June 22, 1937. H. M. PATERNAYAN 2,084,821

RUG AND CARPET BINDING SEWING MACHINE

Filed April 18, 1936 5 Sheets-Sheet 1

Fig. 1.

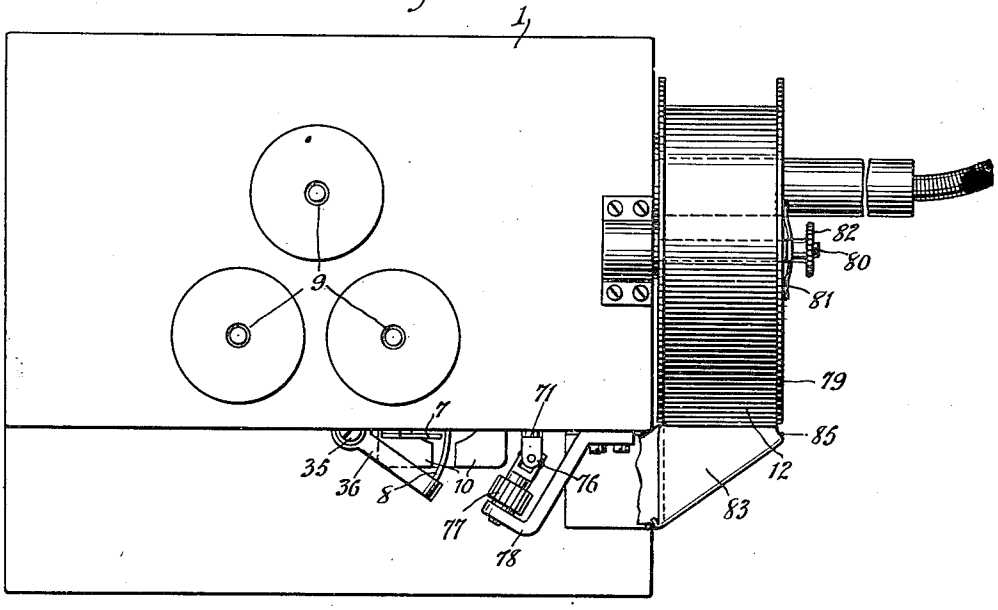
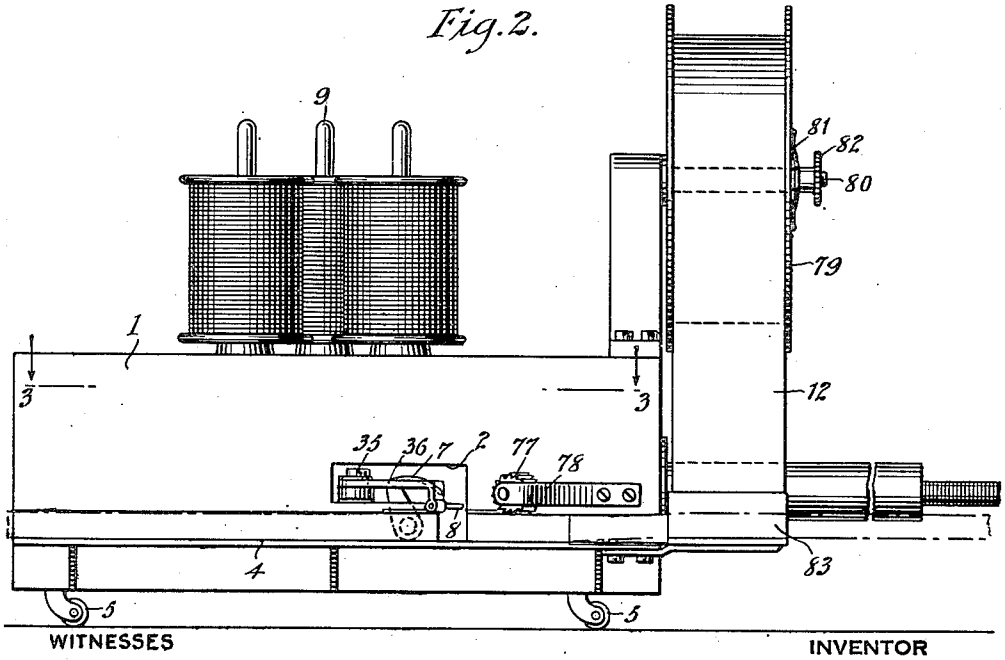


Fig. 2.



WITNESSES

Edw. Thorpe

A. L. Kitchin.

INVENTOR

Harry M. Paternayan

BY

Munn, Anderson & Liddy.

ATTORNEYS

June 22, 1937. H. M. PATERNAYAN 2,084,821

RUG AND CARPET BINDING SEWING MACHINE

Filed April 18, 1936 5 Sheets-Sheet 2

Fig. 3.

