Oct. 8, 1940. A. F. MESTON ET AL 2,217,126

PILED SURFACE IN PATTERN FORM

Original Filed Feb. 6, 1935 4 Sheets-Sheet 1

Fig. 1.

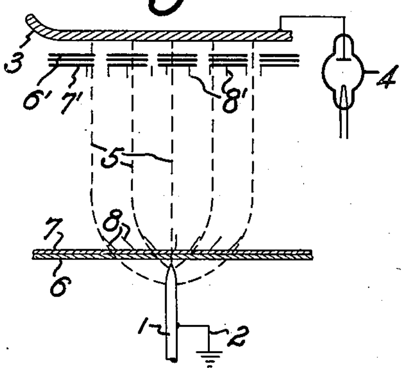


Fig. 2.

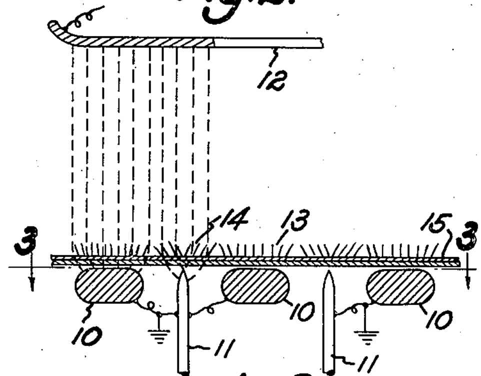


Fig. 3.

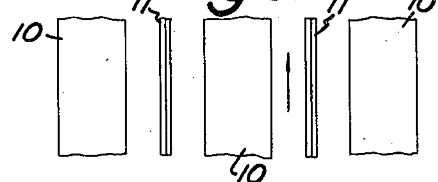


Fig. 4.

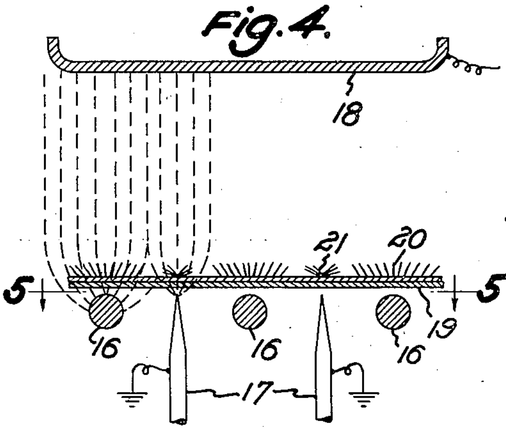


Fig. 5.

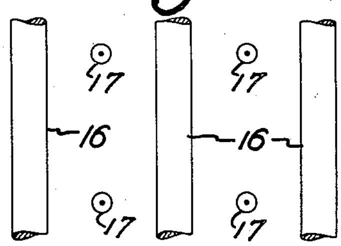
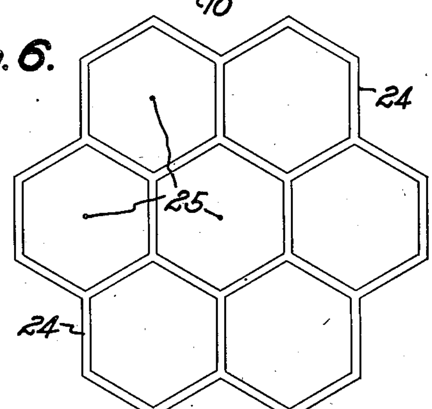


Fig. 6.



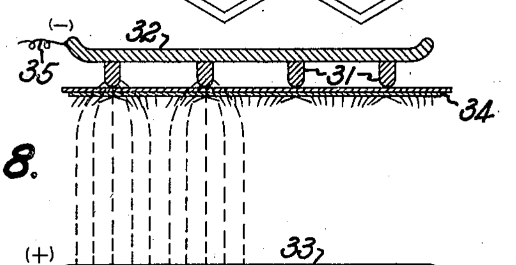


Fig. 7.

Fig. 8.

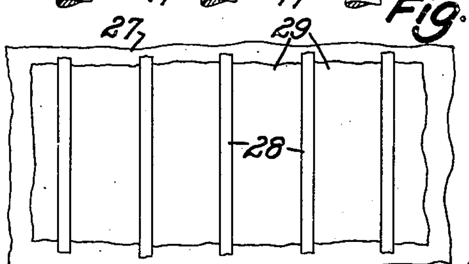
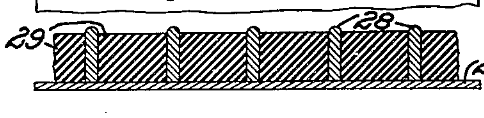


Fig. 9.



Inventors:

Archibald F. Meston

Harry R. Wintermute

By Potter, Pierce & Scheffler

Attorneys.

PILED SURFACE IN PATTERN FORM

Original Filed Feb. 6, 1935 4 Sheets-Sheet 2

Fig. 10.

