arm 40 is brought into closed position with the lower edge of the hook forming portion 37 of the looper arm member 32 to effect the required shearing action.

In the operation of the device, starting with the components of the device in the position shown in Figure 2, as the needle 11, having the yarn indicated at 53 with which the chenille stitch is to be formed threaded through the eye thereof, descends downward through the base fabric material 54, carrying the yarn 53 below the fabric in the form of a downwardly directed loop, the eccentric driving disk 27 coupled to the rotary shuttle driving pins 16 in the shuttle race 15 is driven in a clockwise direction, moving the eccentric driving lug 31 in an arcuate path toward the right. as viewed in Figure 2. By interaction of the driving lug 31 and the slot 36 formed in the looper arm member 32 in which the driving lug 31 rides, the looper arm member 32 is cammed forwardly about its pivot formed by mounting screw 33 to a position alongside the needle 11 when the needle 11 is at a downwardly extended position in its reciprocatory stroke, with the forward edge of the hook portion 37 of the arm 32 carrying the projection 38 extended somewhat beyond the needle as shown in Figure 1. The timing of the movement of the needle 11 and the looper arm member 32 is so regulated by positioning of the eccentric driving lug 31 that the needle 11 completes the downward portion of its stroke while the looper arm member 32 is still being cammed forward, and the needle 11 has already commenced its upward stroke when the forward portion of the hook formation 37 of the looper arm 32 reaches a position alongside the needle 11 slightly above the eye thereof, in the relative positions shown in Figure 1. As the friction between the base fabric 54 and the yarn loop stitched therethrough is sufficient to cause the yarn loop just formed on the downstroke of the needle to extend outwardly from the sides of the needle, as indicated generally at 55 in Figure 1, as the needle begins to ascend upward through the material, the forward end of the hook portion 37 on the looper arm carrying the projection 38 will enter the loop formed in the yarn between the laterally extended loop 53 and the side of the needle 11, thus retaining the loop around the hook portion of the looper arm member 32 as the needle ascends further toward its uppermost position above the base fabric 54. During the remainder of the rotation cycle of the eccentric driving disk 27 and the driving lug 31, corresponding to the upward stroke of the needle 11, the looper arm member 32 is cammed rearwardly about the mounting screw 33 to its initial position shown in Figure 2, the projection 38 on the hook portion 37 of the looper arm member 32 retaining the loop formed about the hook portion 37 throughout the return portion of the reciprocatory stroke of the looper arm 32.

The shearing arm member 40 mounted on the looper arm member 32 to pivot about the mounting screw 41, is moved in a reciprocatory manner in conjunction with the movement of the looper arm 32, as the lower end of the shearing arm member 40 is maintained in fixed relation with the mounting plate 20 by the coupling link 46 coupled to the mounting plate 20 by screw member 49. Thus, as the looper arm member is

cammed forwardly toward the needle 11 by the driving lug 31, the upper portion of the shearing arm member 40 is carried forward therewith, effectively rotating the shearing arm member 40 clockwise about the pivot 41 and the shearing edge 45 of the arm 40 away from the companion shearing edge of the hook portion 37 of looper arm 32. On the return or rearward portion of the stroke of the looper arm 32, the shearer 40 is accordingly rotated in a counterclockwise direction about the pivot 41, thus rotating the shearing edge 45 into closed or shearing relation with the hook portion 37 of the looper arm 32 to effect cutting of the yarn loops that may be formed about the hook portion 37 between the shearing edges. It will be noted that each individual loop formed about the looper arm 32 is severed by the shearing arm 40 several cycles after the loop has been formed about the looper arm 32, each loop being shifted rearwardly by successive loops formed about the looper arm until the loops are moved into position between the shearing edges of the shearing arm 40 and the hook portion 37 of the looper arm member 32. In this manner a neat, relatively uniform series of cut loops of yarn stitched through the base fabric material is formed extending below the base fabric, to effect production of such ornamental effects resembling chenille type stitches as may be desired.

To permit the downwardly depending cut-loops of yarn stitched in the base fabric to be readily fed rearwardly from below the work surface of the sewing machine, centrally located slots extending rearwardly of the needle axis aligned with the needle and the line of feed of the sewing machine may be provided in the feed dog 14 and throat plate 13.

