May 16, 1933. E. F. CLARK 1,908,957

MACHINE FOR TREATING PILE FABRICS

Filed Dec. 31, 1930 3 Sheets-Sheet 1

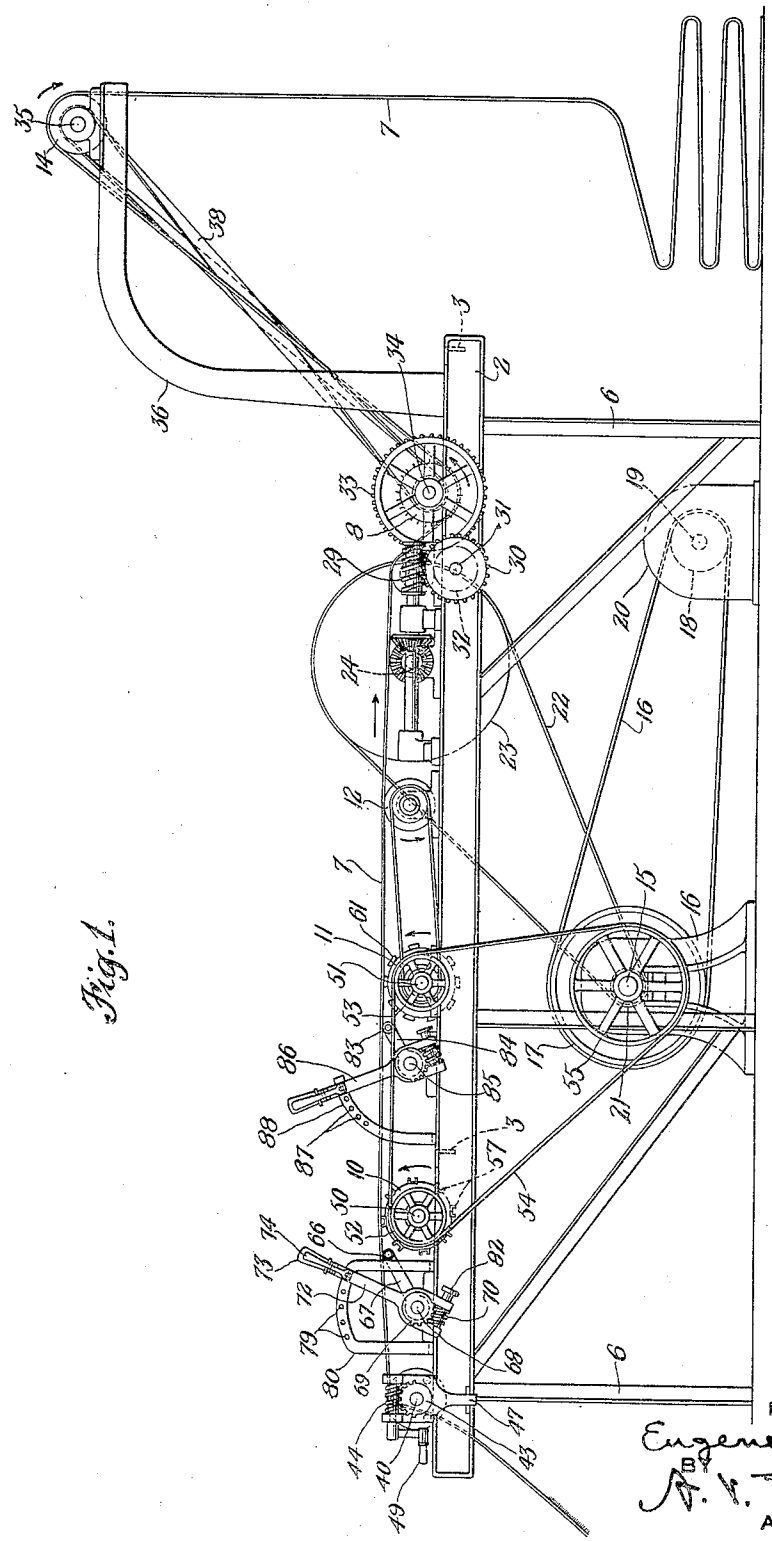


Fig. 1.

