



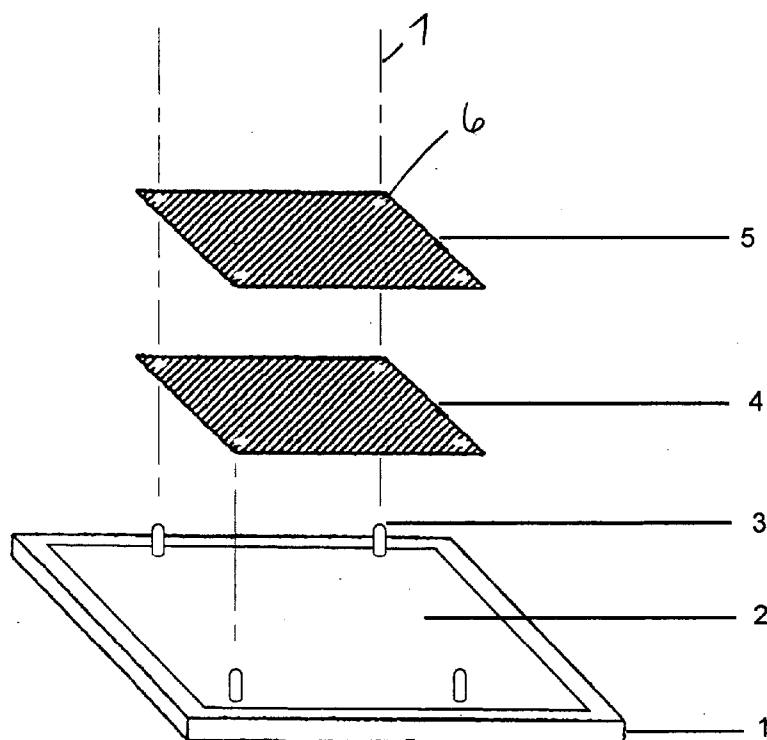
US 20060102488A1

(19) **United States**(12) **Patent Application Publication****Fischer**(10) **Pub. No.: US 2006/0102488 A1**(43) **Pub. Date: May 18, 2006**(54) **PHOTOGRAPHIC PRINTING SYSTEM AND
METHOD FOR APPLICATION OF
MULTIPLE MASKS IN COLORING
REFRACTORY METALS****Publication Classification**(51) **Int. Cl.**
C25D 11/04 (2006.01)(52) **U.S. Cl.** **205/324**(76) **Inventor: Paul Fischer, Manchaca, TX (US)**

Correspondence Address:

