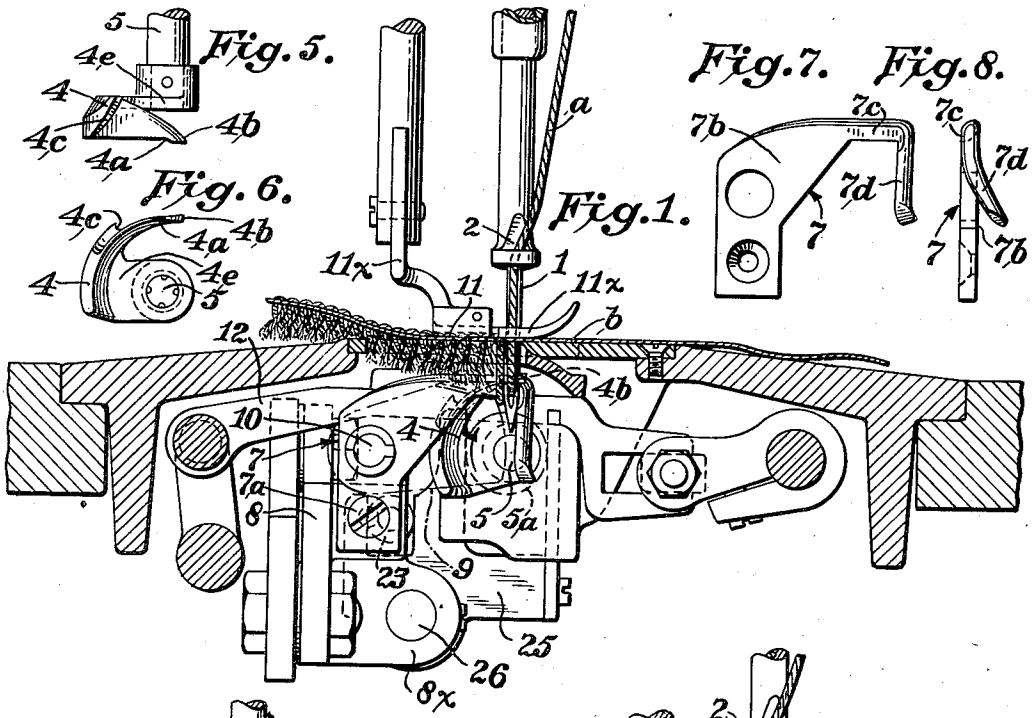
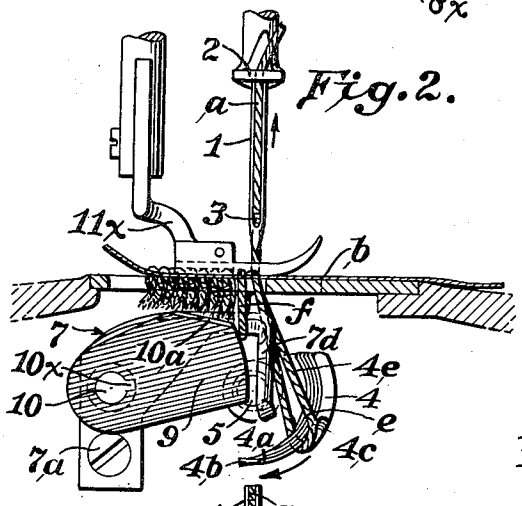
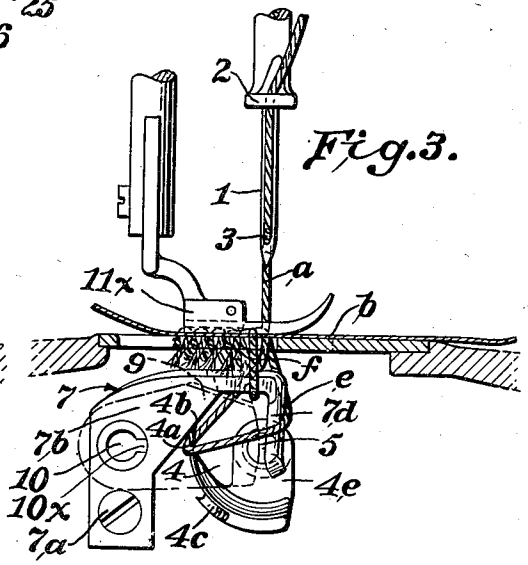
March 26, 1940. W. H. SPARKS 2,194,876

