Dec. 8, 1936. H. PERKONS 2,063,267

RUG MAKING ATTACHMENT FOR SEWING MACHINES

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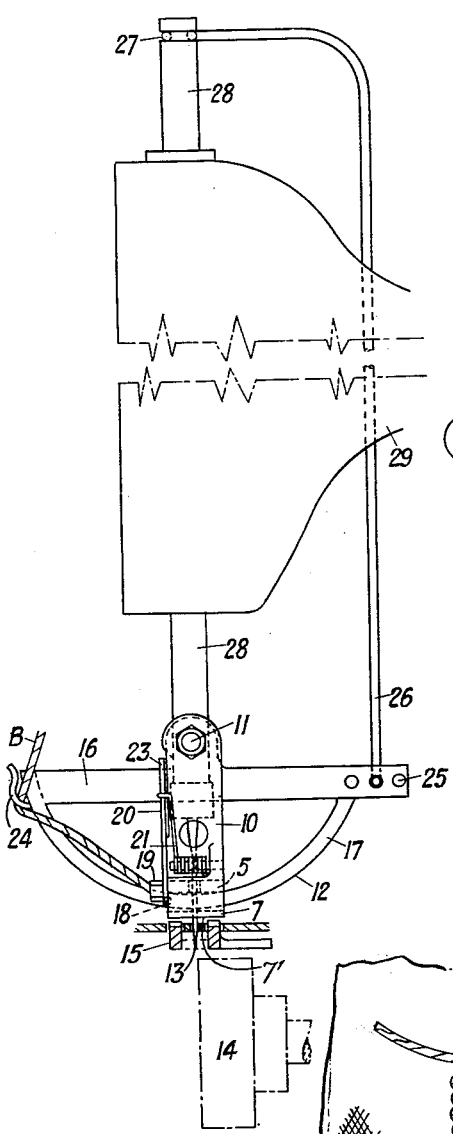

FIG. 1.

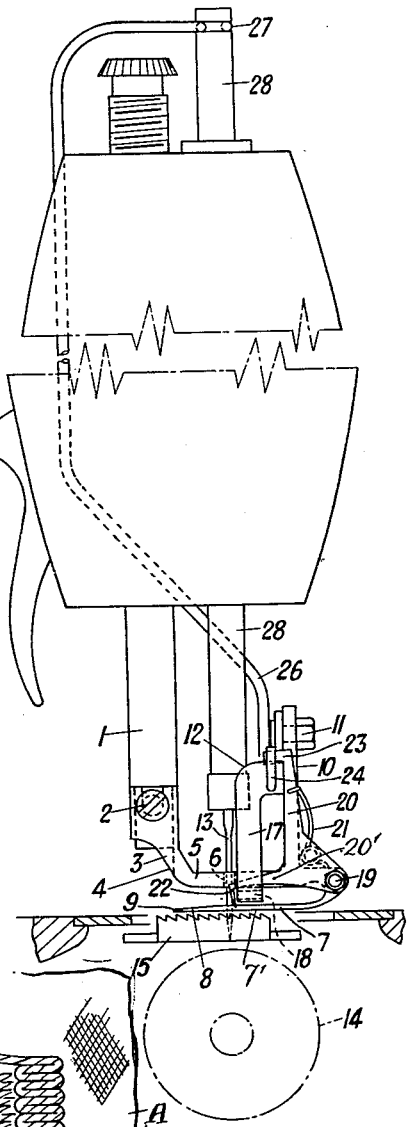

FIG. 2.

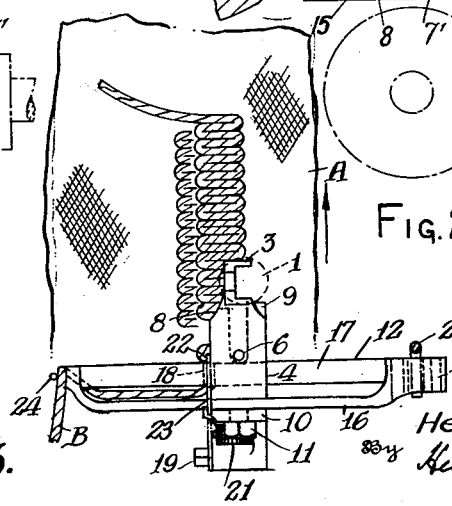

FIG. 3.

