

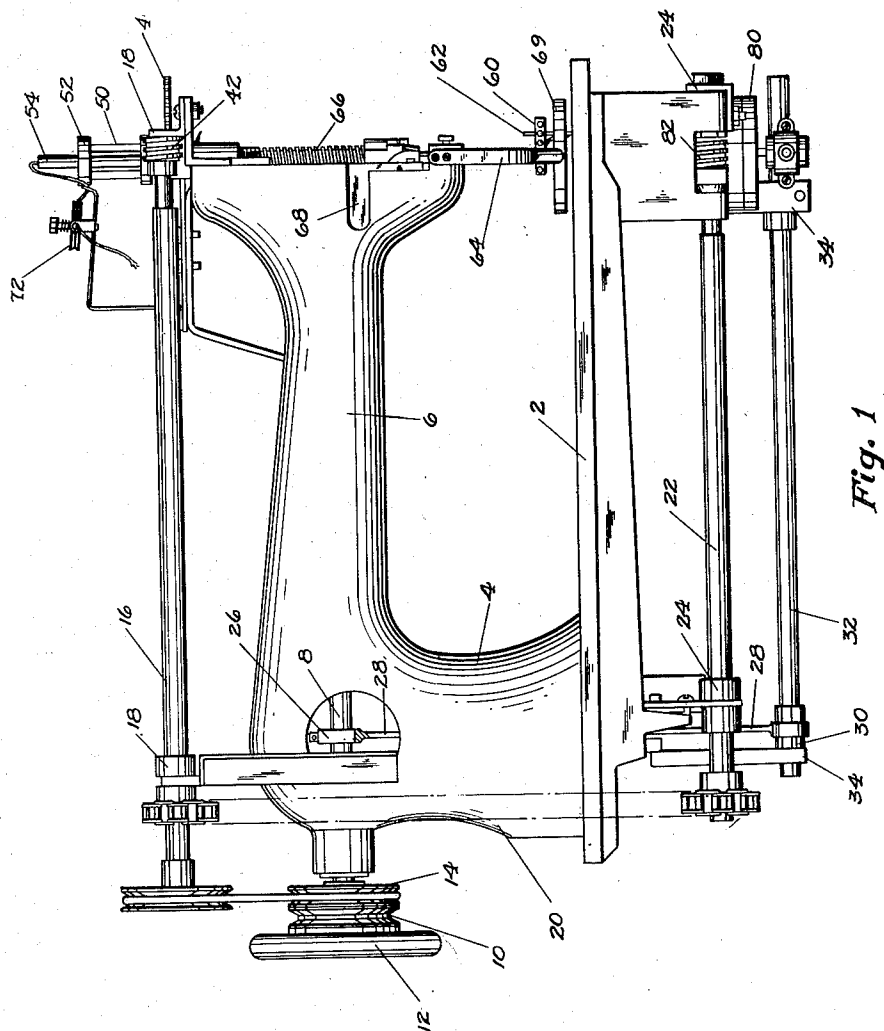
Oct. 30, 1951

J. MONTGOMERY
CHENILLE SEWING MACHINE

2,573,043

Filed May 7, 1947

6 Sheets-Sheet 1



Inventor

Julius Montgomery

By Bailey, Stephens and Huettig
Attorneys

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6 Sheets-Sheet 2

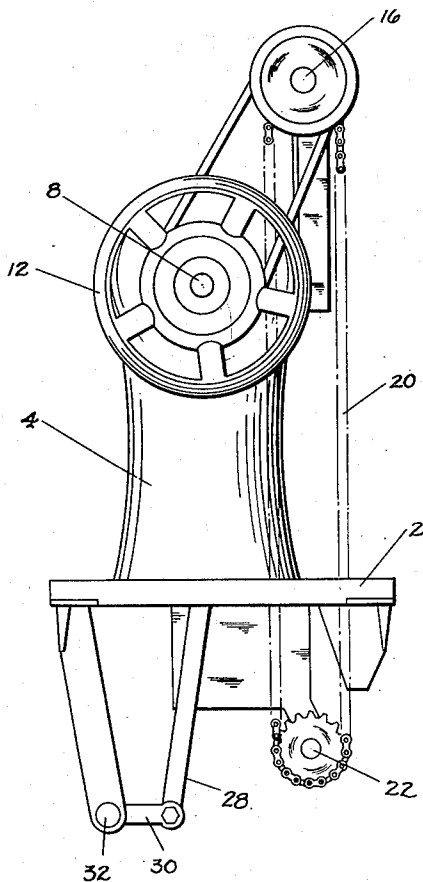


Fig. 2

