This invention relates to a multiple color flock printing machine and refers more particularly to a machine adapted to print a pattern or design in one or more colors with which there is associated a flock printing pattern or design in one or more colors; said color pattern and said flock pattern being always applied in proper register.

Methods of flock printing, heretofore employed, did not make it possible to obtain a multiple color flock print. In flock printing it is necessary to arrange the printing means at a certain distance from the flocking means, so that the run of the fabric which is passed through a machine is quite long. Due to this length of fabric it was found impossible heretofore to construct a properly operating machine which would carry out two or more flock printing operations upon a single run of fabric. It was found in the past that whenever attempts were made to combine more than one flock printing device in a single machine, the second printing did not register with the first one, due to stretch and distortion of the fabric during its passage from one flock printing device to the other.

An object of the present invention is the provision of a flock printing machine by means of which a single run of fabric passing through the machine is subjected to two or more flock printing operations which are all in perfect registration with each other.

Another object is the provision of a multiple color flock printing machine which is able to carry out several flock printing operations, preferably of different colors, in connection with, or supplementary to, the printing of a color pattern.

A further object is the provision of a textile printing machine comprising a plurality of flock printing means which may apply flock paste and/or flock of different colors in perfect registry upon a fabric running through the machine.

A still further object of the present invention is the provision of a multiple color flock printing machine comprising means for automatically adjusting the position of the blanket supporting the fabric during its passage through the machine.

Still another object of the present invention is the provision of a machine comprising a plurality of flock printing devices adapted to apply flock one after the other to the same fabric, a subsequently used flock printing device being provided with means maintaining in perfect condition the flock previously applied by another flock printing device.

A further object is the provision of a multiple color flock printing machine provided with means for adjusting the positions of at least two flock stencils constituting a part of the machine, in at least three different directions.

The above and other objects of the present invention may be realized through the provision of a multiple color flock printing machine comprising an endless blanket which is driven by suitable means and which is passed over a curved arch-shaped support. The fabric to be treated is brought in contact with the blanket and travels along with it while the fabric is subjected to several flat printing and flock printing operations. The flock paste applied to the fabric by a flock stencil causes it to adhere to the blanket while they are moved over the arch-shaped support, thus preventing any shrinkage of the fabric. The first flock applying device may be arranged approximately in the middle of the arch-shaped support, while two flock stencils may be placed at the two ends of the support. A second flocking operation may take place after the fabric has been separated from the blanket. The operative surfaces of the stencil which is situated at the exit side of the arch-shaped support are provided with suitable cavities and indentations in order to avoid the removal of the previously applied flock. Brackets slidable upon guides forming a part of the main frame are used for adjusting the positions of the flock stencil, the printing rollers and the tension rollers. Automatically operable electric means are employed for preventing the slippage of the blanket.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing a preferred form of the inventive idea.

In the drawings:

Figure 1 illustrates diagrammatically the operation of the machine constructed in accordance with the principles of the present invention. Figure 2 shows in section the fabric traveling along with the blanket. Figure 3 shows the multiple color flock printing machine in side elevation. Figure 4 is a top view of the machine. Figure 5 is a section along the line 5—5 of the Figure 4. Figure 6 is an end view of the machine, looking in the direction of the arrow 6 shown in Figure 3. Figure 7 is a detailed sectional view along the line 7—7 of Figure 3, on a larger scale. Figure 8 is a section along the line 8—8 of Figure 3 on a larger scale.
Figure 9 is a section along the line 9—9 of Figure 3.

Figure 10 is a section along the line 10—10 of Figure 3.

Figure 11 is an enlarged cross-section through a portion of the second stencil.

The general operation of the multiple color flock printing machine constructed in accordance with the present invention, is illustrated diagrammatically in Figure 1 of the drawings. The machine comprises an endless blanket 20 which passes around two large rollers 21 and 22. The tension of the endless blanket 20 may be adjusted by means of adjustable tension rollers 23 and 46. Any lateral slippage of the blanket upon the rollers in a direction at right angles to the direction of its travel, is prevented by a blanket-shifting roller 24 automatically operated by the shifting device E (Figure 5).

The fabric 25 is passed over a pressure roller or idler 26 and joins the blanket 20 at the point 27 upon the outer surface of the large roller 22. The fabric is moved together with the blanket around the roller 22 and is brought in contact with the first printer or printing roller 21 and the second printer 28. Then the fabric is brought in contact with the flock stencil 29 by means of which a flock paste of the desired color is applied in the form of a suitable design upon the surface of the fabric. The device for adjusting the position of the stencil 29 is designated by the letter C in Figure 5. The fabric and the blanket are passed together over a curved support 30.

In the modification illustrated, the support 30 is curved in the form of an arch. A flock applying device A is situated substantially in the middle of the support 30 and is used for applying the flock which may have suitable color or colors, by any suitable means such as compressed air, gravity or low-pressure air, upon the surface of the fabric, the superfloous flock being removed by suitable suction pipes forming a part of the device A.

Figure 2 illustrates the fabric after it has passed the flock stencil 29. It is apparent from Figure 2 that the flock past 31 applied to the fabric 25 by the stencil 29 penetrates through the entire fabric and reaches the blanket 20. Due to the adhesive quality of the flock paste, it connects the fabric with the blanket and the fabric becomes glued to the blanket. At the same time, the fabric and the blanket are both stretched over the support 30, and any possible distortion of the fabric is effectively prevented.

The flocking device A comprises a container 32 having a nozzle through which the flock 33 is applied by means of compressed air to the surface of the fabric 25. In the modification illustrated, the pipes 34 and 35 are used for blowing air upon the fabric while the pipes 36, 37 and 38 are under suction. The comminuted flock applied to the surface of the fabric will adhere to the flock paste 31 and form small heaps 33 (Figure 11) which become impregnated with the flock paste. The superfloos amount of flock which was not brought in contact with the flock paste, is removed by the blowing pipes 34 and 35 and the suction pipes 36, 37 and 38.