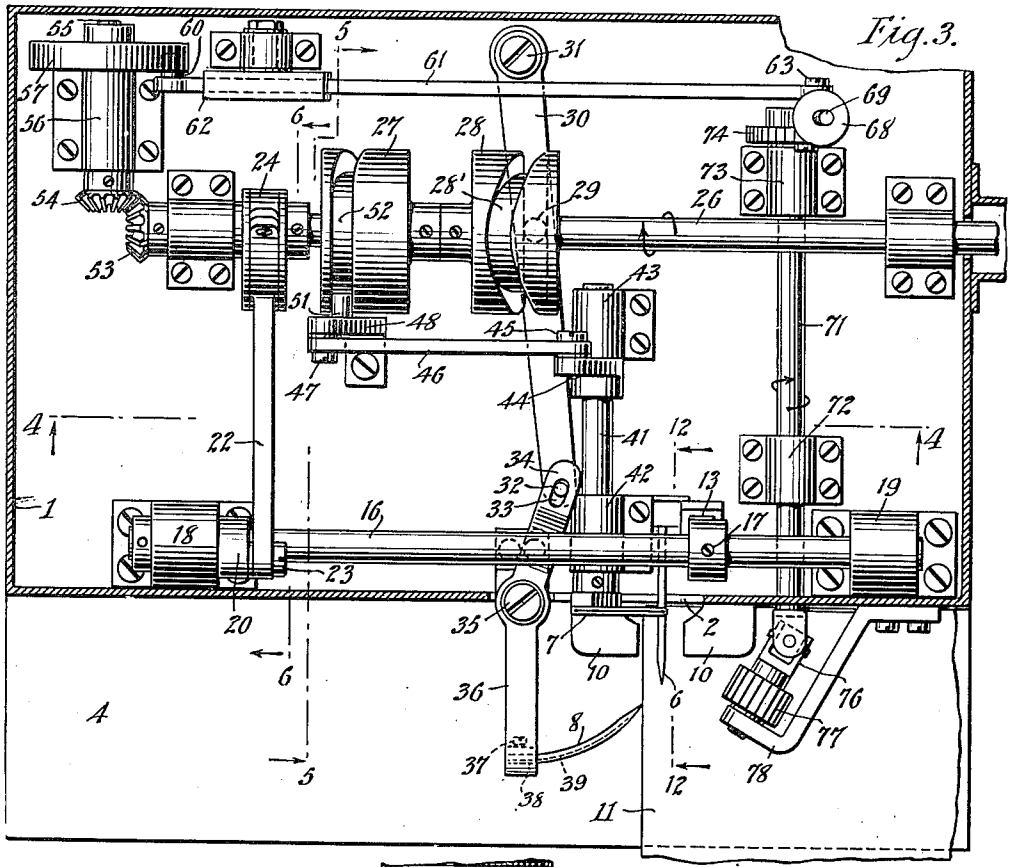
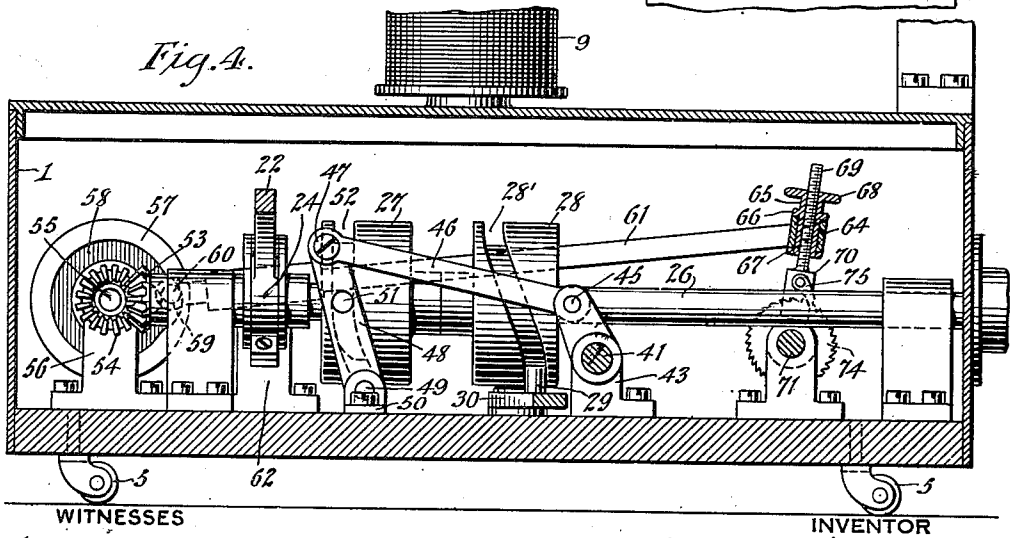


Fig. 4.



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ATTORNEYS

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RUG AND CARPET BINDING SEWING MACHINE

Filed April 18, 1936 5 Sheets-Sheet 3

Fig. 5.

