Jan. 16, 1973 E. J. LANDIS 3,711,346

METHOD OF REPRODUCING WOOD GRAIN SURFACE CONFIGURATIONS

Filed April 15, 1970

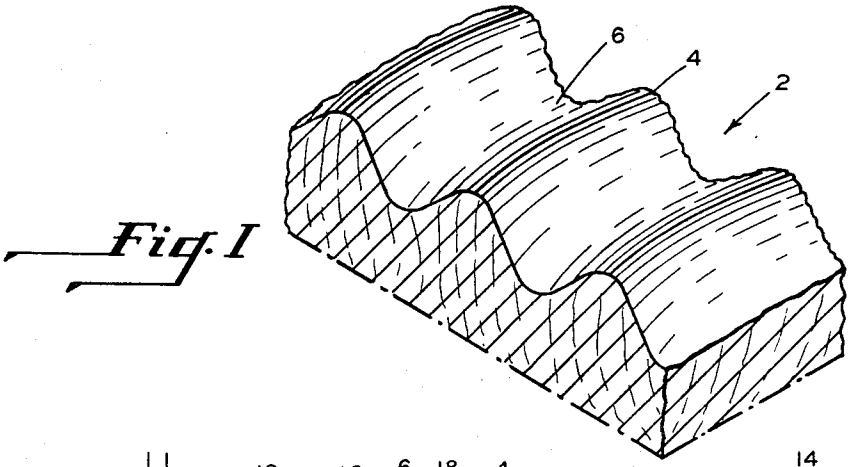
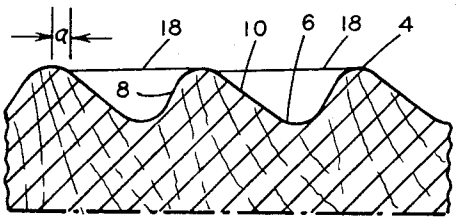


Fig. I



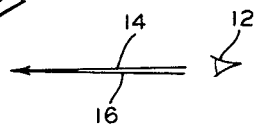
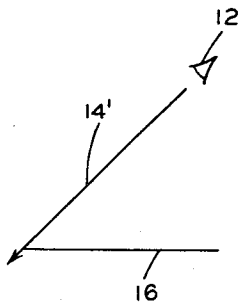


Fig. II



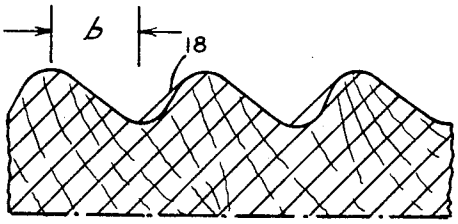


Fig. III

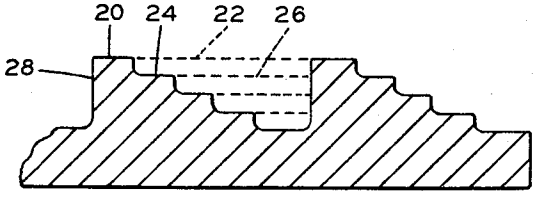


Fig. IV

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METHOD OF REPRODUCING WOOD GRAIN SURFACE CONFIGURATIONS

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U.S. Cl. 156—58 2 Claims

ABSTRACT OF THE DISCLOSURE

A sandblasted wood grain effect is desirable to reproduce in metal for engraving other materials. Oblique light is used to cast shadows on a piece of sandblasted wood. The axis of the light is shifted relative to the plane of the surface of the wood, and a series of photographs are taken. The series of photographs are then used to produce negatives. The negatives are used in a chemical milling process to etch the wood grain configuration into the metal plate.

BACKGROUND OF THE INVENTION

Field of the invention

The invention is directed to a technique for reproducing a wood grain and, more particularly, to the chemical etching of a wood grain effect in metal.

Description of the prior art

U.S. Pat. No. 1,548,465 discloses that it is old to reproduce the graining of wood in steel or like materials. The reproduction is carried out by the use of a photographic process and chemical milling.

U.S. Pat. No. 3,428,503 discloses a rather recent teaching of producing a three-dimensional effect in metal by the use of a series of photographs and chemical milling. This technique was particularly useful in the reproduction of three-dimensional objects.

It is the object herein to provide a simple and novel technique for reproducing in a metal plate a wood grain effect. This metal plate could then be used subsequently for forming a wood grain surface in thermoplastic flooring materials. The technique is carried out by the use of oblique light which is positioned relative to the valleys and ridges of a wood grain pattern so that a series of photographs may be taken to assist in the faithful reproduction of the wood grain pattern by chemical milling.

SUMMARY OF THE INVENTION

The piece of wood to be reproduced is first sandblasted to emphasize the ridge and valley effect which is particularly noticeable in weathered wood. A light is then shined across the sandblasted surface of the wood in a direction perpendicular to the grain of the wood. The light is positioned at an angle of one to ten degrees above the plane of the wood surface, and therefore long shadows are cast in the valleys of the wood grain due to the ridges of the wood grain. As the lighting is elevated by only a few degrees at a time, a series of photographs are taken with progressively changing shadow widths. The sets of films thus generated are next used in a series of steps to chemically etch the image of the wood grain into a metal plate.