The fabric, after having passed under the flocking device A and over the curved support 30, is supplied with flock paste for the second time by the second flock stencil 39 which is situated close to the exit edge of the curved support 30.

After that, the blanket 20 is separated from the fabric 25. The fabric 25 continues to move in a substantially horizontal direction and is subjected to the action of a second flocking device B which in the modification illustrated, comprises a flock applying pipe 40 and five air-blowing and air-suction tubes 41 to 45.

The endless blanket is passed over the roller 21 and in contact with the roller 22 until it is brought again in contact with the fabric at the point 27. The blanket is cleaned while it passes over the rollers 21 and 45.

The above-described mode of operation, which is illustrated diagrammatically in Figure 1 of the drawings, makes it possible to apply flock pastes and/or flock of different colors to one single run of fabric, thereby producing a multicolored flock printed fabric. The machine by means of which this result may be achieved will now be described in detail.

As shown in Figures 3 and 5 of the drawings, the large roller 22 is carried by a bracket 50 connected with the main horizontal frame 75. The frame 50 is used for carrying the idler 26 and the first printing roller 21. As shown more clearly in Figure 5, the horizontal frame 75 is supported by the two frames 80 and 16 extending substantially in vertical directions.

The hollow idler 26 is made integral with shaft stubs 51 which are rotatably mounted in U-shaped supports 52. As shown more clearly in Figure 5, the supports 52 are slidable in a direction substantially toward the roller of the first printer 21 along guide 53 which forms an integral part of the frame 50. The supports 52 may be held firmly in any desired position upon the frame 50 by means of bolts 54.

The movements of each support 52 along the guide 53 are caused by means of a large bolt 55 having one end which presses against the support 52. The opposite end of the bolt 55 is rotatably mounted in a bracket 56 which forms an integral part of the frame 50 and which is provided with inner screw threads which engage the screw threads of the bolt 55.

As shown in Figure 3, a gear-wheel 57 is rotatably mounted upon the shaft 51 and meshes with another gear-wheel 58 which is rotatably mounted upon a pivot 59 carried by the frame 50. The gear wheel 57 may be adjusted in relation to the gear-wheel 58 through the provision of a worm gear 71 which is connected with the gear-wheel 57 and which meshes with the pinion 72 keyed upon the shaft 51, this adjustment being carried out by turning the worm 71.

As shown in Figures 3, 5, and 6, the first printing roller 21 is hollow and is firmly connected with shaft stubs 60. The two shaft stubs 60 are rotatably mounted in supports 61 which are open at one end to provide for a convenient removal and insertion of the roller 21 and of its shaft stubs 60. The supports 61 are slidable along guides 62 which form an integral part of the frame 50. Bolts 65 are used for holding the supports 61 upon the guides 62. A separate adjusting bolt 63 presses with one of its ends against each of the supports 61. The bolts 63 are carried by the supports 64 which form an integral part of the frame 50 and which are provided with inner screw threads meshing with the outer screw threads of the bolt 63. Due to this arrangement, the position of the first print-
ing roller 27 upon the frame 50 may be con-
viently adjusted by loosening the bolts 65 and
by turning the bolts 63 which in their turn move
the supports 61.
5 The shaft 60 carries a gear-wheel 66 which
meshes with the gear-wheels 58 and 67, and
which is loosely mounted upon the shaft 60.
The gear-wheel 60 is connected with a worm
gear 68 which meshes with another gear-wheel
10 Bolton upon the shaft 60.
The purpose of the worm gear 68 is to provide
a convenient adjustment between the first print-
ing roller 27 and the second printing roller 28.
By turning the worm gear 68, the pinion 69, the
shaft 66 and the toothed wheel 65 will be ro-
tated, thereby changing the relative position of
the first printing roller 27.
The printing material is applied to the print-
ing roller 27 in the usual manner, the super-
fluous amount being collected in a container 70
which is attached to the frame 50.
As shown more clearly in Figure 3 of the draw-
ings, the shaft 155 carrying the large roller
22 is rotatably mounted in brackets 156 con-
nected with the horizontal frame 75.
The shaft 79 of the second printing roller 28
is provided with two pulleys 80 which are at one end
so that the roller may be inserted and re-
moved at will. The brackets 73 are slideable
along guides 74 which form a part of the ver-
tical frame 75.
The movements of the brackets 73 are caused
by bolts 71 which are rotatably mounted in sup-
ports 78 suspended from the frame 75.
35 As shown in Figures 3 and 6, the roller 28 is
rigidly connected with the shaft stubs 79. A
gear wheel 80 meshing with the gear-wheel 67
is loosely mounted upon the shaft 79. The gear-
wheel 80 is rigidly connected with a worm gear
81 which is in engagement with the gear-wheel
82. The object of this arrangement is to pro-
vide the usual means for adjusting the position of
the second printing roller 28 whenever such ad-
justment is needed.
A scraper 83, one end of which is in contact
with the surface of the second printing roller 28,
is situated underneath this roller. The oppo-
site end of the scraper 83 projects into the interior
of the frame 75 and is provided for removing the
superfluous amount of the printing material car-
ried by the roller 28.
The first flock stencil 29 and the device C for
adjusting the position of this stencil are illus-
trated in Figures 3, 5, 6, and 8 of the draw-
ings. As shown more clearly in Figures 4 and 8, the
device comprises two cylindrical bearing members
86, one of which is surrounded by a crown-shaped
gear wheel 87. Each of the two edge portions of
the stencil 29 is firmly connected with a sepa-
rate ring 111 which rests upon a bearing mem-
ber 86. This ring is provided for the frictional contact thereof.
Bolts 88 connect the ring 111 with the gear-
wheel 87. (Figure 8.)
Flock paste is applied to the inner walls of the
stencil 29 by means of a trough comprising a
curved slanting wall 157 which is adjustably
mounted in the support 89. The trough is adjust-
ably mounted upon a support 83 which is
attached by means of bolts 84 to the frame 90.
(Figure 5.)
The doctor blade 92 used for pressing flock paste
through the perforations of the stencil 29 is ad-
justably mounted upon a support 93 which is
attached by means of bolts 94 to the frame 90.
Flock paste is introduced into the trough formed
by the wall 157 and the doctor blade 92 within
the hollow stencil 29 by any suitable means not
shown in the drawings.
The cylindrical bearing member 86 may be
adjusted in the vertical direction by means of
two hand wheels 95 each of which is firmly con-

