

May 13, 1941.

J. A. McCANN

2,242,182

MACHINE FOR FLOCK PRINTING

Filed July 23, 1938

2 Sheets-Sheet 1

FIG. 1.

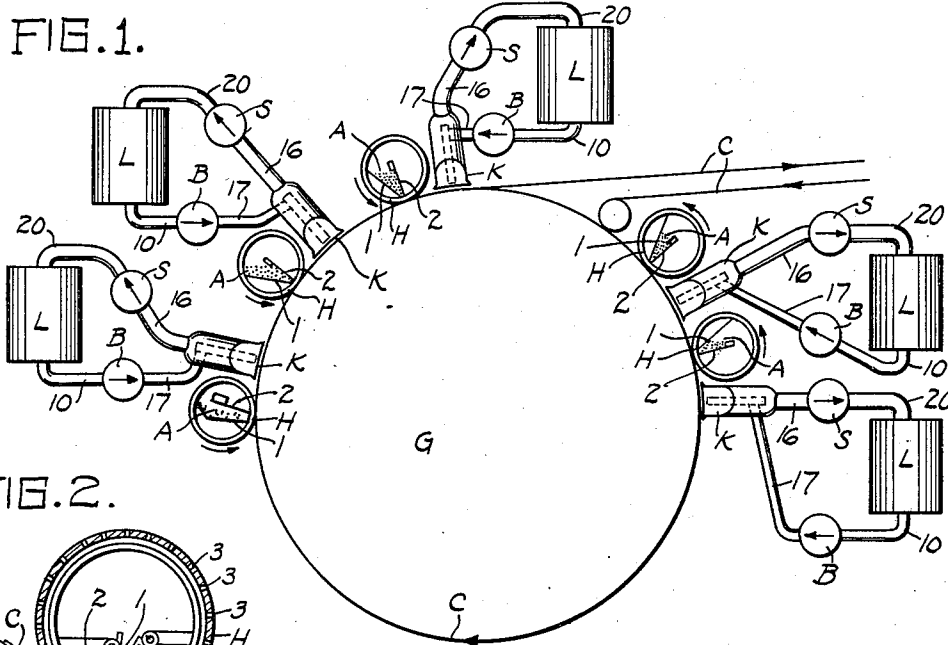


FIG. 2.

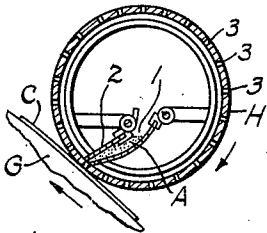


FIG. 3.

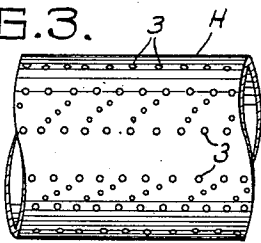


FIG. 4.

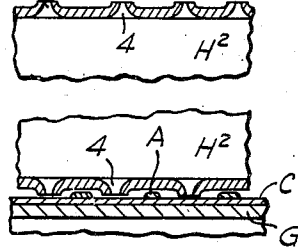


FIG. 5.

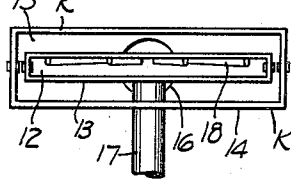


FIG. 6.

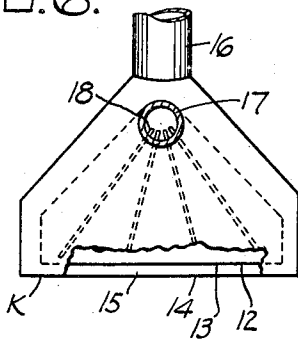
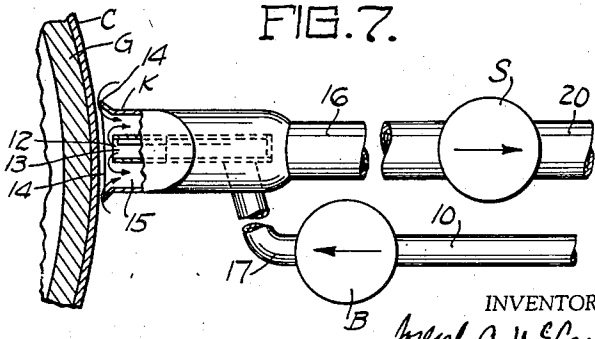


FIG. 7.



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2 Sheets-Sheet 2

FIG. 8.

