

[72] Inventors **Emmett James O'Boyle**
St. Paul, Minnesota;
Marlyn W. Rodi, Minneapolis, Minnesota
[21] Appl. No. **589,948**
[22] Filed **Oct. 27, 1966**
[45] Patented **Aug. 11, 1970**
[73] Assignee **Webb Publishing Company**
St. Paul, Minnesota
a Corp. of Minnesota

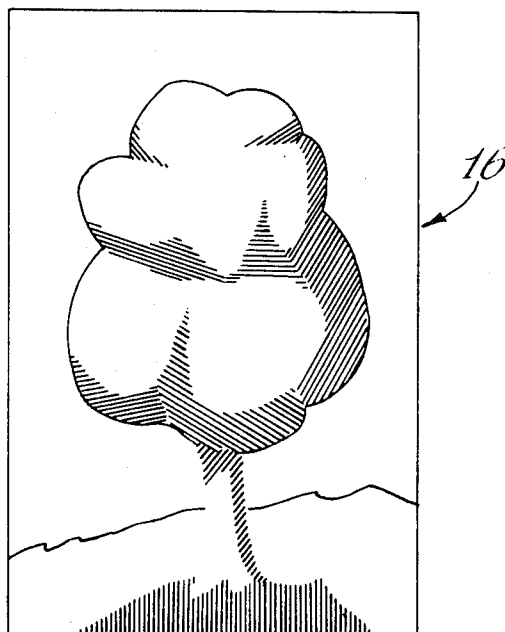
[56] **References Cited**
UNITED STATES PATENTS
2,969,728 1/1961 Horn 101/32
2,988,838 6/1961 Morgan 101/32
3,283,714 11/1966 Carpenter et al 101/32X
3,345,171 10/1967 Laridon et al 101/28UX
FOREIGN PATENTS
247,347 6/1960 Australia 96/30
495,457 11/1938 Great Britain 101/211

Primary Examiner— Robert E. Pulfrey
Assistant Examiner— J. Reed Fisher
Attorney— Robert M. Dunning

[54] **PROCESS FOR FORMING EMBOSSED FOIL PICTURES**
8 Claims, 6 Drawing Figs.

[52] **U.S. Cl.**..... **101/32,**
101/24, 401.1, 96/32
[51] **Int. Cl.**..... **B41m 1/24,**
G03f 7/16
[50] **Field of Search**..... **101/32,**
28, 211; 96/30, 32, 40, 44; 101/401.1

ABSTRACT: Embossed pictures are formed by producing a composite positive made by scribing the dark areas of an enlarged negative, and then scribing the dark areas of the positive formed therefrom. An embossing plate is produced from a reverse negative formed from the composite positive. A panel is printed with a printing plate made from the original art work, and then embossed with the embossing plate.