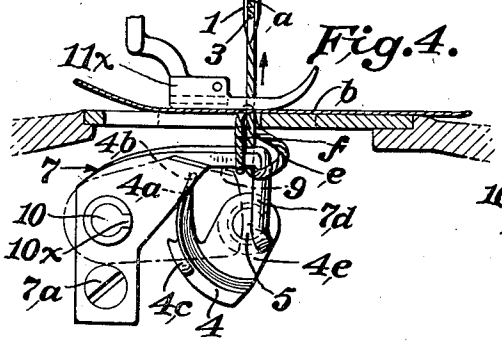
CHENILLE SEWING MACHINE AND THE LIKE

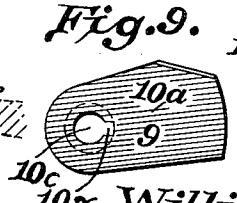
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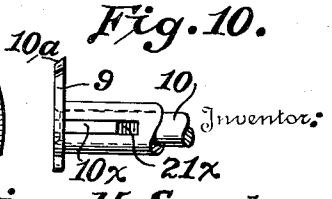












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CHENILLE SEWING MACHINE AND THE LIKE

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Fig. 11.

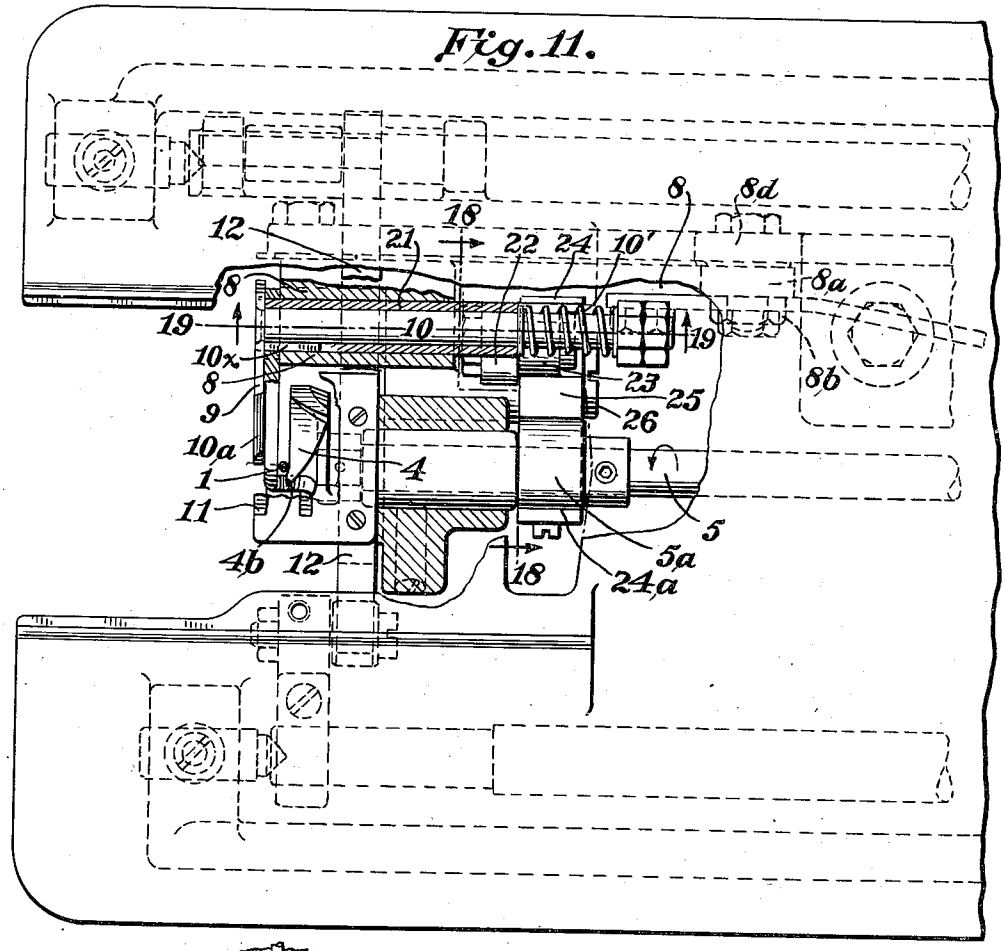
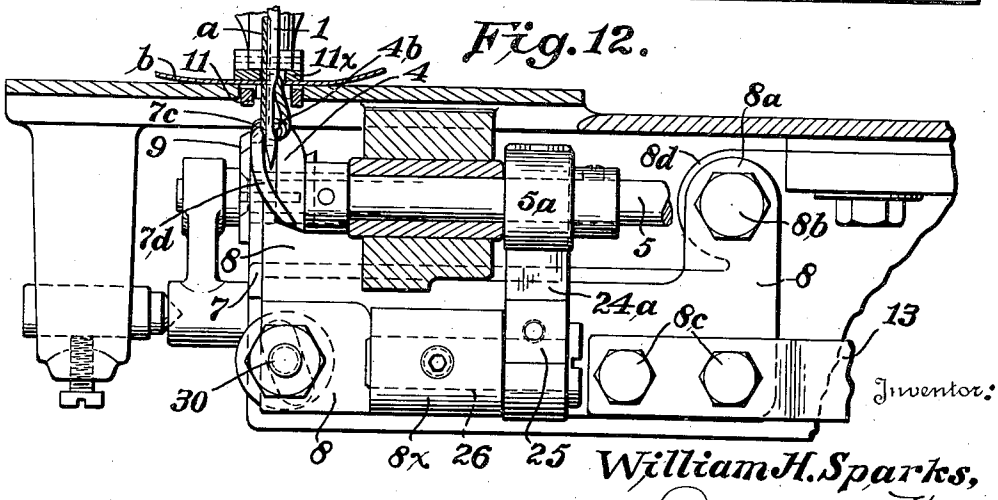