cnected with a separate threaded shaft 96 (Fig. 6).
Each shaft 95 is carried on a separate plate
97 of a separate cover 98 which is connected by
bolts 99 with one of the frame members 90.
The lower end of each shaft 95 is shaped in the
form of an abutment 100 which is connected with
the bearing member 86 by means of a

When the wheel 95 is rotated in such manner
that the shaft 96 is moved upwardly, the abut-
ment 100 pulls upwardly the cylindrical bearing
member 86 thereby raising the flock stencil 29.
The flock stencil is adjusted in a horizontal
direction by means of two hand wheels 102 each
of which is rigidly mounted upon a separate shaft
103, the free end of which presses against the
lower portion of the frame 90 (Figures 4 and 6).
The frame 90 is carried by a support 104 resting
upon the horizontal frame 75 and provided with
guides 105 which are in frictional contact with
the bottom surfaces of the frame 90 (Figures 3
and 5).
The stencil 29 also may be adjusted in a hori-

tontal direction perpendicular to the direction of
adjustment which is accomplished by means of
the hand wheel 102. This second adjustment
may be carried out by a bolt 119 which is ro-
tatably mounted in a support 120 attached to
the frame 75. The free end of the bolt 119 is in
engagement with a member 121 which forms a
part of the support 104. By rotating the bolt
119, the stencil supporting device including the
support 104 and the frame 80, is caused to move
along the guides 159 forming a part of the frame
75.
The gear-wheel 97 connected with the stencil
29 engages a gear-wheel 105 which is keyed upon
the shaft 110. A wheel 107 is firmly connected
with a worm 108 and is mounted upon a sleeve
159 carried by the shaft 110 (Figure 7). A
pinion 109 keyed upon the shaft 110 meshes with
the worm 108. By turning the worm 108, the
position of the gear-wheel 105 and of the gear-
wheel 87 may be conveniently adjusted.
The machine is driven by a motor which is not
shown in the drawings and the rotation of which is transmitted by a belt 112 to a pulley 113
which is keyed upon the driving shaft 114.
A
gear box 115 transmits the motion of the driving
shaft 114 to a gear wheel 116, the teeth of
which mesh with the teeth of a large toothed
crown 117 which is rigidly connected and ro-
tatably mounted with the large cylinder 22. The
toothed crown 117 meshes with the gear wheel
118, the teeth of which engage the teeth of the
pinion 109 keyed upon the sleeve 159 (Figure 7).
The rotation of the pinion 160 is transmitted
through the sleeve 159 and the worm 108 to the
gear-wheel 105 which meshes with the toothed
wheel 87 firmly connected with the stencil 29.
Due to the above-described arrangement, the
stencil 29 is rotated by the driving shaft 114.
The fabric leaving the stencil 29 and passing
70 over the arch-shaped support 30 is quite firmly
connected with its blanket 20. This firm connec-
tion between the fabric 25 and the blanket 20 is
cased by the flock paste 31 which is pressed
by the doctor blade 92 through the perforations
75
of the stencil 28. The flock paste passing through those perforations is applied to the fabric at certain predetermined portions of its surface corresponding to the flock design which is to be impressed upon the fabric. The consistency of the flock paste is such that it penetrates rapidly through the entire thickness of the fabric and reaches the blanket 29 (Figure 2). The flock paste should be sufficiently adhesive to establish a fairly permanent connection between the fabric and the blanket. Due to this adhesive quality of the flock paste, the fabric is moved with the blanket as a single piece over the entire arched surface 30. At the same time, the fabric continues to be stretched while it passes over the support 30, so that any stretch or movement of the fabric 25 relatively to the blanket 20 is effectively prevented.

In the course of this movement, the fabric 25 and the blanket 30 pass under the flocking device A. As has been described already in relation to Figure 1, the flock situated within the tube or container 32, is caused by the action of compressed air to pass through the nozzle of the container 32 and is applied upon the surface of the fabric 25. The flock adheres closely to those portions of the fabric which are covered by the flock paste, so that the flock paste acts as a glue by means of which the flock becomes firmly and permanently attached to the fabric.

Compressed air which is blown upon the fabric through the pipes 34 and 35 and the suction which is produced by the pipes 36, 37 and 38, remove from the surface of the fabric all flock which has not come in contact with the adhesive flock paste and which has not become glued to the fabric by this flock paste.

The device D used for supporting and adjusting the second flock stencil 39, which is situated at the opposite exit end of the arched support 30, is substantially similar to the device C for adjusting the first flock stencil 29 (Fig. 3).

The second stencil 30 must comprise not only those perforations which are necessary for applying the second flock paste upon the surface of the fabric but must also comprise perforations or cavities which correspond to the perforations of the first stencil. Otherwise, the flock produced by the second stencil 29 and the first flock blowing device A would be destroyed by the second stencil 29. A convenient way of shaping the operative surfaces of the second stencil is illustrated in Figure 11 of the drawings which show a section through a portion of the fabric while it is in contact with the outer surface of the second stencil 39.