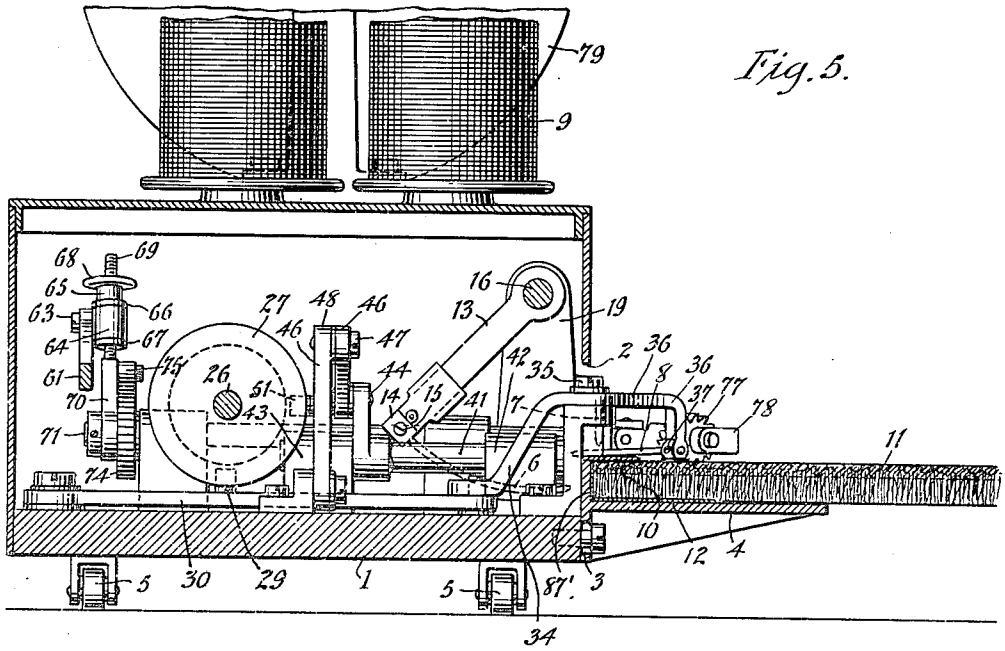


Fig. 6.

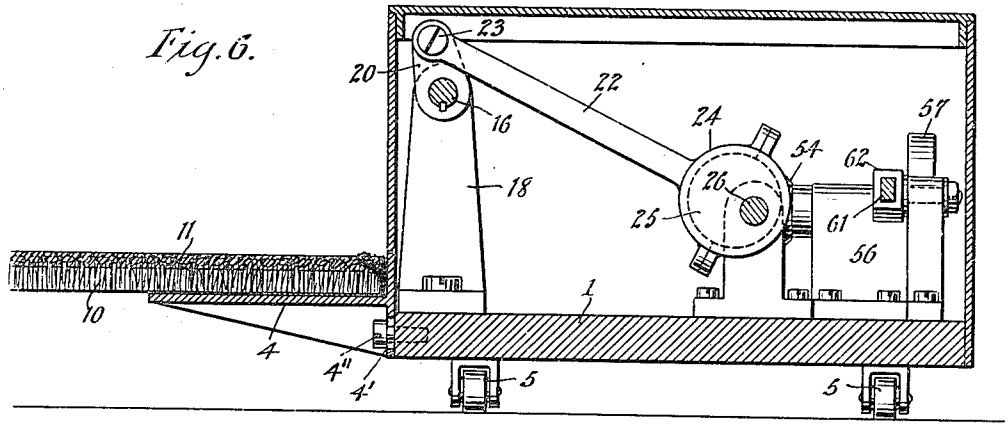


Fig. 7.

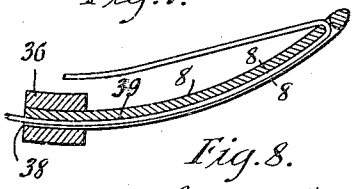


Fig. 8.

Fig. 11.

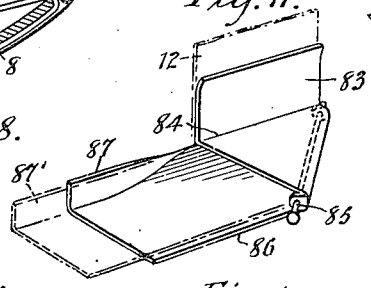


Fig. 10.

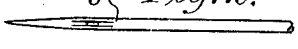
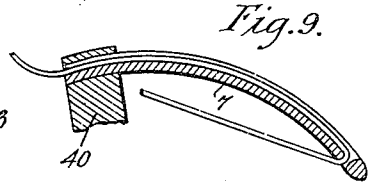


Fig. 9.



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A. L. Kitchin.

INVENTOR

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BY

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RUG AND CARPET BINDING SEWING MACHINE

Filed April 18, 1936 5 Sheets-Sheet 4

Fig. 12.

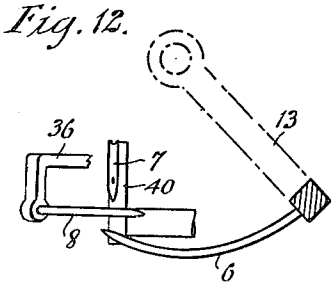


Fig. 13.

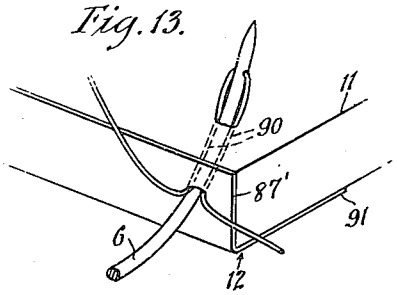


Fig. 14.