Fig. 12.



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CHENILLE SEWING MACHINE AND THE LIKE

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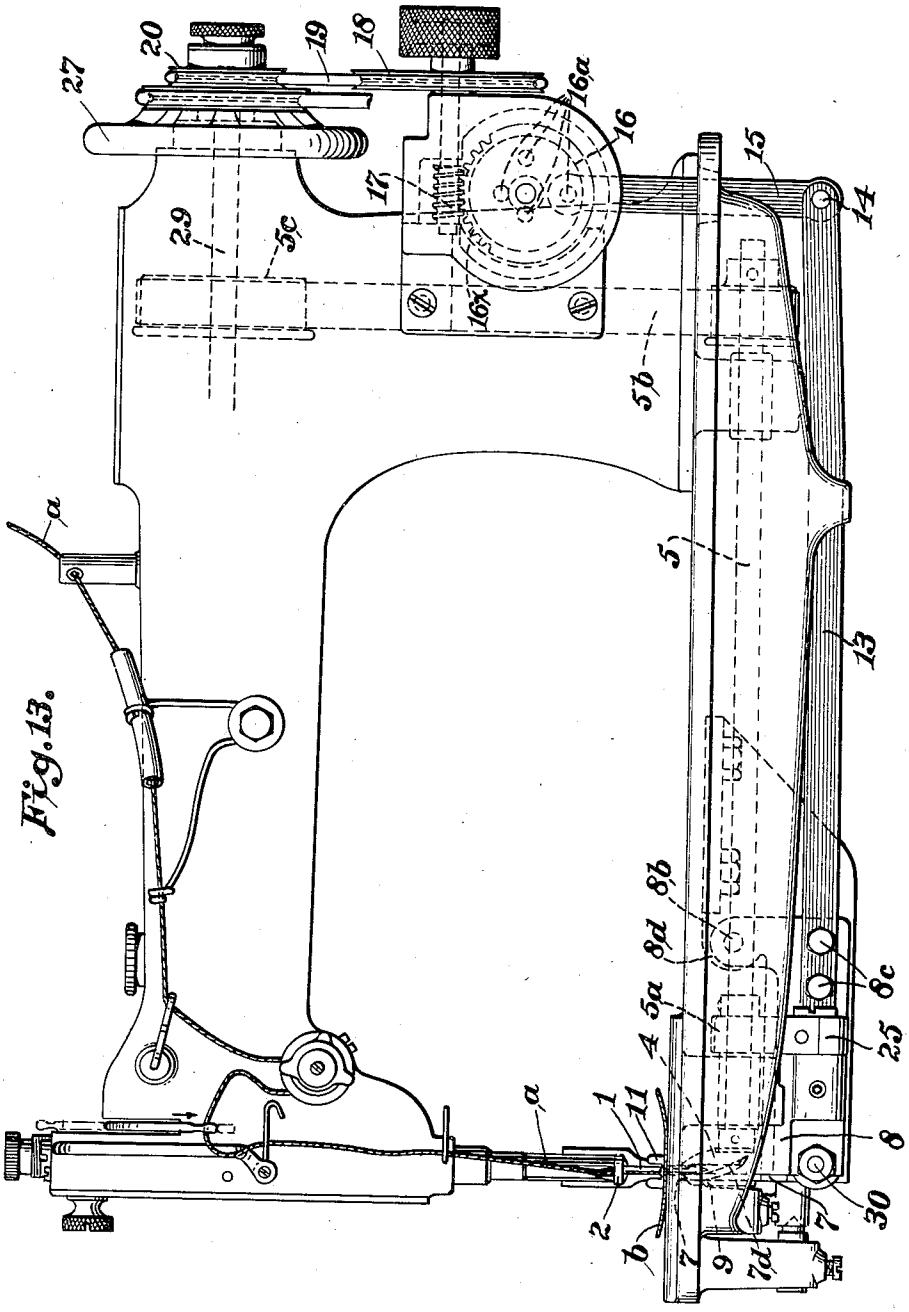


Fig. 13.

