Aug. 30, 1938. J. D. KARLE 2,128,484

RUG MAKING ATTACHMENT FOR SEWING MACHINES

Filed May 13, 1936 2 Sheets-Sheet 1

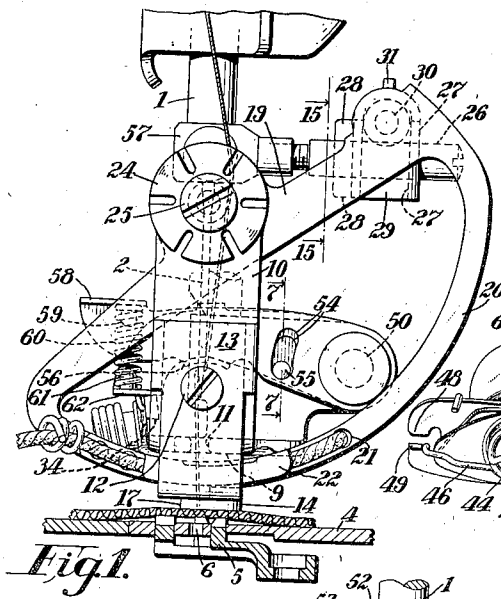

Fig. 1.

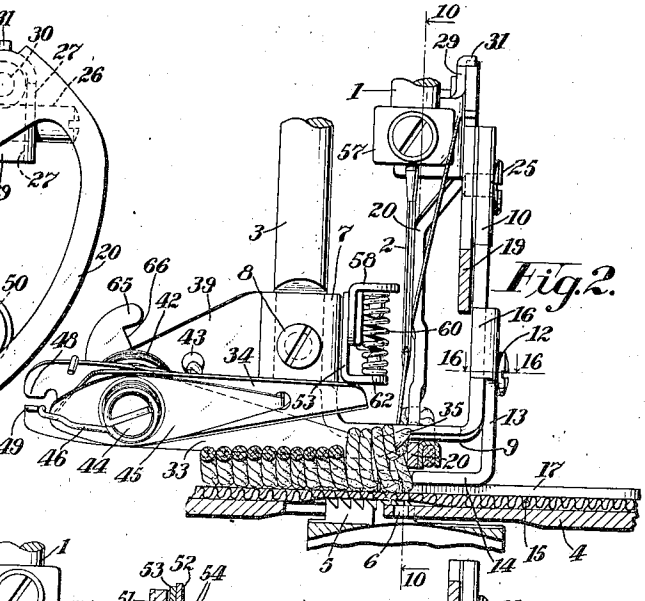

Fig. 2.

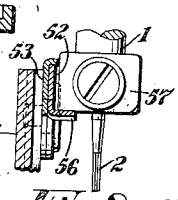

Fig. 8.

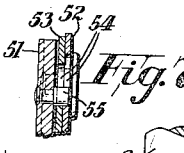

Fig. 7.

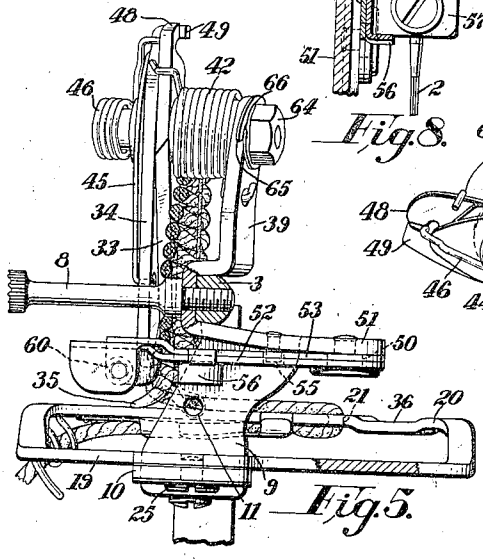

Fig. 5.