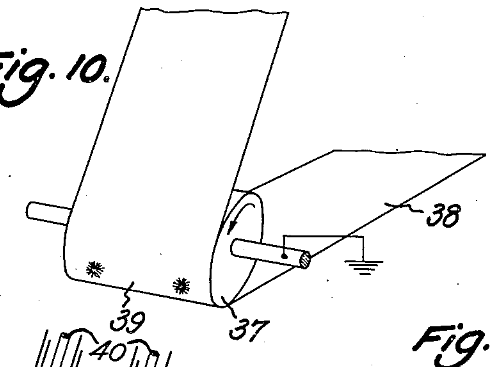


Fig. 11.

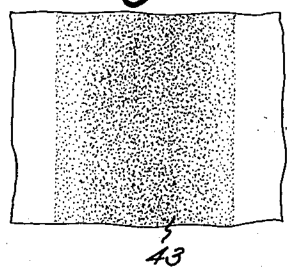


Fig. 12.

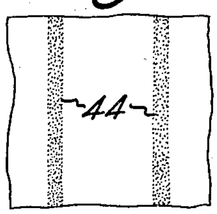


Fig. 13.

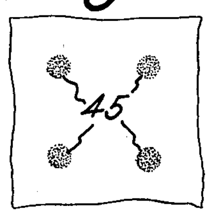


Fig. 14.

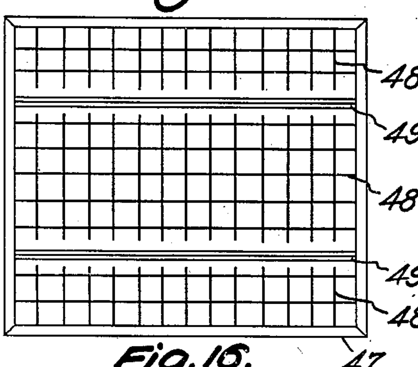


Fig. 15.

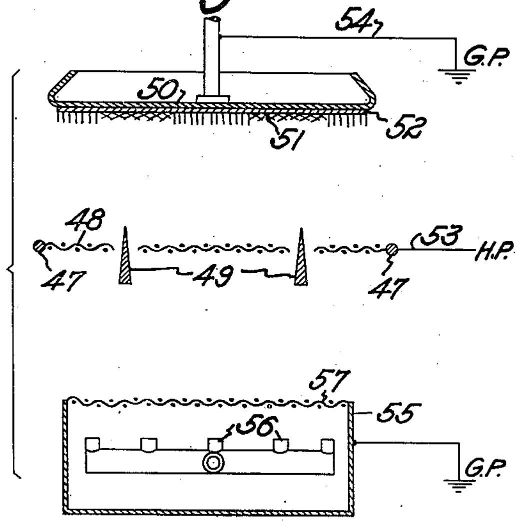


Fig. 16.

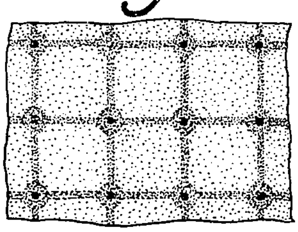


Fig. 17.

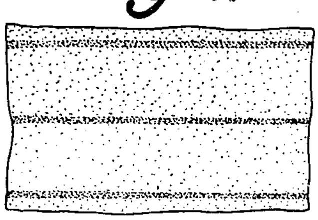
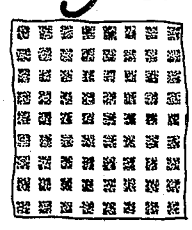


Fig. 18.



Inventors:
Archibald F. Meston
Harry A. Wintermute
By Potter, Pierce & Scheffler
Attorneys.

PILED SURFACE IN PATTERN FORM

Original Filed Feb. 6, 1935 4 Sheets-Sheet 3

Fig. 19.

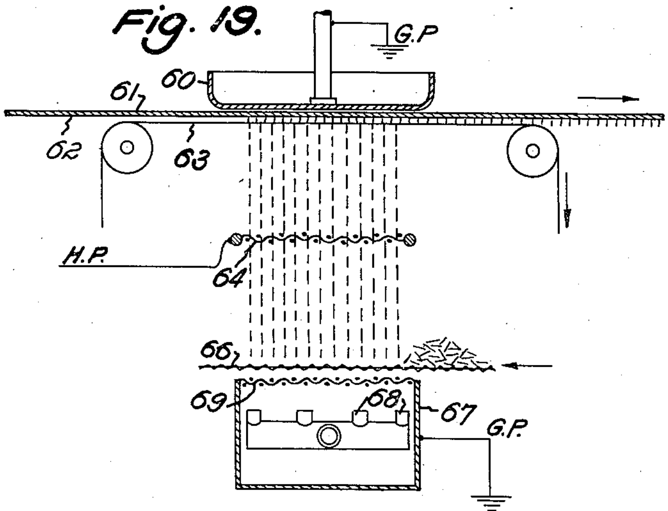


Fig. 20.

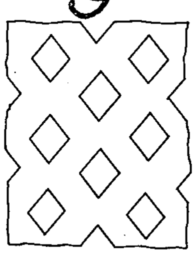


Fig. 21.