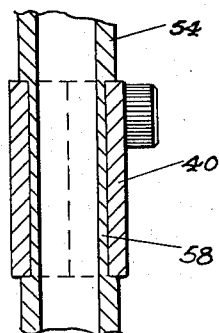


Fig. 5

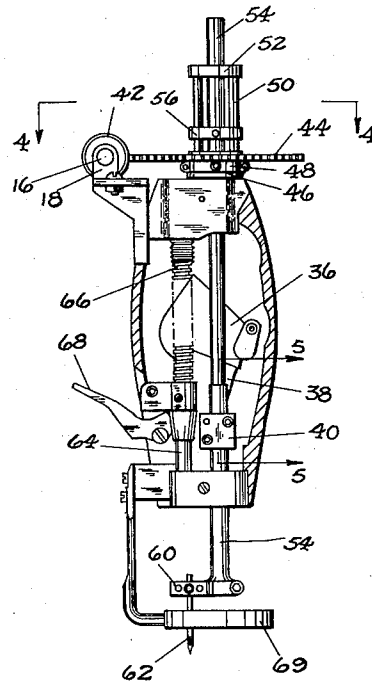


Fig. 3

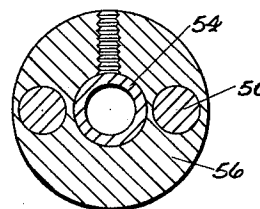


Fig. 4

Inventor
Julius Montgomery

By *Bailey, Stephens and Huetting*
Attorneys

Oct. 30, 1951

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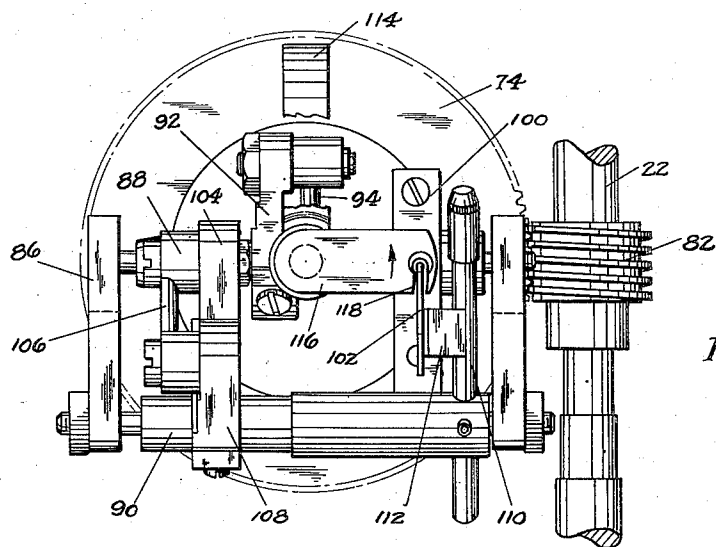