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CHENILLE SEWING MACHINE AND THE LIKE

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Fig. 14.

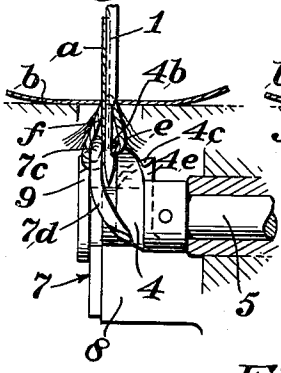


Fig. 15.

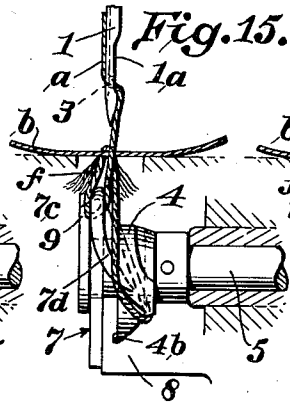


Fig. 16.

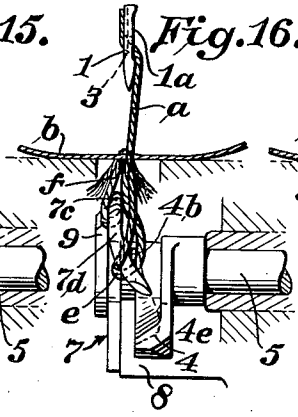


Fig. 17.

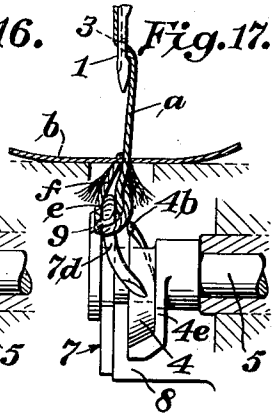


Fig. 18.

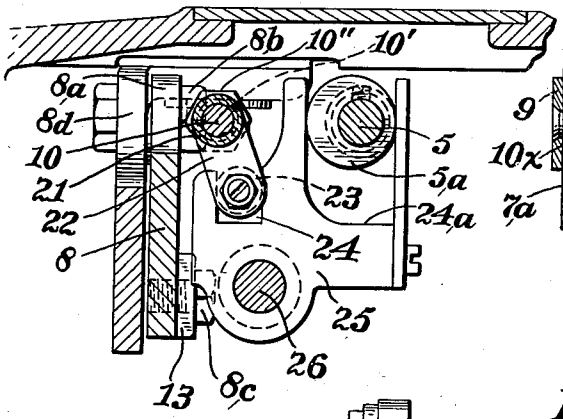


Fig. 19.

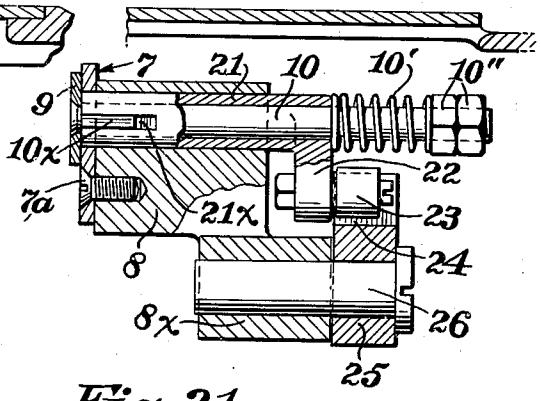


Fig. 21.

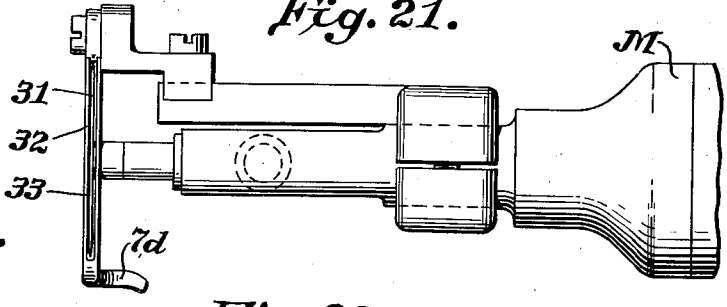


Fig. 20.

