

Nov. 10, 1931.

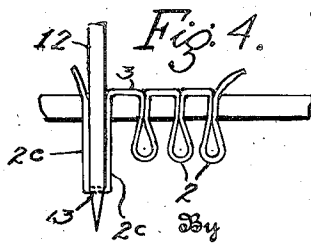
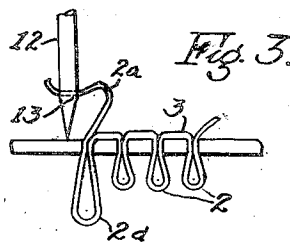
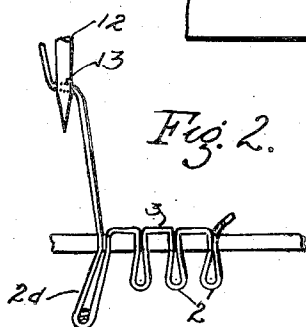
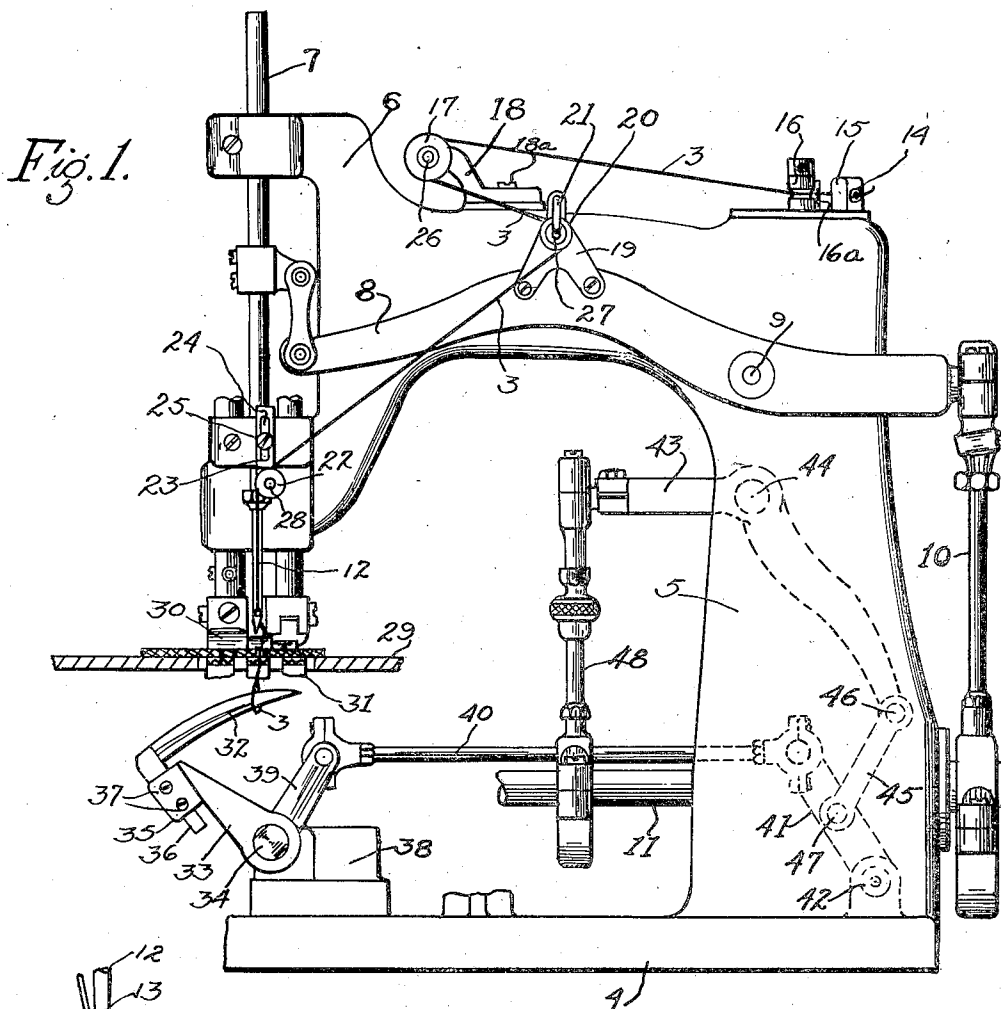
H. E. DYKEMAN

1,831,485

RUG TUFTING MACHINE

Filed Nov. 30, 1928

2 Sheets-Sheet 1



Inventor
Harry E. Dykeman
Sturtevant Mason
 Attorneys

Nov. 10, 1931.