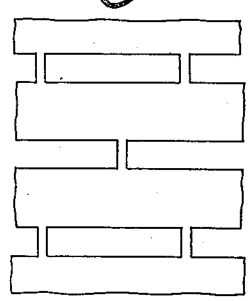


Fig. 23.

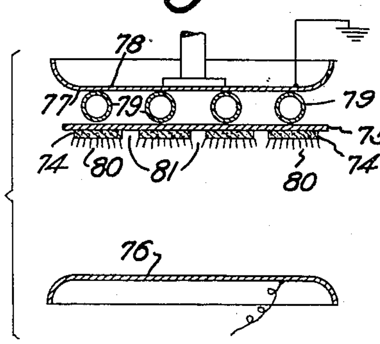
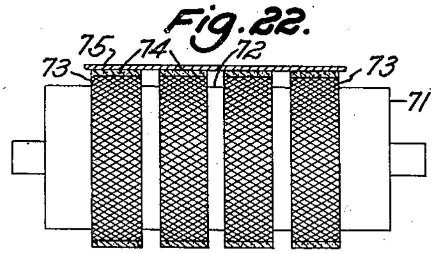


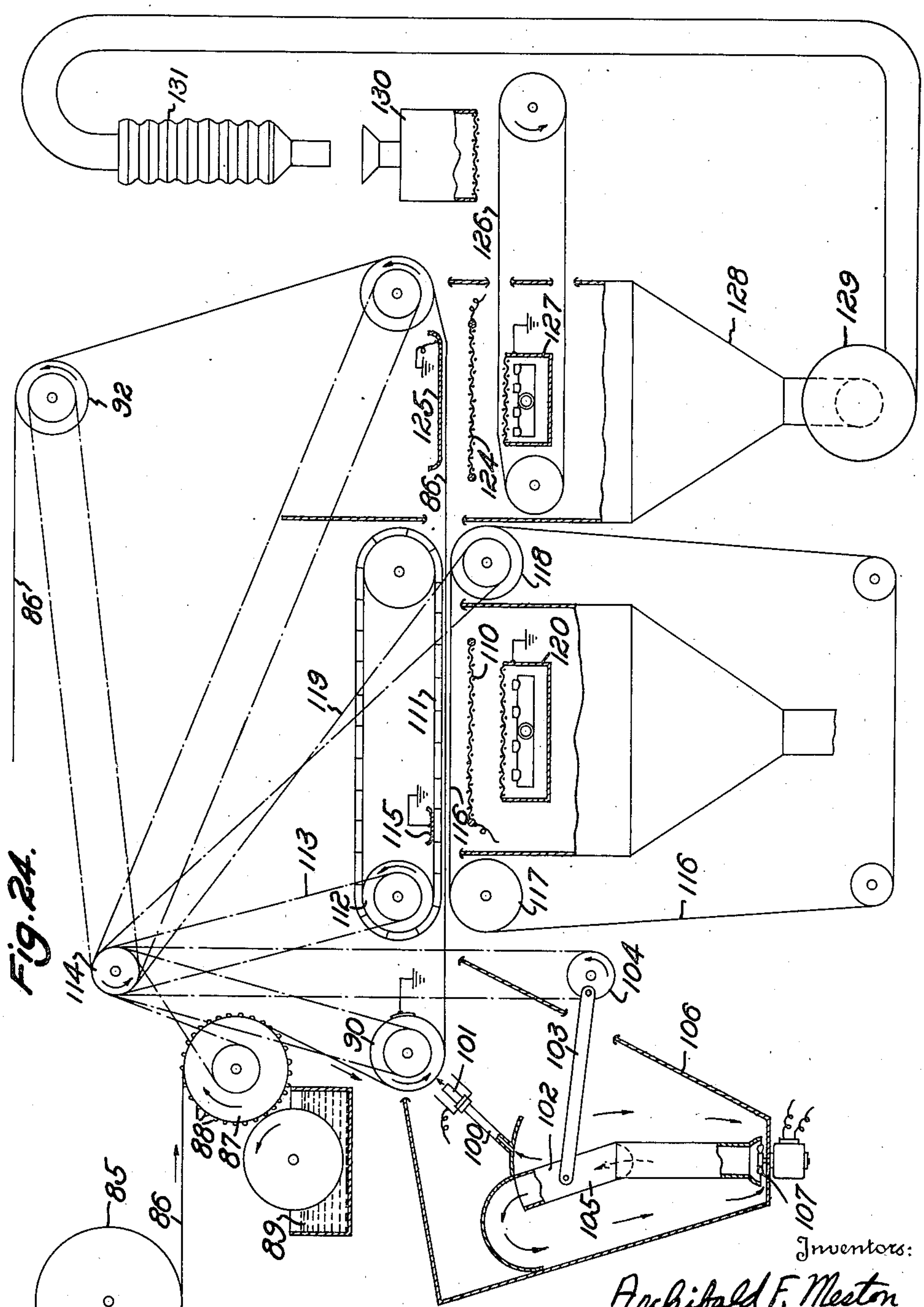
Fig. 22.



Inventors:
Archibald F. Meston
Harry A. Wintermute
By Potter, Pierce & Scheffler
Attorneys.