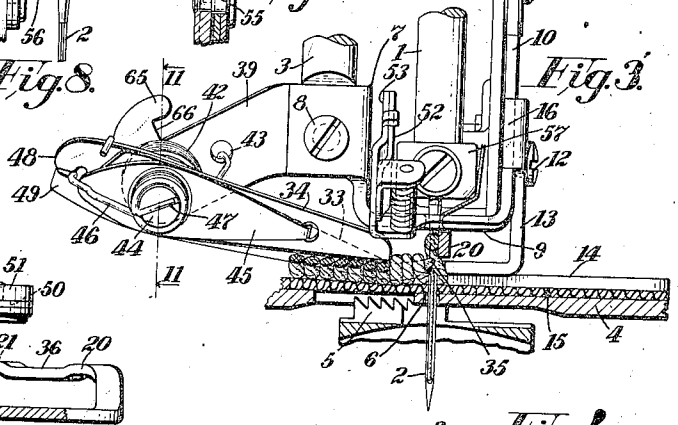

Fig. 3.

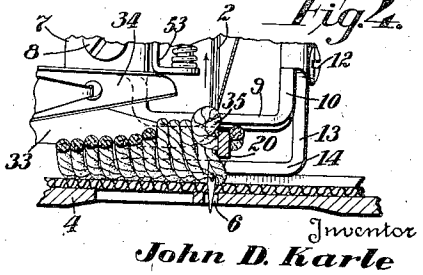

Fig. 4.

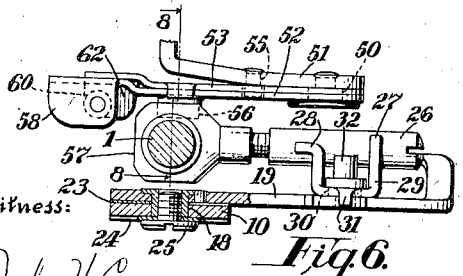

Fig. 6.

Witness:

John H. Cave

Inventor

John D. Karle

By Henry J. Miller

Attorney

Aug. 30, 1938. J. D. KARLE 2,128,484

RUG MAKING ATTACHMENT FOR SEWING MACHINES

Filed May 13, 1936 2 Sheets-Sheet 2

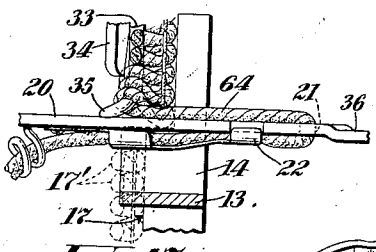

Fig. 17.

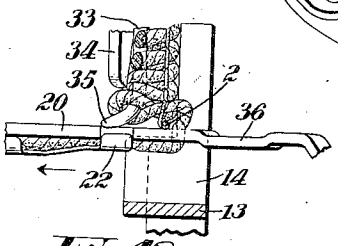

Fig. 18.

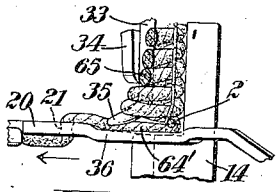

Fig. 19.

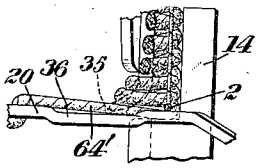

Fig. 20.

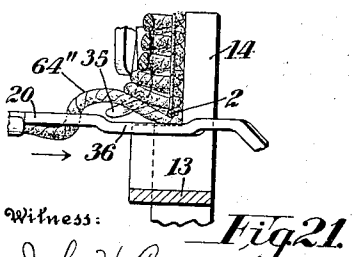

Fig. 21.

Witness:
John N. Cave

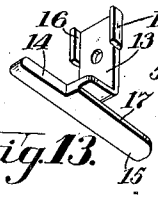

Fig. 13.

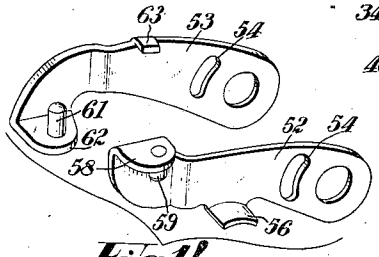

Fig. 14.