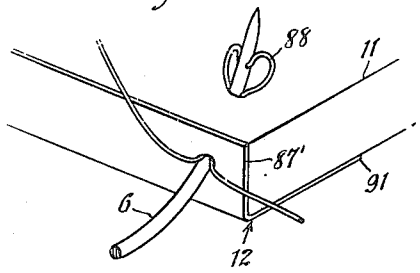


Fig. 15.

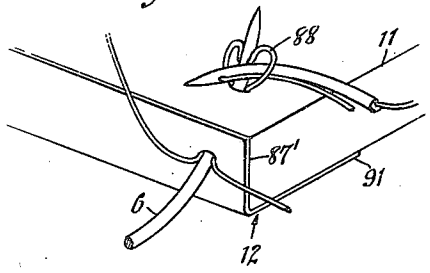


Fig. 16.

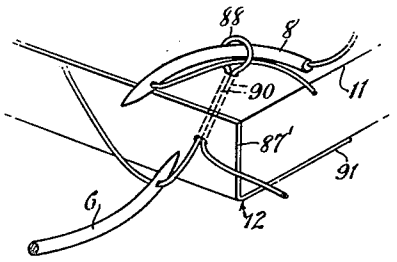


Fig. 17.

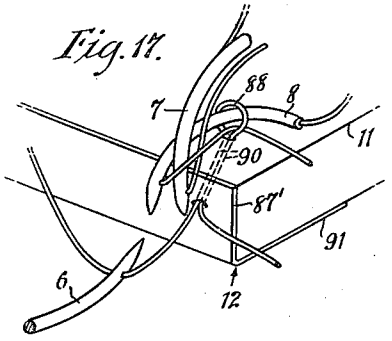


Fig. 18.

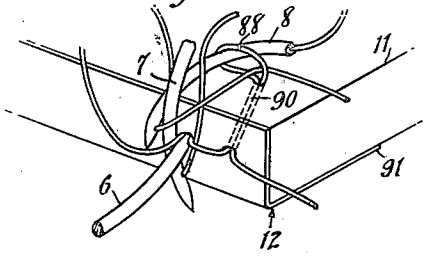
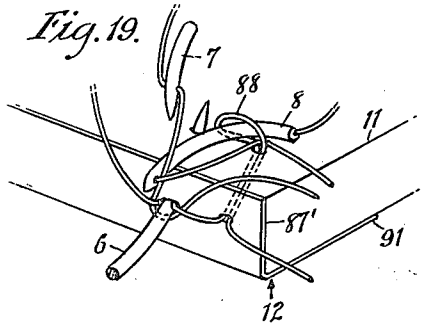


Fig. 19.



WITNESSES

Edw. Thorpe,

A. L. Kitchin

INVENTOR

Harry M. Paternayan

BY

Munn, Anderson & Liddy

ATTORNEYS

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RUG AND CARPET BINDING SEWING MACHINE

Filed April 18, 1936 5 Sheets-Sheet 5

Fig. 20.

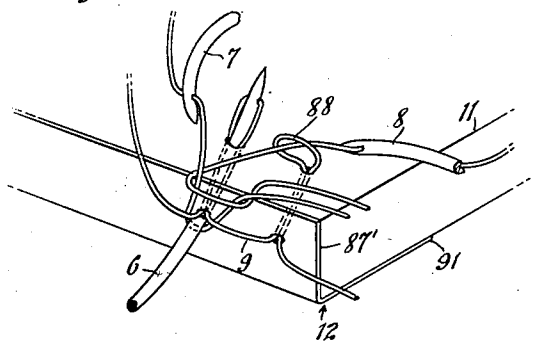


Fig. 21.

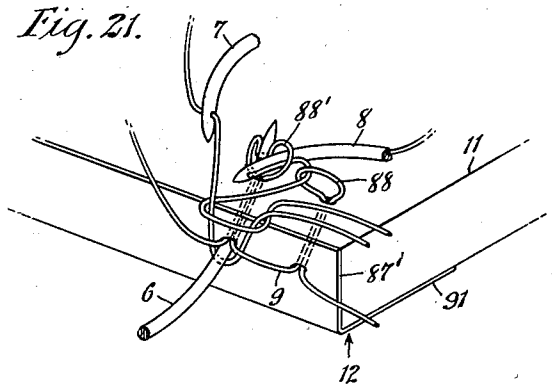
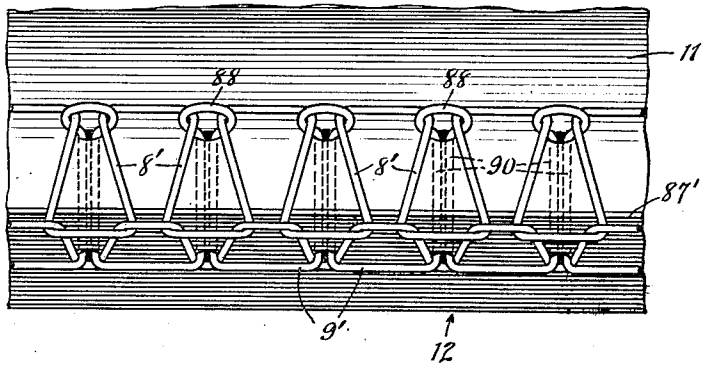


Fig. 22.



