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LITHOGRAPHIC PRINTING PLATE

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6 Claims. (Cl. 148—6)

This invention relates to lithographic printing plates of the kind that are used, for example, in photolithography and carry a grain to which an image is applied. Such plates are usually made of, or at least have a surface of, zinc. The grain is usually formed by a cumbersome and lengthy mechanical treatment.

An important object of the invention is to abolish the need for the mechanical treatment hitherto used. Another object is to provide a lithographic plate with a grain having a much longer life, that is to say, capable of supplying more prints than any hitherto known. A further object of the invention is to provide a lithographic plate with a very fine and deep grain.

I have found that an excellent grain is formed by applying a phosphate coating to the plate. This may be done in any convenient way and one of the advantages of the invention is that acid phosphate solutions of the kind used commercially to apply protective coatings to zinc may be used in the graining of the lithographic plates. The strength of the solution depends somewhat upon the size that is desired for the crystals. In general a strong solution tends to increase the size of the crystals and to coarsen the grain.

By means of the invention it is possible to produce a plate having a number of striking advantages in comparison with a mechanically grained plate. The grain is fine and deep and allows an increased number of prints to be taken from the plate. The fine grain takes the design well, so that the time usually spent by an artist in touching up the design before printing is considerably reduced. In half-tone work, the excellent dot-formation that is produced allows a finer screen to be used. The phosphate coating does not oxidize in the air and therefore need not be covered when not actually in use. The plates can be cleaned and used again more often, because the phosphate coating tends if anything to thicken them, whereas mechanical graining wears their surfaces away.

Although it is unnecessary to subject the plates to any mechanical abrasion before the application of the phosphate coating, it is within the invention to form the coating on a plate which has already been completely or partly grained by mechanical abrasion.

It is found to be very important to render the surface of the plate uniform and to remove any oxidic or similar skin before the plate is subjected to the action of the phosphate solution. This may advantageously be done by treatment with a corrosive agent, grease solvent and a wet-

ting-out agent, followed by etching with an acid. Without such a treatment or its equivalent, an uneven grain may be obtained.

One example of the graining of a zinc lithographic plate according to the invention is as follows:—

A zinc plate is wiped with a cleaning preparation containing phosphoric acid, butyl alcohol and sulphonated loral, and is then rinsed in cold water followed by hot water. It is then immersed for a short time in an etching solution made by adding 1 ounce of concentrated nitric acid to ½ gallon of water and then saturating the diluted acid with alum. After this treatment it is rinsed in cold water wiped again with the cleaning preparation and again rinsed in cold and hot water. The surface is then ready for the phosphate treatment, which consists in immersion for from 30 to 40 minutes in a solution made by dissolving in 100 gallons of water, 30 lbs. of a powder containing (by weight) 77% zinc dihydrogen phosphate, 19% ferrous sulphate and 4% zinc carbonate. This solution is kept at a temperature of about 190° to 200° F. After the immersion the plates are rinsed and dried.

I claim:

1. The process of chemically graining a zinc lithographic plate which comprises cleaning the surface of the plate with a suitable cleansing agent, rinsing the surface of said plate with water or the like, treating the surface of said plate with a heated solution of a hydrolyzable acid phosphate of a divalent metal from the class of phosphates adapted for the protective coating of zinc for about thirty minutes, and rinsing the said plate.

2. In the process of chemically graining a zinc lithographic plate which has been cleaned and rinsed, the step of treating the surface of said plate with a heated solution of a hydrolyzable acid phosphate of a divalent metal from the class of phosphates adapted for the protective coating of zinc for approximately thirty to forty minutes and until suitably grained.

3. In the process of chemically graining a zinc lithographic plate which has been cleaned and rinsed, the step of treating the surface of the said plate with a solution of zinc dihydrogen phosphate kept at a temperature of about 200° F. for a period from thirty to forty minutes.

4. A method for graining a zinc lithographic plate which comprises treating the zinc plate with a cleaning solution, washing the said plate, immersing the said plate in an etching solution, washing the said plate, and then immersing the

said plate approximately 30 to 40 minutes and until suitably grained in a heated solution of hydrolyzable acid phosphate of a divalent metal from the class of phosphates adapted for the protective coating of zinc.

- 5 5. The method for graining a zinc lithographic plate which comprises treating a zinc plate with a cleaning solution comprising phosphoric acid, butyl alcohol and sulphonated loraol, then rinsing
10 the said plate with water, immersing the said plate in an etching solution comprising nitric acid and alum, washing the said plate, and then immersing the said plate until suitably grained in a heated solution of a hydrolyzable acid phos-

phate of a divalent metal from the class of phosphates adapted for the protective coating of zinc.

6. The method of graining a zinc lithographic plate which comprises treating a zinc plate with a cleaning solution comprising phosphoric acid, 5 butyl alcohol and sulphonated loraol, then rinsing the said plate with water, immersing the said plate in an etching solution comprising nitric acid and alum, washing the said plate, and then immersing the said plate until suitably grained 10 in a heated solution of zinc dihydrogen phosphate.

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