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COMPOSITION FOR USE IN PRINTING

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This invention relates to compositions for use in printing, and more particularly to ink-repellent compositions for use on printing plates in an offset printing process.

The compositions disclosed herein are especially suitable for use in conventional offset or lithographic printing operations, wherein a grained or an etched plate with characters thereon is coated successively with an ink-repellent medium and with ink, and then applied against the paper or other material to be printed.

In offset printing operations, the quality of reproduction, as well as the nature of the materials that can be printed, are largely determined by the presence and action of the ink-repellent medium. Water base solutions of various kinds have been used for this purpose, but it has been difficult to produce some types of printed work with them. To make these prior solutions effective, it has been customary to apply them in a fairly thick film on the plate surface. This practice involves the use of a correspondingly heavy grain or etch on the plate, whereas it is often desirable to employ a plate with very light graining or etching to secure sharp character definition of some particular subject matter. In some cases it is important to minimize the delivery of solution to the paper, cloth, foil or other material being printed in order to avoid shrinkage or discoloration damage. In such instances, the usual solutions are not very satisfactory due to the inevitable transfer of appreciable quantities of solution to the material during its contact with the plate. Another difficulty arises from the tendency of these solutions to penetrate into the ink supply during the printing operation and change the properties and behavior of the ink.

An object of this invention is the provision of an improved composition for application on printing plates in an offset process, the composition being capable of forming a particularly thin, tenacious and uniform film having high resistance to penetration by the printing ink.

In accordance with one embodiment of the invention, a composition suitable for various types of offset printing work is provided by dissolving gum arabic, phosphoric acid, ammonium bichromate, magnesium nitrate, and an ester of a sulphodicarboxylic acid in water.

In this solution, the various ingredients are highly effective when used in very small proportions and the following specific composition gives good results:

	Per cent by weight
Gum arabic	.017
Phosphoric acid	.010
Ammonium bichromate	.016
Magnesium nitrate	.060
Dioctyl ester of sodium sulpho-succinate	.006
Water	Balance

Some modifications can be made in the above values and the permissible ranges are shown in the following tabulation:

	Per cent by weight
Gum arabic	.008–.020
Phosphoric acid	.005–.020
Ammonium bichromate	.005–.020
Magnesium nitrate	.010–.070
Dioctyl ester of sodium sulpho-succinate	.003–.010
Water	Balance

Various esters of aliphatic sulphodicarboxylic acids are suitable for this purpose. Such an ingredient is added to the solution most conveniently in a form that is readily water-soluble and also commercially available at reasonable cost. The dioctyl ester of sodium sulpho-succinate, listed in the above tabulations, meets these requirements and is, therefore, used preferably. However, other esters of sulphodicarboxylic acids, particularly water-soluble forms, such as sodium and ammonium derivatives, are satisfactory, although their adoption may require some adjustment of the values given in the above tables.

The solution should have a pH value between 3.5 and 5.0, and a value of 3.8 gives the best results. If other acids are used in place of the phosphoric acid or substitutions made for other ingredients, the composition should be adjusted to provide a pH value within this range.

As stated above, these compositions are adapted to conventional offset printing processes and apparatus. It is customary in these processes to employ grained printing plates with the characters covering or cut through the grained layer of the plate surface. In the printing op-

eration, the ink-repellent solution is first applied against the plate, where it forms in a film on the grained or non-character bearing portions of the plate surface. The ink is then applied to the plate, where, due to the presence of the solution film, it adheres only to the characters and finally the plate is applied against the paper or other material to transfer the ink thereto. Because this process is well known, it is believed that no further explanation thereof is required here.

The compositions disclosed herein can be employed in any offset printing press. When the solution composition is applied to a grained plate in the course of the printing operation, it forms spontaneously into a very thin, highly adherent and ink impervious film on all non-character bearing portions of the plate surface, including small segregated areas, such as occur on halftones.