Fig. 22.

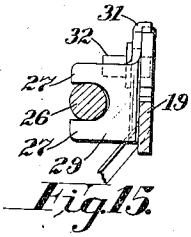

Fig. 15.

Fig. 23.

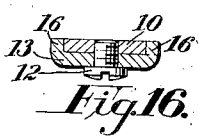

Fig. 16.

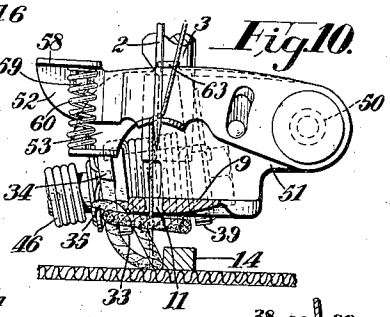

Fig. 10.

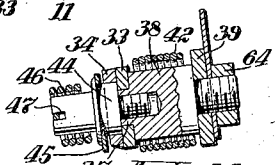

Fig. 11.

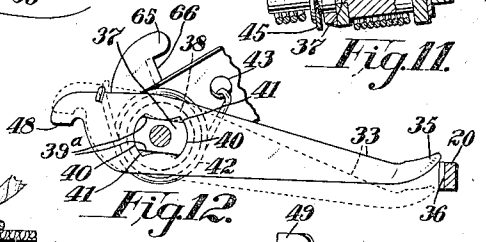

Fig. 12.

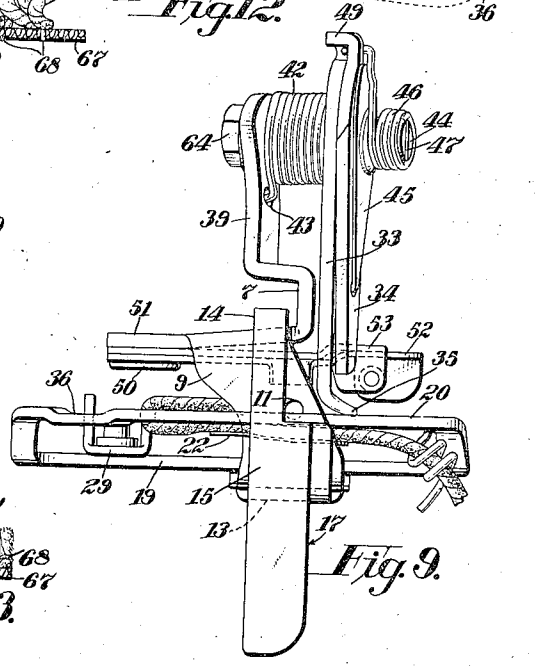

Fig. 9.

Inventor
John D. Karle

By Henry J. Miller

Attorney

Patented Aug. 30, 1938

2,128,484

# UNITED STATES PATENT OFFICE

2,128,484

## RUG-MAKING ATTACHMENT FOR SEWING MACHINES

John D. Karle, Roselle Park, N. J., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application May 13, 1936, Serial No. 79,431

21 Claims. (Cl. 112—9)

This invention relates to sewing machine attachments for forming and presenting loops of a strand of yarn or the like to the needle of a sewing machine which stitches the looped yarn-strand to a base fabric in the production of rugs and various decorative effects.