PILED SURFACE IN PATTERN FORM

Original Filed Feb. 6, 1935 4 Sheets-Sheet 4



Inventors:
Archibald F. Meston
Harry A. Wintermute
By Potter, Pierce & Scheffler
Attorneys.

Patented Oct. 8, 1940

2,217,126

UNITED STATES PATENT OFFICE

2,217,126

PILED SURFACE IN PATTERN FORM

Archibald F. Meston, Bound Brook, and Harry A. Wintermute, Plainfield, N. J., assignors, by mesne assignments, to Behr-Manning Corporation, a corporation of Massachusetts

Original application February 6, 1935, Serial No. 5,288. Divided and this application March 20, 1937, Serial No. 132,169

3 Claims. (Cl. 41—36)

This invention relates to coating and decorating surfaces with simulated piles in pattern form and is particularly directed to the novel pile surfaced material thereby produced.

Fibers, such as rayon flocks, can be deposited in oriented position upon an adhesive covered surface if the surface is positioned in an electric field and fibers are introduced into the electric field in unrestrained manner. The conditions required for satisfactory deposition of fibers in the piling of surfaces are described in copending applications Serial No. 692,201, A. F. Meston, filed October 4, 1933, and Serial No. 699,456, H. A. Wintermute, filed November 23, 1933.

The piles made with the apparatus and methods used and described in the applications just mentioned are quite uniform in composition and appearance. Most of the fibers stand erect, perpendicular to the surface, making piles of monotonous evenness from a decorative standpoint. It has now been found that by suitable control of the electric field by means of which the fibers are deposited, and particularly by the use of a deliberately warped or discontinuous electric field, pleasing variations and definite patterns can be obtained in the pile.

A principal purpose of the invention is the production of pile surfaced material comprising a foundation web having a binder in its surface and fibers attached to the web by the binder which vary topically in concentration or inclination or both to form a pattern.

Apparatus useful in carrying out the invention and several embodiments of the invention, including novel methods and products, are hereinafter described with particular reference to the appended drawings, in which:

Fig. 1 is a diagrammatic side view of complementary electrodes and an electric field therebetween in which fibers are being attached by the forces prevailing in a non-uniform portion of the field;

Fig. 2 is a fragmentary view in side elevation of an assembly of electrode elements as used in the deposition of fibers in accordance with the invention;

Fig. 3 is a fragmentary plan view of what is shown in Fig. 2 taken at 3—3;

Figs. 4 and 5 are fragmentary views comparable to Figs. 2 and 3, respectively, showing the utilization of somewhat different elements in the electrode structure used with the invention;

Fig. 6 is a plan view of another arrangement of electrode elements useful in setting up a non-uniform field in accordance with the invention;

Fig. 7 illustrates in side view the forming of a patterned pile on a base sheet with still another arrangement of electrodes;

Figs. 8 and 9 are fragmentary plan and side views, respectively, of another electrode assembly that can be used advantageously with the invention;

Fig. 10 indicates, perspectively, apparatus including air jets useful in applying fibers to surfaces in accordance with the invention;

Figs. 11, 12 and 13 show with plan views, the types of patterns which can be obtained with the apparatus illustrated in Fig. 10;

Fig. 14 is a plan view of a foraminous electrode comprising corona forming elements, useful in practicing the invention;

Fig. 15 shows diagrammatically in end elevation, apparatus for utilizing the electrode shown in Fig. 14;

Figs. 16, 17 and 18 are views of fragmentary portions of products made with reticulated electrodes;

Fig. 19 shows diagrammatically, in side elevation, apparatus for depositing fibers in pattern formation, by utilizing a moving field stencil;

Figs. 20 and 21 show typical forms of field stencils used with the invention;

Fig. 22 illustrates, in side view, an adhesive applying roll with cut-away portions;

Fig. 23 shows, in sectional elevation, an electrode assembly useful in depositing fibers on a surface coated with the roll shown in Fig. 22; and

Fig. 24 is a diagrammatic view in side elevation of apparatus that permits the utilization of the various electrodes and other means illustrated in the various figures and the carrying out of the several methods of the invention to be hereinafter described.

In Fig. 1, numerals 1 and 3 identify electrodes between which an electric field has been established; electrode 1 is grounded as indicated at 2 and electrode 3 is insulated from ground and connected to a source of high potential constant polarity current represented by tube rectifier 4. The so-called lines of force of the electric field represented by lines 5 leave the electrodes perpendicular to the surface. Electrode 1 has a pointed or rounded top and the lines of force curve and spread out in the manner shown as they leave the small area presented by the top of the electrode. Opposing or complementary electrode 3, on the other hand, has a flat surface upon which the lines of force terminate and the lines of force in the vicinity of this electrode are straight, parallel, and uniformly distributed.