INVENTOR
Eugene F. Clark
BY
ATTORNEY

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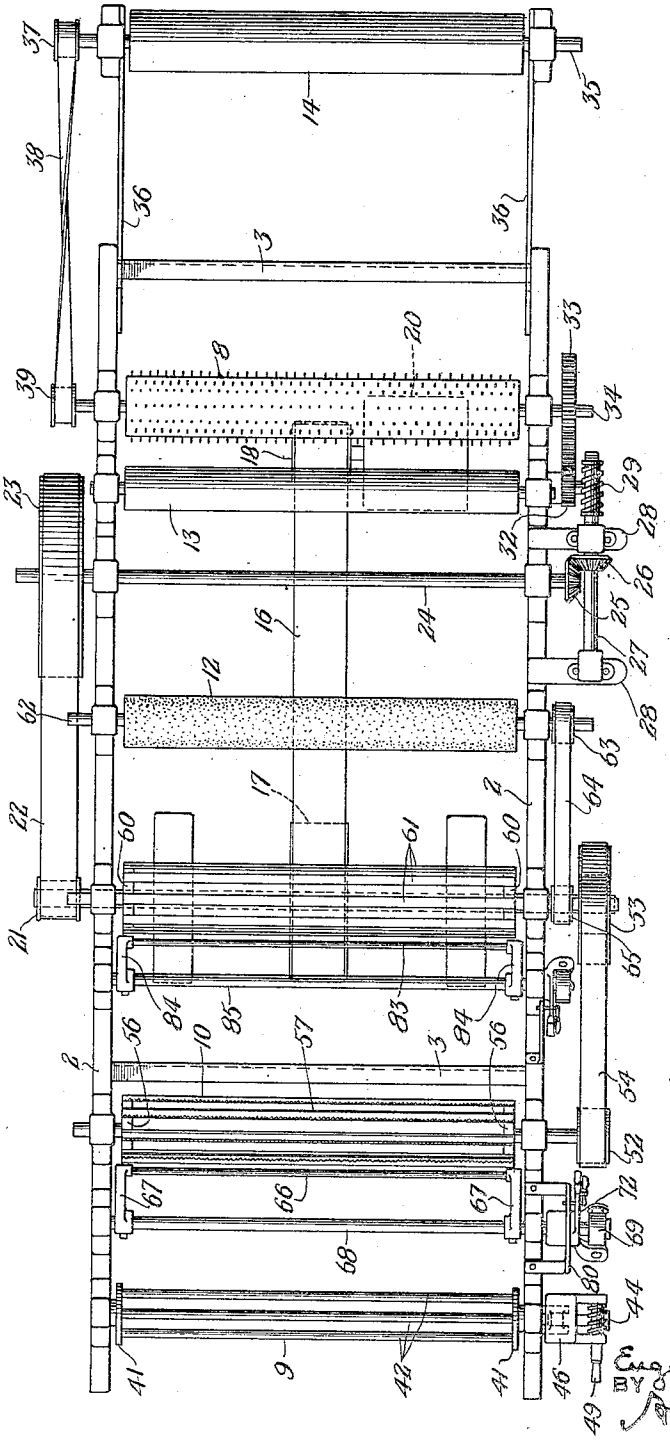


Fig. 1.

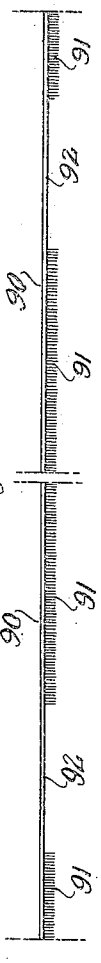


Fig. 9.

