

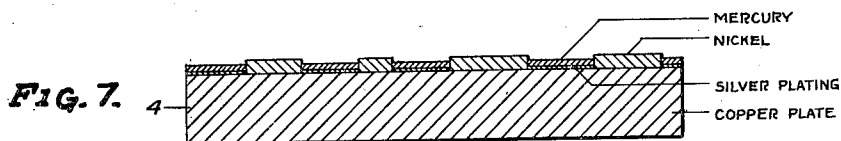
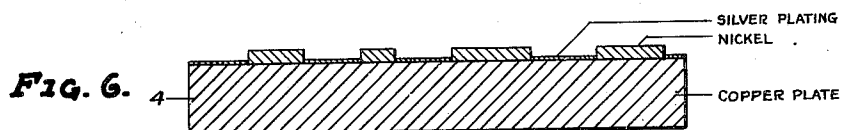
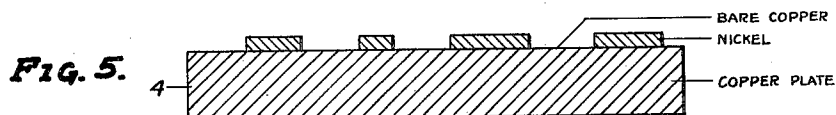
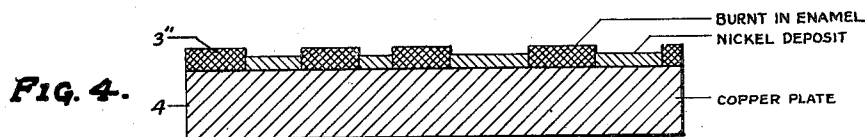
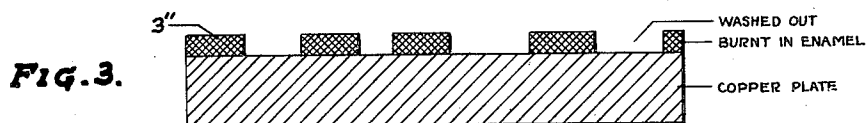
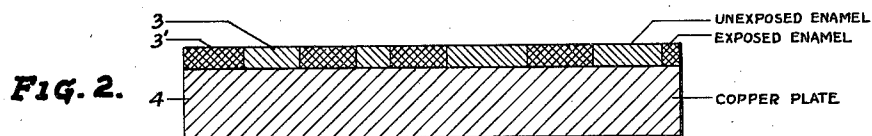
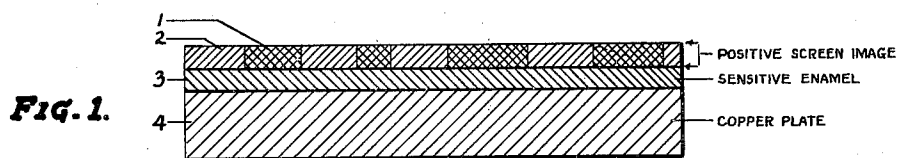
Feb. 18, 1936.

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2,031,185

PLANOGRAPHIC PRINTING PLATE AND PROCESS

Filed March 30, 1931



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UNITED STATES PATENT OFFICE

2,031,185

PLANOGRAPHIC PRINTING PLATE AND
PROCESS

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Application March 30, 1931, Serial No. 526,218

6 Claims. (Cl. 41—41.5)

This invention relates to planographic or mercury printing plates as adapted for letter press printing, particularly for the printing of half-tone pictures, and the objects of the invention are to provide a process whereby such plates may be more easily produced than heretofore, also without resorting to etching of the metal at any stage of the process, also whereby a more durable plate results, also a plate of this character which will more faithfully render the gradations of the original, and finally such a plate which will print longer without renewing the mercury coating.

In the drawing accompanying this application Figs. 1 to 7 are greatly enlarged cross sections of a plate showing the results of successive steps of my process, Fig. 7 being the finished plate.

Before describing my process it is desired to say that I am fully aware of the many known modifications of processes for producing the so-called planographic printing plates using a liquid mercury film as an ink repellant on the surface areas of the plate intended to "print" white, and also that numerous patents have been issued on such processes, but such processes have achieved little more than academic interest owing to defects both in the processes as well as in the plates produced; and as it is to overcome these defects that I have made the present invention it is necessarily rather specific, but nevertheless the specific steps of such a process are important as determining success or failure, and the steps of the process must therefore be taken as whole in considering the invention.

To produce my improved plate with the process which I have worked out I will start with a half-tone screen positive plate of the picture or matter to be reproduced in the form of a planographic plate. The positive bears a screen image in black or opaque and transparent dots and is produced through a half-tone screen in any approved manner well understood. This screen positive is shown in Fig. 1 and wherein the black dots 1 are shown heavily shaded and separated by white dots 2.

The screen positive is laid upon a copper plate previously coated with sensitive enamel which may be the ordinary bichromatized fish glue engraver's enamel as shown at 3 on copper plate 4, and the image is printed into the enamel by exposure to light to harden the portions or dots 3' representing the lights leaving the unaltered portions 3 still soluble as shown in Fig. 2.