It will be apparent from the above description that a novel chenille stitching attachment for sewing machines has been provided, which is readily attachable to the rotary shuttle type of commercially available sewing machines in a manner that requires little skill or labor, which is actuated directly from the shuttle driving mechanism to stitch yarn through a base fabric continuously in a series of loops which are periodically cut to produce a cut-pile or chenille effect, which enables rows of the stitches of yarn to be formed in any desired and evenly spaced relationship by an unskilled operator.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit and scope thereof, and it is desired, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and are specifically set forth in the appended claims.

What is claimed is:

1. A chenille stitching attachment for domestic sewing machines of the rotary shuttle type including a reciprocatory needle, comprising a supporting member adapted for attachment to a conventional shuttle housing assembly of the sewing machine, rotary driven means adapted to be substituted for a conventional shuttle of the sewing machine intercoupled with the shuttle driving element of the sewing machine to be driven thereby, said rotary driven means having eccentric driving means thereon, loop taking means coupled to said driving means and pivotally mounted on said supporting member for reciprocatory movement in a vertical plane below said needle to be

advanced to a position immediately adjacent said needle when in lower position in its stroke, and shearing means pivotally mounted on said loop taking means and oscillated in conjunction therewith to sever loops of yarn formed on said loop taking means at one end of the loops.

2. A chenille stitching attachment for domestic sewing machines of the rotary shuttle type including a reciprocatory needle, comprising a supporting plate adapted for attachment to a conventional shuttle housing assembly of the sewing machine, rotary drive means including a disk member adapted to be substituted for a conventional shuttle of the sewing machine in the shuttle housing and coupled to the shuttle driving element to be driven thereby, said disk member having an eccentrically positioned drive lug thereon, yarn loop taking means pivotally mounted on said supporting plate for reciprocatory movement in a vertical plane below the reciprocatory needle intercoupled with said driving lug, said loop taking means having a hook member thereon positioned to be advanced during movement of said loop taking means to a position immediately adjacent the needle of the sewing machine above the eye thereof when the needle is in lower position in its stroke and engage yarn threaded through the needle to retain the yarn looped around said hook member during ascent of said needle forming a downward yarn loop, and shearing means pivotally mounted on said loop taking means and oscillated in conjunction therewith to sever the loops of yarn formed on said loop taking means at one end thereof.

3. An attachment for forming a chenille type stitch of yarn through a base fabric material for sewing machines of the rotary shuttle type comprising, a supporting plate adapted for attachment to a conventional shuttle housing assembly, rotary drive means including a disk member having an eccentric driving lug thereon adapted to be substituted for a conventional rotary shuttle in the shuttle housing and driven by the shuttle driving element, yarn loop taking means pivotally mounted on said supporting plate for reciprocatory movement in a vertical plane below the base fabric material and coupled with said driving lug, said loop taking means having a hook member thereon positioned to be advanced during the movement of said loop taking means to a position immediately adjacent the needle of the sewing machine when the needle is in lower position in its stroke for engaging yarn threaded through the needle and retaining the yarn in a downwardly directed loop through the base fabric, and shearing means having a scissor-blade member pivotally mounted on said loop taking means and oscillated in conjunction therewith to sever loops of yarn formed on said loop taking means at one end thereof.

4. A chenille stitching attachment for sewing machines of the rotary shuttle type including a reciprocatory needle, comprising a rotary driven disk member adapted to be substituted for a conventional rotary shuttle in the conventional shuttle housing assembly and having recesses to receive the conventional shuttle driving elements of the sewing machine in driving relation, a supporting plate adapted for attachment to a conventional shuttle housing assembly for retaining said rotary disk member in the shuttle housing assembly, an eccentric driving lug on said disk member extending outwardly through a central opening in said supporting plate, yarn loop taking means comprising a looper arm pivotally mounted on said supporting plate for reciprocatory movement in a vertical plane below the needle and having a slot formed therein for receiving said eccentric lug to transform rotary movement of said disk member into oscillatory movement of said looper arm, said loop taking means having a hook thereon adapted to intercept thereon successive loops of yarn threaded through the needle on oscillation of said looper arm, and shearing means pivotally mounted on said looper arm and oscillated in conjunction therewith to sever the loops of yarn formed on said hook.

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