INVENTOR
Eugene F. Clark
BY
ATTORNEY

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Fig. 4.

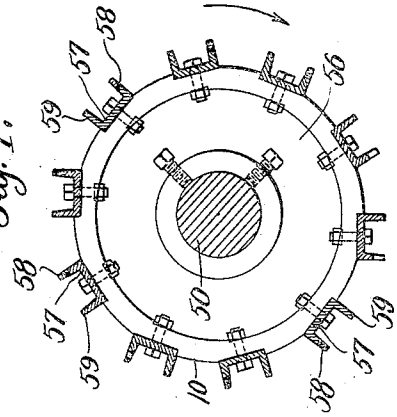


Fig. 5.

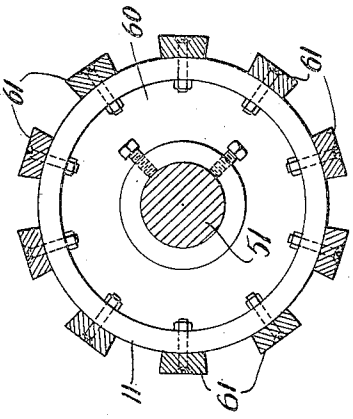


Fig. 3.

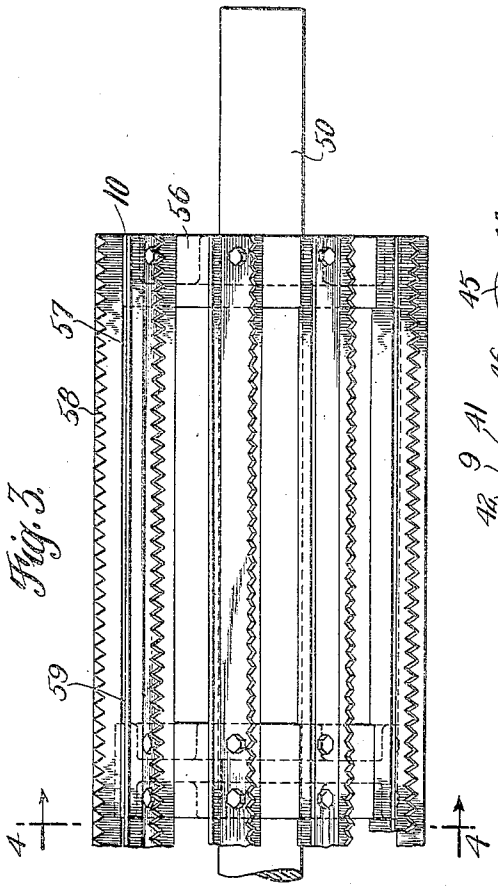


Fig. 6.

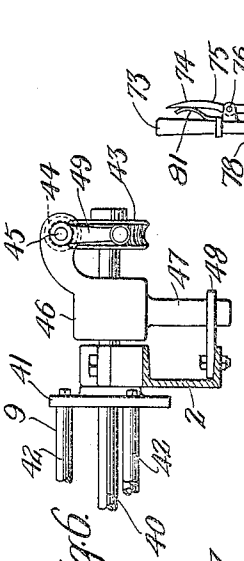


Fig. 8.

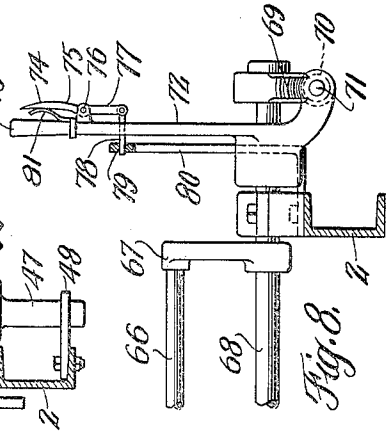
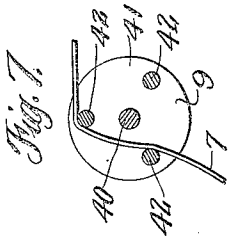


Fig. 7.