The improved properties and action of the solution permit the adoption of very lightly grained printing plates with a resultant increase in the sharpness and clarity of the printed characters. Because the solution film is particularly thin and tenaceous, very little solution is transferred to the material being printed and this reduces the usual danger of shrinkage and discoloration damage. Due to these same solution properties, the penetration of solution into the ink supply is minimized and any appreciable dilution of the ink is thereby avoided. The solution also applies a continuous cleaning action to the plate by floating out and removing stray particles of ink and foreign materials from the grain fissures, which reduces the scumming that is a troublesome problem in offset printing.

One of the most important advantages of the new composition arises from its use with printing plates having an electrodeposited metal coating instead of the usual grained or etched surface. One plate with which this composition can be employed advantageously is produced by plating a layer of zinc on a steel sheet a few thousandths of an inch thick. This plate can be produced at lower cost than the etched or grained plates that are used ordinarily and it can also be maintained more cheaply. When resurfacing of the zinc coated plate becomes necessary after a period of service, it is merely stripped and replated. Due to the action of the composition on the electrodeposited zinc, a coating of very fine texture can be used, which provides a more sharply printed product than is available with a grained or etched plate. Although a zinc coating on the plate is preferred, partly for cost considerations, other metals such as copper can be employed similarly.

The above described composition is suitable for general use and is adapted for long or short plate runs in printing a wide variety of materials. For relatively short plate runs under special conditions, the composition can be modified by elimination of some of the listed ingredients. For example, if the printing plate is in particularly good condition and only a few printed copies are required, a solution of the sulphodicarboxylic acid ester alone in water, in the proportions shown in the tables, can be used. For somewhat longer plate runs, addition of the gum arabic and phosphoric acid is recommended. However, it is convenient to use the complete composition for all applications because of its wide adaptability. It can be used with various plate constructions and effects a progressive conditioning of the plate during the printing process to maintain the continuous production of clean and sharply printed copy.

It will be apparent that further modification of the above described composition and procedures are feasible and it is to be understood that the invention is limited only by the scope of the appended claims.

What is claimed is:

1. An ink-repellent composition for application on printing plates in an offset printing process comprising an ester of a sulphodicarboxylic acid, and water.

2. An ink-repellent composition suitable for application on printing plates in an offset printing process comprising gum arabic, phosphoric acid, an ester of an aliphatic sulphodicarboxylic acid, and water.

3. An ink-repellent composition for application on printing plates in an offset printing process comprising a water solution of gum arabic, phosphoric acid, and an ester of an aliphatic sulphodicarboxylic acid, said solution having a pH value between 3.5 and 5.0.

4. An ink-repellent composition for coating printing plates in an offset printing process comprising gum arabic, phosphoric acid, ammonium bichromate, magnesium nitrate, dioctyl ester of sodium sulpho-succinate, and water.

5. An ink-repellent composition suitable for coating printing plates in an offset printing process comprising gum arabic, phosphoric acid, ammonium bichromate, magnesium nitrate, an ester of an aliphatic sulphodicarboxylic acid, and water.

6. An ink-repellent composition comprising from .008% to .02% gum arabic, from .005% to .020% phosphoric acid, from .005% to .020% ammonium bichromate, from .01% to .07% magnesium nitrate, from .003% to .010% an ester of a sulphodicarboxylic acid, and the remainder water.

7. An ink-repellent composition comprising from .008% to .02% gum arabic, from .005% to .020% phosphoric acid, from .005% to .020% ammonium bichromate, from .01% to .07% magnesium nitrate, from .003% to .010% dioctyl ester of sodium sulpho-succinate, and the remainder water.

8. An ink-repellent composition suitable for coating printing plates in an offset printing process comprising .017% gum arabic, .01% phosphoric acid, .016% ammonium bichromate, .06% magnesium nitrate, .006% an ester of an aliphatic sulphodicarboxylic acid, and the remainder water.

9. An ink-repellent composition suitable for use on printing plates having an electrodeposited zinc coating in an offset printing process comprising .017% gum arabic, .01% phosphoric acid, .016% ammonium bichromate, .06% magnesium nitrate, .006% dioctyl ester of sodium sulpho succinate, and the remainder water.

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