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3,108,535

**FOUNTAIN SOLUTION AND CLEANSING AGENT
FOR THE OFFSET PRINTING PROCESS**

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In the offset printing process, reciprocal repulsion of greasy ink and water is very important. As a rule, during the printing process, both greasy ink and water are applied to the offset printing plate, the water having the function of protecting the non-printing areas of the plate from ink acceptance. Frequently, the water is supplanted by the printing ink and the printing plate becomes water-repellant even in the areas which should not accept greasy ink.

To obviate this undesired development of water repellance, the use of wetting agents (fountain solutions) that are not exclusively water but which also contain additives, has been disclosed. Even these, however, do not always have a completely satisfactory effect. Thus, metal salts in the fountain solution, after prolonged contact with the printing plate, cause undesirable crystal formation thereon. If aqueous solutions of multivalent alcohols are to be used, relatively high concentrations are necessary which are considerably affected by temperature and atmospheric humidity and give sticky prints. With colloids, such as soluble starch, gum arabic and other vegetable gums as fountain solution additives, the fact that these provide excellent culture media for fungi and bacteria is a disadvantage. In the case of printing plates made from the presensitized foils that have recently come into use, fountain solutions hitherto used often attack the image areas too or are not capable of preventing scumming of the printing plate in the image-free areas once the machine has stopped. Fountain solutions containing highly dispersed silicon dioxide lose homogeneity during long storage because the silicon dioxide particles precipitate.

Offset fountain solutions of this type are also known as anti-scumming agents.

The present invention relates to fountain solutions and cleansing agents for the offset printing process which include a monomeric and/or polymeric vinyl phosphonic acid. When they are used, excellent prints are obtained.

It has been found that when monomeric and/or polymeric vinyl phosphonic acid is present in the fountain solution in offset printing the disadvantages described above do not occur. There is a very great, technically important advantage in the fact that the use of the fountain solution of the invention makes it unnecessary for the plate to be gummed with gum arabic when the machine is stopped, because the phosphonic acids, by forming a covering layer, protect the metal surface of the print carrier from atmospheric oxygen. It is a further advantage of the fountain solution to be used according to the present invention that very small quantities are employed. The quantity of printing ink used can then also be correspondingly reduced and the prints come out well inked.

Vinyl phosphonic acid and polymers thereof render metal surfaces—particularly of aluminum—used as print carriers in offset printing water acceptant to a much greater extent than, for example, does the much used orthophosphoric acid. This action by which water acceptance is improved is, at the same time, a cleaning process, by which the metal surfaces are cleansed of any oily or greasy contaminations. Cleansing agents hitherto known are dispersions and contain a number of non-homogeneous substances, as is the case, for example, with the dispersion described in U.S. Patent No. 2,780,168, which serves as a cleansing agent for greasy printing plates and contains, in

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the aqueous phase thereof, monovalent and multivalent alcohols and a colloidal dispersion of silicic acid and, in the nonaqueous phase thereof, there are preferably contained petroleum ethers.

The preparation of vinyl phosphonic acid and many of its derivatives is described in the patent literature.

The fountain solution of the invention is obtained in a simple manner by the solution in water of vinyl phosphonic acid or polyvinyl phosphonic acid or of mixtures thereof; they dissolve readily. Fountain solutions with even very low concentrations of phosphonic acid, e.g., 0.0001% by weight give good results in offset printing. In general practice, however, the use of fountain solutions in which there is a 0.001 to 0.1% concentration of vinyl phosphonic or polyvinyl phosphonic acid is recommended.

For the removal of greasy and oily patches from metal printing plates, higher concentrations are advantageously used, e.g., from 0.1 to 10% by weight of vinyl phosphonic acid and/or polyvinyl phosphonic acid in water. It can be advantageous for additives to be included in the fountain solution of the invention, including those which are already known as fountain solution additives. Examples of such additional water soluble or water miscible additives are: ammonium phosphate, citric acid salts, glycerine and other alcohols, polyglycols, dextrans, alginates, carboxymethyl celluloses and vegetable gums. One or more of these may be added to the fountain solution of the invention.

Small quantities of dyestuffs also may be added to color the vinyl phosphonic acid or polyvinyl phosphonic acid solutions, which are themselves colorless.

The invention will be further illustrated by reference to the following specific examples:

Example I

A very suitable fountain solution and cleansing liquid for use in offset printing processes is prepared from

999 ml. of water
1 g. of polyvinyl phosphonic acid
1.0 mg. of Thymol Blue dyestuff.

Example II

A fountain solution for offset printing is prepared from

300 ml. of water
700 ml. of glycerine
0.5 g. of vinyl phosphonic acid
0.5 g. of polyvinyl phosphonic acid.

These are mixed together and the solution can be used undiluted as a cleansing agent for printing foils. If the mixture is diluted with water to ten times its volume, a very good fountain solution for offset printing is obtained. Formaldehyde or other disinfectant can be added to the diluted solution.

Example III

A fountain solution for offset printing is obtained from

965 ml. of water
35 ml. of glycerine
0.01 g. of vinyl phosphonic acid
1.0 g. of ammonium phosphate.

Example IV

A good fountain solution for offset printing is obtained if 5 g. of tertiary sodium citrate are added to the mixture described in Example II and homogeneously distributed therein.

It will be obvious to those skilled in the art that many modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

What is claimed is:

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1. In an offset printing process, the improvement which comprises dampening the printing plate with a fountain solution comprising an aqueous solution of a member of the group consisting of vinyl phosphonic acid, polyvinyl phosphonic acid, and mixtures thereof.

2. An offset printing process according to claim 1 in which the phosphonic acid is present in the range of about 0.001 to 10% by weight.

3. A process for cleaning a printing plate which comprises treating the plate with an aqueous solution of a

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member of the group consisting of vinyl phosphonic acid, polyvinyl phosphonic acid, and mixtures thereof.

4. A process according to claim 3 in which the phosphonic acid is present in the range of about 0.1 to 10% by weight.

References Cited in the file of this patent**UNITED STATES PATENTS**

2,534,650	Worthen -----	Dec. 19, 1950
2,988,988	Kurz -----	June 20, 1961