INVENTOR
Eugene F. Clark
BY
A. V. Crough
ATTORNEY

Patented May 16, 1933

1,908,957

UNITED STATES PATENT OFFICE

EUGENE F. CLARK, OF DAMARISCOTTA, MAINE, ASSIGNOR TO MARSHALL FIELD MILLS CORPORATION, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

MACHINE FOR TREATING PILE FABRICS

Application filed December 31, 1930. Serial No. 505,919½.

This invention relates to improvements in machines for treating cut pile fabrics such as plush, carpets and rugs.

The object of the invention is to provide a machine of novel construction and operation by means of which the free end portions of the yarn strands forming the pile may be polished and also tapered or pointed, for the production of a rich and lustrous appearance in the pile of the finished fabric.

The invention consists of the elements and the combinations of them hereinafter described and claimed.

In the accompanying drawings, illustrating the invention,

Figure 1 is a side view of a machine for treating pile fabrics embodying my invention.

Figure 2 is a top view thereof.

Figure 3 is a side view of one end portion of one of the rotatable batting members.

Figure 4 is a transverse section of the batting member shown in Fig. 3, on line 4—4 of Fig. 3.

Figure 5 is a transverse section through one of the batting members.

Figure 6 is a detail showing parts of the friction producing, retarding device for the fabric.

Figure 7 is a transverse section through the retarding device shown in Fig. 6, showing the relation thereof to the fabric passing through the same.

Figure 8 is a detail showing parts of one of the fabric supporting and raising bars and the means for supporting and operating the same.

Figure 9 is an edge view of a portion of a strip of pile fabric in the form of a number of rug sections woven in a continuous strip.

Referring to the drawings, the frame of the machine includes longitudinally extending side bars 2, transverse bars 3, connecting the side bars 5, and supporting standards 6.

The pile fabric to be treated is advanced through the machine longitudinally by a cylinder or drum 8 near the discharge end of the machine. The cylinder 8 is provided with outwardly projecting pins which enter the fabric 7 and cause it to be advanced by the cylinder when it is rotated.

The fabric 7 is drawn by the cylinder 8 through and from a friction producing, retarding device 9 at the feed end of the machine; and, as the fabric passes from the device 9, to the cylinder 8, it passes over rotatable batting members 10 and 11, a rotatable brush 12 and a supporting roller 13.

The fabric 7 passes from the roller 13 down under the cylinder 8 and thence upwardly to and over a supporting and advancing roller 14 from which it is discharged downwardly from the machine.

The driving shaft 15 of the machine is mounted in suitable bearings 16 which are secured upon the floor or base which supports the frame of the machine; and the shaft 15 is driven by a belt 16 which passes around pulleys 17 and 18 on the shaft 15 and the power shaft 19, respectively, of a suitable electric motor 20 on the floor or base which supports the machine frame and bearings 16.

The driving shaft 15 is provided with a pulley 21 which is connected by a belt 22 with a pulley 23 on one end of a shaft 24. The shaft 24 extends transversely across the machine and is fitted to turn in bearings on the side bars 2; and the other end of the shaft 24 is provided with a bevel gear wheel 25 in mesh with a similar wheel 26 on a short shaft 27 which extends longitudinally of the machine and turns in bearings supported by brackets 28 which project outwardly from one of the side bars 2. This shaft 27 carries a worm 29 which coacts with a worm wheel 30 on a short shaft 31 which extends parallel with the shaft 24 and turns in a suitable bearing on one of the side bars 2. The shaft 31 carries a pinion 32 in mesh with a gear wheel 33 on a shaft 34 which extends across the machine and turns in bearings on the side bars 2 and carries the fabric advancing cylinder or drum 8, whereby the cylinder 8 is rotated in the direction of the arrow in Fig. 1 when the driving shaft 15 is rotated by the motor 20.