When a non-conducting sheet 6 covered with adhesive 7 is positioned between electrodes 1 and 3 and short fibers are freely suspended in the electric field the fibers are oriented and attached to the adhesive covered sheet parallel to the lines of force passing through the sheet at the point of attachment. Once attached they maintain the position of original attachment and resist re-alinement by forces that may be applied subsequently. When the sheet to be piled with fibers is placed in the position marked 6', the fibers are attached in the positions 8', 8' and a uniform pile of upright fibers is obtained. But if a sheet is held against, or a short distance from, electrode 1, the fibers are attached at angles to the perpendicular as indicated at 8, 8 because of the inclined positions of the lines of force 5 in this region of the electric field. For instance, the field near a point causes the fibers to become arranged like the petals of a flower.

In Figs. 2 and 3, the electrode elements over which the adhesive covered sheet 15 is positioned while being piled comprises members 10 with a more or less extended top surface and members 11 with very restricted or edged top surfaces. The complementary electrode 12 is preferably flat or has an extended surface. The arrangement of the fibers in the pile made with the electric field between electrode elements 10 and 11 and electrode 12 is shown in Fig. 2. The fibers 13 over the extended portions 10 are deposited in erect position except perhaps over the edges of elements 10, while the fibers 14 over edges 11 are deposited in the inclined positions shown and provide a striped effect. This pattern can be made while the sheet is moving in the direction of the arrow in Fig. 3, but if it is desired to have the stripes extend crosswise of the sheet, the electrode elements 10 and 11 must move at the same speed as the sheet.

In Figs. 4 and 5 the electrode assembly which influences the deposition of the fibers is made up of bars 16 and pointed members 17. Complementary electrode 18 has a flat extended surface. The pile formed with these electrode elements, assembled as shown, comprises parallel stripes with spots between them, the stripes being formed of fibers 20 deposited over rods 16 perpendicular to sheet 19 except at the edges and the spots being formed of fibers 21 which are deposited over points 17 in inclined positions. The smaller the diameter of rods 16 and the closer these are to the sheet 19 being piled, the more the fibers at the edges of the stripes lean outward and set off the stripes, and the closer points 17 are to sheet 19 the more pronounced is the inclination of the fibers in points 21.

By varying the relative positions of the electrode elements in Figs. 4 and 5 the pattern formed will present various effects. The electrical connections can be varied also. It will be noted that while elements 10 in Fig. 2 are grounded, elements 16 in Fig. 4 are not connected to ground, but are allowed to electrically "float" on insulating supports (not shown) and to take the voltage resulting from their position in the electric field. If the sheet being piled is held stationary during the deposition of the fibers the pattern will comprise stripes with dots between, but if the sheet is moved during deposition the electrode elements, at least points 17, must move at the same speed as the sheet or streaks will result in the pattern over the points.

Fig. 6 is a plan view of an assembly of electrode elements not unlike the assembly shown in Fig. 5, but in Fig. 6 the bars (similar to those marked 16 in Fig. 5) making up member 24 have been joined together to form a single continuous element. Points 25, one of which is positioned in the center of each individual hexagon, have been found to alter the electric field in such manner that the pile deposited by it comprises hexagon figures of unusual interest. The fibers are inclined at various angles and when looking at the pile from first one and then another position the sheen changes, displaying many fragments of hexagons, some lustrous and some of which are dull. Of course, to provide a closed pattern like the one made with the electrode of Fig. 6, the electrode must participate in any movement undergone by the surface being piled, as will be described, for example, in connection with Fig. 24.

In Fig. 7, elements 31 are strips of insulating material, for instance, of hard rubber or phenol condensation products, attached to a conducting plate 32. Dielectric material with a specific inductive capacity several times that of air, examples of which are porcelain, mica or "Bakelite," when placed in an electric field, will locally concentrate the lines of force in the field in the vicinity of the pieces of dielectric. The arrangement shown in Fig. 7 has conducting plate 32 connected through conductor 35 to a source of unidirectional current at a potential of, say, 70,000 volts above ground. Complementary electrode 33 is positioned some 4 inches below member 32 and is maintained at ground potential. Elements 31 are, therefore, positioned in the strong electric field that exists between electrodes 32 and 33 and tend to concentrate the lines of force as they approach electrode 32.

Now if an adhesive covered surface, as sheet 34, that is not conducting, is placed just in front of elements 31 and fibers are suspended in the electric field above electrode 33, or distributed over the surface of electrode 33, many of the fibers will be raised and oriented by the electrical field and attracted to electrode 32. The fibers will move with their long axis parallel to the electric lines of force and become attached to the adhesive covered under surface of sheet 34 in the inclined positions shown. In this embodiment of the invention the electric field is warped by placing insulating members of sharp curvature or limited area before a conducting member, preferably a simple member of extended area, whereas in the apparatus illustrated in Figs. 1, 2, 4 and 6, warped fields are established by providing conducting elements of sharp curvature and limited area. The insulating strips 31 in Fig. 7 can be formed into geometrical figures, letters and the like, thus permitting a wide variety in the patterns formed.

