Nov. 5, 1940. P. A. SPERRY 2,220,627

APPARATUS FOR TREATING FABRIC

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Fig. 1.

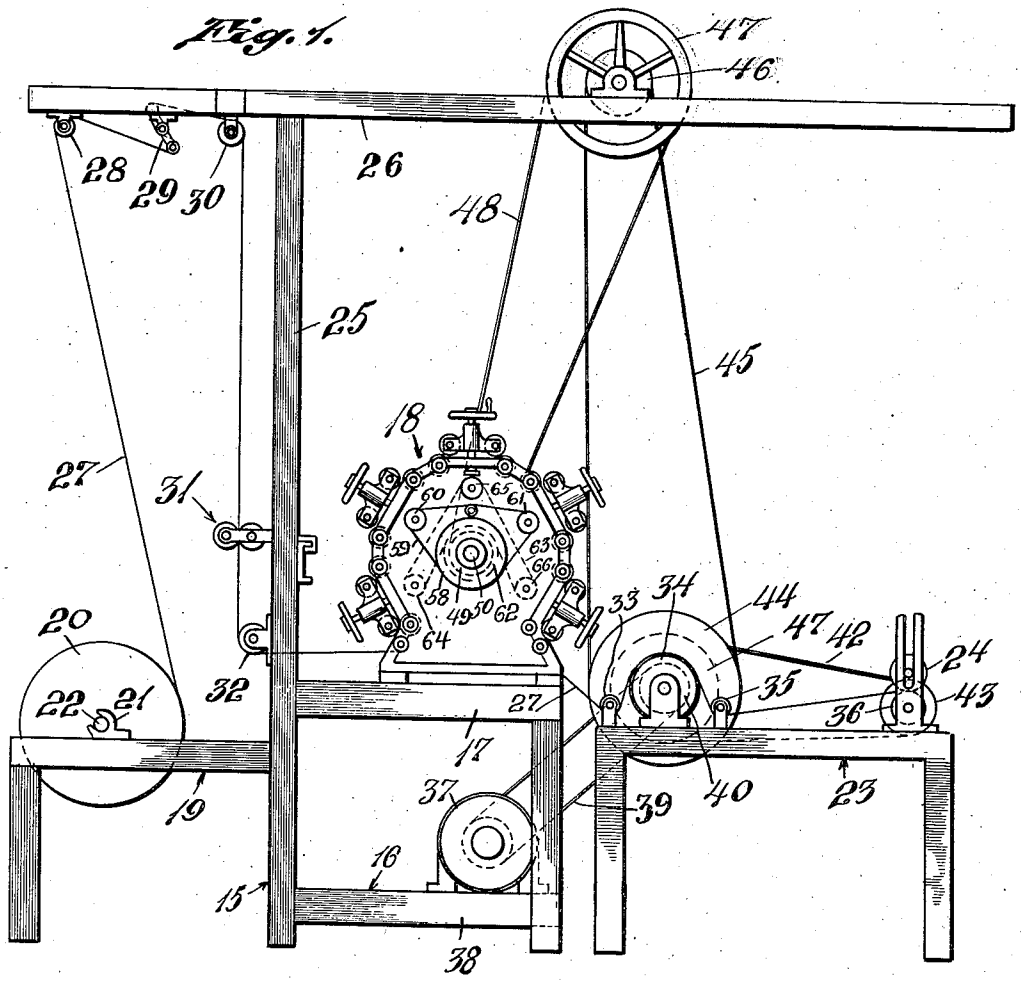
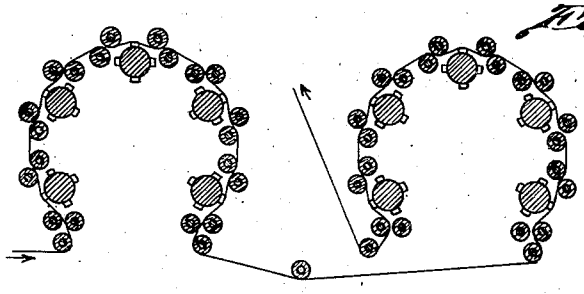


Fig. 12.



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Fig. 2.

