Jan. 16, 1945. J. J. MURRAY 2,367,236

ELECTROLYTIC METHOD OF PRODUCING PRINTING PLATES

Filed May 27, 1940

Fig. 1.

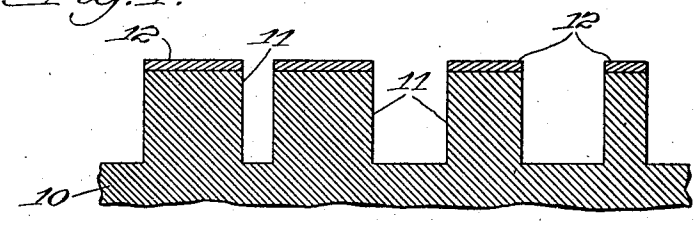


Fig. 2.

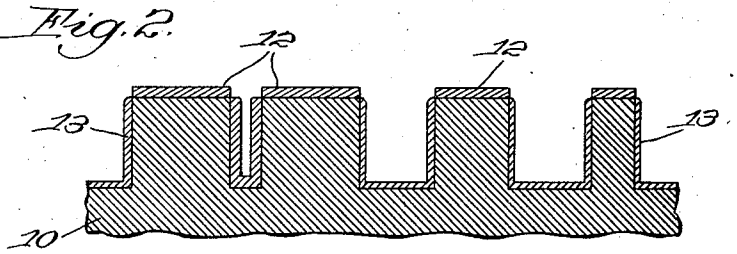
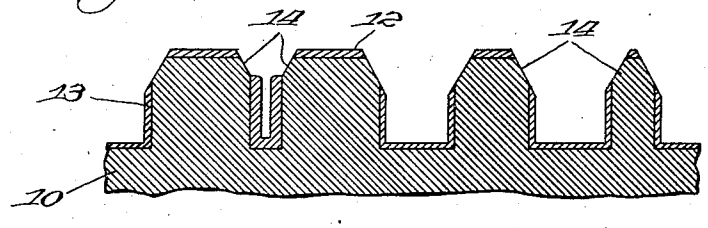


Fig. 3.



Inventor:
John J. Murray.
By Chittick, Wiles, Davies, Hirschler & Dawson
Attys.

Patented Jan. 16, 1945 2,367,236

UNITED STATES PATENT OFFICE

2,367,236

ELECTROLYTIC METHOD OF PRODUCING PRINTING PLATES

John J. Murray, Arlington, Mass.

Application May 27, 1940, Serial No. 337,509

1 Claim. (Cl. 204—17)

This invention relates to an improved printing plate and method of producing the same, and more particularly to a method of increasing contrast in connection with half-tone photographic reproduction processes.

In those printing processes in which the printing is accomplished from a plane surface, and the non-printing surfaces are removed by etching, these processes being generally known as "relief" processes, it is quite frequently necessary to increase the contrast between the dark and light portions of the picture. In the present practice, this contrast is obtained by coating by hand the darker portions of the otherwise finished plate with a resist and then further etching the exposed parts. In complex pictures, this process is quite impracticable, and, in simple pictures, it is expensive. The present method affords automatic control for such processes and the plates produced by following it are not only better than those previously produced, but are readily distinguishable therefrom because of the pyramidal shape of the dots. In following the present process, the relief printing procedure is followed up to and including the etching of the plate in the normal manner to produce the ordinary unimproved printing surface. At this stage, the plate consists of a metal such as copper or zinc which is still covered in the unetched portions with a resist which is generally termed an enamel and is the remains of the originally photosensitive film. The etched portions are so arranged as to leave the unetched parts in a series of dots or lines.

In accordance with this process, the half-tone plate is placed in an electrolytic bath, for example, one capable of depositing chromium, copper or other metal upon the surface of the exposed areas of the plate, and current is then passed to deposit metal on the plate. The amount of metal deposited should be varied to meet the individual requirements of the picture; but ordinarily a time of 3 seconds to 2 minutes is employed, depending upon the strength of the solution, the current density, and the thickness of coating desired.

At the conclusion of the plating operation it will be found that the plating metal has deposited to a greater extent upon the darker or shadowy portions of the plate, and to the least extent upon the most exposed areas. This is apparently due to the fact that the current density is heaviest in proportion to area where the amount of exposed metal is least. That is, the presence of large relative amounts of enamel in the shadowy areas acts to direct the current in that vicinity toward the relatively small amount of exposed metal, thereby causing deposition of more metal in that vicinity. On the other hand, the current is relatively less concentrated in the more exposed areas.

After this treatment, the plate is immersed in etching acid. The action of the acid appears to take place first at the junction of the enamel and the metallic deposit. The highlight areas having the least enamel and the least protective metal are the first to be acted upon by the acid. The acid begins its action at the edges of the enamel and works downwardly and also toward the center of the dot, leaving a dot which is pyramid-shaped.

As a result of the process the contrast between the shadows and the exposed portions of the film is greatly enhanced and this enhancement is carried out in an entirely automatic fashion and very inexpensively.

After the final etching has been completed, the metal deposit may be removed or left upon the plate, the printing being unaffected by the metal if it is desired to leave it on.

The invention is illustrated diagrammatically in the drawing in which Figure 1 shows a cross-section of a portion of a plate 10 comprising a series of dots 11 covered at the top with remnants of enamel 12; in Figure 2 the same plate is shown after the deposit of the metal 13; and in Figure 3 the plate is shown after the final etching, leaving the pyramidal shaped dots 14.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom.

What I claim as new, and desire to secure by Letters Patent, is:

The method which comprises imposing a contrasting photographic image upon a metal plate, etching the plate to develop the image in relief in the form of minute relief areas of metal with adjacent depressions, applying to the relief areas an acid resisting non-conducting resist, coating the plate over the area occupied by the image except for that portion of the area occupied by the resist with a thin electrolytic deposit of an etchable metal, such deposit being produced by applying to the surface of the plate an electrolytic bath through which a single electric current is passed, whereby the depth of etchable metal deposited varies over the surface of the plate in inverse proportion to the amount of etching in any given area, subjecting the electroplated plate to an etching bath, etching it therein to an extent sufficient to remove all of the electroplated metal in at least substantial areas of the plate, and then continuing the etching to remove a substantial quantity of underlying metal, whereby the contrast of the photographic image is increased.

JOHN J. MURRAY.