Figs. 8 and 9 illustrate another electrode structure comprising insulating material used with certain embodiments of the invention. It is made up of a conducting base plate 27, conducting elements 28, here shown as narrow strips with rounded tops, and dielectric material 29 between the strips. Electrodes of this construction give very striking results. The sheet to be piled is placed parallel to the top surface of material 29 and touching or closely adjacent the top (exposed) edges of members 28 and a complementary electrode is positioned at a proper distance —2 to 5 inches, depending upon conditions— above 29 as electrode 12 is positioned above members 10 in Fig. 2. The pile deposited when a strong electric field is established between the electrodes shows very pleasing shaded stripes, probably due to peculiar distortions in the electric field produced at top of elements 28 where they emerge from insulating material 29. The arrangement of the conductive members with relation to the insulating material has been found to have a considerable effect on the patterns produced With the electrode shown in Figs. 8 and 9, very good patterns have been obtained with conducting edges 28 projecting about $\frac{1}{32}$ to $\frac{1}{16}$ inch above the surface of dielectric filler 29.

In those embodiments of the invention shown in Figs. 1 to 9, inclusive, the controlling electrode, that is the electrode influencing the pattern in the pile most greatly, is placed just back of the sheet or other member, the surface of which is to be piled. The adhesive coating is placed on the side of the sheet away from the controlling electrode and faces the complementary electrode which furnishes a surface upon which the other end of the electric field terminates. For example, in Fig. 4, elements 16 and 17 comprise the controlling electrode, member 18 is the complementary electrode, and 19 is the sheet being piled with the adhesive coating on the side of the sheet away from electrode 16, 17. Figs. 6, 8 and 9 shown no complementary electrodes, but it is to be understood that in using the controlling electrodes shown in these figures, suitable opposing or complementary electrodes are also used. The electrodes can be positioned so that the fibers move downward to become attached to the coated surface, as in Fig. 2, or the electrodes can be arranged to cause the fibers to move upward as in Fig. 7. The latter arrangement, or an arrangement with vertically positioned surfaces, is advantageous because such arrangements make easy the jarring of loose and poorly attached fibers from the sheet during the piling operation.

The electrode farthest from the sheet is not of such contour, usually, that it influences the pattern in the pile and is often made as a simple, flat, non-discharging surface. But as will be explained hereinafter, the electrodes away from the sheet to be piled can greatly influence the deposition of the fibers comprising the pile.

The sheet to be piled in Fig. 10 is positioned adjacent an electrode of smooth contour, in this instance, a roll 37 and corona-forming complementary electrodes 40 are responsible for the pattern effect in the pile. It has been found that if the fibers to be electrically deposited are introduced through a tube about which corona discharges are present, desirable results in patterned piles can be obtained. In Fig. 10, sheet 38 travels about a grounded roll 37 which preferably turns to avoid friction and exposes an adhesive covered surface 39 to electrodes 40, each made up of a tube 41 and discharge points 42. It has been found that if wire points 42 are left off when rayon flocks or similar fibers are blown through tubes 41 and the tubes are connected to a source of unidirectional high potential current, the flocks become scattered as they are deposited. Such a result is shown at 43 in Fig. 11. With points 42 attached to and arranged about high potential tubes 41, the flocks are concentrated locally as illustrated in Figs. 12 and 13. If sheet 38 moves while electrodes 40 are stationary, but continuously depositing fibers, stripes 44 are formed. If the fibers are deposited only while sheet 38 is stationary, or while it is moving at the same speed as electrodes 40 are caused to move, spots are formed such as those marked 45 in Fig. 13. Other factors controlling the pattern produced are the size of the tubes or nozzles, the velocity of the air stream, the emphasis given the corona emanating from the points as caused by variously positioning the points about the end of the tube, and the strength of the electric field.

The stripes or points deposited with the electrode assembly in Fig. 10 may be insufficient in themselves to form a pleasing pattern. Advantageously all of surface 39 is covered with adhesive, then spots are first deposited in one color in the manner just described, and then the sheet is moved into another part of the apparatus shown in Fig. 24 where the unpiled surface is covered with fibers of a different color. Not only can the fibers successively deposited be of different colors, but they can be of different length and/or luster, and by controlling the characteristics of the electric field and the length of treatment the spots or stripes can be made to have a very different appearance from the pile filled in between. The furs of certain animals, the silver fox, for instance, can be imitated by using the method just described.

It has been found desirable in the electrical attachment of fibers to form a pile to have the fibers approach the surface to be piled separately, not in clumps or "treed" together. Screens may be used to break up grouped fibers as they are floated in air streams into the electric field and a simple manner of using a screen or other foraminous member for this purpose is to have it function as one of the electrodes. Figs. 14 and 15 show an electrode 47 that functions as a complementary electrode to grounded electrode 50. Electrode 47 of conducting material is insulated from ground and positioned about four inches below electrode 50 and is connected by conductor 53 to a source of unidirectional high potential current. It functions also to break up clumps of fibers blown by air jets 56 from supply means 55 that are not completely disintegrated by disintegrating means 57. It has been discovered that a foraminous electrode, positioned and used as is electrode 47 in Fig. 15, can be caused to influence the arrangement of fibers as they are electrically deposited on a surface,—on the surface of sheet 52, for example, as it is held adjacent 50. One way of altering the pile formed of the deposited fibers is to make foraminous electrode 47 with edges 49 projecting through surface 48 which is preferably of screen. The electric field adjacent edges 49 is so concentrated when a high voltage drop is impressed across electrodes 47 and 50 that corona discharges emanate from the edges and the fibers just over the edges deposit in other than erect positions as indicated at 51. Depressed stripe effects are given the pile formed with electrodes 47 and 50. Of course, points or edges arranged in patterns could be substituted for edge members 49 in electrode 47.