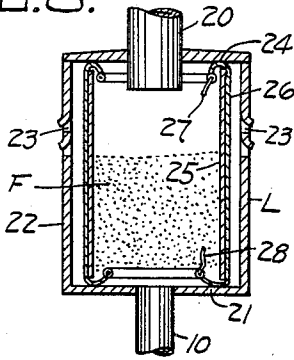


FIG. 9.

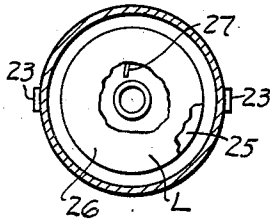


FIG. 10.

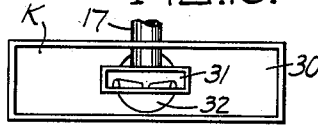


FIG. 11.

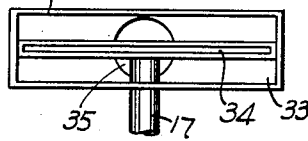


FIG. 12.

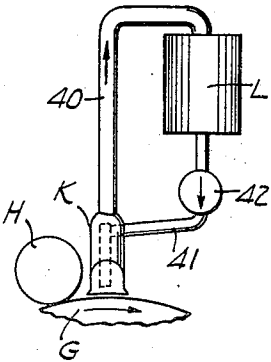


FIG. 13.

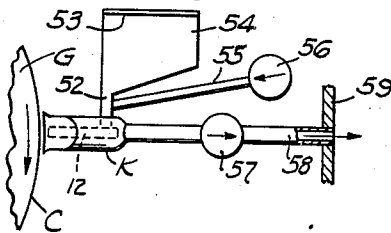
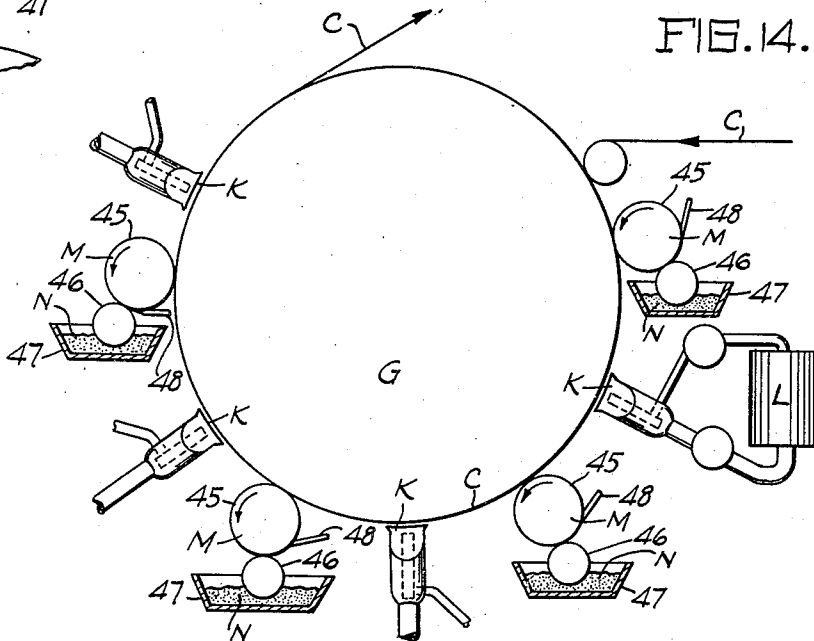


FIG. 14.



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UNITED STATES PATENT OFFICE

2,242,182

MACHINE FOR FLOCK PRINTING

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Application July 23, 1938, Serial No. 220,935

10 Claims. (Cl. 41-1)

This invention relates to a machine for and a process of flock printing. The process of flock printing on cloth as now carried on includes means such as a roller, rollers, or an endless conveyor belt which carries the web of cloth along past a roll, which I will call a pattern roll, which deposits on one face of the cloth in the desired pattern an amount of what is known in the trade as "paint" or "paste," which usually is a colored adhesive, after which the flock is dropped on the cloth while the adhesive is still soft. The flock sticks to the cloth only where the pattern is formed by the adhesive.

The flock is usually made up of finely-divided fibres of cotton, wool, silk, rayon, or other similar material and is quite expensive. To get the right color effect, the paint or adhesive is usually of the same color as the flock which is to stick to it. The flock of each color is scattered everywhere and permeates everything, even the large drying rooms where the finished cloth is kept until the adhesive has hardened with the flock.

A certain amount of flock adheres lightly to parts of the cloth outside of the pattern made by the adhesive, and this must also be removed before the cloth is salable. After a run of one color, all parts of the machine and the drying room must be thoroughly cleaned before another color is used on the same or on a different cloth.

