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COMPOSITION FOR THE TREATMENT OF LITHOGRAPHIC PLATES

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ABSTRACT OF THE DISCLOSURE

A lithographic plate preserver composition of an acidic, aqueous mixture including a starch and a sugar syrup, preferably in amounts between .01 and .1 gram per cc. of composition and 0% to 80% by weight of the composition, respectively, wherein a buffering agent is preferably included in the form of an alkaline metal salt of an acid, and a method of preserving lithographic plates with such mixtures.

This invention relates to a new and improved composition for the treatment of lithographic plates and more particularly relates to a novel composition for protecting lithographic plates before and between runs.

It is important to protect a lithographic plate between runs so that scummng of non-image and blinding of the image prior to reruns is avoided. In selecting a plate preservative, it is important that the preservative does not react with or produce an adhering layer over the resin image. Also, it is desirable that the preservative is not softened or otherwise affected by the normal plate cleaning solvents, e.g., gasoline and Lithotine, which are used to remove ink from the plate. Another requirement is that the preservative can be easily removed when the plate is again run. Also, the preservative should not change the ink acceptance characteristics of the plate, so that the plate will ink relatively quickly. Further, it is desirable that the preservative be easily applied to the plate and that it form a tough film thereon which resists scratching and dirt contamination of the non-printing areas.

Heretofore, it has been common to use a gum such as gum arabic to coat the surface of a lithographic plate before and between press runs. However, it has been found that with certain lithographic plates there is a tendency for the gum to react with the resin image during storage, causing it to refuse to accept ink when the plate is run again. Other preservers are difficult to remove from the non-image areas of the plate after storage.

In view of the deficiencies of plate preservers employed heretofore, it was surprising to discover a plate preservative which overcomes the shortcomings of previously known plate preservatives and in addition affords additional benefits and advantages. For example, the plate preservative of the invention may be easily applied to a plate, and forms a tough film which is resistant to scratching and dirt contamination and which is not softened by plate cleaning solvents. Furthermore, the preservative can be easily removed after storage and does not change the ink acceptance of the image areas of the plate. Furthermore, the preservative does not cause scumming or blinding and permits storage over extended periods of time without difficulty. Also, the preservative can be formulated from commercially available materials at relatively low cost.

The lithographic plate preservative of the present invention comprises an acidic aqueous mixture comprising a starch. While such a starch mixture is operable as a preservant, optimum properties are obtained by including a sugar syrup.

Suitable starches for use in the composition of the present invention includes rice, wheat, corn, potato, arrowroot, starches, etc. Advantageously, the starch employed is of a high quality and purity, e.g., a so-called analytical grade starch.

The sugar solution is advantageously a syrup formed from a carbohydrate and preferably is a corn syrup. Advantageously, the syrup has a viscosity between about 4 and 14 seconds with a number 4 Ford cup, and preferably between about 8 and 10 seconds.

The pH of the preservative is maintained acidic and preferably is between about 3.0 and 6.4, and more preferably between about 4.2 and 5.2. The pH may be controlled by an acid such as oxalic acid, acetic acid, phosphoric acid, etc. Advantageously, a buffering agent is used with acetic acid. Thus, an organic acid salt may advantageously be incorporated in the preservative composition. This salt may be the salt of an acid such as oxalic acid, phosphoric acid, malonic acid, formic acid, etc. Advantageously, the salt is an alkali metal salt of such an acid.

Other desirable materials such as bactericides, algaecides, etc., may be incorporated in the preservative composition as required.

The proportion of the starch in the preservative solution is advantageously between about .01 and .1 gram starch per cc. of preserver and preferably between about .03 and .06. The syrup is preferably employed in a range between about 0 and 80% by weight of the composition and particularly between about 15 and 40%. The acidic buffering agent employed advantageously comprises between about .01 and .3% and preferably between .1 and .3%. The other materials incorporated in the preservative solution advantageously comprise less than about 5% by weight and preferably less than about 2%.

The preservative composition of the invention advantageously is prepared by dissolving the starch in water and adding the acid and buffering agent thereto. The syrup is combined with the acid, buffered starch solution and any additional ingredients are added. The viscosity of the resulting composition may be adjusted by varying the proportion of water in the solution and advantageously is between about 100 and 120 seconds with a number 1 Ford cup. This viscosity range facilitates the application of the composition. Treatment of the plate may be accomplished by pouring, spraying, wiping, etc., the composition onto the plate surface. After the composition has dried, leaving a substantially uniform coating, the plate may be cleaned if inked with a conventional plate cleaning solvent such as gasoline or Lithotine and stored. At the end of the storage period, the plate is placed on a press and run. The preservative is removed after a few copies have been run, and the plate then will run in a manner similar to the initial run of the plate.

The present invention will be described in greater detail with reference to the following examples. These examples are intended to illustrate the invention and not to limit the scope thereof. In the examples, parts and percentages are by weight, unless noted.