Figs. 16, 17 and 18 are plan views of fragments of patterned piles which may be made with the controlling electrodes spaced from the surface being piled. The pattern shown in Fig. 16 is made with an electrode of wire net of coarse mesh (½ to ¾") located in the position of electrode 47 in Fig. 15. A very strong electric field is used to deposit the fibers, but not strong enough to force the fibers down into the adhesive, such as results from quite definite corona discharges. The pile in Fig. 17 results from the use of an electrode comprised of parallel wires and that shown in Fig. 18 may be made with a net of rather small mesh used as a controlling electrode and positioned several inches from the adhesive covered surface being piled. The piles shown in Figs. 16, 17 and 18 are characterized by having lines and/or dots standing out prominently as local concentrations of fibers.

Fig. 19 illustrates apparatus in which the field controlling member is supported in front of the surface being piled, but is preferably at the same or nearly the same potential as the electrode just back of the sheet with the surface being piled. Electrode **60** is preferably flat and is at ground potential. Electrode **64** is of reticulated construction or the like and is maintained at high potential. Sheet **61**, the under side **62** of which is to be piled, is moved through the electric field between electrodes **60** and **64**, preferably just under and touching electrode **60**, as shown. A member **63**, advantageously formed as a belt with stencil-like perforations such as the diamond design shown in Fig. 20 or the slots shown in Fig. 21, is moved parallel with and at the same speed as sheet **61**. It is held a short distance, for example one-fourth inch, in front of adhesive covered surface **62**. The fibers to be deposited are brought into the apparatus on a moving porous belt **66**. When the fibers are carried by belt **66** over the top of wind box **67**, compressed air issuing from nozzle **68** and passing through regulating means **69** blows through the interstices of belt **66** and blows the fibers up through electrode **64** and into the electric field for deposition on surface **62**. Very definite patterns are made with the apparatus shown in Fig. 19 and they can be made very colorful if the sheet to be piled is passed through several partially shielded fields, each one depositing fibers of a different color.

Belt **63** can be made of wire or other attenuated members woven into a pattern and it will influence the deposition of the fibers comprising the pile by altering the electric field. The resulting patterns will be much like those shown in Figs. 16 and 17, but in more striking relief. Or belt **63** can be made up as a stencil and cause a pattern to be made by definitely covering portions of surface **62** and permitting flocks to be deposited only behind openings in the stencil. Besides the diamond pattern shown in Fig. 20, decorative designs, such as flowers, and commercial outlines, comprising names, can be formed. Such stencil-like members effect the pattern not only mechanically but also effect it by locally altering the characteristics and intensity of the electric field and therefore they may be designated as "field stencils."

Figs. 22 and 23 illustrate apparatus adapted to apply adhesive locally to a surface and then to pile the adhesive covered portions in accordance with the invention. In Fig. 22, adhesive applying roll **71** has cut away portions **72** and raised portions **73**. Only the raised portions carry adhesive to the surface to be piled and in the figure a transverse cross-section of a sheet **75** is shown with strips of adhesive **74** applied thereto by raised portions **73**. Fig. 23 shows sheet **75** after having been locally coated with adhesive with roll **71** passing through a strong electric field between complementary electrodes **76** and **77**. Electrode **77** comprises a conducting plate **78** on the bottom surface of which tubes **79**, or other members of small surface area which may be but are not necessarily conducting, are attached. Tubes **79** are spaced to correspond with the spacing of raised portions **73** on applicating roll **71**. Sheet **75** is positioned under and adjacent tubes **79** and, for continuous operation, is moved in a direction parallel to the tubes. The pile **80** deposited on adhesive strips **74**, by action of the electric field in the manner previously described, is not uniformly erect, but leans outwardly at the edges and projects into unpiled spaces **81**. The inclined positions of some of the fibers is due to the directions taken by the lines of force of the electric field approaching the surfaces of tubes **79**. The effect of the inclined fibers partially covering spaces **81** is especially striking when the fibers are of one color and sheet **75** is of another color.

Fig. 24 is a diagrammatic view in side elevation of apparatus which may be used in successively applying the several embodiments of the invention which have been described. A sheet **86** of the material to be piled, for example, a light weight, flexible but closely woven textile, is unwound from supply roll **85**, passed over an adhesive applying roll **87**, over positioning and tensioning rolls **90**, **91** and **92**, and through means, not shown, for finishing and storing the piled product. Roll **87** is shown with raised portions **88** to apply the adhesive from vessel **89** to the surface of sheet **86** in restricted areas only as in that embodiment of the invention illustrated by Figs. 22 and 23. Where the surface of the sheet is to be completely piled, a smooth roll to spread adhesive over the entire surface of the sheet is used.

