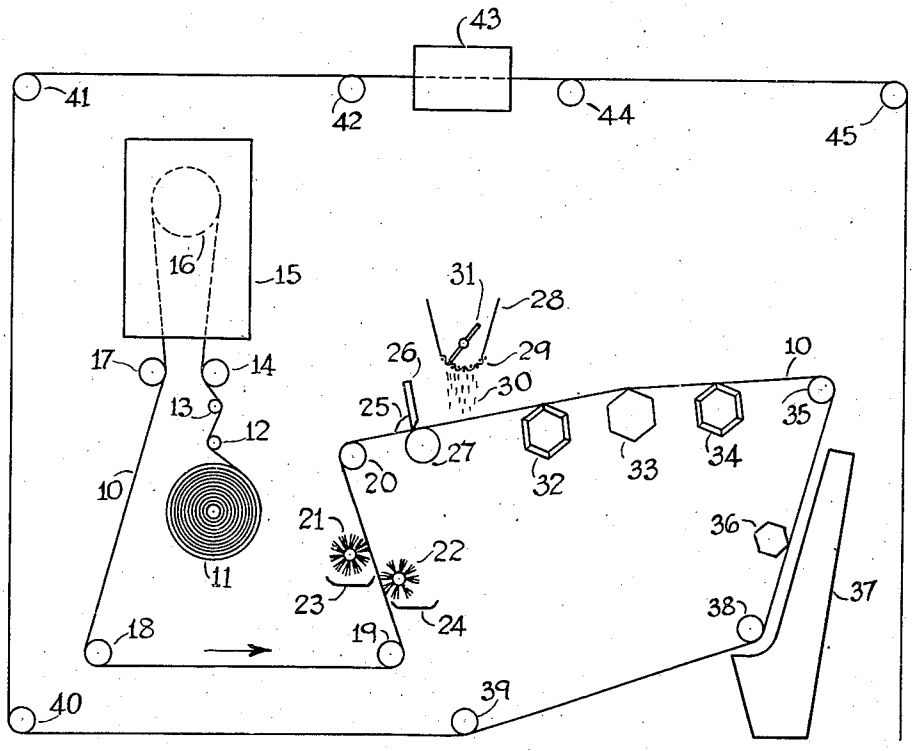
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FLOCKING OF COTTON AND LIKE FABRICS

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FLOCKING OF COTTON AND LIKE FABRICS

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This invention relates to an apparatus for flocking adhesively coated base fabrics of cotton or materials having like electrical properties.

More particularly, these improvements are directed to the production of textile flocked fabrics the flock portion of which is composed of fibers preferably of pile forming length which are fixed at one of their ends to a base fabric of cotton or similar material by an adhesive. The flock may be short textile fibers of wool, mohair, cellulose acetate, casein fibers, silk, viscose or blends of any or all of these fibers.

It has long been known that the beating or vibrating as by a motor driven polygonal bar of an adhesively coated base fabric will cause cut flock to form a pile face with an end of the pile forming flock embedded in the adhesive. The British patent to Cartolux No. 393,017 is merely illustrative of this general prior practice. Fabrics produced by beating alone are however somewhat deficient in pile face density and pile erectness.

It is further known to employ high voltage electrostatic forces in the flocking of adhesively coated base fabrics, but high voltage forces appear incapable of adequately driving the fibers into the adhesive, with the result that pile fabrics so produced while having density of face coverage and erectness of pile have been characterized by unsatisfactory durability and wearing qualities. In addition, pile fabrics so produced may have an excessive pile face density which results in stiffness or boardiness and hence lack of draping qualities desirable for some purposes.

Mechanical beater processes provide a superior anchorage of the flock fibers than high voltage electrostatic methods and are, of course, desirable for this reason. The investment in equipment and maintenance of beater mechanism is substantially less than for electrostatic devices involving high potential forces.

Cotton base fabrics are highly desirable as backings for flocked fabrics because of their strength, flexibility and availability. These cotton base fabrics or fabrics substantially of cotton will when beaten on the back or rapidly vibrated in known ways produce the pile face of deficient pile erectness and density above referred to. Such results can be obtained with a rapidly rotating motor driven steel bar in the known way.

I have found that a rapidly rotating steel bar beating the back of a cotton fabric of normal atmospheric moisture content will not create an electrostatic charge measurable on a gold leaf electroscope, but that if the fabric is substantially bone dry a measurable charge which will orient the pile forming fibers will be created. A still greater and more desirable charge is created if the fabric is dried as before and the bar or bars are covered with a solid dielectric material such as Lucite, hard rubber, Bakelite or Cellophane. Dielectric covered steel bars are shown in the drawing. The cotton base fabric is fed forwardly through the apparatus under tension and the adhesive is preferably relatively thick so that it will not penetrate to the back of the cloth. A steel bar covered with strips of Lucite secured as by screws or wrapped with Cellophane Scotch tape as a covering will produce a measurable charge on normal cotton.

An object of my invention is to provide a low potential electrostatic charge which will orient textile pile flock fibers being applied to a cotton or like base material.

Another object is to provide an apparatus for producing an electrostatic charge by beating directly on the back of cotton base fabrics in pile flocking operations.

Another object is to reduce the moisture content of cotton base fabrics to below normal and thereafter creating a low potential electrostatic charge by frictional means which will orient pile forming textile flock particles in a flocking operation.

Another object is to improve the pile density and erectness of cotton backed flocked pile fabrics produced by beater methods.