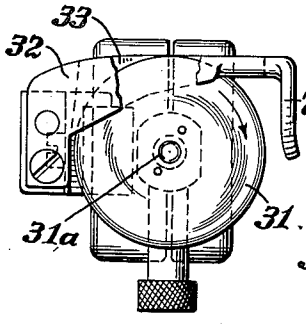
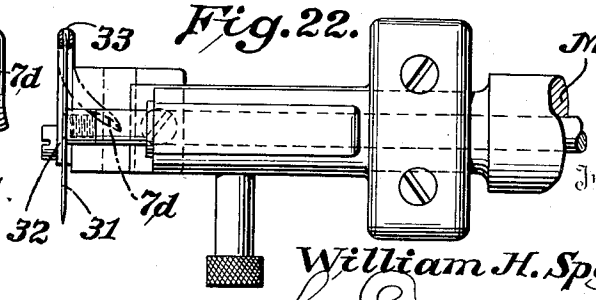


Fig. 22.



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Patented Mar. 26, 1940 2,194,876

UNITED STATES PATENT OFFICE

2,194,876

CHENILLE SEWING MACHINE AND THE LIKE

William H. Sparks, Calhoun, Ga.

Application November 9, 1938, Serial No. 239,728

8 Claims. (Cl. 112—79)

The invention concerns a machine for tufting fabrics, such as applying chenille to bedspread fabrics, though the invention is not limited in all of its aspects to this use.

The invention consists in the features and combination and arrangement of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawings

Figure 1 is a side elevation partly in section of part of the machine looking from the left of Fig. 13. This view shows the needle descending and the loop forming member about to take the thread therefrom.

Fig. 2 is a detail view similar to Fig. 1 with parts omitted. This view shows the new loop as having been drawn and about to be placed on the guide for directing it to the loop holder for cutting to provide the tufts.

Fig. 3 is a view similar to Fig. 2 with the parts in an advanced step in the operation.

Fig. 4 is a view similar to Figs. 2 and 3, with the parts at another stage of the operation.

Fig. 5 is a plan, and Fig. 6 is a side view of the loop drawing member.

Fig. 7 is a side view, and Fig. 8 a front view of the loop holder and an associated guide for directing the loops to said holder.

Fig. 9 is a side view of a cutter for severing the loops to form the tuft.

Fig. 10 is a front view of the cutter and a part of its carrier means.

Fig. 11 is a plan view of part of the machine with a portion broken away and a portion in section.

Fig. 12 is a view of a part of the machine looking from the front with parts in section.

Fig. 13 is a front view of the head of a sewing machine embodying the invention.

Figs. 14 to 17 inclusive are views of the elements immediately involved in the formation and cutting of the loops, all of said views being taken from the front of the machine in which views:

Fig. 14 shows the loop forming member engaging the thread to begin drawing of the loop.

Fig. 15 is a similar view with the loop drawing finger advanced about 180° from the position of Fig. 14, with the loop fully drawn and turned or twisted through an angle of, say, 180° or more, in which position the strands of the loop are crossed at a point slightly below the plane of the foundation fabric. This position corresponds to that shown in Fig. 2.

Fig. 16 shows the loop forming finger as having advanced about ¾ of a revolution from the position of Fig. 14, this position corresponding to that of Fig. 3 where the loop is about to be freed from the loop forming member or point 4*b*, it at this time having been threaded onto the downwardly extending guide which controls and directs it on its way to the loop holder.

Fig. 17 is a front view with the elements in the position of Fig. 4, the loop having been shed from the loop forming member completely and about to be drawn into the fabric by the take-up device, thus positioning the loop on the loop holder.

Fig. 18 is a sectional view on line 18—18 of Fig. 11.

Fig. 19 is a vertical sectional view through the shear blade shaft on line 19—19 of Fig. 11.

Fig. 20 is a side view of a rotary cutter associated with the loop holder.

Fig. 21 is a plan view and Fig. 22 a front view of Fig. 20 and associated parts.

In forming the loop, which is cut to produce the tuft, the said loop is drawn initially of excessive length and in this extra long form it is delivered to a guide member which controls it and directs it to a loop holder where its desired length is obtained by the operation of take-up means exerting a take-up action to pull back the excess thread and leave the loop of the length desired according to the position of the loop holder relative to the throat plate of the machine where the foundation fabric is located.

The needle 1 is reciprocated vertically by any ordinary mechanism, not shown.

The thread *a*, from a suitable supply, passes through the eye of a take-up finger which is controlled to take up slack in the thread.

The thread passes through a suitable guide 2 on the needle bar after leaving the take-up finger, and thence it passes through the eye 3 of the needle. The needle on its righthand side, as viewed from the front of the machine, has a looper spot 1*a* just above the eye. This consists of a depression of a depth to allow the point of the loop drawing finger to pass between the needle and the thread extending down alongside of the needle from the fabric.

