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 [21] Appl. No. **864,731**
 [22] Filed **Oct. 8, 1969**
 [45] Patented **Nov. 30, 1971**
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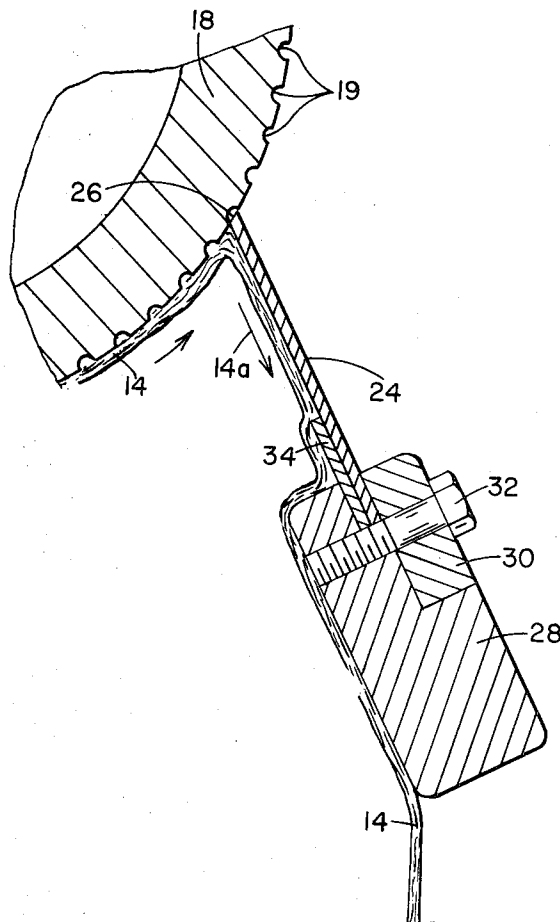
[54] **CATHODIC PROTECTION OF PRINTING APPARATUS**
6 Claims, 3 Drawing Figs.

[52] U.S. Cl..... **204/148,**
 101/157, 101/169
 [51] Int. Cl..... **B41f 9/10,**
 C23f 13/00
 [50] Field of Search..... 101/148,
 157, 169; 204/147, 148, 196, 197

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ABSTRACT: A rotary printing machine for fabrics which includes a color box containing a printing paste constituting a liquid electrolyte, a rotatable print roll having an engraved cylindrical outer printing surface, a rotatable brush roll in the color box for supplying to the printing surface an excess of printing paste as the print roll rotates, a steel doctor blade with a horizontally extending longitudinal edge positioned against the printing surface to remove the excess printing paste for gravity flow across one side of the blade in a direction perpendicular to its edge and a printing cylinder traversing and pressing a fabric web against the print roll printing surface following supplying of the printing paste thereto by the brush roll and after removal of the excess by the doctor blade. The doctor blade has a more electropositive strip of metal, such as magnesium, or aluminum, in electrical contact with the steel doctor blade spaced from the edge thereof and extending generally throughout the length thereof on said one side for flow of the excess printing paste thereacross in electrical contact therewith, thereby providing a sacrificial anode to prevent electrolytic corrosion and pitting of the doctor blade edge.