As shown in Figure 11, the fabric 25 has been provided with protruding colored portions 33 which constitute the design produced by the first stencil 29 and the first flock blowing device A. When these protruding portions 33 come under the second stencil 39, they are covered by cavities 126 formed in the outer surfaces of the second stencil 39. Although the flock 39 may be somewhat flattened by the bottoms of the cavities 126, it still retains considerable thickness and in the finished band, there will be little difference in the thicknesses of the flock produced by the second flocking operation and of the flock produced by the first flocking operation.

The flock paste situated within the second stencil 39 is perforated through perforations 127 formed in the walls of the second stencil 39 and is deposited in the form of protruding portions 128 upon the surface of the fabric 25.

The stencil 39 is firmly connected with a toothed crown 129 which meshes with the gear wheel 123 carried by the shaft 121 (Figs. 3 and 4). The gear wheel 120 which is also carried by the shaft 121 meshes with the gear wheel 125 and is also in engagement with gear wheel 131 which is driven by gears situated within the gear box 132. As shown in Figure 3, the gear box 132 is firmly connected with the driving shaft 114 and is situated opposite the gear box 115.

A worm 122 used for adjusting the positions of the gear wheels 123 and 129 is firmly connected with a wheel 124 which is rotatable along with the wheel 120. A pinion 108A meshing with the worm 122 is keyed upon the shaft 121.

The second stencil 39 is carried by two cylindrical bearing members 133 (Figs. 3 and 4). Plates 134, one of which is shown in Fig. 3, connect each of the bearing members 133 with the lower end of a separate thimble 135, the upper end of which carries a hand wheel 136. Each of the shafts 135 is supported by a separate cover 137 attached by bolts 138 to the frame 139. By rotating the hand wheels 136, the position of the bearing members 133 and of the second stencil 39 carried by the bearing members, may be conveniently adjusted in the vertical direction.

The flock paste is applied to the inner surface of the stencil 39 by means of a trough comprising a curved surface 140 which is clamped by a support 141 carried by the frame 139. A doctor blade 142 is held by a support 145 which is also attached to the frame 139.

The doctor blade 142 is used for pressing flock paste through the perforations provided in the second stencil 39.

The position of the second stencil 39 may be adjusted in the horizontal plane in two directions perpendicular to each other by substantially the same means as those used for adjusting the position of the first stencil 29.

The adjustment in the direction perpendicular to that of the plane of Figure 3 is carried out by means of hand wheels 144 keyed upon threaded shafts 145, the opposite ends of which press against the lower portion of the frame 139, (Figs. 3 and 4). The frame 139 is slidably mounted on guides 146, the upper surfaces of which are in contact with the lower surfaces of the frame 139.

The guides 146 form a part of the horizontal support 147. The support 147 is movable in a direction at right angles to the direction of the above-described movement by means of one or more bolts 148 carried by a support 149 firmly attached to the frame 45. The threaded end of the bolt 148 engages a lug 150 forming a part of the support 147. By rotating the bolt 148, the horizontal support 147 is moved along the guides 151 which form a part of the frame 75.

The frame 75 carries a bracket 152 which is suspended from the frame 75 and which carries the shaft 153. The large roller 21 and the gear wheel 130 are both mounted upon the shaft 153.

The fabric 25 leaves the blanket 20 at the point 161 (Figure 1), i.e., after it has passed between the second stencil 39 and the large roller 21. As shown in Figure 1, the fabric 25 after it has been separated through perforations 127 formed in the walls of the second stencil 39 and is deposited in the form of protruding portions 128 upon the surface of the fabric 25.

The blanket 20 continues to move around the large roller 21. As has been mentioned already, 75
the blanket 20 carries a certain amount of the flock paste which has reached the blanket after having penetrated through the fabric. This flock paste is removed and the blanket is cleaned in two stages: a roller 162 rotatably mounted underneath the large roller 21 is in frictional contact with the blanket 20 passing around the large roller 21. The lower portion of the roller 162 is immersed in a container 163 which is filled with a cleaning and paste-dissolving liquid. A doctor blade 164 is attached to the walls of the container 163 and comprises an edge which is brought in contact with the blanket after the latter has passed beyond the roller 162.

A large part of the flock paste carried by the blanket 20 is scraped off by means of the doctor blade 164. The tension of the endless blanket 20 may be adjusted by adjusting the position of the tension roller 23. As shown more clearly in Figures 3, 5, and 10 of the drawings, the tension roller 23 is rigidly connected with the shaft stubs 165 and 168 which are supported by U-shaped brackets 167 and 168, respectively (Figure 10). The position of the tension roller 23 may be adjusted by turning a hand wheel 169 which is keyed upon the shaft 170. The shaft 170 is carried by a bracket 171 which is suspended from a second horizontal frame 172, forming a part of and situated underneath the horizontal frame 75. The shaft 170 extends underneath the roller 23 and is integral with a cone gear 172a which is situated adjacent to the hand wheel 169. The cone wheel 172a meshes with a cone wheel 173 which is keyed upon one end of the threaded shaft 174. The shaft 174 is supported by a bracket 175 which is attached to the horizontal frame 172 and by another support 176 which is attached to the horizontal frame 75.

The threads of the shaft 174 are in engagement with the inner threads of a hollow lug 177 forming an integral part of the bracket 167. The bracket 167 is slidably mounted upon the rod 178, the ends of which are carried by the supports 179 and 180. The rotation of the shaft 170 is transmitted to a cone gear 179 which forms an integral part of the shaft 170 and which is situated close to the free end of the shaft 170 carried by bracket 180, which is connected with the horizontal frame 172. The cone gear 179 meshes with the cone gear 181 which is keyed upon a threaded shaft 182. The shaft 182 is carried by a support 183 which is connected with the frame 75 and another support 184 which is connected with the horizontal frame 172. The support 184 is carried by the support 178 and the bracket 176. The lug 185 forms an integral part of the bracket 168.