The loop drawing member 4 is carried on a shaft 5 mounted in suitable bearings to have rotary movement. This rotary movement is constantly in one direction. The part 4 consists of a finger secured to the shaft and having a point 4*b* with an adjacent recess 4*a*, and a more remote shoulder 4*c*, the latter being inclined to the plane of rotation of the finger. The point 4*b* of this

loop drawing member engages the thread near where it emerges from the eye of the needle, and extends thence to the fabric *b*, and Fig. 1 shows the point *4b* of the finger just after it has taken the thread in its rotation clockwise. Fig. 2 shows the loop forming member as having made substantially a half revolution around the axis of shaft 5 from the position of Fig. 1, the loop having been drawn in extended form, and resting against the inclined shoulder *4c* of the loop drawing finger.

As shown in the detail plan view Fig. 5, the loop forming finger widens from its point *4b* to its shoulder 4c, and as the loop slips back along this finger, it is widened or opened to conform to the gradually increasing width of the finger to the point shown in Fig. 2, just before the rotary motion of the loop forming finger brings the open loop to the guide *7d* for directing the loop to a loop holder 7, which is fixed in position by a screw *7a* attaching it to a bracket member or support 8. This loop holder is shown in detail in Figs. 7 and 8, and consists of a plate *7b* having a laterally extending arm *7c*. The elongated guide *7d* is connected to the end of the holder and at its downwardly directed end distant from the eye of the needle receives the extra long loop from the loop forming finger which it is about to do in Fig. 2, as a consequence of the continued movement of the loop drawing finger in the arrow direction. In this latter figure, the needle is rising. The take-up keeps the loop free from slack, draws back the excess thread, causes the loop to traverse the guide, and finally locates the loop of the desired length on the loop holder.

In Fig. 3, the needle is up and the loop under the tension of the take-up is about to be withdrawn from the drawing finger, which has arrived in such a position that the loop has slipped to near the point of said finger. At this stage the loop is still contacting with and under the control of the guide *7d*, and the loop drawing finger has arrived at a point in its revolution where the take-up tension on the thread is about to pull it off of the point *4b* of the loop drawing finger. This action has occurred in Fig. 4, and the take-up device is here drawing the thread back through the eye of the needle, is tightening the new loop, indicated at *e* in Fig. 4, and is about to locate it on the loop holder *7c*. This figure alsc shows the previously formed loop at *f* embracing the horizontal loop holder. This previously formed loop has been fully incorporated in the foundation fabric layer *a*. Its final length has been determined and it is ready to be cut in order to convert it into a tuft element. For this cutting action, a knife 9 is used consisting of a blade fixed to a rock shaft 10 suitably mounted in the support or bracket 8, said blade having a cutting edge at *10a* to sever the loop on the horizontal loop holder *7c*, so that each time the cutting blade swings upwardly, it will perform a cutting action on the loop, or loops, strung on the loop holder. During the operation of the machine, the knife is constantly oscillated and is cutting the loops as they arrive within its range in moving leftward in Fig. 4, it being noted that each new loop as it is drawn into place on the loop holder *7c*, against the lower edge thereof, will be seated in the corner where the loop holder joins the depending elongated guide, and that the previously formed loops will move along (leftward in Fig. 4) the said horizontal loop holder, this action being due to the operation of the reciprocating feeder 11 of the fabric, which feeder is carried by the arm 12 and is operated in any well known way. *11x* is the usual presser foot.

This feeder for the foundation fabric or goods is, as usual, serrated or toothed on its upper side to grip the fabric. Fig. 1 illustrates that a number of the loops have been cut and have passed to the left beyond the range of the oscillating knife blade 9.

It will be observed that the knife does not immediately cut the last loop positioned on the holder, as, for instance, loop *f* in Figs. 1 and 4. More than one such loop may be held intact, i. e., without cutting, on the loop holder during the time that the new loop is being formed and transferred to the loop holder. This intact loop, or loops, *f*, if more than one is left intact while the new loop is being drawn and transferred, will insure the locking of the loops in the fabric and prevent the take-up mechanism from pulling out or disturbing the strand already lodged in the fabric.

In the action above described, it will be noted that the two side strands of the loop have been crossed one upon the other, and these strands initially lie in the foundation fabric in this crossed relation when the loop to which they belong is seated in the fabric. This crossing of the strands is due to the incline of the shoulder *4c* giving the loop a half turn from its initial position to that shown in Fig. 2, where it is about to be threaded onto guide *7c*. The shoulder *4c* serves as a stop to prevent the loop from slipping too far backward on the loop drawing or forming finger *4a*.