H. E. DYKEMAN

1,831,485

RUG TUFTING MACHINE

Filed Nov. 30, 1928

2 Sheets-Sheet 2

Fig. 6.

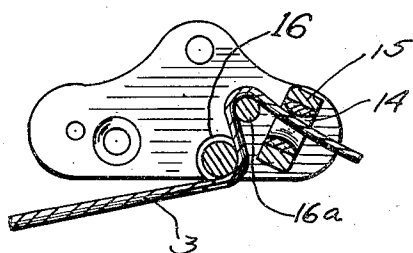


Fig. 7.

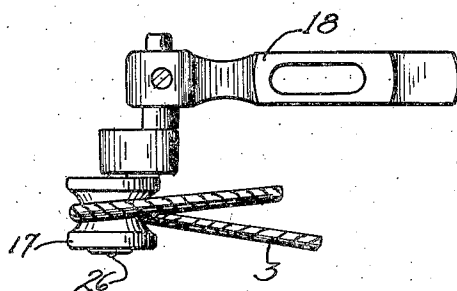


Fig. 8.

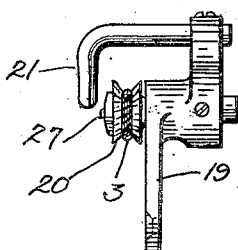


Fig. 9.

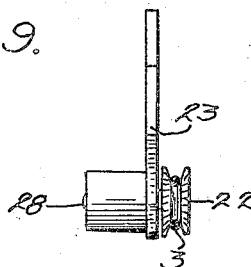
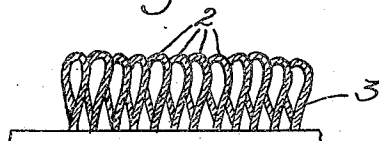


Fig. 5.



Inventor
Harry E. Dykeman

By *Sturtevant Mason*
Attorneys

UNITED STATES PATENT OFFICE

HARRY E. DYKEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO UNION SPECIAL MACHINE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

RUG TUFTING MACHINE

Application filed November 30, 1928. Serial No. 322,939.

The invention relates to new and useful improvements in rug tufting machines, and more particularly to a rug tufting machine wherein the tufts are formed by looping a tufting yarn.

An object of the present invention is to provide a rug tufting machine wherein the tufts inserted through a fabric base are of uniform length and the yarn between tufts laid closely against the face of the fabric base.

A further object of the invention is to provide a machine of the above type wherein the tufting loops are formed and the lengths of the loops determined by the needle forming the loops.

A further object of the invention is to provide a machine of the above type wherein the needle as it penetrates the fabric base to form a tufting loop draws tufting yarn from the previously formed loop so as to determine the length of the loop and lay the tufting yarn closely against the face of the fabric base.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings:

Fig. 1 is a view partly in section and partly in front elevation showing more or less diagrammatically a machine embodying the improvements.

Fig. 2 is a diagrammatic view showing the needle, the loop retaining implement, the fabric, and the formed loops with the needle at the upper end of its stroke.

Fig. 3 is a similar view showing the needle as about to penetrate the fabric base and the previously formed tufting loop released by the retaining implement.

Fig. 4 is a view similar to Fig. 2, but showing the needle at the lower end of its stroke and the previously formed tufting loop drawn up to a predetermined extent by the needle and the tufting yarn thereby laid closely against the face of the fabric base.

Fig. 5 is a view showing diagrammatically a small section of a tufted rug formed by the machine.

Fig. 6 is a view partly in section and partly

in plan showing the yarn guiding devices for receiving the yarn from the supply.

Fig. 7 is a plan view of the stationary yarn guide on the overhanging arm.

Fig. 8 is a side view of the needle lever bracket and yarn guide carried thereby.

Fig. 9 is a side view of the yarn guide carried by the needle head.

The invention is directed to a rug tufting machine and includes an eye-pointed needle mounted in an overhanging arm for reciprocation. The tufts are formed from a tufting yarn which is threaded through the eye of the needle. This tufting yarn as it passes from the supply is led around suitable stationary guiding devices and also over a guiding device carried by the needle lever which reciprocates the needle bar. There is no tension on the yarn and the yarn runs freely over the guiding devices. Cooperating with the needle beneath the work support is a loop retaining implement which is oscillated and timed so as to move into the loop formed in the tufting yarn by the needle. Said loop forming implement has a relatively long movement into the yarn loop and retains the yarn loop until the needle has reached substantially the upper end of its stroke. This insures that the needle on its up stroke will not pull any tufting yarn from the formed loop but will move up on the yarn, the yarn freely sliding in the eye of the needle during this upward movement of the needle. After the needle has reached the upper end of its stroke, the loop is released and on the downward movement of the needle to form the new loop, tufting yarn is freely given to the needle so that the needle does not move down on the yarn but forms a new loop by drawing the tufting yarn in part from the previously formed tufting loop. This draws up the previously formed tufting loop to a predetermined length and also lays the tufting yarn closely against the face of the fabric base.