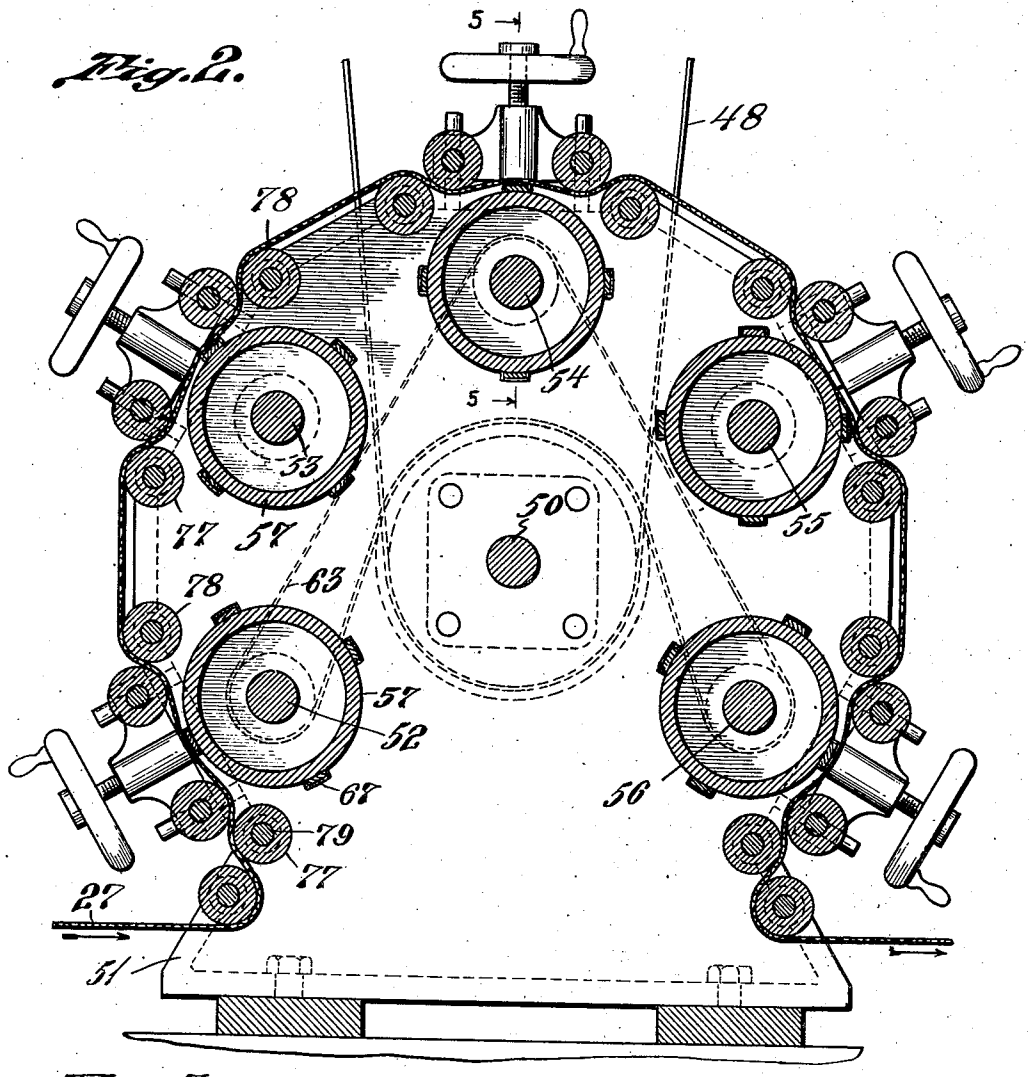


Fig. 3.

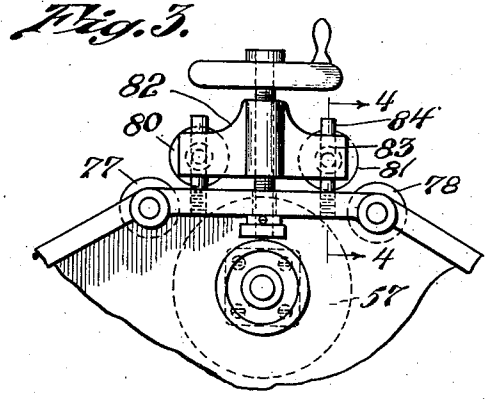
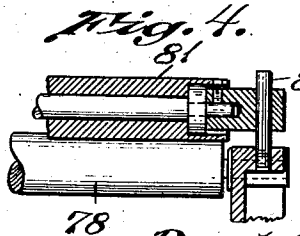


Fig. 4.



