

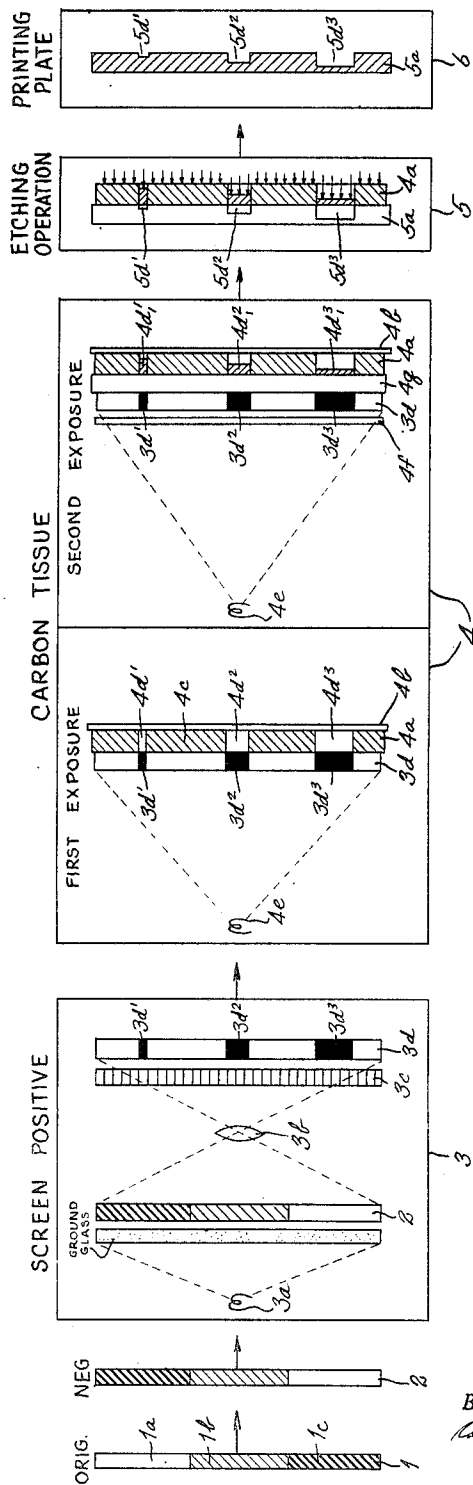
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T. WHELDON

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METHOD OF PREPARING INTAGLIO PRINTING PLATES

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INVENTOR.
THEODORE WHELDON
BY
Campbell, Fumtough, Inc. & Jones
his ATTORNEYS

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METHOD OF PREPARING INTAGLIO
PRINTING PLATESTheodore Wheldon, West Englewood, N. J., as-
signor to Publication Corporation, New York,
N. Y., a corporation of New York

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3 Claims. (Cl. 95—5.6)

1 The present invention relates to methods of forming intaglio printing surfaces and embodies, more specifically, an improvement method by means of which certain photographic operations are utilized to prepare a resist which is then used in a conventional way to etch the desired printing surface.

More specifically, the invention has for an object the provision of certain improved photographic steps by means of which the subject to be reproduced is incorporated in a sensitized gelatin in such fashion that portions of the sensitized gelatin are insolubilized by the use of light and in the form of dots of varying size and thicknesses in proportion to the varying tones of the original subject matter.

The foregoing is accomplished by the utilization of a screen positive image of the subject matter to be reproduced, such screen positive being exposed to the sensitized gelatin twice, once in contact, and once suitably spaced from the sensitized gelatin.

In order that the invention will be readily understood, it will be described in connection with the accompanying drawing, wherein the single figure is a diagrammatic illustration of the various steps of the method of the present invention.

Referring to the drawing, the original subject is illustrated at 1 as having a high-light region 1a, a middle tone region 1b, and a shadow tone region 1c. From this original subject, a negative transparency 2 is formed in the usual way. This negative transparency will show the tones of the original in reverse relationship, that is, the high-light area 1a will be of relatively great density while the shadow tone area 1c will be of relatively light tone.

The next operation is also a conventional operation forming a screen positive from the negative 2. This operation is illustrated diagrammatically within the block 3 wherein negative 2 is exposed by a suitable light source 3a (such as an evenly illuminated ground glass) through a lens system 3b and a suitable screen 3c on to a photographic emulsion 3d. The screen 3c may be a half-tone screen of conventional type, the characteristic of which is that the image is broken up into a series of minute dots corresponding in position to the apertures in the screen. These dots vary in size in accordance with the intensity of light passing through the screen apertures. For example, where the negative is relatively dark (corresponding to the high-light area 1a) small dots are formed as illustrated at 3d¹. Where

2 the negative is relatively transparent (corresponding to the shadow tone area 1c) large dots 3d³ are formed, and where intermediate tones exist, intermediate dots 3d² are formed. In the areas not occupied by the dots above mentioned, the screen positive is transparent.