In the U. S. patents of Heinrich Perkons No. 2,063,267, granted Dec. 8, 1936, and John D. Karle, No. 2,049,395, granted Feb. 28, 1936, there are disclosed attachments of the type in question, the product of which presents uncut loops. The present invention aims to provide an improved sewing machine attachment which not only forms the yarn-loops and presents them to the sewing machine needle, but also cuts the loops to produce a smooth cut-pile effect.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawings, Fig. 1 is a front elevation of a rug-making attachment embodying the invention. Fig. 2 is a left side elevation of the attachment, partly in section, with the sewing machine needle in its elevated position. Fig. 3 is a similar view with the needle in its lowest position. Fig. 4 is a similar and fragmentary view of the rising needle, yarn-looping member and loop-taking member at the time the latter is taking a loop from the yarn-looping member. Fig. 5 is a top plan view of the attachment with the parts in the same respective positions shown in Figs. 1 and 2. Fig. 6 is a horizontal section through the needle-bar of Fig. 1 with the pivotal bearing of the segmental yarn-looping member in section. Fig. 7 is a section on the line 7—7, Fig. 1. Fig. 8 is a section on the line 8—8, Fig. 6, but with the needle-clamp in side elevation. Fig. 9 is a bottom plan view of the attachment.

Fig. 10 is a section on the line 10—10, Fig. 2, with the segmental yarn-looping member omitted. Fig. 11 is a section on the line 11—11, Fig. 3. Fig. 12 is a side elevation of the loop-taking member in depressed (dotted line) and raised (full line) positions relative to the yarn-looping member which is shown in section. Fig. 13 is a perspective view of the lower or work-engaging tread member of the attachment. Fig. 14 is a disassembled perspective view of the yielding two-part cutter-actuating lever. Fig. 15 is a section on the line 15—15, Fig. 1. Fig. 16 is a section on the line 16—16, Fig. 2. Figs. 17–21, inclusive, are a plurality of similar views arranged in a series to show the cooperative relations of the needle, yarn-looping member, and yarn-loop taking member in the operation of the device. Fig. 22 is a section through the product of the attachment taken transversely of the direction of sewing, and Fig. 23 is a similar view taken longitudinally of the direction of sewing.

The invention, in the preferred embodiment illustrated, is applied to a conventional sewing machine having a needle-bar 1, needle 2, presser-bar 3, throat-plate 4 and feed-dog 5; the throat-plate 4 having the usual needle-hole 6.

The attachment may comprise a supporting shank 7 which is detachably secured by the screw 8 to the presser-bar 3. The shank 7 carries the horizontal foot-portion 9 which is upturned at its forward end to form the post 10. The foot-portion 9 is formed with the needle-aperture 11. Secured to the post 10 by the screw 12 is the shank 13 of the tread-member 14 which underlies and is spaced below the foot-portion 9 and has a lower work-engaging surface 15. The shank 13 is steadied on the post 10 by the lateral shank-ears 16, Fig. 16, which engage the opposite side-edges of the post 10. The tread-member 14 has an edge 17 which is engaged by the bases of the previously stitched row 17', Fig. 17, of yarn-loops and serves as a guide for the work.

The post 10 has journaled in its upper end the internally threaded fulcrum-stud 18, Fig. 6, which is fixed to the cross-bar 19 of the open segmental yarn-laying member 20 formed with the yarn-delivery aperture 21 and carrying a yarn-tensioning spring 22 such as disclosed in said Patent No. 2,049,395. A thin spacing washer 23 is interposed between the post 10 and cross-bar 19, and a friction spring-washer 24 is interposed between the post 10 and the head of the screw 25 which is screwed into the fulcrum-stud 18.

The segmental member 20 works in the space between the foot 9 and the tread-member 14 in a transverse vertical plane closely in front of the path of the needle 2 and is actuated by the needle-bar 1 in the following manner. The conventional needle-clamping screw (not shown) is replaced by a special needle-clamping screw 26 having a long horizontally disposed cylindrical portion slidably embraced by the spaced fingers 27, 28 of a U-shaped follower member 29 which is pivoted at 30 on the cross-bar 19 of the yarn-laying member 20. The follower member 29 has at its upper end a stop-finger 31 which overlies

the edge of the cross-bar 19 and prevents the user from applying the follower member 28 to the cylindrical screw stud 26 in an inverted position. The pivot-pin 30 has a head 32, Fig. 6, which projects into the space between the U of the U-shaped follower member and prevents accidental application of the latter upon the stud in a position 90° from the correct position. It will be understood that, through the described connection, the reciprocatory motion of the needle-bar 1 imparts an oscillatory motion to the segmental yarn-looping member 20.