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Fig. 5.

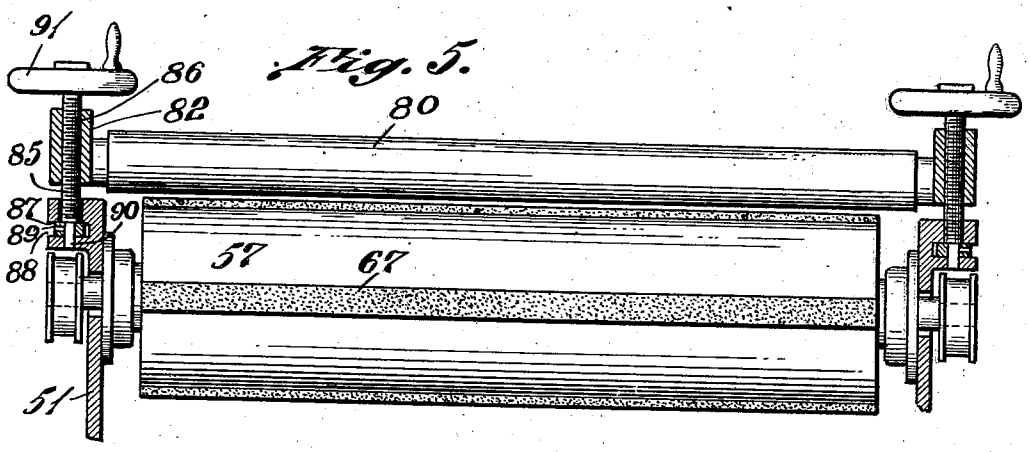


Fig. 6.

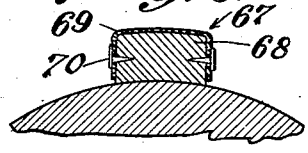


Fig. 7.

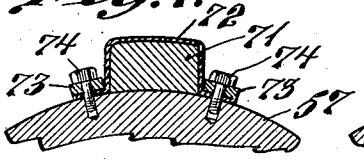


Fig. 8.

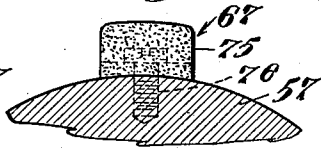


Fig. 9.

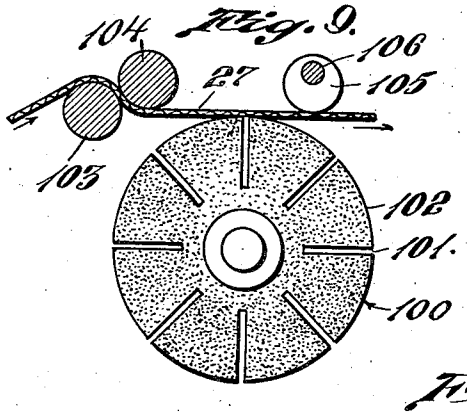


Fig. 10.

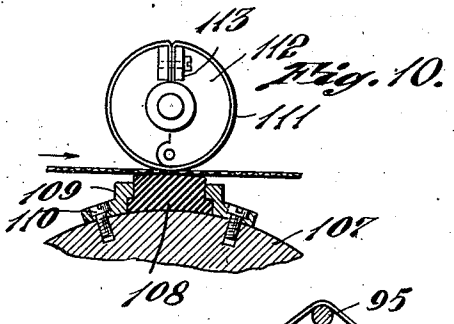


Fig. 11.

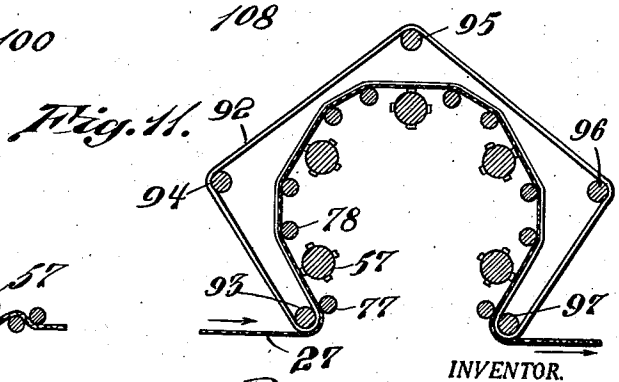


Fig. 13.