As the adhesive coated sheet goes over roll **90**, it may be sprayed with fibers from one or more spray electrodes **101** in accordance with the practice described in connection with Figs. 10, 11, 12 and 13. If the spray electrodes **101** are operated continuously, lines of fibers are deposited upon sheet **86** as shown in Fig. 12, but if the spraying is done at intervals only, spaced patches such as the spots shown in Fig. 13 will be deposited. The fibers for sprays **101** are supplied through conduit **102** and this can be made to move away from the entrance of sprays **101** by reciprocating means, for instance, crank **104** acting, preferably with a quick return movement, through connecting rod **103** will make conduit **102** articulate at joint **105** at the chosen intervals when deposition of particles is to be interrupted. During the period of interruption the fibers blow out the end of conduit **102** and fall to the bottom of casing **106** to be lifted again by blower **107**. If electrode **101** is maintained at high potential connecting tube **100** is made of insulating material.

Sheet **86** next passes through an electric field established between screen electrode **110** and control electrode **111**. The latter electrode can be in the form of any of the control electrodes shown in Figs. 1 to 9 inclusive, but is made into or is attached to an endless band. If electrode **111** is to cause the fibers to deposit in a closed pattern or one with transverse marks, it must move at the same speed and in the same direction as sheet **86** while sheet **86** is moving through the electric field above electrode **110**. This is accomplished by turning pulley **112**, over which electrode **111** passes, by a positive drive **113** such as a chain from a source of power **114** which also turns pulley **90** over which sheet **86** passes, in positive manner. Positive synchronous movement of belt and electrode can also be obtained by having spurs project from the edge of electrode **111** and engage perforations along the edges of sheet **86** in the manner known to the moving picture art. A grounded shoe **115** contacts electrode 111 and maintains it at ground potential.

Underneath sheet 86 a belt 116 may be positioned by utilizing supporting pulley 117 and supporting and propelling pulley 118. Belt 116 may be perforated as a stencil and function as a field stencil in the manner of member 63 in Fig. 19. The stencilling belt must move at the same speed as sheet 86 and such movement is obtained through drive 119. Other field altering means, such as screens, can be used in place of stencilling means 116, and such means travelling at the speed of sheet 86 will give the pile on sheet 86 a woven appearance as indicated in Figs. 16 and 18. Although pattern control electrode 111 and stencilling or other field altering means 116 can be used at the same time, ordinarily this is not done. A flat stationary electrode may be used in place of special electrode 111 when a field stencil is being used in front of sheet 86. Fibers are supplied to the field between electrodes 110 and 111 by supply means 120 in which air jets are utilized to project the fibers up through electrode 110.

Electrodes 124 and 125 in Fig. 24 are energized and used to deposit fibers if portions of the surface of sheet 86 remain unpiled after the sheet passes through the processing steps described in the above. No special effect is sought in this last step. Both electrodes have, in general, flat surfaces and the uniform field that results from impressing a high voltage across electrodes 124 and 125 tends to deposit an erect uniform pile. The deposition of fibers in this step is usually for the purpose of completing the pile started with spray electrodes 101 and/or the pile deposited through field stencil 116 and this filling is often made with fibers of a different color from that used in the preceding steps.

Apparatus for satisfactorily supplying fibers to the field between electrodes 124 and 125 is shown diagrammatically under electrode 124. It comprises an endless foraminous conveying belt 126 upon which fibers are spread by a distributor 130, preferably agitated, and a blowing means 127 that distributes air under pressure under belt 126 and causes it to pass up through the belt and raise the fibers therefrom and blow them through screen electrode 124. Undeposited fibers are collected in hopper 128 and conveyed by an air stream set in motion by fan 129 to filter bag collector 131 and thence to distributor 130.

Fig. 24 illustrates apparatus with a wide range of usefulness in the forming of simulated piles on adhesive covered surfaces. It is illustrative of the wide variation in methods and means for obtaining useful patterns in the electrical deposition of pile forming materials by the local alteration of the characteristics of the electrical field effecting the deposition, so as to produce a definite topical non-uniformity therein. It is obviously subject to a very large degree of variation and may be provided with electrode rapping or agitating means and other devices and modifications.

This application is a division of our application Serial No. 5,288, filed February 6, 1935.

We claim:

1. A patterned pile-surfaced material comprising a base material, a continuous layer of binder material thereon and a substantially continuous coating of fibers having one end embedded in said binder material and the fibers in adjacent areas of said coating having different angles of inclination whereby a design of predetermined pattern is formed by the varying reflection of light.

2. A patterned pile-surfaced material comprising a base material, a continuous layer of binder material thereon and a substantially continuous coating of fibers having one end embedded in said binder material and the fibers in said coating locally varying in angle of inclination whereby a design of predetermined pattern is formed by the varying reflection of light.

3. A pile surface material comprising a continuous layer of binder material having fibers embedded therein at one end thereof, said fibers being disposed at locally varying angles of inclination to form a design of predetermined pattern by the varying reflection of light.

ARCHIBALD F. MESTON.
HARRY A. WINTERMUTE.