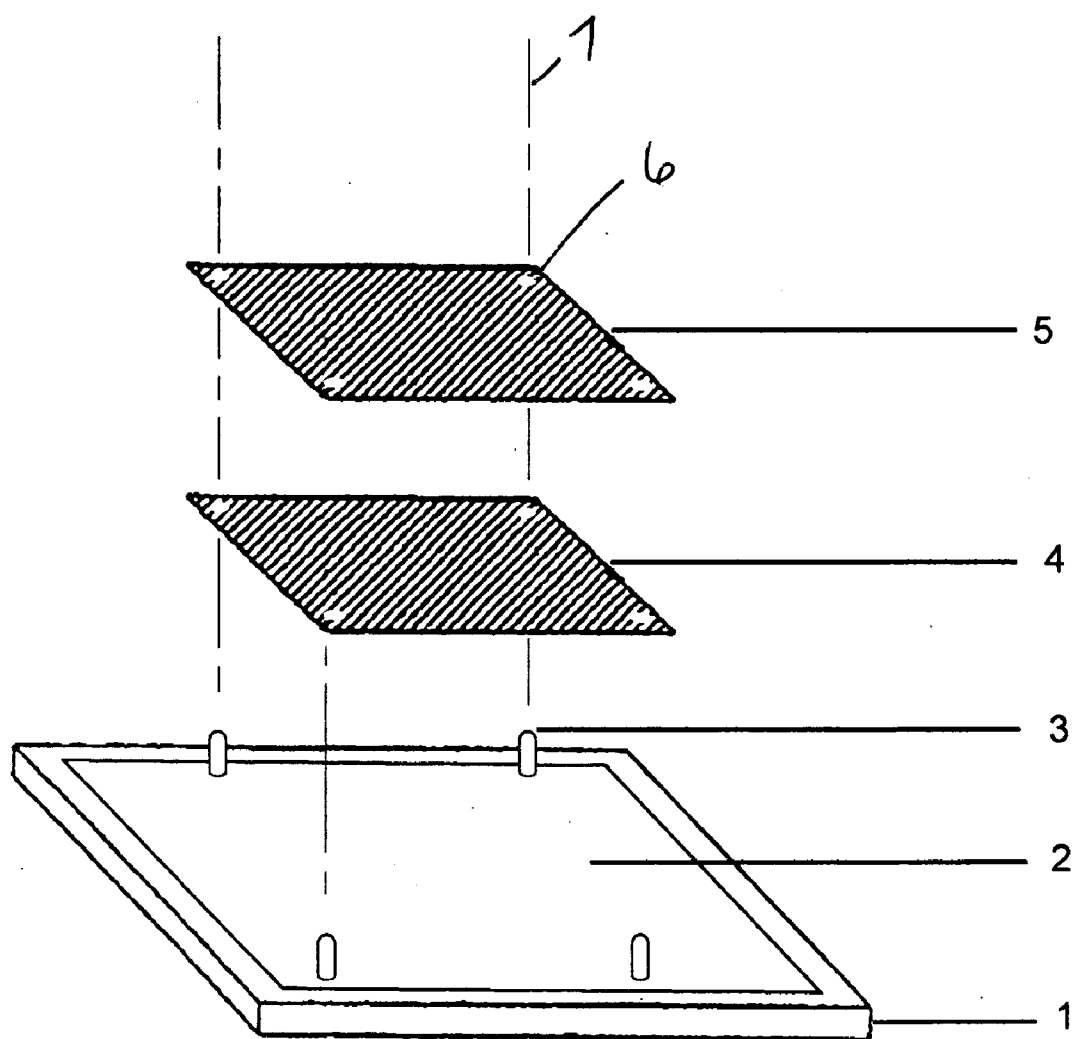
Emery L. Tracy**P.O. Box 1518****Boulder, CO 80306-1518 (US)**(57) **ABSTRACT**

A photographic printing system for anodizing coloring refractory metals using computer graphic imaging is provided. The system comprises a plurality of film masks and a metal plate. Registration marks are formed in each of the film masks and the metal plate for aligning the film masks and the metal plate for controlling the color application in multicolored line art images. A method for anodizing coloring refractory metals using computer graphic imaging is also provided.

(21) **Appl. No.: 10/988,060**(22) **Filed: Nov. 12, 2004****1. Board****2. Metal Plate****3. Registration Pins****4 & 5. Dry film substrates**

1. Board
2. Metal Plate
3. Registration Pins
- 4 & 5. Dry film substrates

FIG. 1



PHOTOGRAPHIC PRINTING SYSTEM AND METHOD FOR APPLICATION OF MULTIPLE MASKS IN COLORING REFRACTORY METALS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates generally to a photographic printing system and method for application of multiple masks in coloring refractory metals and, more particularly, the invention relates to the precise registration of subsequent masks for controlled multicolored line art images and using color separation techniques to produce photographic or blended tone gradients and images.

[0003] 2. Description of the Prior Art

[0004] A process is known for creating a mask using the dry film process as a resist in coloring refractory metals. For instance, the Rjumshina et al patent, U.S. Pat. No. 3,775, 263, describes a polychromatic image formed on the surface of an article by depositing on a solid dielectric layer a thin film of a unilaterally-conductive metal or alloy thereof followed by dividing the film into separate areas in conformity with the shape of the picture to be reproduced. Nothing in the Rjumshina et al patent, however, describes subsequent masks and the alignment of any subsequent masks for controlled multicolored line art images.