Referring more in detail to the drawings, in Fig. 5 a portion of a rug is diagrammatically shown which includes a fabric base 1 in which a series of tufting loops 2 have been formed. These tufting loops are formed from a tufting yarn 3 which is laid against

one face of the fabric base and carried through the fabric base so as to provide projecting loops 2. These projecting loops 2 are very close together and thus a tufted rug 5 formed, the tufted face of which consists of a series of closely placed yarn loops. These are matted down into a very soft yielding surface.

The machine for producing this tufted rug 10 includes a supporting base 4 carrying a standard 5 which is provided with an overhanging arm 6. Mounted for reciprocation in the overhanging arm 6 is a needle bar 7. The 15 needle bar 7 is reciprocated by means of a needle lever 8 pivoted at 9 to the standard and reciprocated by an eccentric strap 10 cooperating with an eccentric on the main shaft 11. Mounted in the needle bar 7 is a needle 12 which is provided with an eye 13. The 20 tufting yarn is led from the supply through a suitable guide eye 14 in a bracket 15, thence across a guiding post 16a to a roller guide 16 mounted for rotation about a vertical axis. The guide eye 14 is relatively large and tapered 25 from each side to the center thereof so that there is little or no tension placed on the yarn as it passes through this eye and around the post. The tufting yarn thence passes over a guide roller 17 carried by a bracket 18 30 mounted on the overhanging arm. The bracket is adjustably secured to the overhanging arm by a screw 18a. Mounted on the needle lever 8 is a bracket 19 which carries a guide roller 20. Attached to the bracket 35 and overhanging the roller is a guard rod 21. This guard rod prevents the yarn from being released from the roller 20 during the reciprocation of the needle lever. The yarn 40 after leaving the roller 20 passes over a guide roller 22 carried by a bracket 23 which is mounted on the needle head. From this guide roller the tufting yarn passes to the eye 13 of the needle. Said bracket is provided with a slot 24 and a screw 25 passing through the 45 slot clamps the bracket in adjusted positions. The roller 17 is provided with an oiling recess closed by the usual ball valve indicated at 26 in Fig. 1 of the drawings. The roller 20 is likewise provided with an oil supplying 50 means as indicated at 27. The roller 22 is provided with a suitable oil supplying means as indicated at 28. The guide rollers over which the tufting yarn runs all being mounted for free rotation and self-lubrication enable the tufting yarn to be supplied to the 55 needle with very little tension placed on the yarn.

The fabric base to be tufted is placed on a work support 29 and is held thereon by the 60 usual form of presser foot 30. The fabric base is fed across the work support by a feeding mechanism which includes a feed dog 31. Cooperating with the needle beneath the work support 29 is a loop retaining implement 32. This implement is carried by an

arm 33 mounted on a shaft 34. The arm 33 is provided with a sleeve 35 and the shank 36 of the loop retaining implement 32 is inserted in this sleeve and secured therein by set screws 37, 37. The shaft 34 is mounted 70 for oscillation in a suitable bearing 38 carried by the bed 4 of the machine. On the other end of the shaft 34 is an arm 39. A link 40 is connected to a ball stud at the outer end of the arm 39. This link 40 is connected at its 75 other end to a ball stud at the outer end of a lever arm 41 shown in dotted lines in Fig. 1.

This lever arm 41 is pivoted to a bracket 42 at its lower end. A rock lever 43 is pivoted at 44 to the standard 5 of the machine. A 80 link 45 is pivoted at 46 to this rock lever and is pivoted at 47 to the lever arm 41. The rock lever 43 is oscillated by an eccentric strap 48 cooperating with an eccentric on the main 85 shaft 11.