Fig. 6

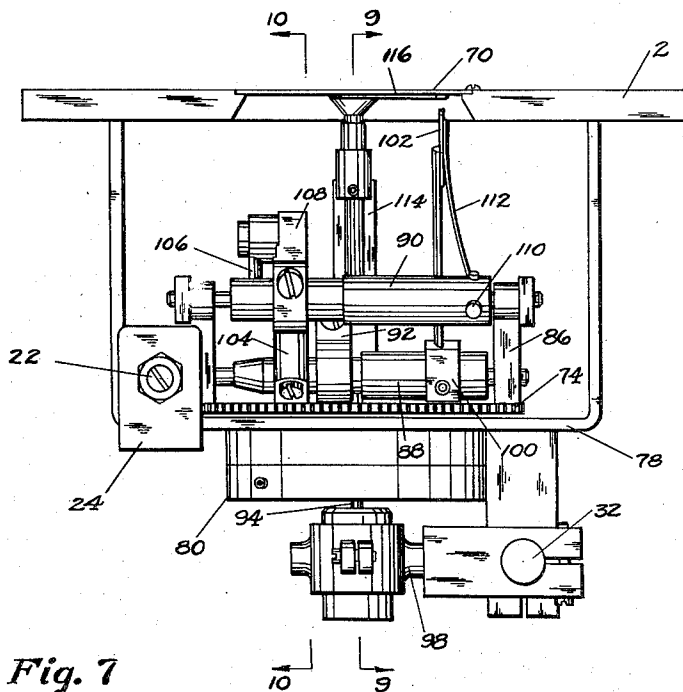


Fig. 7

Inventor

Julius Montgomery

By *Bailey, Stephens and Huetting*
Attorneys

Oct. 30, 1951

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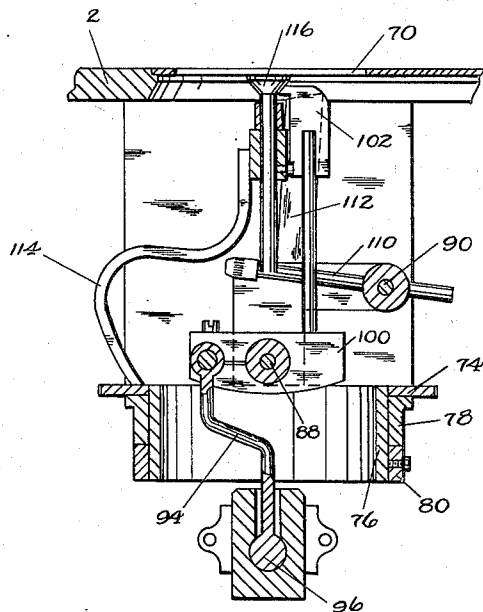