Cooperating with the yarn-looping member 20 is a yarn-loop taking and detaining member 33 which preferably constitutes the lower blade of a scissors device, the upper blade of which is indicated at 34. The lower blade 33 is preferably formed at its free end with an upwardly and outwardly curved loop-taking point or finger 35 which extends forwardly beyond the free end of the upper scissors-blade 34 and terminates closely adjacent the rearward face of the segmental yarn-looping member 20 which has a short forwardly-offset portion 36 for a purpose to be described.

The loop-taking blade 33 is fulcrumed for limited oscillatory movement on the reduced portion 37, Fig. 12, of the stud 38, Fig. 11, fixed to and rotatively adjustable on the rearward extension 39 of the attachment-supporting shank 7. The reduced portion 37 of the stud 38 has two flat sides 39ª, of Fig. 12, and two circular arc portions 40. The fulcrum hole in the blade 33 has two circular arc portions 41 bearing upon the circular arc portions 40 of the fulcrum portion 37 of the stud 38. The arcs 41 are enough longer than the arcs 40 to permit the loop-taking blade to oscillate between its depressed (dotted line) and elevated (full line) positions shown in Fig. 12. The spring 42, which is coiled about the stud 38 and anchored at one end in a hole 43 in the shank-extension 39, biases the blade 33 in a direction toward its elevated or full line position, Fig. 12, at which it is stopped by the flat sides 39ª, Fig. 12, of the fulcrum portion 37. The stud 38 may be rotatively adjusted to regulate the upper position of the yarn-loop taking point 35.

The upper scissor-blade 34 is fulcrumed on the stud-screw 45, Fig. 11, coaxial with and screwed into the stud 38. The blade 34 is yieldingly pressed flatwise against the blade 33 by means of the leaf-spring 45 and is biased upwardly by means of the spring 46 which is coiled about the head of the stud-screw 44 and anchored at one end in the screw-head-slot 47. The rearwardly projecting tail-portions of the blades 33 and 34 are curved toward each other at 48 and 49, respectively, so that when the upper blade 34 has been depressed to closed-scissors position relative to the lower blade 33, the tail-portions 48, 49 of such blades are in contact and a further depression of the blade 34 causes the lower or loop-taking blade 33 to move down from the position shown in Fig. 2 to that shown in Fig. 3.

Operative movements may be imparted to the scissor-blades by the needle-bar through an intermediate yielding lever system, as follows. Fulcrumed on the stud-pin 50 carried by the shank-ear 51 are a pair of levers 52, 53 having arcuate slots 54, Fig. 1, engaged by the stop-pin 55. The lever 52 is formed between its ends with a lip 56, Fig. 14, which is disposed in the path of movement of the conventional needle-clamp 57, Fig. 6, carried by the needle-bar 1. At its free end the lever 52 is formed with a horizontal lip 58 carrying a positioning pin 59 for the upper end of the coil-spring 60, the lower end of which spring engages the positioning pin 61 on the lip 62 at the free end of the lever 53. The lever 53 is formed at its upper edge with a stop-lip 63, Fig. 10, overhanging the lever 52 to prevent over-expansion of the levers 52, 53 under the expanding influence of the spring 60. The lever 53 bears upon the nose of the upper scissor-blade 34, as shown in Figs. 2 and 3, and the upward spring-pressure of the blade 34 produced by the spring 46 holds the levers 52, 53 in their raised positions limited by the stop-pin 55, Figs. 1 and 2. The spring 60 is preferably pre-loaded and is strong enough to hold the levers 52, 53 against movement relative to one-another in their scissor-closing and scissor-depressing movement. In the downstroke of the needle-bar, the spring 46 yields first to permit the scissors to close. The spring 42 next yields to permit the closed scissors to move to depressed position, Fig. 3. Lastly, the pre-loaded spring 60 yields as the needle-bar moves to the end of its down-stroke.