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RUG-MAKING ATTACHMENT FOR SEWING MACHINES

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19 Claims. (Cl. 112—101)

For producing rugs and the like by means of a sewing machine it is known to wind yarn or the like manually in loops around a forked member or former and then to secure the yarn loops to a base fabric by a line of stitches formed in the gap between the prongs of the fork. The winding of the yarn around the forked member requires considerable time and the amount of yarn used is relatively large, since the limbs of the loops are laid in superposed relation. Further, when long rows of loops are to be formed, the operation of winding the yarn on the former has to be repeated.

The present invention has for an object to provide a sewing machine attachment adapted to receive its actuation from the needle-bar of the sewing machine, whereby the yarn is laid sinuously in the form of closely spaced loops on the surface of and stitched to a base fabric, the limbs of each loop lying side by side, the loop-forming and stitching operations proceeding continuously.

As hereinafter described, the attachment comprises a work-engaging foot fitted to the presser-bar of the sewing machine in substitution for the usual presser-foot, a yarn laying member which is vibrated in a direction transverse to the line of feed of the work concurrently with the reciprocation of the machine needle, and a loop-detaining finger spaced from the needle in the direction transverse to the direction of feed and arranged to perform substantially vertical reciprocating movements out of time with the vertical reciprocating movements of the needle so as alternately to detain and release bights of yarn leading from the yarn-laying member to the stitching point.

In the acompanying drawing which illustrates by way of example an embodiment of the invention Fig. 1 is a front elevation part vertical section showing the attachment fitted to the presser-bar of a sewing machine; Fig. 2 is an end elevation part vertical section, and Fig. 3 is a plan view.

Referring to the drawing, 1 denotes the presser-bar of a sewing machine to which is secured, as by means of a screw 2, the shank 3 of a horizontally bifurcated foot 4.

The foot 4 comprises an upper limb 5, adjoined to the shank 3 and presenting a needle aperture 6, and a lower limb or tread 7 spaced vertically from the upper limb 5 and formed with a work-engaging surface 7' and with toes 8, 9 (Fig. 3) separated by a slot which originates in front of the needle aperture 6.

Uprising from the foot 4 and spaced from the shank 3 is a leg 10 fitted to the upper end of which is a horizontal stud 11 forming a pivot support for a rocking segment 12 having its centre of curvature on the axis of said stud and adapted to oscillate in a vertical plane transverse to the line of feed in immediate proximity to and in front of the path of vertical reciprocation of the eye-pointed needle 13. The lower stitch-forming implement in the form of a looper 14 co-operative with the needle, and the feed-dog 15 opposed to the tread 7 are illustrated conventionally in the drawing, the direction of feed of the base fabric A being indicated by the arrow in Fig. 3.

The rocking segment 12 comprises in the embodiment illustrated a bridge-bar 16 joining the ends of an arcuate yarn-laying member 17 which traverses the gap or recess between the limbs 5 and 7 of the foot 4.

Between its ends the arcuate member 17 is formed with an eye 18 through which the yarn B is led to the stitching point. In the raised position of the needle 13 the eye 18 is at the side of the needle aperture 6 remote from the toe 8; the eye 18 passing to the other side of the aperture 6 in the descent of the needle.

Journalled for rocking movement on a horizontal pivot stud 19 at the junction of the upper and lower limbs 5 and 7 of the foot 4 is a two-armed lever 20, 20', the arm 20' of which extends rearwardly over the arcuate member 17 and terminates in a downturned loop-bending or detaining finger 22. The upstanding lever arm 20 is engaged by one end of a torsion spring 21 the other end of which engages the foot 4, whereby the lever 20, 20' is urged in the direction to maintain the downturned finger 22 in lowered position, bridging the gap between the limbs 5 and 7 of the foot 4. The finger 22 is disposed in a plane transverse to the direction of feed and containing the needle 13, and, like the needle 13, is in immediate adjunction to the toe 8 of the foot 4 and works closely in rear of the arcuate member 17. The overhanging upper end 23 of the lever arm 20 projects above the bridge-bar 16 so as to be engaged thereby in the rocking movement of the segment 12, whereby the lever 20, 20' is rocked in a vertical plane about the axis of the pivot stud 19 and the finger 22 is moved up and down in a path transverse to the path of movement of the yarn-laying member 17 and closely in rear of the member 17; said path extending across the gap between the limbs 5 and 7 of the foot 4.