WITNESSES

Edw. Thorpe

A. L. Kitchin

INVENTOR

Harry M. Paternayan

BY

Munn, Anderson & Liddy.

ATTORNEYS

Patented June 22, 1937 2,084,821

UNITED STATES PATENT OFFICE

2,084,821

RUG AND CARPET BINDING SEWING MACHINE

Harry M. Paternayan, New York, N. Y.

Application April 18, 1936, Serial No. 75,058

9 Claims. (Cl. 112—197)

This invention relates to sewing machines, and particularly to an improved sewing machine adapted to sew a binding on a rug or carpet, an object being to provide a construction which will sew the binding in place without causing any of the threads to appear on the upper surface.

Another object of the invention is to provide a sewing machine for securing bindings on rugs and carpets wherein a binding is stitched in place with a preliminary line of stitching.

A further object of the invention is to provide a sewing machine utilizing two loopers and one needle for sewing one edge of a binding to a rug or carpet and at the same time providing a protecting group of threads on one edge and the bottom of the rug or carpet.

In the accompanying drawings:

Fig. 1 is a plan view of a sewing machine disclosing an embodiment of the invention;

Fig. 2 is an edge view of the machine shown in Fig. 1;

Fig. 3 is a sectional view through Fig. 2 approximately on the line 3—3, the same being on an enlarged scale;

Fig. 4 is a longitudinal sectional view through Fig. 3 approximately on the line 4—4;

Fig. 5 is a transverse sectional view through Fig. 3 approximately on the line 5—5;

Fig. 6 is a sectional view through Fig. 3 approximately on the line 6—6;

Fig. 7 is a fragmentary sectional view through one of the loopers shown in Fig. 3;

Fig. 8 is a transverse sectional view through Fig. 7 approximately on the line 8—8;

Fig. 9 is a fragmentary sectional view through a second looper shown in Fig. 3;

Fig. 10 is a plan view of part of the needle shown in Fig. 3;

Fig. 11 is a perspective view of a tape turning and guiding device embodying certain features of the invention;

Fig. 12 is a fragmentary sectional view through Fig. 3 approximately on the line 12—12;

Fig. 13 is a fragmentary perspective view showing the first movement of the needle shown in Fig. 12;

Fig. 14 is a view similar to Fig. 13 but showing the needle slightly withdrawn and producing a loop;

Fig. 15 is a view similar to Fig. 14 but showing one of the loopers illustrated in Fig. 12 entering the loop;

Fig. 16 is a view similar to Fig. 15 but showing the needle completely withdrawn and the looper moved to its complete functioning position;

Fig. 17 is a view similar to Fig. 16 but showing the next step in the sewing operation and illustrating how the second looper moves downwardly;

Fig. 18 is a view similar to Fig. 17 but showing the next step in movement of the respective loopers and needle;

Fig. 19 is a view similar to Fig. 18 but showing the next step in the operation of the loopers and needle with the auxiliary looper withdrawn;

Fig. 20 is a view similar to Fig. 19 but showing the next step in the operation of the needle with the auxiliary looper withdrawn;

Fig. 21 is a view similar to Fig. 20 but showing a further operation of the loopers and needle and the beginning of the second stitch;

Fig. 22 is a fragmentary perspective view of part of a rug with a binding stitched in place by a machine embodying the invention.

Referring to the accompanying drawings by numerals, 1 indicates a casing formed of metal or other desired material and provided with an opening 2, as shown in Fig. 5, through which the needle and other parts extend. Immediately below this opening the wall 3 forming part of the casing 1 is provided with a platform 4 adapted to receive the edge portion of the rug or carpet receiving the binding. This platform is adapted to be moved upwardly and downwardly to properly receive rugs or carpets of different thicknesses. This is permitted by the slots 4' and the proper adjustment of the screws 4'' as shown in Figs. 5 and 6. This adjustment also permits the positioning of the stitches so that they will catch more or less of the base of the rug. From Fig. 5 it will be observed that suitable casters 5 support the casing 1 so that the machine may be moved along the rug when in operation or, if preferred, the rug might be moved in respect to the machine, although ordinarily the rug will lie on the floor and the machine will be urged along the edge of the rug or carpet.

As illustrated particularly in Figs. 3 and 12, the machine is provided with two loopers and one needle, namely, the needle 6, the primary looper 7, and the auxiliary looper 8, and there are also provided three spools on top of the casing 1, said spools being carried by suitable pins 9 so that the threads from the spools may be readily fed to the respective loopers and needle, said threads merely sliding over the edge of the casing 1 when the machine is in use.

