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METHOD OF PREVENTING PILING IN LITHOGRAPHIC PRINTING

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1 Claim. (Cl. 101-149.2)

This invention relates to a new composition to be used as a fountain solution in a lithographic printing press and to an improved method of lithographic printing.

Rotary lithographic printing conventionally employs a smooth surfaced printing plate on which the image areas have been made water-repellent and oil-retaining while the non-image areas have been made water-wettable. In operation of a conventional rotary lithographic printing press, the plate cylinder as it rotates is in rolling engagement with a fountain solution roller which carries "fountain solution." This fountain solution is water, which usually contains minor amounts of additives such as phosphoric acid, salts of hexavalent chromium, gum arabic, magnesium nitrate, carboxymethyl cellulose, etc. This "fountain solution" wets the non-image areas thoroughly, but is repelled by the hydrophobic image areas. As the plate cylinder rotates further, a greasy or oily hydrophobic ink is then immediately applied to its surface and adheres to the hydrophobic image areas. As the plate cylinder rotates still further, the ink image is transferred either directly to the stock being printed, or as in offset printing, to a rubber blanket from which it is then retransferred to the stock being printed.

It will be noted from the foregoing very brief description that fountain liquid and ink are being continuously, though separately, supplied to the rotating printing plate. It will also be noted that while the fountain solution is always supplied to an essentially ink-free sector of the plate cylinder, the ink is always applied to a sector which has just been wetted with fountain solution. Even though the ink and the fountain solution are immiscible, a certain amount of fountain solution is invariably transferred from the plate to the ink form rollers. Some of the fountain solution so transferred to the inking roller will in turn be transferred back up the ink-delivering roller train up towards the ink fountain.

While the press operator already has some means available for controlling and limiting this essentially unavoidable admixing of fountain solution into his ink, for example, by reducing the rate of application of fountain solution, it very often happens, for one reason or another, that an excessive amount of aqueous fountain solution is so transferred, which results in the phenomenon known as "piling." Piling is the term applied to the condition prevailing when ink accumulates along the inking train in increasing masses. Piling results from, and is a symptom of, the insufficient transfer of ink from the inking train to plate cylinder, and consequently results in weak, irregular prints. This is due to a loss of tack of the ink. Tack is conveniently measured on an Inkometer, on which it may be easily demonstrated that the tack of a lithographic ink falls from a high value for a water-free ink to its lowest value point where the ink has a maximum water content. If piling does not clear up of its own accord or is not overcome by whatever means the press operator has available, it often becomes necessary to interrupt the printing operation, clean off the inking train, and (sometimes) even to replace the whole ink supply. This is expensive, in time, labor, and material.

It has been found that the piling of lithographic inks occurs when tack has been reduced by dispersed water, and that reducing the water content of the ink will overcome piling.

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There has now been discovered a new fountain solution composition and a process which substantially eliminates piling caused by fountain solution in the ink supply. This is accomplished by using a novel fountain solution composition which maintains all the desirable properties of the conventional water fountain solutions and at the same time is more volatile than the conventional "water" fountain solutions. Thus any fountain solution transferred to the ink form rollers or to ink delivering roller train will substantially evaporate before reaching the ink supply.

The novel fountain solution composition comprises a solution of water and an alcohol preferably ethanol and isopropanol as well as a small quantity of carboxymethyl cellulose used as a desensitizing colloid. The alcohol-water solution may comprise up to 70% alcohol and the remainder, water. The limiting factor on the alcohol used is that the carboxymethyl cellulose will precipitate out of solution if more than 70% alcohol is used. It should be noted that while ethanol gives the best results, isopropanol may be readily substituted for it and also give desirable results.

The carboxymethyl cellulose functions as a desensitizing colloid. In conventional lithographic printing, plates contain a desensitizing colloid applied to non-image areas to prevent any adhesion of ink. During the operation of the press, it has been found that there is a tendency for the desensitizing colloid to wear away. It has, therefore, been conventional to add small amounts of desensitizing colloids to the fountain solution to help replenish the colloid worn away during the press operation. The two desensitizing colloids primarily used are gum arabic and carboxymethyl cellulose. It has been found that gum arabic will not remain in an alcohol-water solution and will precipitate out. Carboxymethyl cellulose will remain in solution if not more than 70% alcohol by volume is used.

It will also be understood that other conventional additives such as phosphoric acids, salts of hexavalent chromium, and magnesium nitrate may optionally be used in the fountain solution of this invention.

The following examples will serve to illustrate this invention.

Example 1

The following ingredients were mixed:

1% H_3PO_4 -----	Cc. 20
1% Carboxymethyl cellulose-----	60
Water -----	940

The resulting mixture was used as a fountain solution on a conventional "Multilith" lithographic press. After 180 sheets were printed, noticeable piling began to appear on the form rollers.

Example 2

The following ingredients were mixed:

1% H_3PO_4 -----	Cc. 20
1% Carboxymethyl cellulose-----	60
Water -----	440
60 Ethanol -----	500

The resulting mixture was used as a fountain solution on a conventional "Multilith" lithographic press. The lithographic results were desirable in all respects.

Example 3

1% H_3PO_4 -----	Cc. 10
1% Carboxymethyl cellulose-----	30
Water -----	170
70 Ethanol -----	300

The above ingredients were mixed. When this combi-

nation is used as a fountain solution on a "Multilith" lithographic press, desirable lithographic properties are obtained.

Example 4

	Cc.	5
1% H ₃ PO ₄ -----	10	
1% Carboxymethyl cellulose-----	30	
Water -----	120	
Ethanol -----	350	

The above ingredients were mixed and used as a fountain solution on a "Multilith" lithographic press. The press was run for 5000 impressions and displayed excellent lithographic properties.

While there have been described what are at present considered to be the preferred embodiments of this invention, it will be obvious to one skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is, therefore, aimed to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

In the operation of a lithographic printing press, the method of preventing piling of the ink which comprises wetting the printing plate with a solution of carboxymethyl cellulose in a solvent comprising from 52% to 70% by volume of ethanol and the remainder, water.

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