The fabric supporting and advancing roller 14 is carried by a shaft 35 which turns in bearings on side brackets 36 which are secured to and rise from the side bars 2 of the machine

frame. The shaft 35 is provided with a pulley 37 which is connected by a cross belt 38 with a pulley 39 on the shaft 34 carrying the fabric advancing cylinder 8, whereby the roller 14 will be rotated in the direction of the arrow in Fig. 1 when the cylinder 8 is rotated.

The friction producing and retarding device 9 for the fabric 7 comprises a shaft 40 extending across the feed end of the machine and fitted to turn in bearings on the side bars 2, spaced heads 41 secured to the shaft 40, and parallel rods or bars 42 extending between the heads 41 and spaced around the shaft 40. The fabric 7 enters the machine through the space between two of the bars 42 of the retarding device 9 which supports the fabric at the feed end of the machine and produces the necessary friction on the same to cause the fabric advancing cylinder 8 to draw the fabric through the machine with the desired degree of tension.

The tension of the fabric 7 may be increased or decreased by turning the shaft 40 to different positions of adjustment and thereby increasing or decreasing the extent of the bending effect of the friction bars 42 on the fabric 7, and consequently increasing or decreasing the retarding influence of the device 9 upon the fabric.

One end of the shaft 40 of the device 9 extends outwardly and has a worm wheel 43 fixed thereon which is engaged by a worm 44 on a shaft 45. The shaft 45 is fitted to turn in bearings which project from a collar 46 on the shaft 40. The collar 46 is prevented from turning on the shaft 40 by an arm 47 which extends downwardly from the collar and rests within an opening in a bracket 48 projecting from one of the side bars 2. The shaft 45 is provided with a suitable crank or handle 49 by means of which the shaft and worm 44 may be turned in either direction to turn the shaft 40 of the retarding device to increase or decrease the retarding influence thereof upon the fabric.

The shafts 50 and 51 of the batting members 10 and 11 are journaled in bearings on the side bars 2 of the machine frame and they are provided with pulleys 52 and 53, respectively. A belt 54 extends around the pulleys 52 and 53 and a pulley 55 on the driving shaft 15, whereby the members 10 and 11 will be rotated in the directions of the arrows in Fig. 1, when the driving shaft 15 is rotated.

The batting member 10 comprises the shaft 50, spaced collars 56 secured thereon and parallel channel bars 57 distributed in spaced relation around the collars 56 and secured thereto by means of bolts. The forward flange 58 of each channel bar 57 is serrated and provides a comb-like bar the teeth of which are adapted to enter and comb the pile of the fabric 7 when the member 10 is rotated. The channel bars 57 are set at such angles with relation to each other and to the collars 56 that the serrated flanges 58 of the bars are a slight distance farther from the axis of the shaft 50 than the plain flanges 59 of the bars 57. The serrated flanges 58 and plain flanges 59 of the channel bars 57 constitute, in effect, serrated and plain batting bars which are distributed around the member 10 in alternate succession and which are adapted to act upon the pile of the fabric in alternate succession as and for a purpose hereinafter explained.

The batting member 11 comprises the shaft 51, spaced collars 60 secured thereon and parallel bars 61 arranged in spaced relation around the collars 60 and secured thereto by means of bolts. The outer surfaces of the bars 61 are made angular in cross section to provide corner portions adapted to act upon the pile of the fabric when the member is rotated during the operation of the machine as hereinafter described.

The brush 12 is cylindrical in form and it is carried by a shaft 62 which turns in bearings on the side bars 2 of the machine frame. One end of the shaft 62 extends outwardly and is provided with a pulley 63 which is connected by a belt 64 to a pulley 65 on the shaft 51 carrying the batting member 11, whereby when the shaft 51 is rotated, as previously described, the brush 12 will be rotated in the direction of the arrow in Fig. 1.