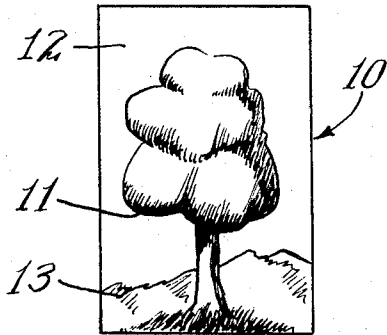


FIG. 1

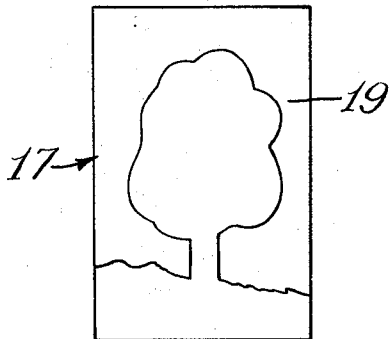


FIG. 4

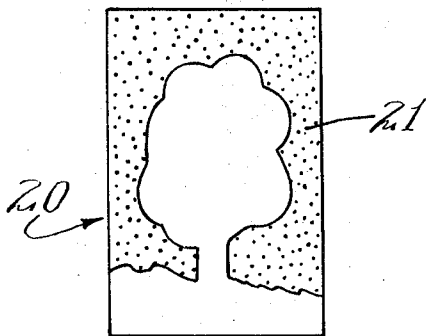


FIG. 5

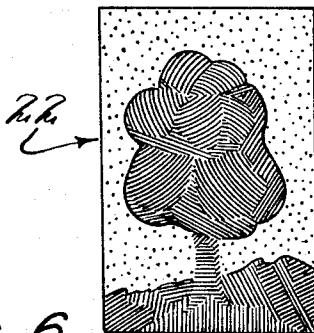


FIG. 6

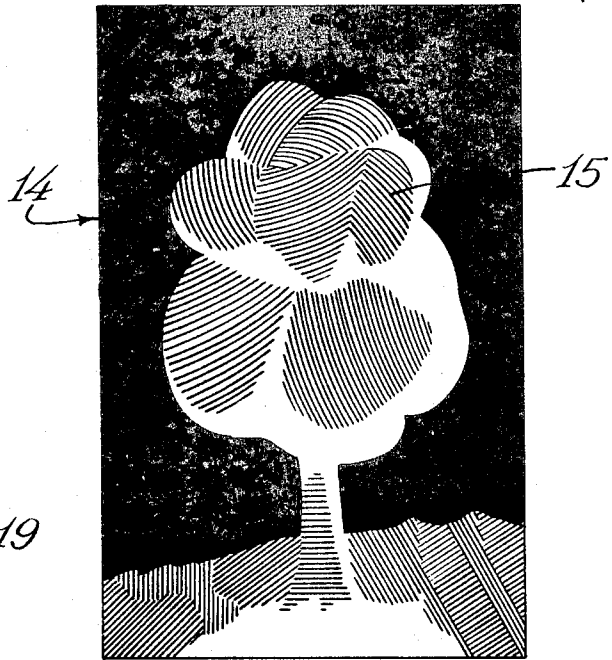


FIG. 2

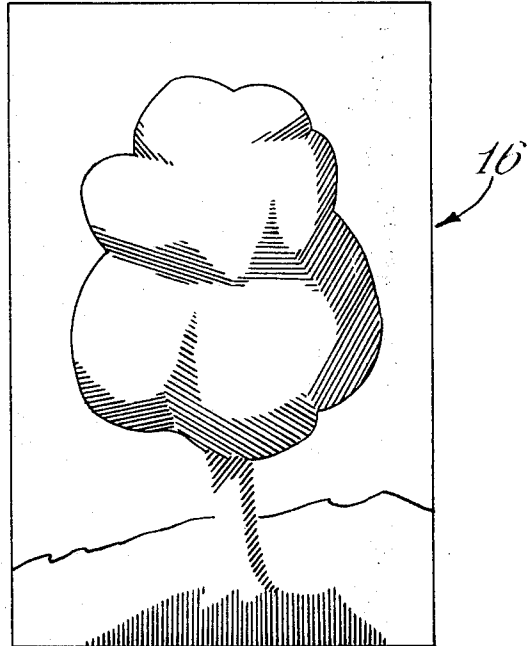


FIG. 3

INVENTOR
EMMETT J. O'BOYLE
MARLYN W. RODI

BY Robert M. Dunning
ATTORNEY

PROCESS FOR FORMING EMBOSSED FOIL PICTURES

This invention relates to an improvement in a process for forming embossed foil pictures and deals particularly with a means of producing in quantity pictures produced on metal foil which have been embossed to reflect the light in a manner to provide a highlighted pictorial representation.

An object of the present invention resides in providing a pictorial representation, preferably printed on a metallic foil sheet and characterized by areas which may be of the same color which are highlighted so that the appearance of the picture varies according to the light which is reflected from these areas.

It has been found that pictures of various types are extremely attractive when printed on a metal foil which tends to reflect the light. It has been further found that pictures of this type become even more unusual and attractive in appearance if the surface of the foil is embossed. The present invention resides in a manner of producing such prints.

It has further been found that if the metal sheet itself is embossed, it tends to flatten out when placed under pressure, such as will occur when a picture is framed. However, by laminating the foil onto a backing sheet of paper or similar material with wax, the wax tends to hold the foil in its embossed shape so that the print will permanently retain its embossed form.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification: **FIGURE 1** is a diagrammatic illustration of the art work.

FIGURE 2 discloses a greatly enlarged line negative of the art work illustrated in **FIGURE 1**, and in which the emulsion has been scribed with a scribing tool to separate the dark areas of the negative into a series of lines which may be parallel or curved in spaced relation to provide an attractive design.

FIGURE 3 is a view similar to **FIGURE 2** showing a positive of the art work which is transparent, and which is scribed with a scribing tool to divide the darkened areas of the positive into spaced lines.

FIGURE 4 illustrates a wrong reading or reverse negative of the art work in which the periphery of the negative is painted with an opaque paint so as to remove the area surrounding the actual art or picture.