The main purpose of this invention is to so blow the light fluffy flock onto the cloth, on which the desired pattern has been made by an adhesive, in such a way that only the flock which strikes the adhesive will remain on the cloth while all of the rest will be sucked away by the special type of blowing and sucking mouth leaving the cloth and surrounding air entirely free from flock.

Multi-colored flock printing on a single machine with a single process or run is very desirable but the difficulty has been to control the application of the flock so that the process of putting on the second color would not interfere with the first color by squeezing the flock and adhesive which had been applied and causing it to spread and run by pressure. It is necessary to get rid of the flock outside of the first pattern which may cling to the cloth outside of the pattern and to quickly dry or harden the adhesive between the application of the first color and the other colors.

The main feature of my invention is the use of a combined blowing and sucking mouthpiece in a position directly after a pattern roll which deposits an adhesive in the desired pattern on the cloth, said mouthpiece having a blowing mouth through which the flock is blown on the cloth, such mouth preferably being between two sucking mouths or inside a sucking mouth or means. Such sucking mouths or means pick up

all the flock which is not caught by the adhesive, leaving only what is firmly attached to the adhesive. Such sucking means or part of the mouthpiece, by creating partial vacuum and inducing a powerful current of air, help to dry and harden the adhesive so that it will not spread while passing the next assembly.

In addition to the suction drying or hardening means, with certain kinds of slow drying adhesives, I prefer to use a pattern roll which is a tube or cylinder of thin metal through which holes are punched to form the pattern. By well-known means, the paint, paste or adhesive is caused to pass through these holes to the outside of the roll and is then deposited on the cloth. After the first roll, I prefer to make the holes for the second and subsequent patterns in the form of nipples of a sufficient height to keep the body of the roll above the flock deposited by the preceding assembly or assemblies.

However, I can also use rolls such as are used in calico and other printing wherein the pattern is engraved or cut into the surface. With such a roll, I find it desirable to use a quick drying adhesive, such as certain forms of lacquer. However, if the suction air current is sufficiently strong, or if it is heated, or if the cloth is subjected to a heated air current or to a vacuum immediately after it has passed the mouthpiece, almost any kind of an adhesive can be used.

With my machine and process, I can flock print without waste and with a clean, well-defined pattern of a single color or patterns of different colors, running the cloth through the machine only once. The machine and process are adapted for single color flock printing or multiple color flock printing.

The drawings are to a great extent diagrammatic to show the arrangement of parts.

Fig. 1 is a diagrammatic side elevation showing a preferred arrangement of my flock applying assemblies.

Fig. 2 is a sectional view in a plane at right angles to the axis of a pattern roll, the thickness of the stock being exaggerated.

Fig. 3 is an elevation with a roll such as shown in Fig. 2 and Fig. 4 is a fragmentary transverse section of a modified pattern roll.

Fig. 5 is a view of the mouths of a preferred type of mouthpiece and Fig. 6 is a view from the outside of such a mouthpiece with parts broken away.

Fig. 7 is an elevation showing part of the cloth carrying roll, with the cloth, the parts being exaggerated, associated with a mouthpiece as viewed from the side of the mouthpiece or the end of the carrying roll.

Fig. 8 is a vertical sectional view and Fig. 9 a horizontal view of a preferred type of closed flock container.

Figs. 10 and 11 are views similar to Fig. 5 showing modified forms of mouthpieces.

Fig. 12 is a diagrammatic side elevation showing a modified form of flock applying assembly.

Fig. 13 shows another modified form of flock applying assembly.

Fig. 14 is a view similar to Fig. 1 showing diagrammatically the arrangement of the parts where engraved rolls of the calico printing type are used.

In the drawings, C represents a web of cloth and G represents a carrying main cylinder which is revolved by any suitable means, carrying the cloth with it.

Around part of this main cylinder, preferably the top, I arrange a plurality of what I will call flock applying assemblies. Each assembly includes a pattern roll, such as H, which, as shown in Fig. 2, is provided on the inside with a paste container 1 and a doctor blade 2, both of well-known construction, by which an adhesive A is conveyed to the cloth through holes 3 in roll H. Holes 3 are arranged so as to form the desired flock pattern.

The cloth C and surface speeds of cylinder G and roll H are the same. On the roll H of the first assembly, the holes 3 may be flat, but on the later rolls, they should pass through nipples, such as shown at 4 in Fig. 4 in a roll H².

Another part of each assembly is a mouthpiece K which may ordinarily extend the entire width of the cloth C or if the pattern is to be only on part of the width, it may extend as wide as necessary or it may extend beyond the edges of the cloth.

The edges 14 of mouthpiece K form the lips of a sucking mouth 15 and are close to the cloth C and to the surface of cylinder G, the distance being perhaps one-fourth of an inch.