Extending transversely across the machine adjacent to the batting member 10 is a fabric supporting and raising bar 66. This bar 66 extends between and is connected to two spaced arms 67 which extend fixedly from a shaft 68. The shaft 68 extends between and is fitted to turn in bearings on the side bars 2. The outwardly extending end portion of the shaft 68 has a worm wheel 69 fixed thereon which is engaged by a worm 70 on a shaft 71. The shaft 71 is fitted to turn in bearings extending downwardly from a hand operated lever or arm 72 which is carried by the shaft 68 and which is prevented from turning thereon by the engagement of the worm wheel 69 with the worm 71. The upper end of the arm 72 terminates in a handle 73 by means of which the arm may be moved forward and back to rock the shaft 68 and thereby lower and raise the bar 66 to different positions of adjustment. Adjacent to the handle 73 is one arm 74 of a lever 75 which is fulcrumed, at 76, on a projection on the arm 72. The other arm 77 of the lever 75 is connected to a pin 78 which extends through a hole in the arm 72 and is adapted to enter any one of a series of openings 79 in a bracket 80 on one of the side bars 2 to hold the arm 72 and bar 66 in different positions. The pin 78 is pressed normally into one of the openings 79 by a spring 81 which is interposed between the lever arm 74 and the handle 73. By pressing the lever arm 74 toward the handle 73 the

pin 78 may be withdrawn from the opening 79 with which it is engaged, and the arm 72 may then be operated to raise and lower the bar 66; and, thereafter, the lever arm 74 may be released to permit the spring 81 to move the pin 78 into any one of the openings 79 in accordance with the position of adjustment of the arm 72. The shaft 71 carrying the worm 70 is provided with a handle 82 by means of which the worm 70 may be turned to turn the shaft 68 relatively to the arm 72 to raise or lower the bar 66 with relation to the arm 72 for the fine adjustment of the position of the bar 66 when the pin 78 is engaged with any one of the openings 79.

Adjacent to the batting member 11 is a fabric supporting and raising bar 83 similar to the bar 66. The bar 83 is carried by two arms 84 which are fixed on a shaft 85 which extends across the machine and is fitted to turn in bearings on the side bars 2. The shaft 85 is provided with an operating arm 86 which is connected thereto the same as the operating arm 72 is connected to the shaft 68; and the arm 86 is adapted to be held in different positions of adjustment by a pin carried thereby which is arranged to enter openings 87 in a bracket 88 on one of the side bars 2 the same as the arm 72 is held in positions of adjustment by the pin 78 carried thereby which enters the openings 79 in the bracket 80.

It will now be understood that each fabric supporting bars 66 and 83 may be raised and lowered as desired by operating their arms 72 and 86, respectively, and also that each bar may be set in different positions of adjustment.

The fabric to be treated is passed through the machine in a long continuous strip. When the strip of fabric is in the form of a number of rug sections woven in a continuous strip, as shown in Fig. 9, the strip comprises a backing 90 and pile tufts or pile yarn strands 91 extending from one surface thereof, and each two adjacent rug portions or sections are joined by plain portions 92 of the fabric backing 90, having no pile tufts or strands extending therefrom, for purposes well known in the art of rug weaving.

The operation of the machine is as follows:

A strip of any suitable fabric is attached to the forward end of the strip of pile fabric to be treated, and this attached strip is of sufficient length to extend substantially from the retarding device 9 to and under the fabric advancing cylinder 8 and thence up and over the roller 14. The attached strip of fabric is then passed through the retarding device to and under the cylinder 8, and up and over the roller 14. The machine is then set in motion by supplying current to the motor 20, and the cylinder 8 and roller 14 act upon the attached strip of fabric to draw it and the strip of fabric to be treated through the machine until the fabric to be treated reaches the cylinder 8 and roller 14, whereupon the cylinder 8 and roller 14 act upon the fabric to be treated until the entire length thereof has been passed through the machine. The rearward end of the strip of fabric to be treated has attached thereto a strip of suitable fabric of sufficient length to provide the desired tension in the rearward end portion of the fabric to be treated as it passes from the retarding device 9 to the fabric advancing cylinder 8.