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Patented Nov. 5, 1940 2,220,627

UNITED STATES PATENT OFFICE

2,220,627

APPARATUS FOR TREATING FABRIC

Paul A. Sperry, New Haven, Conn.

Application July 14, 1938, Serial No. 219,134

4 Claims. (Cl. 26—28)

This invention relates to a machine for treating the surface of a fabric to obtain a suede-like effect upon the fabric; and has for one of its objects to provide a finish obtaining this desirable effect while maintaining the strength of the fabric greater than is usual in the finishing of fabrics to obtain this suede effect.

Another object of the invention is to improve the so-called "feel" or "touch" of the fabric.

A further object of the invention is to provide a suede-like finish which may be applied either before or after dyeing, or both before and after dyeing, and yet streaks which sometimes occur will be avoided.

Another obpect of the invention is to improve presence of any hair-like fibers which occur and stand outwardly from the fabric as occur in some suede finishes which are at present in use.

A more specific object of the invention is to provide a clearing action for the abrasive which is utilized in providing the suede effect on the surface by a beating of the goods.

Another more specific object of the invention is the arrangement for varying the tension on the goods that the desired beating action may be had.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is an elevation of the apparatus for performing this invention;

Fig. 2 is an enlarged sectional view of the surfact treating machine;

Fig. 3 is a fragmental detail showing the adjustable mounting for a set of tension rolls;

Fig. 4 is a section on line 4—4 of Fig. 3;

Fig. 5 is a sectional view substantially on line 5—5 of Fig. 2, illustrating the mounting of the tension roll and also illustrating the mounting of one of the rotary members;

Figs. 6, 7 and 8 are fragmental sectional views illustrating different methods of mounting an abrasive segment upon the rotary member;

Fig. 9 is a diagrammatic view illustrating the modified form of abrasive tool and means of controlling the work as it contacts therewith;

Fig. 10 is a fragmental sectional view of another modified arrangement of beating and abrasive action on the work;

Fig. 11 is a diagrammatic view illustrating a different modification and showing a belt backing up and positioning the work as it is fed to the machine;

Fig. 12 illustrates diagrammatically the passage of the work through two machines in tandem;

Fig. 13 illustrates diagrammatically the treating of the opposite surfaces of the work in a single piece through a modified form of machine.

The provision of suede-like finish upon fabrics, such as may be used for rain coats or the like, is provided by abrading the surface of the fabric which in most all cases occurs by means of a wheel continuously engaging the surface of the fabric and grinding away some of the surface material of the fabric. Grinding with such a wheel is found to cause a clogging of the wheel by fine particles getting in the pores thereof and also such grinding action reduces the strength of the fabric to a very great degree, for example, sometimes as great as 60% of the strength of the fabric is lost by this action. Further, it frequently occurs that by such a harsh action upon the fabric the fibers are disposed on the surface in such a manner that they appear like small hairs over the surface which is detrimental to the appearance and feel of the fabric; and in order to eliminate these undesirable results, I have arranged to cause a beating action at the time of abrading by providing short sections of an abrasive upon a rotary member which at the time of beating also abrades the fabric, there being a sufficient give in the fabric as it passes through the machine and is subjected to this action to cause the fabric to vibrate back and forth at a rather rapid rate and circulate air through the fabric, thus clearing of the fabric of all fine particles and also clearing the abrasive tool of all particles which might tend to collect in the pores thereof. Thus, the tool is kept clean and the undesirable wearing and reduction of the strength of the fabric is avoided, the fabric loosing but little of its strength, for instance, such as 10% which is a great improvement over the prior practice; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawings, 15 designates the framework for supporting the operating parts of my apparatus and the fabric operated upon. The middle portion of the frame 16 provides a horizontal support 17 for the abrading machine designated generally 18 and through which the work is fed. At one side of the middle portion of the frame there is the framework 19 for supporting the supply package of fabric 20 in suitable

bearings 21 for the trunnions 22 thereof. On the other side of the middle frame 16 is the frame 23 which supports the delivered package 24 of the fabric and certain driving mechanism for this package 24 and for the machine 18. An upright 25 from the middle portion of the frame 16 supports an overhead horizontal portion of the framework 26 which in turn supports rolls for guiding the travel of the fabric and operating mechanism for the apparatus.