The size of the dots of the screen positive are also controlled by the spacing of the screen from the photographic emulsion (screen distance), and by the intensity of the light passing through the screen (determined by the duration and also the actual light intensity of the light source). This is generally known and need not be explained in detail herein. It is sufficient to state that, by controlling the screen distance and exposure, the size of the dots on the screen positive may be controlled so that none of the dots touch or overlap to an extent that would produce connected pockets in the printing plate. In other words, a screen positive with the character described in the patent to Wilkinson No. 2,155,458 may be formed.

Having made the screen positive 3d, the photographic operations essential to the present invention are then followed. These operations center about the exposure of the screen positive upon the sensitized gelatin (commonly called carbon tissue) which is later to be used as the resist in the operation of etching the image in the printing surface. Upon this sensitized gelatin two exposures are made through the screen positive 3d. Although the order of these exposures is immaterial, in the diagrammatic illustration of the drawing the first exposure is that of exposing the sensitized gelatin to a source of light through the screen positive 3d. The sensitized gelatin is illustrated at 4a in the block 4 in the drawing, being illustrated as having a paper backing 4b. Where the screen positive is transparent, the underlying portions 4c of the sensitized gelatin are fully exposed, as illustrated by hatching. Beneath the respective dots 3d¹, 3d², and 3d³, unexposed areas 4d¹, 4d², and 4d³, respectively, remain. Any suitable light source 4e may be used in accordance with common practice.

After completing the first exposure, the sensitized gelatin 4a is again exposed through the screen positive 3d behind a diffused source of light. This light source is represented diagrammatically by a diffuser 4f. The screen positive 3d is spaced from the sensitized gelatin 4a by means of a transparent plate or film 4g, and the effect of the diffused light and the spacing of the screen positive from the sensitized gelatin is such that the screen formation of the screen

positive is lost upon the sensitized gelatin, and the latter thus, in effect, sees only the variation of the tone of the original subject as translated by the varying sized dots in relation to the transparent area in which those dots occur. Thus, where the dots are small, a relatively intense light appears under that area on the sensitized gelatin, and the unexposed areas $4d^1$ are exposed substantially as indicated by the hatching at $4d^1$. In the middle tone areas where the dots $3d^2$ are larger, the previously unexposed areas $4d^2$ are exposed to a depth indicated by the hatching $4d^2$. In the shadow tone areas where the dots $3d^3$ are relatively large, the effect of the exposure is least, and the previously unexposed areas $4d^3$ are exposed to a depth illustrated by the hatching at $4d^3$.

After the two exposures illustrated diagrammatically in the block 4 have been completed, the carbon tissue is used in a conventional manner to form an intaglio printing surface. For example, as indicated in block 5 in the drawing, it is applied to a copper surface 5a which is to be the printing surface, the paper backing is stripped, and the unexposed portions of the sensitized galatin (which portions are soluble in warm water) are dissolved away. A suitable etching medium is then used, and pockets are thus etched in the printing surface 5a that correspond in area to the size of the dots, and in depth to the intensity of the light by which those dots were formed. These pockets are illustrated at $5d^1$, $5d^2$, and $5d^3$. The printing plate is illustrated in cross-sectional form in the block 6 of the diagrammatic showing of the drawing.

While the invention has been described with specific reference to the structure shown in the accompanying drawing, it is not to be limited save as defined in the appended claims.

I claim:

1. The method of forming an intaglio print-

ing surface comprising forming a screen positive of subject matter to be reproduced, twice exposing in any order the screen positive upon a layer of light-sensitive gelatin, once in contact therewith and once spaced therefrom to diffuse the screen pattern, developing the light-sensitive gelatin to form a resist and etching a surface through the gelatin resist to produce an intaglio printing surface.

2. The method of forming an intaglio printing surface comprising forming a screen positive of subject matter to be reproduced, twice exposing in any order the screen positive upon a layer of light-sensitive gelatin, once in contact therewith and once spaced therefrom to diffuse the screen pattern, using a diffused source of light to lose the effect of the screen formation upon the sensitized gelatin, developing the gelatin to form a resist and etching a surface through the gelatin resist to produce an intaglio printing surface.

3. The method of forming an intaglio printing surface comprising forming a screen positive of subject matter to be reproduced, exposing the screen positive in a contact photographic printing operation upon a layer of bichromated gelatin, spacing the screen positive from the resist and exposing from a diffused source of light to lose the effect of the screen formation upon the sensitized gelatin, developing the gelatin to form a resist and etching a surface through the gelatin resist to produce an intaglio printing surface.

THEODORE WHELDON.

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The following references are of record in the file of this patent:

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