As shown, at the end opposite the edges 14 is a suction pipe 16 which passes to a suction fan S and from this is a pipe 20 which preferably enters the top of a closed foraminous flock container L. A cage 25 in this container L is preferably covered with canvas 26 or some similar foraminous material which allows the air to pass out but prevents the flock from following it. As shown, it also has suitable air vents 23, 23.

Inside of mouthpiece K spaced from the front and back of sucking mouth 15 is the blowing mouth 12 which, as shown, extends almost the entire width of the mouthpiece K with its edges or lips 13 inside the edges 14 and spaced a greater distance than edges 14 from the cloth C and cylinder G. This space might be one-half inch.

This mouth 12 is closed, except at the edges 13, and into it enters the blowing pipe 17 which connects it with the fan or blower B which also connects by means of a pipe 10 with the bottom of flock container L.

The suction fan S may be much more powerful than the blowing fan B so that the air will rush in, as shown by the arrows, on all sides of the opening at the edges 13 and an excess of air will also be carried in from the outside past the edges 14. The suction tends to create a vacuum.

To distribute the air from the blowing mouth 12, I may use diverging ribs 18.

I find a practical spacing for a carrying roll seven feet in diameter is to have the edges 14 about one-fourth of an inch and the edges 13 one-half inch from the curved surface of the roll and from the cloth and I find a desirable proportion is to have the relative size of mouth 12 about one-fourth of mouth 15 or with the effective sizes 1 to 3. To prevent any scattering of

the flock and to rarefy the air between the edges 14 at the mouth opening, I prefer to make the suction fan S much more powerful or to drive it at a much higher rate of speed than the blower B. The result of this is that the air coming out of mouth 12 and coming in around the edges of mouth 15 will create something of a vacuum as well as a terrific current, both of which will help to quickly dry the adhesive A.

In Figs. 5, 6 and 7, I show a sucking mouth which extends not only at the front and back of the blowing mouth but also around the ends, while in Fig. 10 I show a sucking mouth 30 which is very much larger than the blowing mouth 31 and is connected with the suction pipe 32, and in Fig. 11 I show a blowing mouth 34 which is the same length as the sucking mouth 33. 35 represents a suction pipe.

A preferred form of flock container is shown at L. This includes a base 21 into which pipe 10 enters, a removable top 24 into which the pipe 20 enters, a tubular body 22 with vents 23, 23 and inside of this a tubular cage 25 which extends from the top 24 to the bottom 21 but is open at the ends and a foraminous bag 26 which covers the wall of cage 25 and is pulled in at the top by a draw string 27 and at the bottom by a draw string 28. With this construction, the flock F is sucked down from the bottom through pipe 10 and on returning, is discharged through pipe 20, the excess of air passing out through the bag 26 and vents 23.

A modification of the flock delivery assembly is shown in Fig. 12 where roll H and mouth K are the same as is also the flock container L, but there is only one fan 42 which combines the functions of a blowing and a sucking fan. This fan sucks flock from the bottom of container L, blows it out through pipe 41 and the delivery mouth of mouthpiece K and sucks it back through container L and pipe 40. By suitably proportioning the pipes and mouths, as for instance, as shown in Fig. 10, this construction is effective in some cases.

Such an arrangement can often be used for flock printing in a single color, although with any of the flock printing assemblies, described herein, a single color can be applied to the cloth.

In Fig. 13, I show another arrangement for operating the mouthpiece K. In this construction, there is a hopper 54 preferably with a closed cover 53 and a sloping bottom which is filled with the flock. The flock trickles down through the tube 52 until it is caught by a blast of air through a tube 55 from the blower 56 and carried through the inner mouth 12 so as to impinge on the cloth C which has been treated with the adhesive.

Another blower 57 sucks the air from around mouth 12 and carries it through a pipe 58 which may pass through a wall 59 of a suitable receiving bin of any type.

Instead of using a perforated roll such as H and such as are now commonly used in flock printing, I can use a roll such as M of the type used in calico printing but instead of the usual dye, used in calico printing, I prefer to use a quick drying lacquer N. This lacquer is carried in a trough 47 from which it is taken by roll 46 and deposited on the curved surface 45 of roll M on which the desired pattern is engraved or cut in.

The usual doctor blade 48 scrapes off the excess lacquer, returning it to trough 47, and only what is in the recesses is carried along and left on cloth C. The drying qualities of such a lacquer

N can be so regulated that it will retain its adhesiveness until it has reached the mouthpiece K but the air current which is sucked in and the attendant rarefaction will cause it to be enough dried or hardened so that, after it passes the first mouthpiece, it will not smudge, spread or cause any trouble when passing the next unit.