[0005] Since the Rjumshina et al patent, there has been a shift in the advancement of computer technology. Specifically, Adobe introduced Adobe Photoshop around 1990. In version 3 of Adobe Photoshop, Adobe introduced the ability to use layers to create separate, multiple images that stack upon one another and could be manipulated independently to generate film positives. This allows for the generation of multiple, aligned line art images that can generate film positives for use in the wet and dry film process. Further, to create the appearance of four color process printing, Photoshop has the ability to color separate an image using the "Indexed" color space. This method of color separation is different than the common, widely used method in traditional color printing. Indexed Color separates color based on user defined tones and the number of tones, which can be much greater than four. Additionally, each color layer is rendered as square dots. For instance, when a traditional color magazine print is viewed through small magnification, colored round dots are visible with white space as the background. The illusion of more than four colors is achieved through the close proximity and overlapping of these dots. Indexed color achieves its illusion of many colors only through the close proximity of dots and, in dense color areas, places these dots directly next to one another as in a mosaic using square tiles. Indexed color does not overlap dots, lending itself ideally to the anodization process since no intermediate color is achieved through overlapping as in traditional offset printing.

[0006] Unfortunately, while Adobe Photoshop satisfactory aligns layers on the pixel level, it is difficult, if not impossible to transfer this precision to multiple film positives for controlled multicolored line art images and color separation techniques to produce photographic or blended tone gradients and images.

[0007] Accordingly, there exists a need for a photographic printing system and method for application of multiple

masks in coloring refractory metals having precise registration of subsequent masks for controlled multicolored line art images. Additionally, a need exists for a photographic printing system and method using color separation techniques to produce photographic or blended tone gradients and images.

SUMMARY

[0008] The present invention is a photographic printing system for anodizing coloring refractory metals using computer graphic imaging. The system comprises a plurality of film masks and a metal plate. Registration marks are formed in each of the film masks and the metal plate for aligning the film masks and the metal plate for controlling the color application in multicolored line art images.

[0009] The present invention further includes a method for anodizing coloring refractory metals using computer graphic imaging. The method comprises providing a metal plate, applying a plurality of film masks to the metal plate, and aligning the film masks and the metal plate for controlling the color application in multicolored line art images.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is an exploded perspective view illustrating a photographic printing system and method for application of multiple masks in coloring refractory metals, constructed in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] The present invention is a photographic printing system and method for application of multiple masks in coloring refractory metals. The present invention applies multiple masks to color refractory metals through anodization with precise registration, including process color.

[0012] In offset, four color printing, color separations are made to give the illusion of continuous tone, photographic images using only four colors of ink. Other printing systems including Hexachrome using six colors or four colors plus one or more spot colors can also be used. This same photographic image can be achieved through an entirely different method of the present invention of color separation and assigned to dry or wet film masks to anodize refractory metals. The method of the present application is accurate to at least 85 dpi, similar to the resolution of color newspaper printing.

[0013] In the practice, a mask resists the anodization process and can be removed to add additional masks to create additional image layers. The system of the present invention uses multiple masks to color metals. The system of the present invention allows for 1) the precise registration of subsequent masks for controlled multicolored line art images and 2) using color separation techniques to produce photographic or blended tone gradients and images. It should be noted that while the present invention has been described for coloring metals, it is within the scope of the present invention to color other materials.

[0014] The system and method of the present invention utilizes registration marks placed on each film layer for aligning the film layers in a desired manner. While Photoshop does a good job of aligning layers on the pixel level, the ability to transfer this precision to film positives is

achieved by the inclusion of registration marks placed on each film layer, as described herein. A jig is fabricated on a mill to hold the necessary tolerances. As illustrated in FIG. 1, the jig consists of a board 1 receiving the metal plate 2 with a small registration pin 3 in each of the four corners, if it is rectilinear, to correspond to the registration marks 6 on the film 4, 5. The dimensions of the centerlines 7 of the holes are then used to punch holes in the metal and the film on the mill so that the application of each film layer to the metal is accurately aligned. This method works for both line art and the indexed color separation process. It is possible using these techniques to use many other methods of rendering color areas, i.e. posterizing, mezzotinting, etc. but the ability to register them accurately all reduces to the method above.