Another object is to produce by frictional engagement a low potential electrostatic field which is used to distribute and orient flock fibers being deposited upon an adhesively coated cotton base fabric.

These and other objects of invention will be manifest from a consideration of the following description, claims and the drawing.

The figure is a diagrammatic illustration of novel apparatus capable of carrying out my improved methods.

Referring to the drawing, there is illustrated a base fabric 10 of cotton or like material fed from supply roll 11, passed between tension adjusting rolls 12 and 13 and over guide roll 14 into drying chamber 15 where the normal moisture content of the fabric may be removed, leaving is substantially bone dry. Normal moisture content may be 7 to 10%, whereas the present improvement contemplates drying to approximately 1% or less by weight. The drying cham-

ber may be of any convenient type, and wire covered card clothing roll 16 for feeding the fabric along may conveniently be located within the drying chamber.

After emerging from the dryer, the fabric is passed over guide rolls 17, 18, 19 and 20 and between brushes 21 and 22, which brush into troughs 23 and 24 any lint, dirt or other foreign matter that may have become deposited on the fabric.

An adhesive 25 of rubber cement, pyroxylin or other suitable composition may be applied as by doctor blade 26, roller 27 being used to support the fabric at the point of application.

The adhesively coated fabric is then passed beneath hopper 28 having screen bottom 29 and containing flock fibers 30 which are pushed by rotating blade 31 through the screen and caused to drop upon the coated fabric positioned or passing continuously beneath. It is to be understood that the terms "adhesive" and "adhesively coated" as used above and in the claims refer to the coating prior to drying or other solidification.

The fabric is then passed over one or more polygonal bars which are rapidly rotated by conventional means, such as an electrical motor (not shown), and which beat the fabric and cause it to rapidly vibrate. In the illustration, a series of three bars 32, 33 and 34 is depicted, but it will be understood that this number is merely illustrative and that any reasonable number, including a single bar, may be used. The bars may be of steel or other metal, but are preferably surfaced with a material of good dielectric property such as hard rubber, Lucite, Bakelite, or Cellophane, as shown for bars 32 and 34.

The first polygonal bar or bars is or are preferably rotated in the direction in which the base fabric is moving, while the last bar or bars may be rotated in the opposite direction. All the bars may, however, be moved in the same direction of rotation if desired.

In order to compensate for the fact that the beaters tend to throw the fibers slightly in the direction of their respective rotation, the fabric may preferably be moved over the beaters at a slight incline. For example, the beaters may desirably be arranged in crown formation, that is, with the center beater or beaters occupying a higher position than the forward and rearward ones, the forward and center beaters rotating in the direction of fabric movement and the rearward beaters rotating against the movement of the fabric. This arrangement is, of course, merely illustrative of an arrangement I have found satisfactory and is not intended to be limiting in any way.

During the beating operation the electrostatic field generated by the frictional engagement between the rapidly rotating bars and the dry cotton base material causes the deposited fibers, through mutual repulsion, to distribute and orient themselves in substantially erect position and the vibratory or beating action forces them into the adhesive where they become firmly secured. It will be understood that wool fibers, being curved or crescent shaped, will not be caused to take on a straight upright position, but these fibers are distributed and oriented to the extent permitted by their shape. These improvements are especially important in connection with the application of wool flock to a cotton base fabric, because the mutual repulsion set up by electrostatic field will overcome to an important degree the tendency of curved wool flock to form small masses of flock. This tendency to form masses is peculiar to wool which is serrated and curved and hence has felting properties.

After leaving the beaters, the fabric may be passed over guide roll 35 to beater 36 where the excess or unsecured fibers are beaten off to collecting tray 37. The fabric is then taken over guide rolls 38, 39, 40, 41 and 42 to steam chamber 43, where the adhesive is vulcanized or set, after which the fabric is taken over guide rolls 44 and 45 to a roll-up device. If desired, finishing steps, such as shearing and brushing, may be incorporated into the process after the adhesive is vulcanized or hardened.

Prior beater methods include those in which a belt or apron is interposed between the beater bar or bars and the base fabric, as well as those in which the beating is directly on the base fabric. The particular method depends on the nature of the materials used and the result desired. The present concept is directed primarily to the latter type in which a cotton or other base of like electrical properties is used as a base fabric and the beater bars are directly in contact with the base fabric. The beater bars are preferably dielectrically superior to cotton.

Having described my invention, I claim:

1. In an apparatus for the production of flocked fabrics, the combination of parts which includes means for feeding a base fabric through the device under tension, a drier device through which the base fabric may be fed, a blade for applying the adhesive to the base fabric after it leaves the drying unit, means for distributing pile flock onto the base fabric, and a dielectric beater bar positioned to contact the base fabric on its reverse side.

2. In an apparatus for the production of flocked fabrics, the combination of parts which includes means for feeding a base fabric through the device under tension, a drier device through which the base fabric may be fed, a blade for applying the adhesive to the base fabric after it leaves the drying unit, means for distributing pile flock onto the base fabric, a dielectric beater bar positioned to contact the base fabric on its reverse side and means for removing unsecured flock particles.

3. In an apparatus for the production of flocked fabrics, the combination of parts which includes means for feeding a base fabric through the device under tension, a drier device through which the base fabric may be fed, means for applying the adhesive to the base fabric after it leaves the drying unit, means for distributing pile flock onto the base fabric, a dielectric beater bar positioned to contact the base fabric on its reverse side and a vulcanizing or an adhesive setting unit positioned to receive the fabric after beating.

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