Hot air can be blow through the blower mouths to assist in the quick drying or hardening of the lacquer or other adhesive for the flock.

Mouthpieces of a suitable size can be located between the engraved rolls of a regular calico printing machine and the regular color troughs can be filled with a lacquer of the right consistency.

I claim:

1. A combined blowing and sucking mouthpiece for flock printing which includes a blowing mouth inside a sucking mouth, together with means for blowing flock through the blowing mouth and for sucking part of such flock through the sucking mouth.

2. A combined blowing and sucking mouthpiece for flock printing which includes a blowing mouth inside a sucking mouth, together with means for blowing flock through the blowing mouth and other means for sucking part of such flock through the sucking mouth.

3. The combination in a multi-colored flock printing machine; of a revoluble cloth carrying main cylinder; with a plurality of flock applying assemblies, each assembly including a revoluble pattern roll with a surface in contact with the cloth on the main cylinder and having the same surface speed, means for applying adhesive to the pattern of the pattern roll, and a combined blowing and sucking mouthpiece positioned proximate to and parallel with the delivery side of said pattern roll, all parts of the edge of the mouthpiece being close to the main cylinder, said mouthpiece including a blowing mouth inside a sucking mouth; a foraminous closed flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and other means to suck the air and surplus flock through the sucking mouth from around the blowing mouth and to deliver it into said container.

4. The combination in a multi-colored flock printing machine; of a revoluble cloth carrying main cylinder; with a plurality of flock applying assemblies, each assembly including a revoluble pattern roll with a surface in contact with the cloth on the main cylinder and having the same surface speed, means for applying adhesive to the pattern of the pattern roll, and a combined blowing and sucking mouthpiece positioned proximate to and parallel with the delivery side of said pattern roll, all parts of the edge of the mouthpiece being close to the main cylinder, said mouthpiece including a blowing mouth inside a sucking mouth; a foraminous closed flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and to suck the air and surplus flock through the sucking mouth from around the blowing mouth and to deliver it into said container.

5. The combination in a multi-colored flock printing machine; of a revoluble cloth carrying main cylinder; with a plurality of flock applying assemblies, each assembly including a revoluble pattern roll with a surface in contact with the cloth on the main cylinder, means for applying adhesive to the pattern of the pattern roll, and a combined blowing and sucking mouthpiece po-

sitioned proximate to the delivery side of said pattern roll, the edge of the mouthpiece being close to the main cylinder, said mouthpiece including a blowing mouth inside a sucking mouth; a flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and means to suck the air and surplus flock from the edges of the blowing mouth and to deliver it into a receiving member.

6. The combination in a flock printing machine; of a revoluble cloth carrying main cylinder; with a flock applying assembly including a revoluble pattern roll with a surface in contact with the cloth on the main cylinder, means for applying adhesive to the pattern of the pattern roll, and a combined blowing and sucking mouthpiece positioned proximate to the delivery side of said pattern roll, the edge of the mouthpiece being close to the main cylinder, said mouthpiece including a blowing mouth inside a sucking mouth; a flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and means to suck the air and surplus flock from the edges of the blowing mouth and to deliver it into a receiving member.

7. The combination in a flock printing machine for continuously printing a web of material; of means to continuously carry along the web; with means to apply adhesive to the material in successive patterns; a combined blowing and sucking mouthpiece positioned proximate the means for applying the adhesive, the edge of the mouthpiece being close to the web of material on the carrying means, said mouthpiece including a blowing mouth inside a sucking mouth; a flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and means to suck the air and surplus flock from the edges of the blowing mouth and to deliver it into a receiving member.

8. The combination in a flock printing machine; of a continuous cloth carrying means; with means to continuously apply adhesive in patterns to the surface of the cloth; a combined blowing and sucking mouthpiece positioned proximate the adhesive on the cloth after it has been applied, the edge of the mouthpiece being close to the cloth, said mouthpiece including a blowing mouth proximate a sucking mouth; a flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and means to suck the air and surplus flock from some of the edges of the blowing mouth and to deliver it into a receiving member.

9. The combination in a flock printing machine; of a combined blowing and sucking mouthpiece including a blowing mouth proximate a sucking mouth; with a flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and means to suck the air and surplus flock from outside the blowing mouth and to deliver it into a receiving member.

10. For use in flock printing, the combination of a combined blowing and sucking mouthpiece including a blowing mouth proximate a sucking mouth; with a flock container and means to carry flock therefrom by a current of air to and through the blowing mouth; and means to suck the air and surplus flock from outside the blowing mouth and to deliver it into a receiving member.

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