In addition to the platform 4, there is an auxiliary platform 10, as shown in Fig. 5, which extends above but usually in contact with the bottom of the rug, as for instance rug 11. This

rug is upside down and the tape or binding 12 is arranged as shown in Fig. 5 at the corner of the rug when the sewing operation is to start. The platform 10 is divided, as shown in Fig. 3, so that there will be an ample open space for the operation of the needle 6. It will be understood that the needle 6 and loopers 7 and 8 operate in certain time relation to each other and perform the operations illustrated particularly in Figs. 13 to 21 inclusive, whereby a desired line of stitching is provided, said stitching appearing when completed as shown in Fig. 22. This secures one edge of the binding 12 in place.

As illustrated in Fig. 22, the stitching extends through the binding a short distance from the bottom of the rug and leaves the major part of the binding extending down and then under the rug when the same is upside down. After the binding has been placed in position by this stitching it is turned over to overlap the bottom and then another line of stitching applied by a suitable machine, as for instance the machine disclosed in my copending application Serial No. 87,651, filed June 27, 1936.

As illustrated in Fig. 3, the parts are really shown in top plan, except the casing which is shown in section. The rug 11 is shown as having been positioned so that one corner will be substantially opposite the needle 6. When the parts are in this position the machine may be started and the sewing operation performed. The detail operation of the loopers and needle will be set forth later, but at this time it is desired to point out that the needle 6 is carried by an arm 13 which has an apertured enlargement 14 carrying a set screw 15. When the needle 6 is inserted in the apertured enlargement 14, set screw 15 is tightened and then this needle is in condition for operation. The upper end of arm 13 surrounds a rock shaft 16 and is secured thereto rigidly in any desired manner, as for instance by set screw 17. Rock shaft 16 is rockably mounted in suitable bearings 18 and 19 carried by the casing 1.

As illustrated in Fig. 6, a short crank or arm 20 is keyed or otherwise secured to rock shaft 16 and a link 22 is pivotally connected at 23 to the free end thereof so that as said link reciprocates the link will be moved and shaft 16 rocked. Link 22 is rigidly secured to or formed integral with a strap 24 which surrounds the eccentric member 25. The eccentric member 25 is keyed or otherwise rigidly secured to the driving shaft 26, which shaft continually rotates when the device is in use. Shaft 26 extends through the casing 1, as shown at the right in Fig. 3, and is adapted to be connected to any suitable source of power, as for instance an electric motor or a flexible driving shaft. By reason of this structure, as shaft 26 continually rotates the eccentric member will function and shaft 16 will rock back and forth in an even movement according to the action of the eccentric member 25. This causes the needle 6 to move regularly back and forth through the goods during the sewing operation.

While these operations are taking place, the cams 27 and 28 are continually rotating. These cams are connected respectively to the loopers 7 and 8 so that these loopers will function at the right time. A pin 29 is secured to a lever 30 pivotally mounted at 31. The parts are so arranged that the pin 29 extends into the cam groove 28' of cam 28, whereby as this cam rotates lever 30 will swing back and forth. It will be noted that cam groove 28' has an arc-shaped portion merging into a straight portion so as to give the looper 8 a desired movement. A pin 32 extends from the lever 30 through an elongated slot 33 formed in the end of lever 34, which lever is pivotally mounted at 35 on a suitable support carried by the casing 1. The outer end 36 of lever 34 carries the looper 8, which looper is secured thereto in any desired manner, as for instance by having an aperture therein receiving part of the looper. A set screw 37 acts to clamp the looper in place. The outer end 36 is also provided with a thread guiding aperture 38 through which the thread passes to a groove 39, as shown in Fig. 7. By this arrangement the looper 8 moves back and forth in a horizontal plane as the lever 30 swings back and forth.

Coacting with the looper 8 and with the needle 6 is a looper 7 which moves in a vertical plane, but the plane is at right angles to the plane of movement of needle 6. The looper 7 is carried by an arm 40 which has its lower end rigidly secured by a set screw, key or otherwise to the rock shaft 41, which rock shaft is rockably mounted in suitable bearings 42 and 43, and arm 44 is rigidly secured by set screw or otherwise to rock shaft 41 and has a pin 45 pivotally connecting the outer end of the arm to a link 46 which is also connected by pin 47 to the outer end of the lever 48. Lever 48 is pivotally mounted at 49 on a suitable bracket 50 and is provided with a wrist pin 51 which extends into the cam groove 52 of the cam 27. The groove 52 has what may be termed a straight portion and a curved portion so as to give a reciprocatory movement to link 46 as cam 27 rotates. The cams 27 and 28 have their grooves so formed and the parts are so timed that the loopers 7 and 8 will move in a desired sequence, as illustrated particularly in Figs. 13 to 21 inclusive.

The power shaft 26 has a pinion 53 rigidly secured thereto by set screw or otherwise, and said pinion meshes with a pinion 54 rigidly secured to the shaft 55, which shaft is rotatably mounted in a bearing 56. A cam wheel 57 is rigidly secured to shaft 55 and rotates therewith. This cam wheel is provided with a cam groove 58 which is circular, except at the point 59 where it is offset radially outwardly, whereby the pin 60 which projects into the groove 58 holds the rod 61 stationary as cam wheel 57 rotates, except when the offset portion 59 actuates the pin. It will be noted that pin 60 is rigidly secured to the rod or bar 61 which is slidably mounted in a suitable bracket 62 and which is pivotally connected by pin 63 to a sleeve 64 (Fig. 5). The sleeve 64 is rotatably mounted on an internally threaded tubular member 65 which has enlargements 66 and 67 acting as abutments for holding sleeve 64 in place.