It will be seen that with the described arrangement, as the segment 12 is rocked about the axis of the pivot stud 11 in the descent of the needle, the yarn-guiding eye 18 will be caused to pass out of the gap between the limbs 5 and 7 of the foot 4 and beyond the finger 22, pulling off yarn from the source of supply, and the lever 20, 20' will be vibrated about the axis of the pivot stud 19 to raise the finger 22. On the ascent of the needle the yarn-guiding eye 18 returns to its starting point at that side of the needle 13 remote from the finger 22, while the finger 22 descends between the pulled-off yarn and the arcuate member 17 before the returning eye 18 passes the finger 22, so that the length of yarn pulled off is bent around the finger 22 by the return movement of the eye 18 and forms a loop.

At one end of the bridge-bar 16 is a yarn-guiding hook 24 by way of which the yarn B is led from the source of supply to the eye 18.

Engaging a selected one of a set of apertures 25 at the other end of the bridge bar 16 is the lower end of a link 26 whose opposite end is connected at 27 to the vertically reciprocating needle-bar 28. In the particular construction illustrated the link 26 is bent to clear the head of the overhanging arm 29 of the machine frame and is connected to the needle-bar 28 at a point adjacent to the upper end of the latter; but it is to be understood that the location of the point of connection of the link 26 to the needle-bar 28 is a matter of choice.

In the operation of the machine, as the stitching proceeds, with feed of the work in the direction of the arrow shown in Fig. 3, the yarn emerging from the eye 18 in the arcuate member 17 of the rocking segment 12 is alternately detained and released by the finger 22, so that in the interval between successive work-piercing movements of the needle there is formed in the gap or recess between the limbs 5 and 7 of the foot 4 a loop of yarn which extends transverse to the line of feed from the eye 18 to the finger 22 and thence to the point of anchorage of the previous loop to the work, and which in the next work-piercing movement of the needle is secured to the base fabric A close to one edge of the row of loops being formed. As will be understood, the upper limb 5 of the foot 4 acts as a stripper for the yarn loops.

When one row of yarn loops has been stitched to the base fabric, another row is stitched to the base fabric in overlapping relation with the first row, and so on.

As is understood, the length of each loop depends on the spacing of the finger 22 from the needle path. With replacement of the lever 20, 20' by one in which the finger 22 is further spaced from the needle-aperture 6 longer loops may be formed. The dimension of each loop measured in the direction of feed of the work is that of a single stitch length, the origin of each loop being at the point at which it is anchored to the base fabric by the stitching thread.

If so desired, the loops may be severed by means of a loop-severing device.

By the term "yarn" it is intended to include not only woollen yarn such as ordinarily used for rug-making but also other textile materials capable of being laid in loops.

I claim:—

1. A sewing machine attachment, comprising a work-engaging foot presenting a needle-aperture, a yarn-laying member mounted on said foot for vibratory movement in a plane close to said aperture, and a loop-detaining member mounted on said foot for vibratory movement in a path transverse to the path of movement of said yarn-laying member and positioned to receive movement from said yarn-laying member.

2. A sewing machine attachment, comprising a foot presenting a needle-aperture and bifurcated to present a work-engaging tread portion and a stripper portion separated by a gap, a yarn-laying member mounted on said foot and presenting a yarn guide movable in said gap, past said aperture, and a loop-detaining member mounted on said foot and having a finger movable in the direction across said gap and close to the path of said yarn guide.

3. A sewing machine attachment comprising a work-engaging foot presenting a needle aperture, a yarn-laying member pivotally mounted on said foot for movement in a plane transverse to said foot and close to said aperture, and a loop-detaining member pivotally mounted on said foot and provided with a finger movable in a path transverse to the path of said yarn-laying member and spaced laterally from said aperture.