FIGURE 5 illustrates a negative which is made to provide a background for the actual art work, and in which the actual art work is painted over with opaque paint so that only the background area of the negative remains.

FIGURE 6 illustrates a light-sensitive plate such as is used in letter press printing machines which has been exposed first to the negative bearing the art work, and then exposed to the negative bearing the background. This plate is then etched to a depth of perhaps three and a half-thousandths (.0035) of an inch.

The actual picture produced by the present process is preferably reproduced on reflective metal foil which has been laminated to a paper background with wax or similar material as the adhesive. The drawings illustrate the various steps of forming an embossed print from original art work. The method involves both the making of a printing plate for printing the art work on the surface of the foil, and then embossing the foil to enhance the appearance of the print. The entire process starts with the original art work. The method of forming the etched plate will first be described.

The art work is illustrated in general by the numeral 10. The art work may be in several colors, or may be merely a black and white print. The art work may include darkened areas such as 11, and blank areas such as 12 which are later to be filled in with a predetermined type of background. In the illustration, a tree is illustrated standing on a hillside with certain areas 13 of the background shaded or colored.

The first step of the process is to provide a greatly enlarged transparent photographic negative which is indicated in **FIGURE 2** by the numeral 14. This negative normally com-

prises a plastic film, and the emulsion on the film has been removed in the light areas of the actual art work so that the darkened areas 15 of the negative 14 correspond to the light areas of the art work. The dark or partially dark areas of the emulsion on the negative 14 are scribed with a scribing tool which scrapes lines of the emulsion from the negative. These scribed lines divide the darkened area of the negative into spaced lines rather than solid areas. Preferably, the scribing of the negative has a tendency to follow the shape of the original art work or to blend with it. In other words, the negative is preferably not scribed with a series of lines which extend in parallel spaced relation throughout the negative, but areas of the negative are scribed with curved or straight lines which extend in different directions in different areas of the negative.

As indicated in **FIGURE 3** of the drawings, a transparent positive 16 is formed from the transparent negative, so that the dark areas of the positive correspond to the light areas of the negative 14. The positive 16 is usually a plastic sheet bearing a light-sensitive coating which is exposed through the negative. The emulsion on the positive 16 is then scribed in the same manner as the negative 14, to divide the darkened areas into spaced areas of emulsion between which the emulsion has been scraped away by the scribing tool, thus forming a composite positive. Due to the fact that both the negative 14 and the positive 16 are materially enlarged from the size of the finished print, the scribed lines appear much closer together in the finished print than in either the negative or the positive.

The composite positive thus produced is re-photographed and greatly reduced to bring the plates to proper size for printing. A wrong reading or reverse negative is then formed. The periphery of this negative is painted with an opaque paint so as to remove the area surrounding the actual art or background. The numeral 17 indicates the reverse reading negative, and shows peripheral areas 19 of the negative painted out with an opaque paint so that only the art work remains unmasked. A mask 20 is made from the outline in the reverse reading negative 17 which is indicated in **FIGURE 5** by the numeral 20. This mask 20, contrary to the mask 17, obscures the art work and leaves only the background area of the transparency transparent. Such areas are indicated by the numeral 21.

The mask 20 is used to produce a predetermined background for the picture. This may be accomplished by producing a transparency in which the blank areas 21 of the mask 20 are filled with a predetermined design. For example, the transparency mask 21 may be exposed on a transparent negative through a film of plastic which is stippled, lined, or otherwise patterned to produce a background of a predetermined type and style.

A plate of the type used for letterpress or the like and bearing a light-sensitive surface is then exposed first to the negative bearing the art work, and then to the negative bearing the background. This plate is then etched to a depth of perhaps three and one-half thousandths (.0035) of an inch. When this plate contacts the foil, it embosses the foil.

A printing plate for printing the art work upon the surface of the foil is then formed. These plates may be of different types to suit different types of printing. Starting from the original art work, a negative or positive is formed through a half-tone screen which divides the picture into spaced dots. Obviously, if the art work is in several colors, a series of screens must be produced from the art work to print each of the various colors. A negative or positive is thus formed from which the printing plate may be produced. The method of forming a typical printing plate will be described.