The reciprocating means for the needle causes the needle to pass through the fabric base and insert a tufting loop formed in the tufting yarn by the needle through the fabric 90 base. As the needle begins its upward movement, the tufting yarn is bowed out slightly from the shank of the needle and the loop retaining implement 32 enters the tufting loop and passes on into the tufting loop. This 95 retaining implement 32 has a relatively long body portion and a relatively long stroke. Said loop forming implement reaches the forward end of its stroke just slightly before the needle reaches the upper end of its stroke. 100 There is more or less of a dwell given to the needle as it reverses its movement at the upper end of its stroke. On its upward movement the tufting yarn is held substantially taut by this loop retaining implement and the 105 eye of the needle will slide upwardly on the tufting yarn. During this upward movement of the needle, the roller 20 is moving away from the roller 22 and also away from the roller 17 as it moves in the arc of a circle about a center at the axis 9 of the needle lever. 110 The tufting yarn being held taut at this time yarn will be drawn from the supply through the yarn guiding eye 14. As the needle starts its downward movement, the thread guiding 115 roller 20 will at once begin to move toward the roller 22 and the roller 17 and will give slack to the tufting yarn. The feed of the tufting yarn is so free that the tufting yarn between the eye of the needle and the 120 roller 22 will move down with the needle and thus create a slack in the tufting yarn between the eye of the needle and the previous needle puncture as indicated at 2a in Fig. 3 of the drawings.

When the eye of the needle reaches the 125 fabric base, a new loop begins to form in the tufting yarn and the needle continues to form and extend this loop until it reaches the extreme lower end of its stroke. There is more or less of a friction grip of the fabric 130

on the yarn pressing the same against the sides of the needle. The roller 20 continues to give up slack to the needle until it reaches the lower end of its stroke. This downward movement of the needle consumes the slack 2a before the needle reaches the lower end of its stroke. The yarn will be then drawn close against the face of the fabric base and yarn will be drawn from the previously formed yarn loop. As shown in Figs. 2 and 3, this previously formed yarn loop indicated at 2d is longer than the other yarn loops 2. The yarn for forming the strand 2c in the loop that is being formed by the needle will be drawn from this previously formed elongated yarn loop 2d, drawing said yarn loop up to a predetermined shorter length. It is this formation of the yarn loop by the needle which draws on the previously formed yarn loops and makes the yarn loops of uniform length and which also draws the yarn between the loops tight against the face of the fabric base.

In order that the yarn may be snugly nested against the fabric base, the position of the guide rollers 17 and 22 which are adjustable may be shifted and so set that the needle takes slightly more yarn than has been pulled from the supply on the upward movement of the needle, and, therefore, will pull at this time a small portion of yarn from the supply. As noted, there is little or no tension on the yarn, nevertheless, the pulling of the yarn about the rollers will place sufficient tension so as to insure the drawing up of the previous loop to a predetermined extent and the laying of the yarn close against the face of the fabric base.

The particular device for forming the yarn loops and the mechanism for operating the same may be greatly varied without departing from the spirit of the invention, which resides largely in a reciprocating needle, an oscillating thread retaining implement, and a yarn supply means, all of which are timed and operated to form the fabric loops and then draw the fabric loops to a predetermined length and at the same time lay the yarn between loops close against the face of the fabric base.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A rug tufting machine including in combination a needle, means for reciprocating said needle for inserting a tufting loop through a fabric base, a loop retaining implement cooperating with the needle, means for reciprocating said loop retaining implement whereby said implement is caused to engage a tufting loop formed by the needle and retain the same until the needle reaches substantially the upper end of its stroke, said needle on its downward stroke operating to draw tufting yarn from the previously

formed loop whereby said loop is shortened and the yarn between needle punctures drawn tightly against the fabric base, and means operating on the upward movement of the needle for pulling tufting yarn from the supply and for giving the yarn drawn from the supply to the needle on the downward movement thereof.

2. A rug tufting machine including in combination a needle, means for reciprocating said needle for inserting a tufting loop through a fabric base, a loop retaining implement cooperating with the needle, means for reciprocating said loop retaining implement whereby said implement is caused to engage a tufting loop formed by the needle and return the same until the needle reaches substantially the upper end of its stroke, said needle on its downward stroke operating to draw tufting yarn from the previously formed loop whereby said loop is shortened and the yarn between needle punctures drawn tightly against the fabric base, and means operating on the upward movement of the needle for pulling tufting yarn from the supply and for giving the yarn drawn from the supply to the needle on the downward movement thereof, said last-named means including adjustable guiding members whereby the amount of yarn pulled from the supply may be varied so that the needle as it reaches the lower end of its stroke will pull a small amount of thread from the supply.

In testimony whereof, I affix my signature.

HARRY E. DYKEMAN.