BRIEF DESCRIPTION OF THE DRAWING

FIG. I is an isometric view of a wood grain surface;

FIG. II is an end view of FIG. I showing the application of oblique light;

FIG. III is similar to FIG. II except the application of light has changed slightly; and

FIG. IV is a cross-sectional view of a metal surface which has been etched to produce a wood grain effect.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. I, there is shown a piece of wood **2** which has been sandblasted to emphasize its grain. The graining of the wood is made up of a series of soft wood areas and hardwood areas. When the wood has been sandblasted, there is formed a series of ridges **4** and valleys **6**.

Referring to FIG. II, there is shown the general cross-sectional configuration of a piece of wood which has been sandblasted. The ridges which exist in the wood are not truly symmetrical in shape. One side of the ridge **8** is very steep, whereas the other side of the ridge **10** has a more gradual inclination. This results from the natural growing cycle of the wood and a gradual change from soft wood development to hardwood development.

In FIG. II a light source **12** supplies light generally along the axis **14**. This oblique light has its axis **14** inclined only about one degree above the horizontal plane **16**. (FIGS. II and III are out of proportion in relative size relationships.) This horizontal plane is the same plane which would include the grain surface of the board. Due to the very shallow angle, the light will cause long shadows **18** to be cast across the valley areas **6**. Naturally, the shadows are generated by the ridges **4**. As seen in the left-hand side of FIG. I, only a very narrow area *a* will be illuminated. A photograph will be taken of the wood surface being illuminated in the manner shown in FIG. II. The negative of the picture will show narrow white bands through a relatively large black area. The angle of illumination is changed one or two degrees at a time and a separate photograph is taken each time the angle is changed.

Referring to FIG. III, there is shown a view where the axis **14'** has now been elevated to nine degrees above the horizontal plane. It can be seen in FIG. III that the shadow **18** is substantially shorter and a lighted area *b* exists which is substantially larger than the lighted area *a* of FIG. II. Consequently, a negative of the picture taken in FIG. III will tend to have very large white band areas on a relatively small black surface. It has been found that by taking a series of photographs at one degree, three degrees, five degrees, seven degrees and nine degrees a very good collection of photographs can be generated for the production of a wood grain effect in metal.

By use of conventional chemical milling techniques, the photographs are used to control etching of a metal plate. Normally, the metal plate is painted with a resist-type material over which there is placed one of the photographs. The pattern of the photograph is then developed with the resist giving areas which are protectively covered by the resist and other areas wherein the underlying metal is exposed. When the metal is placed within an etching solution, the etching solution eats away the exposed metal areas leaving untouched those areas covered by the protective resist. By using the series of photographs, a series of step-like etches are performed on the metal plate. Depending upon the photographic techniques employed, the metal plate can be made a mirror image of the sandblasted wood surface, as is preferable in this case, or the metal plate could be made as an exact copy of the sandblasted wood surface.

FIG. IV shows what the metal plate would look like after it has gone through a series of etching baths with the series of photographs used to place a series of protective resist coats on the metal plate. In the embodiment shown in FIG. IV, a photograph was used which resulted in the surface **20** being the only surface receiving the protective resist coating. The original surface **22** of the metal was unprotected and thus was eaten away during the chemical milling stage. Chemical milling was carried

on until metal was removed down to surface **26**. Another photograph was used and surfaces **20** and **24** were provided with the protective resist while surface **26** was then eaten away during the chemical milling process. This process was carried out through a series of steps until the structure of FIG. IV existed. It should be noted that the side **28** was not cut away in a series of steps, but is cut away in a generally perpendicular plane. This provides a surface which is very similar to that of surface **8** of FIG. II. The series of steps on the opposite surface of the ridge is very comparable to surface **10** of FIG. II. The series of steps could be left in their step-like pattern or the metal plate could then be dipped with no surfaces protected, and the chemical milling process would generally round off the corners of the steps. However, this step is normally not necessary if the grain pattern of the original wood pattern was fairly fine and the metal surface was to be used subsequently as an embossing plate for embossing the wood grain effect into vinyl materials. This technique has been found to be particularly useful for generating embossing dies which are used to provide vinyl flooring with a wood grain-like appearance.

What is claimed is:

1. A method of producing a three-dimensional surface simulating a wood grain, including the steps of: preparing a wood surface with an emphasized graining having a series of valleys and ridges, disposing a light source generally perpendicular to the direction the wood graining extends, said light source being positioned at a very shallow angle relative to the plane including the upper extremities of the ridges of the wood grain, generating long shadows on the wood grain surface due to the shallow angle of the lighting means, photographing the wood grain surface in this condition with long shadows, shifting the light means to a series of positions in the range of one degree to nine degrees with an increasing angle relative to said horizontal plane whereby a series of conditions

are formed with shadows of decreasing length, photographing the wood grain surface each time the lighting means has been shifted, developing said films to provide a series of photographic negatives which will be used to treat a photosensitive resist material, providing a flat surface of etchable material, coating said surface with a photosensitive resist and using one of the above-developed photographs for conditioning the photosensitive resist to coat certain areas of the etchable material and to be removable from other areas of the etchable material, removing the removable resist coating material and placing the etchable material in an etching solution to remove a portion of the etchable material not protected by the photosensitive resist, and repeating the above steps of applying the photosensitive resist and different photographic negatives to generate a wood grain pattern in the etchable material.

2. The method of claim **1** wherein the series of photographs are registered with each other so as to form a ridge-like structure which is substantially perpendicular to the planar surface on one side and substantially inclined relative to the planar surface on the other side of the ridge.

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U.S. Cl. X.R.

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