The work 27 is led from the supply package 20 upwardly over a guide roll 28, thence through a tension unit 29 and a second guide roll 30, all supported on the horizontal frame portion 26. The work then passes through the guiders 31 where it is transversely spread to its full width and then passes over the guide rolls 32 and enters and passes through the machine 18, which will be described in greater detail hereinafter, where the fabric receives its treatment causing its suede-like finish. As the fabric 27 emerges from the treating apparatus 18 it travels over guide roll 33, sand roll 34, guide roll 35 to the delivery package roll 24 where it is reeled by being driven through the surface of the drive roll 36. A motor 37 is mounted upon the lower portion 38 of the middle frame 16 which through belt 39 drives a pulley 40 which in turn rotates a sand roll 34 and also the belt pulley 41 which through belt 42 drives the pulley 43 to drive the feed roll 36. This belt at the same time drives the pulley 44 which through belt 45, pulley 46, pulley 47 and belt 48 drives pulley 49 and the main drive shaft 50 of the machine designated generally 18.

The beating and abrading machine 18 consists of a pair of side upright members 51 which mount the main drive shaft 50 extending through the center of the apparatus and also mount shafts 52, 53, 54, 55 and 56 upon which rotary members 57 are mounted. The shafts 52 to 56 with a member 57 mounted upon each one are rotated from the main drive shaft 50 by two systems of flexible drive elements, such as chains or belts. A pulley 58 on one end of the machine and secured to shaft 50 drives a belt 59 which passes over pulleys 60 and 61 on the ends of shafts 53 and 55 to drive these shafts from the pulley 58. At the opposite end of the machine a pulley 62 is mounted on shaft 50 and through belt 63 which is trained over pulleys 64, 65 and 66 drives the shafts 52, 54 and 56 in a direction opposite in rotation to the rotation of the shafts 53 and 55.

Each of the rotary members 57 is shown as a cylindrical drum, although any support for short segments of an abrading surface 67 may be provided. I have illustrated these segments as located at four equally distant portions of the member 57 with these segments 67 short in arcuate extent and with a space between them of approximately three times their arcuate extent, although these dimensions are not important but are merely illustrative of one way of accomplishing the result. Each of these segments 67 is provided with an abrading surface which may be formed in various ways. In Fig. 6 there is wooden core 68 to which a strip of abrasive treated material 69 is secured by brads 70. In Fig. 7 the core 71 is of metal and the abrasive strip of material 72 is stretched over the core 71 and bound to the core and member 57 by rails 73 bolted to the member 57 as at 74. In Fig. 8 the abrasive section 67 consists of a solid segment 75 of abrasive grains suitably bonded together, the section being secured to the member 57 by bolt 76. These examples illustrate that various manners of providing such an abrasive segment may be had.

Guide rolls 77 and 78 are suitably mounted upon shafts as 79 extending from one frame 51 to the other and located to assist in positioning the work 27 with reference to the rotary member 57. These rolls 77 and 78 have their axes fixed in the machine and occur at either sides of the point of contact of the rolls 57, along adjustable guide rolls 80 and 81 which are rotatably mounted on shafts 83 supported by the yokes 82. The yokes are guided on pins 84 for a sliding movement toward and from each roll 57. Each yoke 82 at each end of the rolls 80 and 81 may be manipulated toward and from the roll 57 by a threaded shaft 85 passing through the threaded opening 86 in the carriage, this shaft being held against axial movement with reference to the frame 51 by a collar 87 (see Fig. 5) located in slot 88 and having a set screw 89 engaging the reduced portion 90 of the shaft 85 so that as rotation of the shaft 85 occurs by the hand wheel 91 the carriage and the rolls 80 and 81 will be moved outwardly or inwardly toward the member 57 to cause the work 27 to be moved nearer to or permit the work to be normally positioned further from the axis of the member 57 and consequently control the amount of flexing of the work at this location which will occur by reason of the sections 67 striking the work at intervals and abrading the surface thereof. The guide rolls for the work of each at the rotary members 57 may be differently adjusted if desired.

In some cases instead of utilizing the yokes and rolls 80 and 81 as carried thereby a belt 92 may be utilized for backing up the fabric work 27, as shown in Fig. 11. Here this belt will be driven over guides 93, 94, 95, 96 and 97 and will back up and hold the work against the guide rolls 77 and 78 at each side of the beater and abrasive members 57, as illustrated diagrammatically in Fig. 11. The rolls 94 and 96 may be adjustable so as to vary the tension on the belt, and it is found that a better action will occur by having this belt sufficiently loose so that a substantial beating action may occur on the fabric as the members 57 rotate.