The soluble portions are next washed out with warm water and the plate dried, then burnt in

over a flame in the usual way to a deep straw color to form the enamel dots 3'' shown in Fig. 3, and when the plate is cool the spaces between the dots are preferably cleaned out by swabbing with a 10% solution of cyanide of potash or other cleaning agent such as acetic acid not likely to eat the copper. The plate is washed, drained, and if cyanide was used, is covered with powdered bicarbonate of soda, which may be rubbed on with the fingers, so as to neutralize or stop further action of any traces of cyanide, or any other cyanide neutralizing application may be used for this purpose.

The plate is then dipped in warm water to remove the soda and thereafter lowered into a nickel plating bath for about fifteen minutes at about 2½ volts current strength for electrodeposition of nickel on the bare copper surfaces between the enamel dots to a thickness equal to about half the thickness of the enamel as shown in Fig. 4, after which the plate is removed.

The plate is then heated and swabbed with a wad of cotton dipped into a warm solution of lye (2 ounces to the quart of water) to clear off all the lightly burnt-in enamel dots as shown in Fig. 5, and after which the plate is rinsed, and next, some light abrasive powder such as Bon Ami or Dutch Cleanser and a moist tooth brush is used to scrub the surface of the plate to clean any little scum off of the exposed copper dots as well as to remove any feather edges from the deposited nickel dots and stain of the lye. The plate is then rinsed and dried.

A silvering solution is now swabbed over the plate and rubbed in all directions to coat the copper areas only with a coating of silver as shown in Fig. 6. This solution may be a saturated solution of silver nitrate (about a dram, or enough to wet a swab of cotton) and to which a few drops of a strong solution (saturated or half saturated) of cyanide of potassium has been added. A precipitate will form in the solution which will redissolve if excess cyanide is added, but the best results seem to be obtained when some precipitate is still in the liquid and on the swab wetted with it. The best way to determine the proper quantity of cyanide to add is when by swabbing the plate by rubbing the cotton about it a bright film of silver is deposited. The silver will deposit on the bare copper only and will not affect the nickel covered areas. The plate is then rinsed and dried.

The silvered areas are next amalgamated with mercury by rubbing the mercury thereover or

rubbing with a damp cloth dipped in a mixture of powdered chalk and mercury (about 38% of mercury carried in finely divided condition in the chalk). This builds up a mercury layer on top of the thin silver film of a total thickness about half that of the nickel dots, as shown in Fig. 7.

The plate is then ready for the press to be printed with ordinary printing ink, preferably renewing the mercury coating from time to time by the process described in my copending patent filed under Serial No. 491,448, which matured into Patent No. 1,854,719, April 19, 1932, and which was reissued on March 5, 1935 as Reissue Patent No. 19,489.

If, in printing, the mercury areas should become overcharged with mercury for any reason, the mercury may all be removed with a strong solution of water ammonia, about 50—50, applied for about thirty seconds, and after which the plate may be rinsed, dried, and re-amalgamated as before described. Should the ammonia be too strong or left on the plate too long it will remove the silver coating also and this will have to be renewed, but it will not affect the nickel areas.

I have tried chromium deposits instead of nickel but it is not satisfactory as the dots often lift and failures are too frequent.

In considering my invention it should be noted that the plate has not at any time been subjected to an etching process and hence there is no undercutting of any small dots to cause them to subsequently fail, also to be observed is that the finished plate presents nickel areas and dots built up upon the plain copper surface with intermediate areas of mercury of lesser thickness, so that in printing the mercury is to a considerable extent prevented from squashing out.

The mercury is bound to the plain copper plate by a film of silver physically applied to make a chemical union therewith and while I have used a film of gold similarly applied I find the silver gives a better bond.

It is obvious from what has been disclosed the copper plate need not be solid, but may be a substantial coating of copper supported on a brass or steel plate, though I prefer the solid copper plate as there is no danger of peeling or serious surface defects.

Having thus described my improved process and plate produced thereby, I claim:—

1. The process of producing a metal planographic printing plate without etching, which comprises building up by electro-deposition upon a plain smooth metal surface a series of amalgam-resisting, ink-receiving metal areas corresponding to the desired printing design, and by amalgamation a series of intermediate mercury areas.

2. The process of producing a metal planographic printing plate without etching, which comprises building up by electro-deposition upon a plain metal surface a series of nickel areas corresponding to the desired printing design, and by amalgamation a series of intermediate mercury areas of lesser thickness than the nickel areas.

3. The process of producing a metal planographic printing plate without etching, which comprises building up by electro-deposition upon a plain metal surface a series of nickel areas corresponding to the desired printing design, and by amalgamation a series of intermediate mercury areas of lesser thickness than the nickel areas bonded to the plate by a film of silver.

4. The process of producing a planographic printing plate which comprises exposing to light through a screen positive a layer of sensitive enamel coated upon a copper plate, washing out the soluble portions, burning in the hardened areas, electro-depositing a non-amalgamable metal on the copper between the burnt-in areas, cleaning off the burnt-in enamel, silvering the bare copper areas only and building up a mercury coating on the silvered areas.

5. The process of producing a planographic printing plate which comprises exposing to light through a screen positive a layer of sensitive enamel coated upon a copper plate, washing out the soluble portions, burning in the hardened areas, electro-depositing a non-amalgamable metal on the copper between the burnt-in areas, cleaning off the burnt-in enamel, silvering the bare copper areas only and building up a mercury coating on the silvered areas to a height below the top of the non-amalgamable areas.

6. A process as described in claim 4 in which the non-amalgamable metal is nickel and the silvering is done by swabbing a silvering compound over the plate adapted to attach itself to the plain copper areas only.

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