Patented Dec. 9, 1941

2,265,829

UNITED STATES PATENT OFFICE

2,265,829

DEVELOPMENT OF LITHOGRAPHIC PLATES

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No Drawing. Application August 6, 1938, Serial No. 223,523

4 Claims. (Cl. 95—88)

In the manufacture of deep-etch lithographic plates it is customary to coat a cleaned and counter-etched zinc or aluminum plate with a "resist" which is sensitive to light, and the plate is then exposed to light in the form of the subject matter which is to be reproduced, such that in those areas where no image is desired on the finished plate the resist is hardened; then the unhardened areas of the resist are removed by a developing agent so as to leave the image portions of the plate clean. A so-called "deep-etching solution" is then applied to the plate and allowed to attack the exposed image areas until the metal is etched away to the desired depth, and after drying, the deep etched areas are treated with material, commonly referred to as a lacquer, to render them receptive to ink. Subsequently the light-hardened areas of the resist, which during etching have served to protect the non-image areas of the plate, are removed by a "clean-up" solution. The plate is then given a desensitizing etch to make the non-image areas receptive to water and is ready for printing. In accordance with the present invention, improved procedure and materials are involved, such as to afford more easy manipulation and control, and more reliable and positive action, and making possible the production of plates having improved longevity, definition, fidelity and uniformity.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In the preparation of plates in accordance with my invention, I may employ the commonly used materials such as glue or gum arabic. Preferably, however, the coating as in accordance with my copending application Ser. No. 329,564 may be employed, such combination yielding particular advantages over the previously known materials, thereby making possible an improved receptivity to action of the developer materials.

The resist material, whether of the preferred composition as indicated, or of other composition, suitably sensitized with a soluble bichromate or the like as usual, is applied to the metal plate; and the further treatment to be described is next in order.

The coated metal plate (the metal being usual or as preferred, zinc, aluminum, etc.), having been exposed to light and the subject matter which is to be reproduced, is treated with the developer. The commonly used developer heretofore for removing the unhardened portions of the resist after exposure to light, is a concentrated solution, about 50° Bé., of calcium chloride containing a small percentage of lactic acid; and following the developer, anhydrous alcohol is used to remove the residue of the developer remaining on the plate. Calcium chloride however can react with the alcohol wash to form salts which are insoluble, and these remaining on the plate during the subsequent etching process not only prevent uniform etching action but prevent proper adherence of the ink-receptive lacquer which is later applied, causing the latter to lift from the plate. Also, the lactic acid reacts with the zinc or aluminum of the plate to form salts which are insoluble and have a similar harmful effect on the subsequent treatment. A further disadvantage of a developer of such type is that it acts slowly, ordinarily requiring at least five minutes time. Preferably therefore I apply to the exposed plate as developer material a concentrated solution of magnesium chloride containing a small proportion of a hydroxydicarboxylic acid, such as malic acid, or somewhat less desirably tartaric acid. For example the magnesium chloride solution may be 65 to 72 per cent $MgCl_2.6H_2O$ and the hydroxydicarboxylic acid 2.5 to 5 per cent. Magnesium chloride is very soluble in anhydrous alcohol, and for instance may form up to a fifty per cent solution, and therefore alcohol may be used to remove the residue of such material from the plate without any danger that an insoluble salt will be formed and left on the surface. Removal of the unexposed resist proceeds also much faster with magnesium chloride than with previous developer materials, being complete in from one to three minutes. The dihydroxy acid of the developer, such as malic acid, reacts to some extent with the metal of the plate, but salts so produced are soluble in alcohol and hence are readily removed by the alcohol wash. The preferred developer material produces these advantages when applied in connection with the heretofore known resists such as gum or gum-glue or with other preferred resist.

Following removal of the unhardened portions of the resist by the developer, the plate is deep-etched. According to customary procedure, zinc plates are etched with a solution of anhydrous alcohol and hydrochloric acid and aluminum plates are etched with a concentrated solution of

iron chloride. This or other preferred etching solution may be employed.

Having etched the plate by the usual or the preferred etching materials as indicated, the hardened resist is next removed from the non-image areas of the plate which it has protected during the deep-etching.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a process of making lithographic plates, treating an exposed sensitized lithographic plate with a solution of magnesium chloride modified by containing a small amount of a hydroxydicarboxylic acid.

2. In a process of making lithographic plates, treating an exposed sensitized lithographic plate with a solution of magnesium chloride and a small amount of malic acid.

3. In a process of making lithographic plates, treating an exposed sensitized lithographic plate with a solution containing magnesium chloride 65 to 72 per cent and a hydroxydicarboxylic acid 2.5 to 5 per cent.

4. In a process of making lithographic plates, treating an exposed sensitized lithographic plate with a solution containing magnesium chloride 65 to 72 per cent and malic acid 2.5 to 5 per cent.

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