It will be observed that the scissors device, including its loop-taking point or finger 35, is spaced laterally of the line of sewing. This spacing determines the lengths of the yarn-loops formed by the attachment.

Secured to the shank extension 39 by means of the nut 64 is a thread and yarn cutter having a nose 65 which, together with the upper edge of the shank extension 39, forms a thread-receiving pocket at the bottom of which is the cutting edge 66. This cutter is convenient for use in severing the thread and yarn in removing the work from the machine.

*Operation*

Beginning at a point in the cycle when the needle is at the end of its up-stroke, Fig. 1, and the segmental member 20 is at one extreme of its oscillatory movement, Fig. 17, as the needle descends, the segmental member moves to the left, Fig. 1, and the feed-dog 5 feeds the work a stitch-length before the point of the needle enters the work. The motion of the segmental member 20 to the left from the extreme position shown in Fig. 17, slackens the length of yarn strand 64 between the loop-taking finger 35 and the yarn-delivery eye 21 and bows out a loop of yarn in position for seizure or entry by the descending needle 2. The descending needle, which works close to the rear face of the segmental member 20, enters between the latter and the looped yarn-strand and thus seizes the loop presented thereto by the segmental member, as shown in Fig. 18. Further motion of the segmental member 20 to the left takes up the slack in the yarn strand, and, at the time the forwardly offset portion 36 of the segmental member reaches the loop-taking point 35, the scissors device has been fully closed to cut a previously formed loop 65, Fig. 19. The closed scissors device is then depressed to carry the finger 35 below the yarn-strand 64' extending from the needle 2 to the yarn-delivery eye, Figs. 19 and 20. The forwardly offset portion 36 of the segmental member permits the yarn-strand 64' to be deflected forwardly and passed by the downwardly moving finger 35.

As the needle rises, the segmental member moves toward the right from the extreme position shown in Fig. 20, and throws out a yarn-loop 64'', Fig. 21, in position for seizure by the rising finger 35. It will be remembered that the needle-bar, in completing its downstroke, has

moved the lever **52**, Fig. 14, relative to the lever **53** and has compressed the spring **60** between these two levers. Hence, at the beginning or during the early portion of the upstroke of the needle and while the segmental member is moving toward the right from the extreme position shown in Fig. 20, the loop-taking finger **35** dwells in its lowermost position as the yarn-loop **64''** is bowed out in position for seizure by such finger. Thus as the segmental member oscillates back and forth it presents yarn loops in positions (Figs. 18 and 21) for alternate seizure by the needle **2** and cutting device **35**.

A desirable feature of the present improvement resides in the inclination of the plane of action of the scissor-blades, as shown in Figs. 10 and 11. By proper selection of the degree of this inclination, the relative lengths of the cut limbs of the yarn-loops may be proportioned to one another to secure an even top or cut surface **66** of the product, as shown in Fig. 22, the cut loops **65'** being shown secured to the base-fabric **67** by the lines of stitching **68**.

The foregoing detailed description of the preferred embodiment of the invention is to be read in an illustrative sense and not in limitation of the invention, which latter is independent of the forms and relative arrangements of parts except in-so-far as such forms and relative arrangements are particularly pointed out in the appended claims in characterization of the invention.

The term "yarn" as used herein is intended to include any strand or cord or strip-like material.

Having thus set forth the nature of this invention, what I claim herein is:—

1. The combination with stitch-forming mechanism including a reciprocatory needle, of a yarn-loop taker disposed at one side of said needle, means disposed a distance less than a stitch-length in advance of said needle to loop a yarn-strand back and forth between said needle and yarn-loop taker, and means to sever only the yarn-loops taken by the yarn-loop taker.