Fig. 9

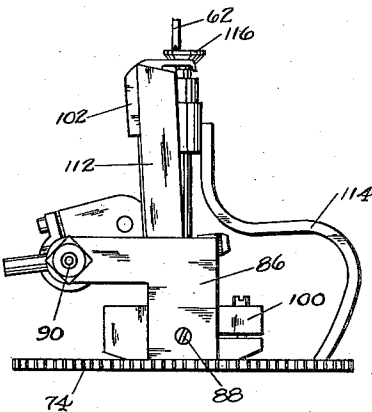


Fig. 8

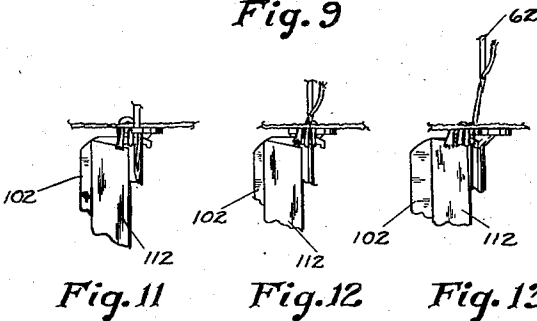


Fig. 11

Fig. 12

Fig. 13

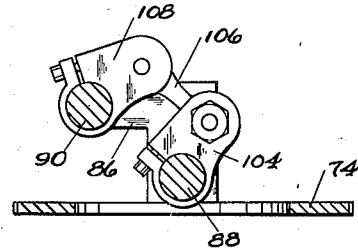


Fig. 10

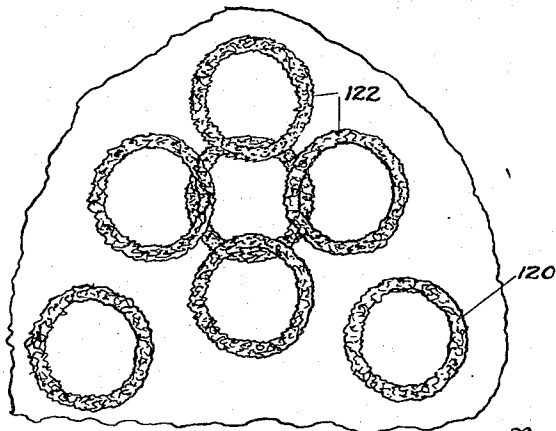


Fig. 15

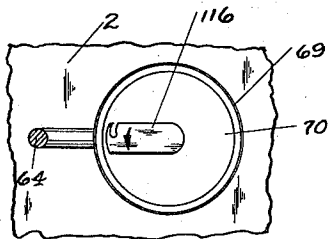


Fig. 14

Inventor
Julius Montgomery

By *Bailey, Stephens and Huetting*
Attorneys

Oct. 30, 1951

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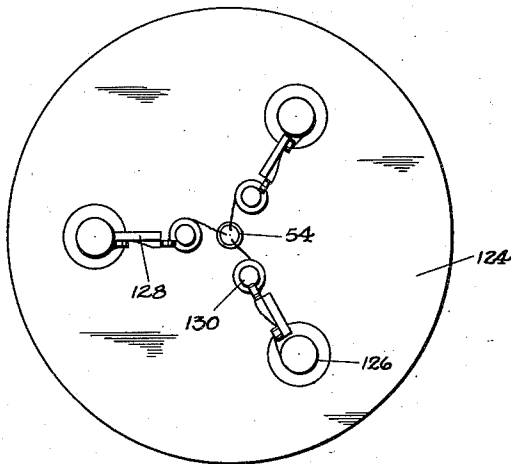


Fig. 17

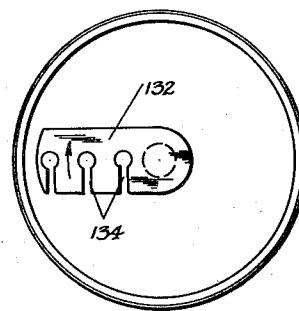


Fig. 18

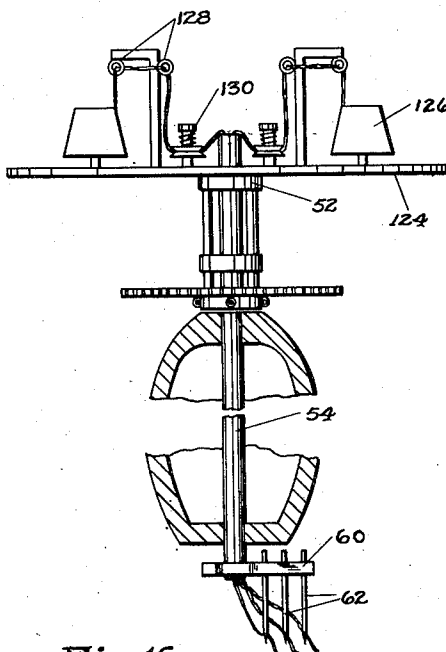


Fig. 16

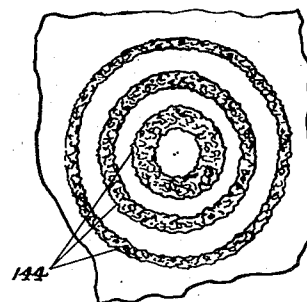


Fig. 21

Inventor

Julius Montgomery

By *Bailey, Stephens and Huetting*
Attorneys

Oct. 30, 1951

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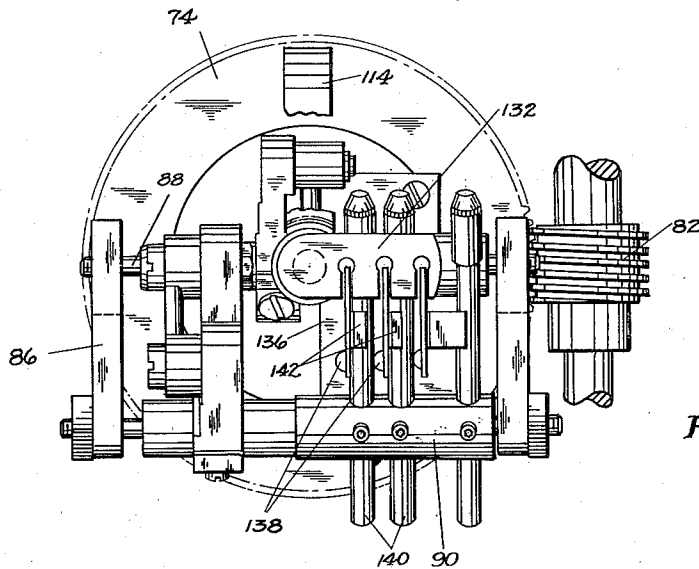