The etched plate is indicated in general by the numeral 22 in **FIGURE 6** of the drawings. In forming the printing plate or plates, the negative or positive is formed from which the offset printing plate may be produced. This negative or positive is actually a triple exposure. The first exposure is of the half-tone of the original art work. The second exposure is of the background negative with the art work area painted away, and may comprise the negative 20 illustrated in **FIGURE 5** of the drawings. The third exposure is merely of a negative or posi-

tive having a borderline designed to encircle the picture. In other words, this third exposure may comprise a rectangular darkened area which encloses the art work and background.

After the printing plate has been produced, the laminated foil is printed with the printing plate, or series of printing plates in the event the picture is in more than one color. The printed foil sheet is next embossed by the etched plate 22 which forms ridges in the foil corresponding to the scribed lines in the negative or positive. The picture thus formed is extremely attractive as the picture includes closely spaced ridges extending in various directions which tend to catch and reflect the light to enhance the appearance of the finished print.

The various FIGURES of the drawings are diagrammatic, in that it is impractical to show various shades of color as well as the completely dark and light areas. In other words, the views would seem to indicate that only dark and white areas are present; but in reality the art work has gradations of color between the two extremes. In scribing the negative of FIGURE 2, only the darker shades are scribed, and the same is true of FIGURE 3. Actually, the scribed areas of FIGURE 2 would appear lightly in FIGURE 3; but these lines have been omitted in the interests of clarity, and to distinguish between the scribed areas formed in the negative and in the transparent positive. In a similar manner, the composite result of scribing the art work as in FIGURES 2 and 3 has been omitted from FIGURE 4, it being understood that the result of scribing the art work in FIGURE 1 would appear in FIGURE 4, within the opaque peripheral areas.

We claim:

1. A process of producing embossed pictures including the steps of:

producing a transparent photographic continuous tone negative of the original art work greatly enlarged relative to the original art work,
 scribing the dark areas of emulsion to divide the dark areas into spaced areas,
 forming a transparent continuous tone positive from the scribed negative, and of the same size as the negative,
 scribing the dark areas of the positive to divide the dark areas into spaced areas forming a composite positive,
 producing a reverse negative from the composite positive, of greatly reduced size relative to the positive,
 exposing a plate having a light sensitive surface from the reverse negative and etching the plate to a substantial depth,
 forming a negative or positive from the original art work through a half-tone screen, and of the same size as said reverse negative
 exposing a printing plate having a light sensitive surface through the last named negative or positive to form a printing plate,
 printing a sheet with the use of the printing plate, and embossing the sheet with the first mentioned etched plate.

2. The process of claim 1 and in which the sheet includes a foil layer.

3. The process of claim 1 and in which the sheet comprises metal foil laminated to paper with a waxy material.

4. The process of claim 1 and in which a series of printing plates are exposed, each plate being adapted to print a different color.

5. A process for producing embossed foil pictures including the steps of:

producing a greatly enlarged transparent continuous tone negative of the original art work,
 scribing the emulsion on the dark areas of the negative to divide the area into elongated spaced areas,
 forming a continuous tone positive of the scribed negative of the same size as said negative,
 scribing the emulsion on the dark areas of the positive to divide the area into elongated spaced areas, thus forming a composite positive,
 producing a greatly reduced reverse negative of the positive,
 painting out the background area of the reverse negative, producing a negative of a background design, of the same size as said reverse negative,
 painting out the art work area on the last named negative, exposing a light sensitive plate to the negative of the art work with the background painted out and to the background negative with the art work area painted out, and etching the plate to a substantial depth,
 forming a half-tone negative or positive from the original art work, of the same size as said reverse negative,
 forming a negative or positive by exposing the film to the half-tone negative or positive of the art work and then to the background negative or positive with the art work painted out,
 forming a printing plate from the last mentioned negative or positive,
 printing the foil with the above mentioned printing plate, and
 embossing the foil with said etched plate.

6. The process of claim 5 and in which the foil is laminated to paper with wax.

7. The process of claim 5 and in which a series of printing plates are produced, each capable of reproducing a different color.

8. The method of forming an embossing plate including the steps of:

producing a transparent photographic continuous tone negative of the original art work which is greatly enlarged relative to the original art work,
 scribing the dark areas of emulsion to divide the dark areas into finely spaced areas,
 forming a transparent continuous tone positive from the scribed negative and of substantially the same size as the negative,
 scribing the dark areas of the positive to divide the dark areas into finely spaced areas, forming a composite scribed positive,
 producing a reverse negative of greatly reduced size relative to the positive from the positive,
 exposing a plate having a light sensitive surface from the reverse negative and etching the plate to a substantial depth to form an embossing plate.