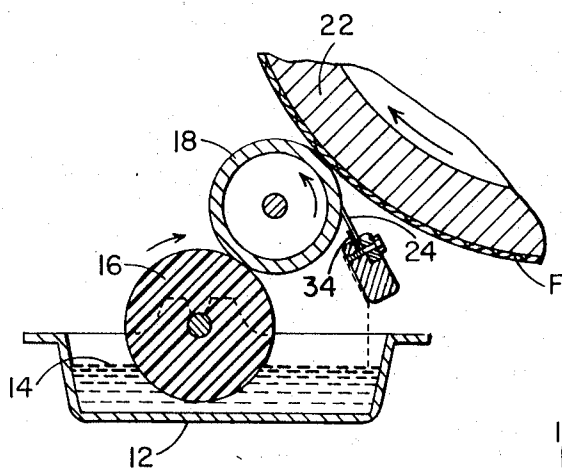


FIG. 1

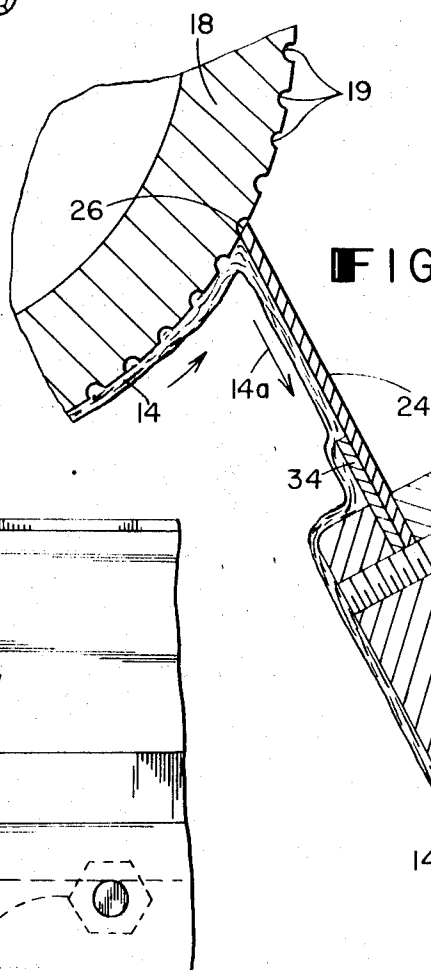


FIG. 2

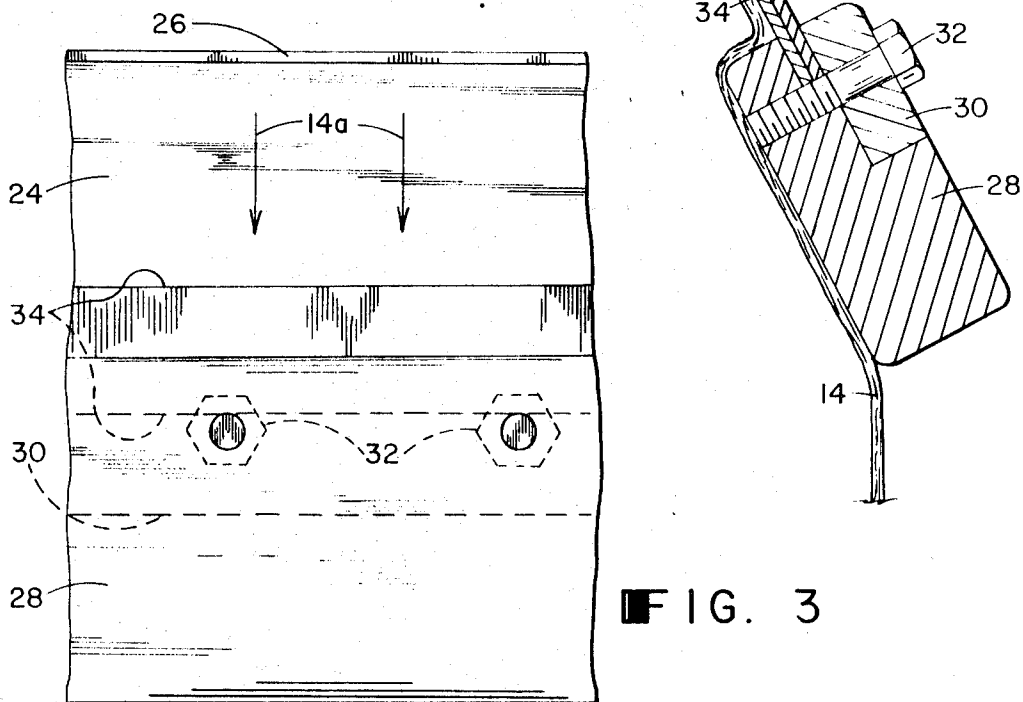


FIG. 3

CATHODIC PROTECTION OF PRINTING APPARATUS

This invention relates to rotary printing machines and more particularly to novel apparatus and methods for preventing electrolytic corrosion and pitting of the edges of doctor blades when used with printing rolls in such equipment.