Fig. 19

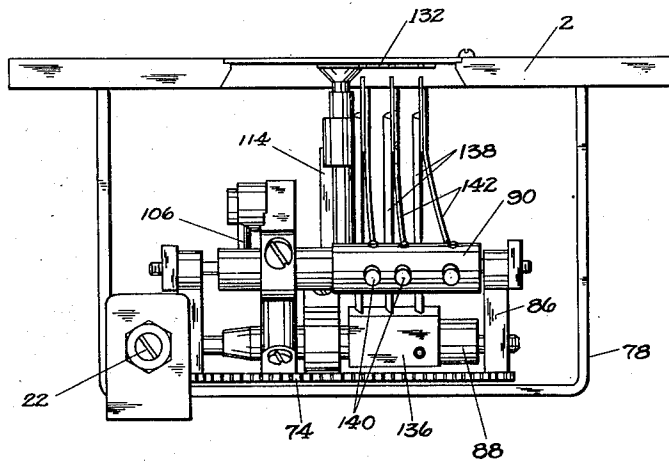


Fig. 20

Inventor

Julius Montgomery

By *Bailey, Stephens and Huetting*
Attorneys

UNITED STATES PATENT OFFICE

2,573,043

CHENILLE SEWING MACHINE

Julius Montgomery, Calhoun, Ga., assignor of thirty-five per cent to Shepherd Brothers Spread Company, a partnership composed of S. L. Shepherd and F. B. Shepherd, Calhoun, Ga.

Application May 7, 1947, Serial No. 746,439

9 Claims. (Cl. 112-79)

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This invention relates to chenille sewing machines, and more particularly to machines for sewing chenille patterns on a fabric. It is especially designed for the sewing of circles of chenille tufts.

Various types of chenille sewing machines have been used in the past, but most of these either sew in a straight line or require that the fabric be moved to form a pattern. In making large spreads or the like, this requires considerable labor and time, and can only be accomplished by skilled workers.

The primary object of the present invention is to provide a machine which is capable of producing chenille patterns on a fabric economically and rapidly.

Another object of the invention is to provide a machine of this type which produces a pattern without movement of the cloth or other fabric to which the chenille is applied.

Still another object of the invention is to provide a machine capable of sewing circles of chenille tufts on a stationary fabric.

A further object of the invention is to provide a device which is in general similar to a conventional sewing machine, with the addition of such parts as are needed to accomplish the desired result.

Still a further object of the invention is to provide, on opposite sides of a fabric holding means, a needle and a loop holding hook (preferably combined with a cutter), the needle and hook being mounted and driven to move in corresponding paths, preferably circular paths. The needle and hook then cooperate to form loops (or tufts, if a cutter is used) on the lower side of the fabric, the hook holding the loops extended when the needle is withdrawn.

An additional object of the invention is to provide a support for the hook (and cutter) which has a central opening through which extends the connecting link which operates the cutter. Such an arrangement is more compact and durable than other possible ways of moving the hook. Furthermore, the hook and cutter are mounted on separate shafts on the same revolving support, these shafts being connected to operate in unison.

Another object of the invention is to provide a novel type of throat plate element which moves with the needle and hook and which is so arranged that it does not interfere with the tufts already formed in the circle. This is accomplished by forming the throat as a slot opening on the trailing edge of the throat plate element.

Still another object of the invention is to pro-

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vide a novel needle mounting in which the needle is carried by a rotatable, reciprocating bar, and is offset from the axis of the bar so as to move in a circle. Preferably, this bar is hollow and the yarn is fed through it to the needle, the yarn tension being mounted adjacent the upper end of the bar. By such a construction, the bar performs the functions of the conventional thread take-up lever.

An additional object of the invention is to provide a machine for sewing several lines of chenille simultaneously in a pattern of curved lines, and more especially for sewing simultaneously a plurality of concentric circles of chenille.

A further object of the invention is to provide a system for feeding yarn simultaneously to a plurality of chenille needles operating to form a pattern, while avoiding tangling of the yarn.

Still another object of the invention is to provide a method of and apparatus for producing a plurality of lines of chenille tufts of differing density and thickness, so as to give variety to the pattern. In this aspect, the invention contemplates an arrangement for sewing simultaneously two or more rows of tufts with different numbers of tufts per unit of length, even though the needles make the same number of strokes per unit of time, by causing one of the needles to travel in a longer path than another needle.

The invention in this form includes in its preferred modification the use of a needle bar mounted to turn about a vertical axis, carrying a plurality of needles at different distances from the axis, and also carrying for rotation a separate source of yarn supply for each needle. Preferably these sources are remote from the needle, and the yarn is fed from them through the hollow needle bar to the needles.

Further objects and advantages of the invention will appear more fully from the following description, especially when taken in conjunction with the accompanying drawings which form a part thereof.