A hand wheel 68 is rigidly secured to the sleeve 65 so as to rotate the same whenever desired. A threaded rod 69 is screwed into the sleeve 65 and is connected in any desired manner with the lever 70, which lever is pivotally mounted on the intermittently actuated driving shaft 71, which shaft is mounted in bearings 72 and 73. A ratchet wheel 74 is rigidly secured to shaft 71 and accommodates a pawl 75 (Fig. 4) so that when the bar or rod 61 moves to the right, as shown in Fig. 4, shaft 71 will be partly rotated. When the rod or shaft 71 moves back in the opposite direction, pawl 75 will merely slide over the teeth of the ratchet wheel 74. This will give the shaft 71 an intermittent rotary move-

ment. This shaft extends through the housing or casing 1, as shown in Fig. 3, and is connected by a universal joint 76 with the feed wheel 77, said feed wheel being a toothed member having a part rotatably mounted in a bracket 78, which bracket is rigidly secured to the casing 1. The cam 57 is so set that the feed wheel 77 will move the machine or the rug, as the case may be, when the needle 6 is withdrawn, namely, moved back to the position shown in Fig. 5.

The operator of the machine should, in addition, pull the machine to help the feed roller. It will therefore be seen that the sewing machine and the rug are stationary in respect to each other when the needle 6 is functioning and also for most of the time when the loopers 7 and 8 are functioning. When these loopers are stationary and the needle 6 is withdrawn, as shown in Fig. 5, feed roller 77 functions. This action is continued until the device has moved the full length of the rug or, if preferred, the rug has been moved the full length of the device. This action will sew one edge of the binding 12 in place so that the stitching will appear as shown in Fig. 22.

In order that the binding may be fed into position as the device is moved along, a spool 79 has been provided which is rotatably mounted on a suitable shaft 80 secured to the casing 1 in any desired manner. A spring 81 surrounds the pin 80 and is brought under tension by the nut 82 so that a desired tension or resistance is given to the spool 79. The binding 12 is wound on spool 79 and fed downwardly past the guide 83, as shown in Fig. 11, and then around the corner of bend 84 to the rotatable pin 85. The tape extends around this pin and moves to the left, as shown in Fig. 11, over the horizontal guide 86, which guide has a turned-up flange 87 that turns up one edge of the binding, as illustrated in dotted lines in Fig. 11, whereby the flange or turned-up part of the binding is in position to be stitched in place.

When a rug has been placed in the position shown in Fig. 3 and the machine caused to function, the first operation will be the movement of needle 6 to the position shown in Fig. 13. When moving to this position the needle passes through turned-up edge 87' and through the base of the rug 11, the rug 11 being shown upside down in Figs. 13 to 21 inclusive. As the machine continues to function needle 6 will be partly withdrawn, as illustrated in Fig. 14, whereupon the thread carried by needle 6 will form a loop 88. While the needle is functioning, as just described, the loopers 7 and 8, will be stationary, but as soon as the needle 6 moves to substantially the position shown in Fig. 14 the auxiliary looper 8 will move to the position shown in Fig. 15. As looper 8 continues to move, needle 6 will also continue to move, until the parts assume the position shown in Fig. 16, namely, with needle 6 completely withdrawn and looper 8 moved forward for its full stroke through the loop 88. This results in causing two runs of the thread carried by needle 6 to be placed in position in the rug.

Each time that the needle 6 moves into the rug and out again a double run of thread will be left in the rug, while the loop 88 will extend from one double thread to the other along the bottom of the rug. As soon as the parts have moved fully to the position shown in Fig. 16, looper 7 will function and will move to the position shown in Fig. 17, while needle 6 is remaining substantially stationary. As the machine continues to function, needle 6 moves back on the next stroke until it occupies the position shown in Fig. 18 with the point extending between the looper 7 and the thread carried thereby. As the needle 6 continues to move it will pass through one corner of the rug and also through the flange 87', as illustrated in Fig. 19. While this is taking place looper 7 will be retracted. As needle 6 continues to move, looper 8 will be retracted, so that the parts will then assume the position shown in Fig. 20.

After having arrived at the position shown in Fig. 20, the machine continues to function and needle 6 starts its second retracting movement, whereupon a second loop, namely loop 88', is formed. As soon as this is formed the looper 8 will move over and extend therethrough. As far as needle 6 and looper 8 are concerned, they are in the same position in Fig. 21 as they are in Fig. 15, so that the next movement will cause needle 6 to retract to the position shown in Fig. 16 and looper 8 to move over to the position shown in Fig. 16. The needle and looper 7 will then function as just described and as shown in Figs. 17 to 20 inclusive.