The bracket 168 is slidably mounted upon a vertical rod 186, the ends of which are carried by the supports 187 and 188. When the hand wheel 169 is rotated, this rotation is transmitted through the medium of the shaft 170 to the cone gears 172a and 179. Since the cone gears 173 and 181 are rotatable along with the brackets 167 and 168, respectively, and since these gears engage the cone gears 172a and 179, the rotation of the hand wheel 169 will cause a rotation of the threaded shafts 174 and 182. This rotation will cause a simultaneous downward or upward movement of the brackets 167 and 168 carrying the shaft stubs 165 and 166 of the adjusting roller 23.

The blanket 20, after having been passed around the adjusting roller 23, is subjected to the second cleansing operation, as shown in Figures 3 and 5. The blanket 20 passes around the roller 46 rotatable along with its shaft 159 which is carried by U-shaped brackets 191 attached by bolts 192 to the vertical frame 76. The brackets 191 are movable along oblique guides 193 which form an integral part of the frame 76.

The blanket 20, passing around the roller 46, is brought in contact with a roller 194, the lower portion of which is situated within a container 195 filled with a cleansing and flock-dissolving liquid. A doctor blade 196 is attached to the container 195 and comprises an edge which is in frictional contact with the blanket. The doctor blade 196 scrapes off the remains of the flock paste still adhering to the blanket, so that the blanket leaving the roller 46 is substantially free from all flock paste and is sufficiently clean to serve as a support for a new run of fabric which is brought in contact with the blanket at the point 27 (Figure 1).

The blanket 20 is passed over a roller 24 which is connected with a device E (Fig. 5) used for the purpose of preventing any shifting of the blanket in directions perpendicular to the direction of its movement.

This automatically operable device E prevents the sideward shifting of the blanket is illustrated more clearly in Figures 4 and 9 of the drawings. The hollow roller 24 is rigidly connected by its two ends with shaft stubs 191 and 196 which are rotatably mounted in the two brackets 199 and 200, respectively. These brackets are integral parts of a horizontal frame 201 which extends underneath the roller 29.

The frame 201 is provided with a central portion 202 having the form of a sleeve which surrounds a pivot 203, mounted upon a support 204 which is attached to the frame 172. The frame 201 is provided with lugs which carry rollers 205 and 206. Due to the described arrangement, the roller 29 can swing around the pivot 203 while the rollers 205 and 206 serve the purpose of supporting the frame 201 and of facilitating its movements around the pivot 203.

A lug 207 forms an integral part of the bracket 199 while a similar lug 208 forms an integral part of the bracket 200. As shown more clearly in Figure 4, an endless cable 209 passes through suitable openings formed in the lugs 207 and 208. Any suitable clamping means may be used for firmly connecting the lugs 207 and 208 with the cable, so that as soon as the cable is moved the frame 201 is caused to turn around the pivot 203.

The cable 209 is passed over four pulleys 210, 211, 212, and 213 which are supported by the vertical frame 172. As shown in Figure 4, the cable 209 is wound a few times over a pulley 215 which is situated between the pulley 212 and the lug 201 of the frame 201.

The horizontal frame 172 carries a small electric motor 216, the shaft of which may be rotated in opposite directions depending upon the direction of the electrical current caused to flow through the motor 216. The motor 216 drives a worm gear 217 which is in engagement with a pinion 218 keyed upon a shaft 219 which carries the pulley 215. The pulley 215 is rotatable along with its shaft 219.

Two electrical switches or fingers 220 and 221 are situated on the opposite sides of the blanket 20. These electrical fingers are connected by 75
suitable conducting wires not shown in the drawings, with the electric motor 216. The electrical connections between the fingers 220 and 221 on the one hand and the motor 216 on the other hand, are such that when one of these fingers is actuated, the electrical current passing through the motor 216 is caused to flow in a certain pre-determined direction; when the other finger is actuated, the electrical current is caused to flow in the opposite direction. Thus, if the finger 220 is actuated, the shaft of the motor 216 is rotated in the opposite direction from the direction of its rotation caused by operating the finger 221. The two fingers 220 and 221 thus operate as switches causing the rotation of the motor 216 in two opposite directions.

When the blanket 20 shifts in a direction toward the finger 220, it comes finally in contact with this finger and moves it, closing thereby an electrical circuit which sends an electrical current through the motor 216. The motor 216 is rotating and its motion is transmitted through the worm 217 to the gear wheel 218, the shaft 219, and the pulley 215. The pulley 215 when rotated, pulls the cable 209 thereby causing a movement of the roller 24 around its pivot 203. The roller 29 by moving to the new position causes the blanket 20 to slip back into its proper central position and to move out of contact with the finger 220. Then the electrical circuit is interrupted and the motor 216 is stopped.

If the blanket 20 is shifted in the opposite direction, it finally comes in contact with the finger 221 and by moving the finger 221 closes another electrical circuit which sends an electrical current in the opposite direction through the motor 216. The worm 217 and the pulley 215 will be rotated in the opposite direction. The cable 209 will shift the roller 29 in the opposite direction until this roller will cause the blanket 20 to move out of contact with the finger 221 and to assume its original position.

The described multiple color floc printing machine is used to produce a textile fabric having a flock print consisting of many colors. As has been described already, the machine comprises two flock stencils 29 and 30, a flock applying device A situated between these two flock stencils, and a second flock applying device B situated on the opposite side of the flock stencil 30 (Figure 1). Before the machine is operated, the position of the flock stencil 29 and 30 is adjusted to provide a perfect registry of design, each of the flock stencils being adjustable in the vertical and in two horizontal directions. The machine comprises two printing rollers 27 and 28 of the usual type which are adjustable in a direction toward the fabric. While the endless blanket 20 is being driven the position of the blanket is adjusted by the automatically operable roller 24.