In the drawings:

Fig. 1 shows in side elevation, with parts broken away, a sewing machine embodying my invention;

Fig. 2 is a rear view of the machine;

Fig. 3 shows in front elevation, with parts broken away, the needle guiding and operating portion of the machine;

Fig. 4 is a horizontal cross-section on the line 4-4 of Fig. 3;

Fig. 5 is a vertical cross-section on the line 5-5 of Fig. 3;

Fig. 6 is a top plan view of the hook and cutter portion of the machine;

Fig. 7 is a side elevation of the mechanism of Fig. 6;

Fig. 8 is a front elevation thereof;

Figs. 9 and 10 are cross-sections on the lines 9—9 and 10—10 respectively of Fig. 7;

Figs. 11 to 13 show three different positions of the needle, hook and cutting mechanism during the making of a stitch;

Fig. 14 is a plan view of the presser foot;

Fig. 15 shows an example of the types of patterns produced by the machine;

Fig. 16 shows in side elevation the needle mechanism of a machine for sewing several circles simultaneously;

Fig. 17 is a top plan view thereof;

Fig. 18 is a top plan view of the throat plate of such a machine;

Fig. 19 is a top plan view of the hook and cutter portion thereof;

Fig. 20 is a side elevation of the mechanism of Fig. 19; and

Fig. 21 shows a type of pattern produced by such a machine.

As shown in the drawings, the machine includes a base or table 2 with an upright 4 supporting arm 6. Through the arm extends main shaft 8 which can be driven by a motor through pulley 10 adjacent hand wheel 12. A second pulley 14 is connected by a belt to needle shaft 16 mounted in bearings 18 above arm 6. This shaft through chain and sprocket connection 20 drives the hook turning shaft 22 mounted in bearings 24 below table 2.

Main shaft 8 also has an eccentric at 26 which reciprocates link 28 connected to rock lever 30 on hook operating shaft 32 located below the table in bearings 34. Link 28 extends through the hollow upright 4. At its front end, main shaft 8 has a crank 36 connected by link 38 to a block 40, the purpose of which will be described below.

Needle shaft 16 at its forward end carries a worm 42 engaging a worm wheel 44. This worm wheel has a central downwardly projecting trunnion having at its lower end a flange 46, this trunnion being held in a bearing 48 to mount the wheel for turning. Upstanding from wheel 44 are two posts 50 connected at their tops by a disc 52. Needle bar 54 extends slidably through aligned central openings in wheel 44 and disc 52. Secured to the needle bar is a disc 56 (see Fig. 4) having openings slidable on posts 50, so that the needle bar can slide up and down through wheel 44 but is forced to turn about its axis as the wheel turns.

Block 40 (see Fig. 5) is formed in two parts held together by screws or the like. Needle bar 54 has a section 58 of reduced cross section into which the two block members engage, so that the needle bar moves up and down with the block but can turn freely in it. At its lower end, the needle bar carries a transverse arm 60 in which is mounted needle 62, so that as the needle bar turns the needle moves in a circular path around the needle bar axis.

The presser foot (see Figs. 3 and 14) is mounted in the usual manner on a vertically slideable bar 64 resiliently pressed downward by spring 66 and capable of being lifted and held in raised position by a cam lever 68. The presser foot is in the form of a ring 69, of a diameter somewhat greater than that of the needle path. The table 2 has below the presser foot a circular opening 70 of a

diameter intermediate those of the presser foot ring and needle path.

The needle bar 54 is preferably in the form of a hollow tube. Adjacent its upper end is a conventional tension mechanism 72 through which yarn is guided to the top end of the needle bar (see Fig. 1) through which it passes to the bottom end where it is led to needle 62.

Below the table, and beneath the needle mechanism, is the loop forming and cutting mechanism (Figs. 6 to 10). This mechanism is carried by a ring 74 secured on a sleeve 76 having a large central opening. Sleeve 76 (Fig. 9) can turn in an opening in plate 78 mounted below table 2, and is held in this opening by ring 80 secured on its lower end. The periphery of ring 74 has worm gear teeth meshing with worm 82 on shaft 22.

Ring 74 has on opposite sides upstanding L-shaped ears 86. Mounted in these ears are a hook carrying shaft 88 and a cutter carrying shaft 90. Shaft 88 has secured on it a rock lever 92 connected by link 94 extending through the central opening of sleeve 76 to a ball and socket joint 96 on arm 98 secured to shaft 32. Shaft 88 also carries a lever 100 on which is mounted loop-holding hook 102. A third lever 104 on shaft 88 is connected by link 106 to lever 108 on shaft 90. This shaft has a cross pin 110 in which is secured cutter 112, this being a thin piece of spring metal resiliently pressing against one side face of hook 102.