In other words, this shoulder is for insuring the transport of the newly formed loop to the guide. This shoulder desirably is mounted on the loop forming finger. The depending guide *7d* which receives the loop and directs it to the loop holder *7c* is curved laterally, as shown in Figs. 8 and 12, and its point lies in position to receive the opened loop of Fig. 2. The loop drawing finger 4, as shown in Fig. 4, overhangs a free space by reason of the fact that its supporting arm *4e*, Figs. 5 and 6, is offset to one side of the plane of revolution of the finger. This finger therefore readily can deliver the loop to the downwardly directed point of the elongated guide *7d*.

The loop forming finger in this particular disclosure is timed to make two complete revolutions for each reciprocation of the needle, but I do not limit myself in this respect.

The distance between the loop holder and the foundation fabric determines the length of the loops, and of the tufts when the loops are cut. The loop holder is therefore made adjustable. For this purpose, the bracket 8 on which the loop holder *7c* is mounted has an ear *8a* pivotally connected by a bolt *8b* to the frame or base of the machine at *8d*. To this bracket 8 is bolted at *8c* a rod 13 pivoted at 14 to a link 15, which may be connected to a rotary disc 16, Fig. 13. By rotating this disc more or less, the connections just described will adjust the whole bracket 8 about the pivot *8b* for setting the loop holder up or down in relation to the foundation fabric, and hence the length of the loop will be altered, and as a result, the depth of the tuft will be changed when the loop is cut. The disc 16 may be operated in any desired way. I have shown worm gearing at 17, Fig. 13, operated from a wheel or pulley 18. When set in any desired position, the worm gearing will lock the parts against accidental operation.

The pulley 18 may be regarded as a representation of any desired form of hand wheel for adjusting the parts above mentioned by hand, or it may be, as shown a pulley driven constantly during the operation of tufting so as to get a wave effect in the tufting by constantly varying the length of the loop, and consequently of the tufts when cut, said wave effect defining the surface of the grouped threads of different lengths. The drive for the pulley 18 may be the belt 19 from another pulley as 20. The link or pitman 15 may be connected with the disc 16 at various distances from its center of rotation, for which purpose a series of openings 16*a* are provided at varying radial distances from the center of the disc. This will give varying positions vertically to the loop holder 7*b*, 7*c*, automatically during the operation of the machine.

It will be understood that the same bracket 8 which supports the loop holder 7*c* also carries the loop cutting knife 9, because its shaft 10 is mounted in said bracket. This shaft lies within a sleeve 21. This has an arm 22 depending from it, carrying a roller 23 embraced by a fork 24 of an arm 25, pivoted at 26 to a part or boss 8*x* of the bracket 8 heretofore described. This arm 25 has another fork or recess 24*a* in which works an eccentric 5*a* on the shaft 5 which, as before described, carries the loop drawing finger 4 and rotates in one direction. The sleeve 21 is connected to the shaft 10 by a key 10*x* on the shaft lying in a slot 21*x* of the sleeve, so that rocking movement of the sleeve will be imparted to the shaft 10 and cutter, but the cutter will have a tendency to press to the right in Fig. 11 under tension of the spring 10', Fig. 11, surrounding the shaft 10, bearing at one end against the end of the sleeve and at the other end against a nut 10'' on the shaft. The knife 9 is thus pressed towards the side of the loop holder 7*c* to cut the loop with a shearing action.

In order to remove the completed fabric from the machine, a cutting of the final loops may be performed by operating the cutter by hand power applied to the hand wheel 27. For this action, the presser foot would be lifted from the fabric, the hand wheel would be turned through a limited angle back and forth sufficiently to oscillate the knife the required stroke, and during this hand operation of the knife, the fabric would be stressed leftward by hand, so that the loops on the loop holder 7*c* will be drawn leftward within range of the cutter.

For performing this action, the machine would be turned over to a point where the operation of the hand wheel back and forth by hand can be performed without affecting to any material degree the raised position of the needle, the position of the operating parts being substantially neutral in respect to the operation of the needle.

Instead of an oscillating cutter for the loops, a disc cutter may be employed rotating about an axis 31*a*. This may be rotated by an electric motor M. Such a cutter is shown at 31. The fabric feeder will draw the loop against this rotating cutter disc.

The loop holder, when this rotary cutter is employed, is split at 33, the loop holder generally being designated by the numeral 32. The edge of the rotary cutter enters the slot provided by the split form of the loop holder.

The shaft 5 which carries the loop forming member 4 is mounted to rotate in a bracket affixed to and depending from the frame or table of the machine. This shaft is driven from a belt 5*b* which is driven from a pulley 5*c* on a shaft 29, shown in dotted lines.

It will be observed that the guide 7*d* is elongated and extends far enough downwardly from the loop holder portion, and far enough distant from the eye of the needle, when lowered, to receive the loop in the extended condition of Fig. 2 (or slightly more), this extended condition being a consequence of the use of a finger such as 4 rotating constantly in one direction. The elongated form of the guide insures that the loop will be taken with certainty when it is in its elongated form, and with its strands well spread apart and crossed to present an opening of considerable width to the downwardly directed end of the guide member 7*d*.