As set forth in my earlier U.S. Pat. No. 3,166,487, in known rotary printing machines for textile fabrics, and the like there is included a reservoir called a color box, containing a printing paste constituting a liquid electrolyte, which is spread upon a rotatable print roll having an engraved cylindrical outer printing surface by a rotatable brush roll in the color box. A steel or other metallic doctor blade with a horizontally extending longitudinal edge is positioned against the printing surface to remove excess printing paste from the unengraved portions of the print roll. A printing cylinder is also provided for traversing and pressing a fabric web against the print roll printing surface following supplying of said paste thereto by said brush roll and after removal of the excess by said doctor blade, with enough pressure between the print roll and printing cylinder to transfer or print the paste from the engraved depressions to the moving fabric. If the doctor blade does not remove all the unwanted excess printing paste from the surface of the engraved print roll, streaks will be left on the roll which will appear as undesirable stripes on the fabric when the printing cylinder applies the fabric against the print roll. Any cracks, nicks or other unevenness in the edge of the doctor blade must therefore be avoided or unsalable streaked printed fabric will be produced. But, unfortunately, it has been long known that deleterious pitting and corrosion of the edge of the doctor blade frequently appeared after operation of such roller printing equipment for a relatively short period of time.

As a result of the development work leading to the inventions of my U.S. Pat. No. 3,166,487, it was discovered that such corrosion and pitting of the edge of the doctor blade is largely due to the electrolytic action occurring in a voltaic cell which includes the usual steel doctor blade as the anode; the printing paste as the liquid electrolyte and the color box and print roll in contact with the paste as the cathode of the cell. The inventions of that patent approached the solution to the problem by adding an electrode to the color box and applying a small direct current thereto which transferred the corrosive etching or pitting action to the interposed electrode.

It is the major object of the present invention to solve the corrosive etching and pitting problems of doctor blades in rotary printing machines in a much simplified yet even more effective manner, and at the same time eliminate the inconvenience of having to utilize supplemental direct current for such control.

The above and further objects of the invention are accomplished by mounting on the doctor blade in electrical contact with it and with the printing paste flowing across it a strip of metal more electropositive than that of the doctor blade. Such strip is preferably spaced from the doctor blade edge and extends generally throughout the length thereof. It may be of aluminum or magnesium to act as a sacrificial anode for the steel doctor blade to prevent electrolytic corrosion and pitting of the doctor blade edge.

Other objects and features of the invention will be apparent from the following description of a preferred embodiment of the invention, together with the accompanying drawings, wherein:

FIG. 1 is a vertical section through the active printing parts of a roller printing machine showing somewhat diagrammatically one form of the present invention applied thereto;

FIG. 2 is an enlarged sectional view of the doctor blade portion of FIG. 1, and

FIG. 3 is an enlarged partial elevational view of the doctor blade portion of FIG. 2. In the rotary printing machine shown in the drawings, there is included a color box 12 which contains the printing paste 14 constituting a liquid electrolyte.

A rotatable fiber or nylon brush roll 16 dips into the reservoir of printing paste 14 in said color box and upon rotation carries the paste and spreads onto the engraved cylindrical

outer printing surface of rotatable print roll 18 an excess of said paste as said print roll rotates. Print roll 18 has on its outer surface a repetitive design in the form of depressions 19 for carrying the printing paste to be applied to the fabric F. It is from the depressions 19 on this roll that the paste is printing or applied against the fabric F, carried by the traversing printing machine cylinder 22 past the print roll to transfer or "set" the engraved design on the fabric.

The printing paste 14 being supplied in substantial excess to the surface of print roll 18, there is provided a doctor blade 24, generally of steel, having a horizontally extending longitudinal edge 26 positioned against the surface of the print roll 18 in advance of the place where the roll reaches the fabric, so that the excess printing paste 14 is removed for gravity flow across one side of the doctor blade, and in a direction perpendicular to said edge as shown by arrows 14a. The excess printing paste 14 is thus removed from the print roll 18 and is returned to color box 12 by gravity flow. The doctor blade 24 is firmly but adjustably secured as by a mounting bar 28 on a suitable portion of the frame of the machine so that the engagement of the edge of the blade with the surface of the print roll may be carefully adjusted and maintained. A clamping bar 30, held in place as by a series of bolts 32 assists in securing the blade to the mounting bar in proper position.