2. In a sewing machine, the combination with a reciprocatory needle and work-feeding means, of yarn-laying means movable transversely of the line of stitch-formation and disposed a distance less than a stitch-length in front of the needle-path to present loops of a yarn-strand directly to said needle, means spaced laterally of the line of stitch-formation to detain yarn-loops presented by said yarn-laying means at a distance from said needle, and means to sever said last mentioned loops.

3. In a sewing machine, the combination with a reciprocatory needle and work-feeding means, of yarn-laying means movable transversely of the line of stitch-formation and disposed a distance less than a stitch-length in advance of the needle-path to present loops of a yarn-strand directly to said needle, and loop-severing means spaced laterally of the line of stitch-formation and including a vibratory loop-severing blade supported in rear of said yarn-laying means and having a yarn-loop taking finger at its forward end.

4. In a sewing machine, the combination with a reciprocatory needle and work-feeding means, of yarn-laying means movable transversely of the line of stitch-formation and disposed a distance less than a stitch-length in front of the needle-path to present loops of a yarn-strand to said needle, vibratory means spaced laterally of the line of stitch-formation to seize and detain yarn-loops presented by said yarn-laying means, and means to sever said last mentioned loops.

5. The combination with stitch-forming mechanism including a reciprocatory needle, and work-feeding means, of a yarn-laying member disposed a distance less than a stitch-length in advance of said needle, and a vibratory scissor blade co-operatively related to said yarn-laying member to seize, detain and sever yarn-loops presented by the latter, and means to actuate said yarn-laying member and said vibratory scissor-blade in timed relation to one another.

6. The combination with stitch-forming mechanism including a reciprocatory needle, and work-feeding mechanism of a yarn-laying member having a yarn-delivery eye and movable to-and-fro across the line of stitch-formation in a plane disposed less than a stitch-length in advance of said needle so that the needle in its descent will pass between said yarn-laying member and the yarn-strand delivered through said eye, means at one side of said needle to take yarn-loops presented by said yarn-laying member, and means to sever said loops.

7. In a sewing machine, the combination with an endwise reciprocatory needle, a feed-dog and a presser-foot, of a segmental yarn-laying blade adapted to oscillate in a vertical plane disposed less than a stitch-length in advance of said needle, a scissors-device including coacting scissor-blades one of which is formed with a loop-taking point projecting forwardly of the other blade and terminating closely in rear of said segmental blade, and means for oscillating the scissor-blade having the loop-taking point.

8. In a sewing machine, in combination, stitch-forming mechanism including a reciprocatory needle-bar carrying a needle, work-feeding mechanism, yarn-laying means actuated by said needle-bar transversely of the line of stitch-formation in a path disposed less than a stitch-length in advance of said needle, a vibratory yarn-loop taker at one side of said needle, and needle-bar-actuated means to operate said yarn-loop taker and cause the latter to dwell during the initial stage of movement of the yarn-laying means in throwing out a yarn loop for seizure by said yarn-loop taker.

9. A rug-making attachment for sewing machines comprising a supporting member adapted for attachment to a conventional sewing machine presser-bar in lieu of the conventional sewing machine presser-foot, a tread member carried by said supporting member, a segmental yarn-laying member pivotally mounted on said supporting member to oscillate in a vertical plane transversely of the direction of length of said tread member, a scissor-blade pivotally mounted on said supporting member and having a yarn-loop seizing point terminating closely adjacent the plane of action of said yarn-laying member.

10. A rug-making attachment for sewing machines comprising a supporting member adapted for attachment to a conventional sewing machine presser-bar in lieu of the conventional sewing machine presser-foot, a tread member carried by said supporting member, a segmental yarn-laying member pivotally mounted on said supporting member to oscillate in a vertical plane transversely of the direction of length of said tread member, a scissor-blade pivotally mounted on said supporting member and having a yarn-loop seizing point terminating closely adjacent the plane of action of said yarn-laying member, and yielding

means on said supporting member to transmit motion from the conventional sewing machine needle-bar to said scissor-blade.