A bracket 114 extends upwardly and inwardly from ring 74 to a point above the center of the ring, where it carries a throat plate element 116 extending outward to a point below needle 62. Aligned with needle 62 is throat opening 118, this being in the form of a notch opening in the trailing edge of element 116.

This machine operates as follows:

Cloth on which a chenille pattern is to be formed is placed on table 2 and the presser foot 69 is lowered to hold a circular area of the cloth stretched across opening 70. The machine is now operated, and needle 62 passes through the fabric carrying a loop of yarn with it. Hook 102 and cutter 112 are in the position shown in Fig. 9, out of the path of the needle. When the needle approaches its lowest position, the hook advances to a position just on the outside of the needle (Fig. 11) where it engages in the loop of thread. The needle then is retracted to the position shown in Fig. 12, the hook holding the loop in extended position below the cloth. As the needle reaches its highest position (Fig. 13) the cutter 112 advances upward. This series of operations is repeated to cast a series of loops on the hook. After the second or third loop is cast on, the loops are pushed one by one into the path of cutter 112 (see Fig. 13) and are cut thereby to form tufts on the lower side of the fabric.

The needle and the hook and cutting mechanism move in unison in a circular path during this operation, so that a ring of tufts is formed. The throat plate element 116 also turns with the needle, so as to support the cloth at all times. Since the throat 118 opens on the side of the throat element where loops have already been formed, that is, on the trailing edge, the formed loops or tufts do not interfere with the movement of this element. Such an arrangement can form a circle of tufts as shown at 120 in Fig. 15. Such circles may also be sewn in overlapping relation to form patterns such as 122.

As the needle and needle bar move upwardly from the position shown in Fig. 11 the loop is

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retained by hook 102, so that this part of the yarn is held against upward movement. As the top of the needle bar rises, therefore, it pulls additional thread through the tension mechanism so as to provide the slack for the next loop as the needle again moves down through the fabric.

When the circle is completed, the presser foot is raised, the cloth is shifted so that all the loops are pulled to the back of the hook, and the machine is turned, preferably by hand, until the knife or cutter rises and cuts these loops to form tufts.

In the form shown in Figs. 16 to 20, the driving mechanism is the same as for the arrangement previously described. However, transverse arm 60 carries three needles 62 (Fig. 16) at varying distances from the axis of needle bar 56. On disc 52 is mounted a carrier 124 supporting three balls 126 of yarn, which is led through guides 128 and tension devices 130 to the top of the needle bar. The three yarns pass downward through the bar to the three needles, and the needle bar acts as a takeup for all three threads.

The throat plate 132 is mounted to turn in unison with the needles, and has a slot 134 for each needle opening in its trailing edge.

Shaft 88 carries a lever 136 in which are mounted three hook members 138 arranged to cooperate with the three needles. Shaft 90 carries three cross pins 140 each bearing a cutter 142 cooperating with one of the hooks. These shafts are mounted in ears 86 on plate 74 and are driven and operated in the manner shown in Figs. 1 to 14.

Fig. 21 shows the pattern produced by the device of Figs. 16 to 20, composed of three concentric rings 144. The inner ring has the same number of tufts as the intermediate and outer rings, but it is of shorter length, so that it will have more tufts to the inch. If it is desired to have the rings uniform, yarns of graduated thickness can be used, the inner ring being formed of the thinnest yarn. If, on the other hand, the same yarn is used for all three rings, then the inner ring will be wider and fluffier than the next outer ring. With such a procedure, a variation of the pattern is produced which is especially attractive.

While I have described herein some embodiments of my invention, I wish it to be understood that I do not intend to limit myself thereby except within the scope of the claims hereto or hereinafter appended.

I claim:

1. In a machine for forming chenille patterns on a fabric, means for holding a substantial area of fabric in taut condition, a needle, means mounting said needle for reciprocation in a direction transverse to the fabric held by such holding means, means to guide said needle to move in a circular path in a direction transverse to the longitudinal axis of the needle, a loop holding hook, means mounting said hook on the opposite side of said fabric holding means from said needle mounting means, means to move said hook to engage and hold in extended position a loop of flexible material carried through the fabric by said needle, means to guide said hook for movement in a circular path corresponding to the path of movement of such needle, and cutting means associated and movable with said hook to cut the loops formed by said needle and hook.