4. In a sewing machine, in combination with a vertically reciprocating needle-bar, a needle carried by said needle-bar, a presser-bar, a foot carried by said presser-bar, a feed-dog opposed to said foot, a vibratory yarn-laying member mounted on said foot for vibratory movement in a plane transverse to the direction of feeding movement of said feed-dog and close to the path of said needle, said member connected to receive vibratory movements concurrent with the reciprocating movements of said needle-bar, and a loop-detaining member mounted on said foot for movement in a path transverse to the path of movement of said yarn-laying member and having a finger spaced laterally from the path of said needle, said finger movable to yarn-engaging position in the ascent of said needle and to yarn-releasing position in the descent of said needle.

5. In a sewing machine, in combination, a reciprocating needle-bar, a needle carried by said needle-bar, a presser-bar, a foot carried by said presser-bar and presenting a needle aperture, a feed-dog opposed to said foot, a yarn-laying member mounted on said foot for rocking movement in a plane transverse to the direction of feeding movement of said feed-dog and close to said aperture, an operative connection between said yarn-laying member and said needle-bar, a loop-detaining member mounted on said foot for rocking movement in a plane parallel to the direction of feeding movement of said feed-dog, and having a detaining finger engageable with the yarn at a point spaced from said aperture, said loop-detaining member having a part in the path of said yarn-laying member whereby said loop-detaining member is given movement in one direction by said yarn-laying member, and a spring urging said loop-detaining member in the opposite direction.

6. A sewing machine attachment comprising a foot having a work-engaging surface and a needle-aperture, a detaining finger supported for movement in a path transverse to said work-engaging surface and spaced laterally from said aperture, a spring urging said finger in one direction, and a yarn-laying member mounted on said foot for movement in the direction transverse to said foot, said yarn-laying member having a yarn-guiding eye movable in a path passing close to said aperture and to the path of said finger, said yarn-laying member adapted to im-

part movement to said finger in opposition to said spring.

7. A sewing machine attachment comprising a work-engaging foot having a tread portion and a superposed portion unitary with a shank and presenting a needle-aperture, said superposed portion spaced from said tread portion to afford a recess between said portions, said superposed portion joined to said tread portion at the end remote from said shank to close one end of said recess, a yarn-laying member pivotally carried by said foot and presenting a yarn guide adapted to perform yarn-delivering and return movements across said recess in a region located between said aperture and the closed end of said recess, and a detaining member pivotally mounted on said foot and presenting a finger movable in a path to intercept the yarn in the return movement of said yarn guide.

8. In a sewing machine, in combination with stitch-forming mechanism including a reciprocating needle-bar and a needle carried by said needle-bar, a yarn-laying member mounted for vibratory movement in front of said needle, an operative connection between said needle-bar and said yarn-laying member, and a detaining finger movable in a path close to the path of said yarn-laying member, said finger deriving movement from said needle-bar by way of said yarn-laying member, said finger movable to yarn-engaging position in the ascent of said needle and to yarn-releasing position in the descent of said needle.

9. In a sewing machine, in combination with stitch-forming mechanism including a reciprocating needle-bar and a needle carried by said needle-bar, a presser-bar adjacent to said needle-bar, yarn-laying and looping members sustained by said presser-bar, said yarn-laying member adapted to swing in a path in front of said needle and having an operative connection with said needle-bar, said looping member adapted to swing in a path transverse to the path of said yarn-laying member and actuatable by said yarn-laying member in one direction.

10. In a sewing machine, in combination, a reciprocating needle-bar, a needle carried by said needle-bar, a presser-bar, a foot carried by said presser-bar, a yarn-laying member mounted on said foot for vibratory movement in a plane transverse to said foot and in front of said needle, a loop-detaining member mounted on said foot for vibratory movement in a plane intersecting the plane of movement of said yarn-laying member, and an operative connection between said needle-bar and one of said members, the other of said members deriving movement from said member operatively connected to said needle-bar.