The machine is driven by a motor which is not shown in the drawings and the rotation of which is transmitted to the driving shaft 114 and from said driving shaft by means of two sets of gears to the large rollers 21 and 22 and the stencils 29 and 30.

On the other hand, the rotation of the printing rollers 27 and 28 is caused by frictional contact with the endless blanket 20 and the fabric 25.

Since a too great pressure of the printing rollers 27 and 28 against the moving fabric 25 may affect the design of the flocking, the printing rollers upon the fabric, the frictional contact is maintained by the adjustable roller 26 which is rotated by the movement of the blanket 20 and of the large roller 22. The rotation of the roller 26 is transmitted by a suitable gear mechanism to the two printing rollers 27 and 28.

An important feature of the machine constructed in accordance with the present invention is the provision of means preventing the shifting or the stretch of the fabric in relation to the blanket carrying this fabric. These means comprise a curved arch-shaped support situated between the two flock stencils. The shifting is further prevented by the flock paste which penetrates through the fabric and glues it to the blanket.

The blanket after having been separated from the fabric is passed through a suitable cleansing device before it is brought again with the fabric which is being passed through the machine.

What is claimed is:

1. A multiple color flock printing machine, comprising a flock stencil, a flock applying device, supporting means having a curved surface situated between said flock stencil and said flock applying device, and means for moving a fabric from said flock stencil to said flock applying device and over said curved surface, said curved surface receiving the fabric as soon as it leaves the flock stencil and carrying the fabric in bowed condition under said flock applying devices.

2. A multiple color flock printing machine, comprising a flock stencil, a flock applying device, an arch-shaped support situated between said flock stencil and said flock applying device, and means for moving a fabric from said flock stencil to said flock applying device and over said arch-shaped support, said arch-shaped support holding said fabric in arched condition while said flock is applied thereto.

3. A multiple color flock printing machine, comprising at least two flock stencils, an arch-shaped support situated between two flock stencils, a flock applying device situated over said support and between said two flock stencils, and means for moving a fabric from one of said two stencils to the other stencil over said arch-shaped support, said arch-shaped support holding said fabric in arched condition while said flock is applied thereto.

4. A multiple color flock printing machine, comprising at least two flock stencils, an arch-shaped support situated between two flock stencils, a flock applying device situated over said support and between said two flock stencils, an endless blanket extending adjacent to said flock stencils and over said arch-shaped support, said endless blanket extending adjacent to said flock stencils.

5. A multiple color flock printing machine, comprising at least two flock stencils, an arch-shaped support situated between two flock stencils, a flock applying device situated over said support and between said two flock stencils, an endless blanket extending adjacent to said flock stencils and over said arch-shaped support, means for moving said endless blanket, means for placing a fabric upon said blanket in front of one of said two stencils and for separating the fabric from the blanket after the latter has moved past the other one of said two stencils, and means for cleaning said blanket while the latter is out of contact with the fabric.

6. A multiple color flock printing machine, comprising at least two flock stencils, an arch-shaped support situated between two flock stencils, a
flock applying device situated over said support and between said two flock stencils, an endless blanket extending adjacent to said flock stencils and over said arch-shaped support, means for moving said endless blanket, means for placing a fabric upon said blanket in front of one of said two stencils and for separating the fabric from the blanket after the latter has moved all the way over said one of said two stencils, and automatically operable means for adjusting the position of said blanket while the latter is being moved.

7. A multiple color flock printing machine, comprising at least two flock stencils, each of said flock stencils having a perforated surface adapted to come in contact with a fabric, and means for applying flock paste through the perforations of said surface upon said fabric; a flock applying device situated between said two stencils, and means for moving a fabric from one of said stencils to said flock applying device and then to the other stencil, an arch shaped carrier surface extending between said flock stencils substantially without gap so that the fabric will immediately pass on to or off of said arch shaped carrier surface when leaving or entering said flock applying device, and said surface of the last-mentioned stencil which is adapted to come in contact with said fabric, having cavities corresponding to the perforations of the first-mentioned stencil and adapted to over the flocked portions of said fabric, said moving means comprising a continuous blanket and means for maintaining said blanket centered in respect to said flock stencils.

8. A multiple color flock printing machine, comprising two comparatively large rollers, an arch-shaped support extending from one of said rollers to the other roller, separate flock stencils situated adjacent to each of said rollers at opposite ends of said arch-shaped support, a flock applying device situated between the flock stencils and over said arch-shaped support, endless blanket passing over said rollers and said arch-shaped support, means for rotating said rollers, and another roller situated adjacent to one of the first-mentioned rollers, a run of fabric being adapted to pass over the last-mentioned roller and to be moved along with said blanket from the other flock stencil to the other flock stencil.

9. A multiple color flock printing machine, comprising two flock stencils, a flock applying device situated between said flock stencils, another flock applying device situated on the opposite side of one of said flock stencils, an arch-shaped support situated between said flock stencils and adjacent to the first-mentioned flock applying device, a movable endless blanket passing over said arch-shaped support automatically operable means for adjusting the position of said blanket, and separate means for adjusting the position of said flock stencils.

10. A multiple color flock printing machine, comprising a frame, two rollers rotatably supported by said frame, an arch-shaped support carried by said frame and extending from one of said rollers to the other roller, two flock stencils situated at opposite ends of said arch-shaped support, separate means connected with each of said flock stencils and said frame for adjusting the position of the flock stencils in the vertical direction and in at least two horizontal directions, a flock applying device situated adjacent to said arch-shaped support and between said flock stencils, a printing roller situated adjacent to one of the first-mentioned rollers, and carried by said frame, one of said flock stencils being situated between said flock applying device and said printing roller, an endless blanket passing over the first-mentioned rollers and said arch-shaped support, whereby said fabric is brought in contact with said flock stencil and said flock stencil is moved past said flock-applying device.