2. In a device as claimed in claim 1, a throat

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plate element on the opposite side of the fabric from said needle, said element having a slot extending thereinto, and means to guide said element for movement in a path in which said opening remains aligned with said needle, said slot opening substantially circumferentially of said circular path and on the trailing side of said element.

3. In a device as claimed in claim 2, said fabric holding means comprising a table having a circular opening therein aligned with and larger than the circular path of the needle, a presser foot in the form of a ring larger than said opening, and resilient means for holding the presser foot in engagement with the table around said opening.

4. In a machine for forming chenille patterns on a fabric, means for holding a substantial area of fabric in taut condition, a needle, means mounting said needle for reciprocation in a direction transverse to the fabric held by such holding means, means to guide said needle to move in a circular path in a direction transverse to the longitudinal axis of the needle, a loop holding hook, a member mounted on the opposite side of the fabric from the needle for rotation about the axis of the needle path, a shaft turnably mounted on said member, a loop retaining hook carried by said shaft, and means to move said shaft so as to move said hook to engage and hold in extended position a loop of flexible material carried through the fabric by said needle, said member having a central opening therein, a second shaft below said member, a rocker arm on each of said shafts, a link, and means connecting said link to each of said rocker arms, the means connecting the link to the rocker arm on the second shaft including a universal joint, said link extending through said central opening, a third shaft carried by said member, cutting means associated with said hook mounted on said third shaft, and means operatively connecting said first and third shafts to move in unison.

5. In a machine for forming chenille patterns on a fabric, means for holding a substantial area of fabric in taut condition, a needle carrier mounted for reciprocation in a direction transverse to the fabric held by such holding means, means to reciprocate such carrier, said carrier including needle holding means offset from the longitudinal axis thereof, means to rotate said carrier to cause a needle carried by said carrier to move in a direction transverse to the longitudinal axis of the needle, a loop holding hook, a member mounted on the opposite side of the fabric from the needle for rotation about the axis of the needle path, means mounting said hook eccentrically on said member for movement to engage and hold in extended position a loop of flexible material carried through the fabric by said needle, and cutting means associated with said hook mounted on said rotatable member for rotation therewith.

6. In a device as claimed in claim 5, said carrier being hollow for the passage of thread to the needle, and tension means adjacent the end of the carrier remote from the needle.

7. In a chenille sewing device, a needle carrier mounted for reciprocation, said carrier including needle holding means offset from the longitudinal axis thereof, means to rotate said carrier to cause the needle to move in a circular path, said carrier being hollow for the passage of thread to the needle, and tension means adjacent and below the end of the carrier remote from the needle,

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the thread passing directly from said tension means to such end of the carrier.

8. In a machine for forming chenille patterns on a fabric, means for holding a substantial area of the fabric stationary in a taut condition, a plurality of needles, means mounting said needles for joint reciprocation in a direction transverse to the fabric held by such holding means, means to guide said needles to move in predetermined paths in a direction transverse to the longitudinal axes of the needles, a plurality of loop holding hooks, means mounting said hooks on the opposite side of said fabric holding means from said needle mounting means, means to move each of said hooks to engage and hold in extended position a loop of flexible material carried through the fabric by one of said needles, means to guide each of said hooks for movement in a path corresponding to the path of movement of one of said needles, and cutting means associated and movable with each of said hooks to cut the loops formed by said needles and hooks.

9. In a machine for forming chenille patterns on a fabric, means for holding a substantial area of the fabric stationary in a taut condition, a plurality of needles, means mounting said needles for joint reciprocation in a direction transverse to the fabric held by such holding means, means to guide said needles to move in concentric circular paths in a direction transverse to the longitudinal axes of the needles, a plurality of loop

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holding hooks, means mounting said hooks on the opposite side of said fabric holding means from said needle mounting means, means to move each of said hooks to engage and hold in extended position a loop of flexible material carried through the fabric by one of said needles, means to guide said hooks for movement in concentric circular paths corresponding to the paths of said needles, means to hold a plurality of supplies of flexible material, means mounting such holding means to turn with said needles and cutting means associated and movable with each of said hooks to cut the loops formed by said needles and hooks.

JULIUS MONTGOMERY.

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