The result of this operation of the loopers and needle is the group of stitching 8' and 9' shown in Fig. 22. From this figure it will be observed that there is a double run of thread 90 placed in position upon each actuation of the needle 6, while the loopers merely place in position a single run. It will be noted that the respective loops 88 or 88' connect on the bottom of the rug the loops provided by looper 8, while on the edge of the rug the loops provided by looper 7 are held in place by thread from the needle 6. This arrangement presents a row of loops resting against the flange 87' and positioned in a horizontal plane with the upper part interlocking with loops arranged in a horizontal plane and on the back of the base of the rug 11, leaving the pile of the rug free from the stitching.

After the binding has been placed in position as just described, the machine embodying the invention has completed its operation, and later the free portion 91 of the tape 10 is swung around to cover all of the lines of stitching, and then an additional line of stitching is provided by any suitable machine, as for instance the machine of my copending application. This last line of stitching holds the loose edge 91 tightly against the bottom, and consequently presents a rather rounded bead formation covering only the edge of the base of the rug and not the pile thereof and thus making the binding invisible and in the exact form and appearance as is done by hand.

I claim:

1. A rug and carpet binding sewing machine comprising a casing, means for guiding a rug or carpet along one edge of said casing, a needle carried by said casing operating in a vertical plane and positioned to move through one corner edge of said rug or carpet when the machine is functioning, a primary looper carried by said casing operating in a vertical plane at right angles to the plane of the needle, said primary looper being positioned to move in a plane parallel to and near one edge of the rug or carpet, an auxiliary looper carried by said casing operating in a horizontal plane and positioned to move over the back of said rug or carpet, and means for causing said needle to function followed in succession by said auxiliary looper and said primary looper to form a seam with the threads of the needle extending through the

corner edge of the rug or carpet and the threads of the loopers positioned on the side and back of the rug or carpet.

2. A sewing machine for sewing a binding on the edge of the base of a rug including a needle adapted to place successive loops of thread so as to extend from the side edge of the rug diagonally to the back surface thereof, and a pair of associate loopers for placing loops of thread on the side edge of the rug and on the back with portions interlocking with the loops formed by the thread laced in position by said needle.

3. A sewing machine for sewing a binding on the edge of the base of a rug including a group of two loopers and one needle adapted to form a seam having a portion extending through the binding and diagonally through the edge portion of the base of the rug, the respective loopers and needle functioning in planes at right angles to each other, and power actuated means for causing said loopers and needle to function in proper sequence.

4. A sewing machine for sewing a binding on the edge of the base of a rug including a group of two loopers and one needle adapted to form a seam having a portion extending through the binding and diagonally through the edge portion of the base of the rug, power means for causing said loopers and needle to function, and a feeding roller actuated by said power means functioning to move said rug and sewing machine relative to each other each time said loopers and needle are in non-functioning position.

5. A sewing machine for sewing a binding on the edge of the base of a rug comprising a needle adapted to force a thread diagonally through the edge portion of the rug from the side of said edge to the back of said base, a pair of associate loopers for interlocking threads applied thereby with the threads extending diagonally through the edge portion of the rug whereby a seam is complete, and means for feeding a binding member to said loopers and needle as they function so that the diagonally positioned thread will extend therethrough while the thread applied by one of said loopers will rest on said binding and the thread applied by the other looper will rest on the back surface of said base.

6. A sewing machine for sewing a binding on the edge of the base of a rug including loopers and a needle adapted to form a stitch having a portion extending through the binding and diagonally through the edge portion of the base of the rug, power means for causing said loopers and needle to function, a feed roller positioned to engage the undersurface of said rug and cause said sewing machine and said rug to move relative to each other so that said rug will be fed past said loopers and needle, a shaft for rotating said roller, a ratchet wheel rigidly secured to said shaft, a swinging arm mounted on said shaft, a pawl carried by said arm positioned to engage the teeth of said ratchet wheel when the arm is swung in one direction to partly rotate said shaft and said feed roller, a reciprocating bar connected to said arm for actuating the same, a cam functioning to connect said bar with said power means, the cam and associated parts including said loopers and needle being so connected together as to cause said feed roller to function when said loopers and needle are in non-functioning position.

7. A sewing machine for sewing a binding on the edge of the base of a rug including a group of two loopers and one needle operating in planes at right angles to each other for applying a seam to the edge of the base of said rug, and means for causing said loopers and needle to function.

8. A sewing machine for sewing a binding on the edge of the base of a rug including a group consisting of a plurality of loopers and one needle adapted to form a seam having a portion extending through the binding and diagonally through the edge portion of the base of the rug, power means for causing said loopers and needle to function, and means arranged on the top and bottom of said rug to prevent the rug rising when said needle is forced through the edge portion of the base of the rug.

9. A sewing machine for sewing a binding on the base of a rug comprising a plurality of loopers and a needle for applying stitches, one of said stitches extending diagonally through said base, and means for feeding a binding member to the edge of said base as said loopers and needle function so that said diagonally positioned stitching will extend through said binding member while the stitching applied by one of said loopers will rest on said binding member and the stitching applied by a second looper will rest on the back surface of said base, said means for feeding a binding member to said base including a guide formed with a right angle bent portion having a diagonally positioned guiding member at the bent portion whereby a flat binding member may be fed in a given direction, then caused to change direction and finally move parallel to the edge of said rug.

HARRY M. PATERNAYAN.