11. A multiple color flock printing machine, comprising a frame, two rollers rotatably supported by said frame, an arch-shaped support carried by said frame and extending from one of said rollers to the other roller, two flock stencils situated at opposite ends of said arch-shaped support adjacent to said rollers, separate means connected with each of said flock stencils and said frame for adjusting the position of the flock stencils in the vertical direction and in at least two horizontal directions, a flock applying device situated adjacent to said arch-shaped support and between said flock stencils, a printing roller situated adjacent to one of the first-mentioned rollers, and carried by said frame, one of said flock stencils being situated between said flock applying device and said printing roller, an endless blanket passing over the first-mentioned rollers and said arch-shaped support, whereby said fabric is brought in contact with said flock stencil and said flock stencil is moved past said flock-applying device.
printing rollers situated adjacent to one of the first-mentioned rollers, another roller situated adjacent to the same one of the first-mentioned rollers, said printing rollers being situated between the last-mentioned roller and a flock stencil, which is situated between said flock applying device and said printing rollers, means connected with said frame for pressing the last-mentioned roller against the adjacent one of the first-mentioned rollers, means for rotating the first-mentioned rollers, a gear drive transmitting the rotation of the first-mentioned roller to said printing rollers, and an endless blanket passing over the first-mentioned rollers, said arch-shaped support and adapted to be driven by the first-mentioned rollers, a fabric passing over the last-mentioned roller being moved along with said blanket and brought in contact with said printing rollers and the first-mentioned flock stencil, said fabric being then subjected to the operation of said flock applying device and brought in contact with the other one of said flock stencils.

14. A multiple color flock printing machine, comprising two flock stencils, an arch-shaped support situated between the two flock stencils, an endless blanket extending adjacent to said flock stencils and over said arch-shaped support, a roller, said blanket passing over said roller, a pivot, means rotatably supporting said roller intermediate its ends, upon said pivot, electrically operable means connected with the last-mentioned means and adapted to turn said roller around said pivot in opposite directions, two members situated on opposite sides of said blanket and electrically connected with the last-mentioned means, said members being adapted, when brought in contact with said blanket, to actuate the last-mentioned means, the contact of said blanket with one of said members causing the last-mentioned means to turn said roller in one direction, while the contact of said blanket with the other one of said members causes the electric motor to turn said pulley in the opposite direction, means for moving said endless blanket, means for placing a fabric upon said blanket in front of one of said two stencils and for separating the fabric from the blanket after the latter has moved past the other one of said two stencils, said stencils being adapted to apply flock paste upon said fabric, the flock paste penetrating through the fabric and gluing the fabric to the blanket while they are moved over the arch-shaped support, and a device adapted to apply flock paste upon said fabric, said fabric which are covered with the flock paste.

15. A multiple color flock printing machine, comprising two rollers, two gear wheels, each gear wheel being connected with a separate roller, two flock stencils, each flock stencil being situated adjacent to a separate one of said rollers, two toothed crowns, each toothed crown being connected with a separate one of said flock stencils, a rotatable driving shaft, a gear drive transmitting the rotation of said driving shaft to one of the first-mentioned gear wheels, gear wheels transmitting the rotation of the last-mentioned gear wheels to the other one of said toothed crowns, another gear drive transmitting the rotation of said driving shaft to the other one of the first-mentioned gear wheels, other gear wheels transmitting the rotation of said other one of the first-mentioned gear wheels to the other one of said toothed crowns, two printing rollers situated adjacent to one of the first-mentioned rollers, another roller situated adjacent to the same one of the first-mentioned rollers, said printing rollers being situated between the last-mentioned roller and that flock stencil which is situated adjacent to the same one of the first-mentioned rollers, means for pressing the last-mentioned roller against the adjacent first-mentioned roller, a gear drive transmitting the rotation of the last-mentioned roller to said printing rollers, an arch-shaped support situated between the two flock stencils, a flock applying device situated over said arch-shaped support and between the two flock stencils, and an endless blanket passing over the first-mentioned rollers and said arch-shaped support and adapted to be driven by the first-mentioned rollers.

17. A multiple color flock printing machine, comprising a frame, two rollers rotatably supported by said frame, an arch-shaped support carried by said frame and extending from one of said rollers to the other roller, two flock stencils situated at opposite ends of said arch-shaped support, separate bearing means for each of said flock stencils, separate means connected with each of said bearing means for adjusting the same in the vertical direction, means for adjusting the last-mentioned means in a horizontal direction, means connected with said frame for adjusting the last-mentioned means in a horizontal direction perpendicular to the first-mentioned horizontal direction, a flock applying device situated adjacent to said arch-shaped support, an endless blanket passing over said rollers and said arch-shaped support, and means connected with said rollers for driving the same.

18. A multiple color flock printing machine, comprising a frame, two rollers rotatably supported by said frame, an arch-shaped support carried by said frame and extending from one of said rollers to the other roller, two flock stencils situated at opposite ends of said arch-shaped support, two members situated on opposite sides of said frame and electrically connected with said electric motor, said members being adapted, when brought in contact with said frame, to actuate the last-mentioned means, the contact of said blanket with one of said members, causing the electric motor to turn said pulley in one direction, while the contact of said blanket with the other one of said members causes the electric motor to turn said pulley in the opposite direction, means for moving said endless blanket, means for placing a fabric upon said blanket in front of one of said two stencils and for separating the fabric from the blanket after the latter has moved past the other one of said two stencils, said stencils being adapted to apply flock paste upon said fabric, the flock paste penetrating through the fabric and gluing the fabric to the blanket while they are moved over the arch-shaped support, and a device adapted to apply flock paste upon said fabric, said fabric which are covered with the flock paste.
support, rings firmly connected with said flock stencils, cylindrical bearing members supporting said rings, threaded vertical shafts carrying said bearing members, means for adjusting said vertical shafts, means connected with said frame and with the last-mentioned means for adjusting the same in two horizontal directions which are perpendicular to each other, a flock applying device situated adjacent to said arch-shaped support, an endless blanket passing over said rollers and said arch-shaped support, and means connected with said rollers for driving the same.