[0015] After the anodizing is complete, the borders of the metal plate are sheared off leaving no trace of the registration holes. For images larger than a single plate can contain, an image is broken up into separate panels and tiled to any size.

[0016] It is within the scope of the present invention to create a variation on the above method to create a flat frame with the pins in its corners such that the anodization plate could drop into. Use of the Photoshop program for layering is just one program that uses the technique of layers and the use of other computer programs is within the scope of the present invention.

[0017] In addition, other techniques are within the scope of the present application to include a variation in approach to building a multicolored anodized image using the dry or wet film process. If the resolution of the desired image is sufficiently low, it is possible to align the film positives generated from either a color separated or line art image by the creation of registration marks on each set of film that are then used to visually align one layer at a time to build the necessary number of color layers. This could also be accomplished by printing the outline of the border of the plate to be colored on each film positive.

[0018] The foregoing exemplary descriptions and the illustrative preferred embodiments of the present invention have been explained in the drawings and described in detail, with varying modifications and alternative embodiments being taught. While the invention has been so shown, described and illustrated, it should be understood by those skilled in the art that equivalent changes in form and detail may be made therein without departing from the true spirit and scope of the invention, and that the scope of the present invention is to be limited only to the claims except as precluded by the prior art. Moreover, the invention as disclosed herein, may be suitably practiced in the absence of the specific elements which are disclosed herein.

What is claimed is:

1. A photographic printing system for anodizing coloring refractory metals using computer graphic imaging, the system comprising:

a plurality of film masks;

a metal plate; and

registration means formed in each of the film masks and the metal plate for aligning the film masks and the metal plate for controlling the color application in multicolored line art images.

2. The system of claim 1 wherein the registration means are a plate aperture formed in the metal plate and film apertures formed in each of the film masks.

3. The system of claim 2 wherein the metal plate and the film masks are rectilinear, an aperture being formed in each of the four corners.

4. The system of claim 2 and further comprising:

a jig receiving the metal plate, the metal plate having a plate aperture in each of the four corners corresponding to film apertures on the film masks;

wherein the centerlines of the plate apertures are used to align the film apertures such that the application of each film layer to the metal plate is aligned in a desired configuration.

5. The system of claim 1 wherein the photographic printing system can be used for both line art and the indexed color separation process.

6. The system of claim 1 wherein the anodization techniques are selected from the group consisting of posterizing and mezzotinting.

7. The system of claim 1 wherein upon completion of the anodization, borders on the metal plate are removed thereby removing the registration means.

8. The system of claim 1 wherein for images larger than a single sheet, the image is separated into separate panels and tiled to a desired size.

9. The system of claim 1 wherein the registration means are pins formed in each of the corners of the metal plate.

10. The system of claim 1 wherein each film mask is aligned individually one at a time to construct the necessary number of color layers.

11. The system of claim 1 wherein the registration means includes printing the outline of the border of the plate to be colored on each film mask positive.

12. A method for anodizing coloring refractory metals using computer graphic imaging, the method comprising:

providing a metal plate;

applying a plurality of film masks to the metal plate; and

aligning the film masks and the metal plate for controlling the color application in multicolored line art images.

13. The method of claim 12 and further comprising:

forming a plate aperture in the metal plate;

forming film apertures in each of the film masks; and

aligning the film apertures with the plate aperture.

14. The method of claim 13 wherein the metal plate and the film masks are rectilinear, and further comprising:

forming an aperture in each of the four corners.

15. The method of claim 12 and further comprising:

using both line art and the indexed color separation process.

16. The method of claim 12 and further comprising:

selecting the anodization techniques from the group consisting of posterizing and mezzotinting.

17. The method of claim 12 and further comprising:

upon completion of the anodization, removing borders on the film masks thereby removing the registration means.

18. The method of claim 12 and further comprising:
separating the image is separated into separate panels and
tiled to a desired size.

19. The method of claim 12 and further comprising:
forming pins in each of the corners of the metal plate.

20. The method of claim 12 and further comprising:
aligning each film mask individually one at a time to
construct the necessary number of color layers.

* * * * *