According to the present invention, there is provided, clamped between clamping bar 30 and mounting bar 28 and extending thereabove, a novel strip 34 of a metal more electropositive than the metal of doctor blade 24. As so clamped, strip 34 is in electrical contact with the doctor blade 24, spaced below the edge 26 thereof and extending generally throughout the length of the doctor blade on the side thereof across which the excess printing paste flows, so that strip 34 is in electrical contact with the excess printing paste flowing downwardly across it and mounting bar 28 for return to color box 12. Metals such as aluminum and magnesium have been utilized as strip 34 and have been highly effective in eliminating electrolytic corrosion and pitting of the doctor blade.

In carrying out the invention, it has been found to be important that the strip 34 extend generally along the entire length of the doctor blade, which is commonly of the order of 40 to 60 inches in fabric-printing machines, and that sufficient excess printing paste be applied to print roll 18 so that doctor blade 24 and strip 34 is bathed therein throughout their entire length. Of course, the doctor blades surface must slope downwardly for gravity flow of printing paste 14 thereacross the strip 34 must be positioned on the leading side thereof on which such flow occurs. Under these circumstances, the invention provides a galvanic cell which includes the doctor blade and the strip as the dissimilar metal electrodes and the excess of printing paste as the liquid electrolyte and provides a sacrificial anode in the metal strip to prevent electrolytic corrosion and pitting of the edge of the doctor blade.

Although the metal strip shown and described herein is in the form of a separate strip clamped beside the steel doctor blade, it may as well take other forms, such as metal sprayed or plated onto the doctor blades, for example, and metals other than aluminum, more electropositive than the metal of the doctor blade may be used as well.

What is claimed is:

1. In a rotary printing machine for fabrics which includes a color box containing a printing paste constituting a liquid electrolyte
- a rotatable print roll having an engraved cylindrical outer printing surface.
- a rotatable brush roll in said color box for supplying to said printing surface an excess of said paste as said print roll rotates
- a doctor blade with a horizontally extending longitudinal edge positioned against said surface to remove said excess for gravity flow across one side of said blade in a direction perpendicular to said edge and
- a printing cylinder traversing and pressing a fabric web against said print roll printing surface following supplying

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of said paste thereto by said brush roll and after removal
of said excess by said doctor blade
that improvement which consists of
a strip of metal more electropositive than said doctor blade
in electrical contact with said blade spaced from the edge 5
thereof and extending generally throughout the length
thereof on said one side for flow of said excess printing
paste thereacross in electrical contact therewith, thereby
providing a sacrificial anode to prevent electrolytic corro-
sion and pitting of said doctor blade edge. 10
2. In a rotary printing machine as claimed in claim 1,
wherein
said doctor blade is of steel.
3. In a rotary printing machine as claimed in claim 2,
wherein 15
said strip of metal is of the class including aluminum and
magnesium.
4. The method of preventing electrolytic corrosion in a ro-
tary printing machine for fabrics which includes 20
a color box containing a printing paste constituting a liquid
electrolyte
a rotatable print roll having an engraved cylindrical outer
printing surface

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a rotatable brush roll in said color box for supplying to said
printing surface an excess of said paste as said print roll
rotates
a doctor blade with a horizontally extending longitudinal
edge positioned against said surface to remove said excess
for gravity flow across one side of said blade in a direction
perpendicular to said edge and
a printing cylinder traversing and pressing a fabric web
against said print roll printing surface following supplying
of said paste thereto by said brush roll and after removal
of said excess by said doctor blade comprising providing
a strip of metal more electropositive than said doctor blade
in electrical contact with said blade spaced from the edge
thereof and extending generally throughout the length
thereof on said one side for flow of said excess printing
paste thereacross in electrical contact therewith, thereby
providing a sacrificial anode to prevent electrolytic corro-
sion and pitting of said doctor blade edge.
5. The method as claimed in claim 4, wherein
said doctor blade is of steel.
6. The method as claimed in claim 5, wherein
said strip of metal is aluminum or magnesium.

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