11. In a sewing machine, in combination with stitch-forming and fabric-feeding mechanisms, a presser-bar, a foot carried by said presser-bar, a yarn-laying member mounted on said foot for vibratory movement above the fabric in front of the stitching point in a direction transverse to the direction of feed, said member connected to receive yarn-delivering and return-movements from said stitch-forming mechanism, and a detaining finger engageable with the yarn in the return movement of said member and disengageable from the yarn in the yarn-delivering movement of said member.

12. A sewing machine attachment, comprising in combination, a work-engaging foot, and yarn-laying and bending members mounted on said foot for vibratory movements, said yarn-laying member provided with a yarn guide movable across said foot in front of the stitching point, said bending member deriving movement from said yarn-laying member, and having a finger engageable with the yarn in one stage of movement of said yarn guide and disengageable from the yarn in another stage of movement of said yarn guide.

13. In a sewing machine, in combination with stitch-forming and fabric-feeding mechanisms, a fabric-engaging foot, a yarn guide carried by said foot and movable in a path transverse to the direction of feed to lay a yarn on the face of the fabric in front of the stitching point for attachment to the fabric by said stitch-forming mechanism, said guide connected to receive operative movements in synchronism with those of said stitch-forming mechanism, and a detaining element carried by said foot and presenting a finger about which the yarn laid by said guide is bent to loop form, said finger being disengageable from the loop in the operation of said stitch-forming mechanism.

14. In a sewing machine, in combination with stitch-forming mechanism, and fabric-feeding mechanism for effecting stepwise advance movement of a fabric, within the range of operation of the stitch-forming mechanism, a presser-bar, and yarn-laying and looping means carried by said presser-bar and operative to form a row of loops of yarn laid one in each step of advance movement of the fabric in front of the stitching point for attachment to the fabric by stitches located adjacent to one edge of the row, said yarn-laying and looping means operatively connected with said stitch-forming mechanism to effect yarn-laying and looping operations in timed relation with the operation of said stitch-forming mechanism.

15. In a sewing machine, in combination with stitch-forming and fabric-feeding mechanisms, a presser-bar, a foot secured to said presser-bar and having a tread portion, a yarn-laying guide mounted on said foot for reciprocating movement in front of the stitching point, above and across said tread portion, an operative connection between said guide and the stitch-forming mechanism whereby said guide is caused to perform one complete reciprocation in each stitch-forming cycle, and a detaining finger carried by said foot and movable from and towards yarn-engaging position in each reciprocation of said guide.

16. In a sewing machine, in combination with a reciprocating needle-bar, a needle carried by said needle-bar, an arcuate yarn-laying member mounted in front of said needle for oscillation in an upwardly concave path and adapted to lay a yarn transversely of the needle-path, said member deriving its movement from said needle-bar, and a loop-detaining finger movable up and down in a path close to the path of movement of said yarn-laying member and serving to detain and release yarn loops extending from said yarn-laying member to a point penetrated by said needle.

17. A sewing machine attachment comprising a presser-foot adapted to be substituted for the conventional sewing machine presser-foot and having vertically spaced supporting and stripper portions, a post rising from said supporting portion, an open segmental yarn-laying member pivotally mounted on said post and having an arcuate portion formed with a yarn delivery guide disposed in the space between the supporting and

stripper portions of said presser-foot, and a vibratory loop-detainer cooperatively related to said yarn-laying member.

18. A sewing machine attachment comprising a presser-foot adapted to be substituted for the conventional sewing machine presser-foot and having vertically spaced supporting and stripper portions the latter of which is relatively thin, a post rising from said supporting portion, an open segmental yarn-laying member pivotally mounted on said post and having an arcuate portion formed with a yarn delivery guide disposed in the space between the supporting and stripper portions of said presser-foot, and a vibratory loop-detainer cooperatively related to said yarn-laying member.

19. A sewing machine attachment comprising a presser-foot adapted to be substituted for the conventional sewing machine presser-foot and having vertically spaced supporting and stripper portions, a post rising from said supporting portion, an open segmental yarn-laying member pivotally mounted on said post and having an arcuate portion formed with a yarn delivery guide disposed in the space between the supporting and stripper portions of said presser-foot, and a vibratory loop-detainer mounted on said presser-foot in advance of said yarn-laying member and having an arm crossing rearwardly over said arcuate portion and terminating in a downturned finger.

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