It will be observed further that by my invention the loop, under the pull of the take-up, frees itself from the loop forming finger, which latter, by rotating in one direction, brings the loop to a position where the free end of said finger is pointing in an upward direction. Compare in this connection the position of the said finger 4 in Figs. 3 and 4 to the position shown in Fig. 2. No special stripper or take-off means need be associated with the loop forming finger 4 for discharging the loop therefrom. The recess 4*a* is of a size to provide room for the rise of the needle without conflict of the lower end thereof with the said finger, it being remembered that the finger enters a depression in the side of the needle.

Fig. 4 shows the loop discharged from the loop forming finger, and being drawn tightly into the fabric by the take-up.

At 30 is shown a bolt for retaining the pivoted bracket 8 in proper relation against the frame. The bolt passes through the slot to permit movement of the bracket 8.

The invention also concerns the method of forming, transporting, and delivering the loop and cutting the same.

It also includes the chenille having loops with its threads crossed.

By employing a loop forming member rotating in one direction a high production in the number of stitches within a given time is obtained.

Further this rotary loop former contributes to simplicity of the machine, ease and certainty of operation, and reduces repairs and upkeep.

A rotary member is permitted as a practical means of forming the loop by drawing said loop of excess length initially and thereafter reducing its lentgh to the prescribed limit, as it is being incorporated in the fabric. Naturally by employing a rotary loop former a length of loop must be drawn approximating the diameter of the rotary member.

Contributing to the use of said rotary member is the elongated guide member 7*d* which has its lower downwardly directed end disposed at a distance below the eye of the needle, when lowered, to receive the loop when it attains substantially its complete extra length.

The take up tension on the yarn is applied only when the needle rises from the cloth and the loop forming finger is rising on the loop discharging side of its circuit. At other times the thread is free from tension i. e. when the needle is going down through the fabric and while the loop drawing finger is going down.

This eliminates the possibility of producing an inferior article.

I claim:

1. In combination in a machine of the class described, a needle for carrying the thread

through the foundation fabric, a finger rotating in one direction only to draw the thread from the needle in the form of a loop, a relatively stationary loop holder having a seat for receiving the loop from the rotating loop forming finger and for holding a plurality of said loops, means for transferring the loop from the finger to the loop holder during the one directional rotary movement of said finger, and means associated with said loop holder for cutting the loops, substantially as described.

2. Apparatus according to claim 1 in which the said means for transferring the loop includes an elongated depending guide member, connected with the loop holder, having its end directed downwardly adjacent the circular path of movement of the loop drawing finger onto which the said loop drawing finger in its forward movement places the loop to be directed to the loop holder.

3. Apparatus according to claim 1 in which the rotating loop forming finger has a shoulder facing in the direction of rotation spaced laterally away from its point for receiving the loop, and transporting the said loop forwardly to its point of discharge.

4. Apparatus according to claim 1 in which the loop forming finger widens out gradually in rear of its point and has a shoulder on its outer face at its wide portion for engaging the loop and carrying it forwardly in the direction of rotation of said finger, said shoulder being inclined in respect to the direction of movement of the finger to turn the loop from the position in which it lies initially.

5. Apparatus according to claim 1 having take-up means for the thread, said take-up means stressing the thread for pulling the loop off of the finger and against said loop holder when said finger in its rotation points in an upward direction.

6. In combination in apparatus according to claim 1, a movable support for the loop holder, said cutting means also being carried by said support, and means for oscillating said support for varying the length of the loops automatically during the running of the machine, and means for operating the loop cutter relative to the loop holder, substantially as described.

7. In combination, a needle for carrying the thread through the foundation fabric, a finger located adjacent the needle to take the thread therefrom in the form of an elongated loop, a shaft on which said finger is mounted overhanging a free space at the end of said shaft, means for driving the shaft in one direction only, a loop holder arranged in a plane off to one side of the plane in which the finger rotates, and a guide connected to and depending from the loop holder and having its lower end portion extending laterally into the said free space within the path of the rotary loop drawing finger to receive the elongated loop from said finger, thread take-up means for taking up excess thread in the elongated loop in placing the said loop upon the loop holder and means for cutting the loops associated with the loop holder.

8. Apparatus according to claim 1 in which the loop drawing finger is mounted on a one-directional rotary shaft and in which the loop cutting means consists of an oscillating member, a shaft carrying said oscillating member, an eccentric on the shaft of the loop drawing finger, and a connection between the eccentric and the cutter shaft for rocking the latter to operate the cutting means.

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