19. A multiple color flock printing machine, comprising a frame, two rollers rotatably supported by said frame, an arch-shaped support carried by said frame and extending from one of said rollers to the other roller, two flock stencils situated at opposite ends of said arch-shaped support, adjustable supporting means connected with each of said flock stencils and said frame, an endless blanket passing over said rollers and said arch-shaped support, means for rotating said arch-shaped support and said blanked, said blanked and said arch-shaped support being adapted to be brought in contact with the said flock stencils, a flock applying device situated adjacent to said arch-shaped support and between said flock stencils, two rotatable rollers carried by said frame, said blanket passing over the last-mentioned rollers after it has been separated from said blanket, the surfaces of said rollers which come in contact with said blanket being adapted to be cleaned by a cleansing liquid, and a scraper scraper situated adjacent to each of the last-mentioned rollers and having an edge adapted to be maintained in contact with said blanket.

20. A method of securing registry between separated parts of contacting printing rollers in connection with the printing of textile fabrics, which comprises carrying the fabric between the pairs of the contacting printing rollers over a fixed arched surface which arched surface will extend between the printing rollers substantially up to the points of contact of said pairs and will take up and bow the fabric immediately it has passed out of one of the pairs of the printing rollers and will carry it until it has passed into the other pair of the printing rollers.

21. A multiple printing machine for textile fabrics comprising a rotating carrier roller, a printing roller to print a fabric upon said carrier roller, a second carrier roller spaced substantially from the first carrier roller, a printing roller to print upon the fabric upon said second carrier roller and an arch to carry and bow the fabric from one printing roller to the next printing roller, said arch being positioned substantially without gap between said printing rollers and extending into the gap between the contacting printing and carrier rollers up to the point of contact of said pairs and as soon as it passes off the first carrier roller and to carry it until it passes directly on to the second carrier roller.

22. In a textile printing machine of the type including a carrier roller, a movable blanket to carry the fabric to be printed passing over said carrier roller, a bearing structure for said carrier roller, a pivotal mount for said bearing structure, means to swing said bearing structure upon said pivotal mount, guide means positioned on the sides of said blankets, and means actuated by said pressure on said guide means by said blanket to actuate said swinging means.

23. In a textile printing machine of the type including a carrier roller, a movable blanket to carry the fabric to be printed passing over said carrier roller, a bearing structure for said carrier roller, a pivotal mount for said bearing structure and means to swing said bearing structure upon said pivot controlled by the position of said blanket upon said carrier roller, said last-mentioned means including contact members at the side of the blanket positioned slightly away from the blanket when the blanket is in central position but contacting with the blanket when said blanket is off center, a motor, said contact members upon contact with said blanket actuating said motor and an actuating connection from said motor to said pivot to cause swinging movement of the bearing structure upon the pivot to again center the blanket.

24. A textile fabric printing machine, comprising flock stencils, an arch shaped support, an endless moving blanket extending adjacent to said flock stencils and over said arch shaped support, a roller, a pivot, means rotatably supporting said roller intermediate its ends upon said pivot, turning means connected with the last-mentioned means and adapted to turn said pivot in opposite directions, two members situated on opposite sides of said blanket and connected with the last-mentioned means, actuating means operated by said members to actuate the turning means, the contact of said blanket with one of said members causing the turning means to turn said roller in one direction, while the contact of said blanket with the other one of said members causes the turning means to turn said roller in the opposite direction and means for moving said endless blanket.

25. A textile fabric printing machine comprising an endless moving blanket, a roller, said blanket passing over said roller, a support rotatably supporting said roller, a pivot, said support being rotatably mounted upon said pivot, means controlling the lateral position of said blanket, a motor actuated by said guide means when said blanket moves off its proper position and means to cause said roller to move to said roller on said pivot and thereby move said blanket laterally.

26. A multiple color flock printing machine, comprising two carrier rollers, two flock cylindrical stencils, each flock stencil being situated to roll on a separate one of said carrier rollers, a rotatable driving shaft, a drive transmitting the rotation of said driving shaft to said carrier rollers, printing rollers situated adjacent to and before at least one of said stencils and contacting with one of the first-mentioned rollers, an arch-shaped support situated between the two flock stencils and said first-mentioned rollers, a flock applying device situated over said arch-shaped support and between the two flock stencils, and an endless blanket passing over the first mentioned carrier rollers and said arch-shaped support and adapted to be driven by the first-mentioned rollers.

27. A textile fabric flock printing machine, comprising a frame, two carrier rollers rotatably supported by said frame, an arch-shaped support carried by said frame and extending from one of said rollers to the other roller, two flock stencil cylinders situated at opposite ends of said arch-shaped support contacting said carrier rollers.
separate bearing means for each of said rollers and cylinders, a flock applying device situated adjacent to and above said arch-shaped support between said carrier rollers, an endless blanket passing over said rollers and said arch-shaped support, and means connected with said rollers for driving the same, said support extending into the recess between said contacting stencil and carrier rollers up to substantially the point of contact.

29. A flock printing machine, comprising a frame, two rollers rotatably supported by said frame, an arch-shaped support carried by said frame and extending from one of said rollers to the other roller, two flock stencils situated at opposite ends of said arch-shaped support, an endless blanket passing over said rollers and said arch-shaped support, means for rotating said rollers to drive said blanket, said blanket moving along with a fabric adapted to be placed upon said blanket in front of one of said two stencils and to be separated from the blanket after the latter has passed the other one of said two stencils and a flock applying device situated adjacent to said arch-shaped support and between said flock stencils.

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