The strip of fabric to be treated is drawn through the machine with its pile tufts or strands extending downwardly. As the fabric is drawn over the batting member 10 the batting bars 58 and 59 strike against and act upon the pile strands in alternate succession, the toothed or serrated bars or flanges 58 thereof combing and opening spaces in the mass of pile strands, and the plain bars or flanges 59 thereof closing such spaces in alternate succession. This operation of the member 10 polishes the pile strands and wears the free end portions of the individual strands into a tapered or pointed condition.

As the fabric is drawn over the batting member 11 the batting bars 61 thereof act upon the pile strands to polish the same for the production of the desired rich and lustrous appearance thereof; and as the fabric is drawn over the rotating brush 12 the brush acts upon the pile to brush therefrom all loose fibres and parts thereof which may be present therein.

The fabric supporting bars 66 and 83 may be adjusted or set in positions, as hereinbefore explained, to support the fabric 7 passing over the same with relation to the adjacent batting members 10 and 11, respectively, to permit the members to act upon the pile of the fabric with the desired degree of intensity; and the fabric retarding device 9 may be adjusted, as hereinbefore explained, to retard the forward movement of the fabric sufficiently to provide the desired tension thereof as the fabric passes over the batting members 10 and 11 and brush 12.

When the fabric being treated is in the form of a number of rug sections woven in a continuous strip, as shown in Fig. 9, it is desirable that the rotary batting members 10 and 11 shall not act upon the plain portions 92 of the fabric backing. Therefore, immediately before a plain portion 92 reaches the batting member 10 the machine attendant operates the arm 72 to raise the bar 66 and thereby raise the fabric sufficiently to prevent the batting bars of the member 10 from striking the plain portion 92 of the fabric backing, and, after the plain portion 92 passes the member 10, the attendant operates the arm 72 to lower the bar 66 to its previous position to permit the member 11 to act upon the pile of the fabric. Similarly, the machine attendant operates the arm 86 to raise the fabric

supporting bar 83 to raise the fabric and prevent the batting bars 61 of the member 11 from striking each plain portion 92 of the fabric backing when it passes over the member 11.

I claim as my invention:

1. The combination of means for supporting and advancing a strip of pile fabric longitudinally, plain batting bars and serrated batting bars extending transversely of the line of travel of a strip of fabric advanced by said means and means for supporting and actuating said bars and causing them to bat the pile of the fabric in alternate succession in a direction longitudinally of the fabric.

2. The combination of means for supporting and advancing a strip of pile fabric longitudinally, plain batting bars and serrated batting bars extending transversely of the line of travel of a strip of fabric advanced by said means, means for supporting and actuating said bars and causing them to bat the pile of the fabric in alternate succession in a direction longitudinally of the fabric, a rotatable brush extending transversely of the line of travel of the fabric and arranged to brush the pile of the fabric after it has been acted upon by said bars, and means for rotating said brush.

3. The combination of means for supporting and advancing a strip of pile fabric longitudinally, a rotatable member extending transversely of the line of travel of a strip of fabric advanced by said means and having plain batting bars and serrated batting bars alternating with the plain bars, said bars being arranged to engage the pile of the fabric and means for rotating said member.

4. The combination of means for supporting and advancing a strip of pile fabric longitudinally, a rotatable member extending transversely of the line of travel of a strip of fabric advanced by said means and having plain batting bars and serrated batting bars alternating with the plain bars, said bars being arranged to engage the pile of the fabric, a rotatable brush extending transversely of the line of travel of a strip of fabric advanced by said means and arranged to brush the pile of the fabric, means for rotating said member and means for rotating said brush.

In testimony whereof I affix my signature.

EUGENE F. CLARK.