Example I

Thirty parts of analytical potato starch sold by Mallinchrodt Chemical Works as "analytical starch" (A.C.S.) were added to 350 parts of water heated to a temperature of about 200° F. and the mixture stirred until all of the starch had dissolved therein. The solution was then diluted with sufficient ambient temperature water to bring the volume to 500 milliters. One part of glacial acetic acid was added to the solution to lower the pH to about 3.5. Thereafter, five parts of sodium oxalate were added with stirring.

The above solution was mixed with a dark corn syrup sold by Corn Products Company as "Karo Blue Label Syrup" in the ratio of 3 parts of starch solution to 1 part of syrup. To this solution was added .12 part of a bactericide sold by Dow Chemical Company as "Dowicide G." The resulting solution had a pH of about 4.5 and a Baumé value of about 13°.

Six lithographic plates of a size of about 20 inches by 22⅝ inches and a thickness of about .010 inch formed from an aluminum plate having a mat-finish, zinc coating thereon and a polyvinyl cinnamate resin photo resist sold by Eastman Kodak Company under the name of "Kodak Photo Lacquer," were exposed, developed, desensitized and run on a press. After 1000 impressions, the plates were removed from the press and the above preservative solution wiped over the surface of the plates. The coating was permitted to dry, and the plates were washed with white gasoline. The plates were stored for one week and then replaced on the press. The preservative was removed by placing the dampener and ink rolls on the plate and starting the press. After two or three copies had been run, the plates performed satisfactorily for the remainder of the run. After 1000 impressions, the plates were again removed from the press and recoated with the above preservative formulation and stored. At the end of one week, the plates were returned to the press and run again. This procedure was followed until six runs had been completed. In each rerun the preservative was removed from the plate in the first two or three copies, and thereafter the impressions were sharp, clean and completely acceptable.

To show the superiority of the plate preservative of the invention, the above procedure was repeated with the exception that a 7° Baumé solution of gum arabic was employed as the plate preservative. The same cycles of press runs and storage resulted in several of the plates becoming blind, i.e., the image dots refused to accept ink uniformly.

Example II

The procedure of this example was the same as that of Example I, except that the buffering agent was .8 part of phosphoric acid and the pH was 3.3.

The same superior results were obtained as for the plates treated with the preservative of the invention in Example I.

Example III

The procedure of this example was the same as that of Example I, except that in place of the Karo Blue Label Syrup a similar amount of syrup prepared from 200 grams of granulated sugar and 200 cc. of distilled water was substituted. Superior results similar to those of Example I were obtained.

Example IV

The procedure of this example was the same as that of Example I, except that 30 parts of corn starch were employed. The plates showed the same superiority as the plates of the invention in Example I.

The above description and examples show that the lithographic plate preservative of the present invention has a number of benefits and advantages heretofore unattainable. For example, the preservative does not react with the resin image during storage to soften or otherwise alter the image. Also, the preservative does not alter the ink acceptance of the plate on rerunning. Furthermore, the preservative is not softened or otherwise effected by conventional plates cleaning solvents. In addition, the preservative is easily removed when the plate is run again after only a few copies. Moreover, the preservative of the invention is easily applied to the lithographic plate and forms a tough film on the plate which resists scratching and dirt contaimination. The preserver of the present invention has yet another advantage in that it contains no dermatitis-promoting chromates.

From the above description and examples, it is apparent that various modification in the procedures and formulations disclosed herein may be made within the scope of the invention. Therefore, the invention is not intended to be limited by the specific procedures and formulations set forth except as may be required by the following claims.

I claim:

1. A method for protecting a surface of a lithographic plate which comprises applying an aqueous composition having a pH between about 3.0 and 6.4 to the lithographic plate surface and drying said composition on said plate, said aqueous composition comprising between about .01 and .1 gram of starch per cc. of composition and between about 0% and 80% by weight of a carbohydrate syrup.

2. A method as set forth in claim 1 wherein said starch is selected from the group consisting of potato, corn, wheat, rice and arrowroot starches.

3. A method as set forth in claim 1 wherein said starch is present in amounts between about .03 and .06 gram of starch per cc. of composition.

4. A method as set forth in claim 1 wherein said carbohydrate syrup is present in amounts between about 15% and 40% by weight of said composition.

5. A method for protecting the surface of a lithographic plate while not in use which comprises applying an acidic aqueous composition having a pH between about 3.0 to 6.4 to the lithographic plate surface and drying said composition on said plate, said aqueous composition comprising between about .01 and .1 gram of starch per cc. of composition, said starch being selected from the group consisting of potato, corn, wheat, rice and arrowroot starches, between about 15% to 40% by weight of carbohydrate syrup and an alkali metal salt of an acid selected from the group consisting of oxalic acid, phosphoric acid, malonic acid and formic acid.

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