In Fig. 9 a solid abrasive wheel 100 is illustrated with slits 101 to divide it into sections 102, this being mounted adjacent a strip of fabric 27, guided by rolls 103 and 104 and held at varying distances for varying tensions by an eccentric 105 on shaft 106. In other instances a rotary member 107, see Fig. 10, may be provided with a resilient section 108 of rubber held in position by brackets 109 and bolts 110, while the abrasive element includes a wheel 112 for holding the abrasive element 111 in position by a clamp 113 and will cause the desired beating and abrasive action on the surface by reason of the parts being reversed with reference to the arrangement shown in Figs. 1 and 2.

In Fig. 12 a greater abrasive and beating action is provided by reason of two units, such as shown at 18 in Figs. 1 and 2, being in tandem. In Fig. 13 the beating and abrasive action is illustrated on both sides of the fabric in a single pass through the machine by reason of members such as 57 being located on opposite sides in staggered relation in order that the beating and abrasive action on both sides may occur in a single pass through the machine.

The treatment of the fabric by the apparatus here shown will usually occur before the fabric is dyed and again after the fabric is dyed, it

being found that this is a desirable manner of using this apparatus. However, the treatment may be applied before the material is dyed or may be first dyed and the material treated by this apparatus after dyeing, and satisfactory results are found to occur.

Also, as a variation from the description above, the member **57** which is mounted on shaft **56** may have different sorts of sections of beating or abrading the cloth than the members **57** on the four preceding shafts **52** to **55**, inclusive; and I have found that by providing a felt section upon this last member **57** on shaft **56** an improved result in the treatment of many different kinds of fabric may occur.

By the treatment of fabric, as above described, I may avoid many streaky finishes which otherwise occur and a very good imitation suede is provided.

The size of the grain which may be used for the segments **67** for beating and abrading the cloth may be varied according to the hard finish of the cloth or the amount of twist in each of the yarns. I find that the harder finished goods will finish better with the finer size such for instance as 180, 240, 320 and even 400, although I do not wish to be limited to any specific size in this connection.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In an apparatus for treating fabrics to produce a suede-like surface finish thereon comprising a plurality of spaced means each for individually tensioning the fabric, each comprising two spaced supports with no support between in a straight line, differently spaced members engaging the fabric to cooperate with the supports to tension the fabric in a plurality of stretches, a rotary tool for each of said tensioned stretches of fabric having spaced abrading members for intermittently contacting the fabric between said supports to cause the same to be disposed in an arcuate path, means to rotate the tools at a speed sufficient to rapidly vibrate the tensioned stretches of fabric between said supports and means for advancing the fabric through said apparatus.

2. In an apparatus for treating fabrics to produce a suede-like surface finish thereon comprising a plurality of spaced means each for individually tensioning the fabric between two supports with no support between in a straight line, differently spaced members engaging the fabric to cooperate with the supports to tension the fabric in a plurality of stretches, a rotary tool for each of said means having spaced abrading members for intermittently contacting the fabric on the same surface between said supports to cause the same to be disposed in an arcuate path, means to rotate successive adjacent tools operative on the same surface in opposite directions at a speed sufficient to rapidly vibrate the fabric between said supports and means for advancing the fabric through said apparatus.

3. In an apparatus for treating fabrics to produce a suede-like surface finish thereon comprising a plurality of spaced means each for individually tensioning the fabric between two supports with no support between in a straight line, differently spaced members engaging the fabric to cooperate with the supports to tension the fabric in a plurality of stretches, a rotary tool for each of said means having spaced abrading members for intermittently contacting the fabric between said supports and on opposite sides of the fabric to cause the same to be disposed in an arcuate path, means to rotate the tools at a speed sufficient to rapidly vibrate the fabric between said supports and means for advancing the fabric through said apparatus.

4. In an apparatus for treating fabrics to produce a suede-like surface finish thereon comprising a plurality of sets of spaced rolls each set for individually engaging the fabric with no support between them in a straight line, more closely spaced rolls between said supports for engaging and tensioning the fabric, a rotary tool for each of said sets of rolls having spaced abrading members for intermittently contacting the fabric between said supports to cause the same to be disposed in an arcuate path, means to rotate the tools at a speed sufficient to rapidly vibrate the fabric between said supports and means for advancing the fabric through said apparatus.

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