11. A rug-making attachment for sewing machines comprising, a supporting member having an attaching shank, a segmental yarn-laying blade pivotally mounted on said supporting member and having a yarn delivery eye, a vibratory scissor-blade pivotally carried by said support in rear of said segmental member and terminating at its forward free end in a loop-seizing finger, and a second scissor-blade cooperating with said first mentioned blade to sever yarn-loops seized by said finger.

12. A rug-making attachment for sewing machines comprising, a supporting member having an attaching shank adapting it for attachment to a conventional sewing machine presser-bar, a tread member carried by said supporting member, a yarn-laying member carried by said supporting member, and a scissors-device pivotally mounted on said supporting member in rear of said yarn-laying member, said scissors-device including a pair of scissor-blades both of which are movable relative to said supporting member and one of which is longer than the other and is formed with a loop-taking finger cooperatively related to said yarn-laying member.

13. A rug-making attachment for sewing machines comprising, a supporting member having an attaching shank, a segmental yarn-laying member pivotally mounted on said supporting member to oscillate in a vertical plane, said segmental member having a yarn-delivery eye and a forwardly offset portion adjacent to said eye, and a loop-taking member mounted on said supporting member in rear of said segmental member and having a loop-seizing point arranged to move up and down closely in rear of the offset portion of said segmental member.

14. A rug-making attachment comprising a supporting member having a shank adapted to be secured to a conventional sewing machine presser-bar, a yarn-laying member adapted for actuation by the sewing machine needle-bar, a yarn-loop taking and cutting device mounted on said supporting member, and yielding means for transmitting to said device motion received from the sewing machine needle-bar, said yielding means comprising a pair of levers pivotally mounted on said supporting member and a spring interposed between said levers.

15. A rug-making attachment for sewing machines comprising a supporting member having a foot portion and a shank adapted to be secured to a conventional sewing machine presser-bar, said foot-portion having a post rising from its forward end and said shank having a rearward extension, a yarn-laying member pivotally carried by said post, and a yarn-loop taker and cutter mounted on said rearward extension.

16. A rug-making attachment for sewing machines comprising a supporting member having a foot-portion and a shank adapted to be secured to a conventional sewing machine presser-bar, said foot-portion having a post rising from its forward end and said shank having a rearward extension, a yarn-laying member pivotally carried by said post, and a scissors-device mounted on said rearward extension and comprising a pair of pivoted blades one of which is formed with a yarn-loop taking point disposed closely adjacent said yarn-laying member.

17. A rug-making attachment for sewing machines comprising a supporting member having a shank adapted to be secured to a conventional sewing machine presser-bar, a yarn-laying member carried by said supporting member, and a scissors-device comprising a pair of blades pivoted on an axis inclined downwardly and laterally from said supporting member, one of said blades having a yarn-loop taking point.

18. A rug-making attachment comprising a supporting member having a foot-portion and an attaching shank, a post rising from the front end of said foot-portion, a segmental yarn-laying member pivotally mounted on said post, a vibratory yarn-loop taker pivoted in rear of said segmental member and having a forwardly extending loop-taking finger, and shear means for severing yarn-loops taken by said finger.

19. A rug-making attachment for sewing machines comprising a supporting member, a yarn-laying member pivotally carried by said supporting member, a scissors-device pivotally mounted on said supporting member and comprising a pair of blades one of which is formed with a yarn-loop taking point disposed closely adjacent said yarn-laying member, a connection between said blades for transmitting motion from one to the other and means to actuate one of said blades.

20. In a sewing machine, stitch-forming mechanism including a reciprocatory thread-carrying needle, a yarn-loop cutting device spaced laterally of said needle, and means to present loops of a yarn strand in positions for alternate seizure by said needle and cutting device.

21. In a sewing machine, the combination with a yarn-looping member, of laterally separated threaded needle and non-threaded finger elements disposed close enough to said yarn-looping member to take yarn-loops presented thereto in alternation by said yarn-looping member, and means to sever the yarn-loops taken by said non-threaded finger element.

JOHN D. KARLE.